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October 11–14, 2017
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SCIENTIFIC PROGRAM

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Available on the Mobile App (see ad on the right) at:
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Innovations in Modeling and Simulation: Advancing Regulatory Science
May 16–18, 2017, Washington DC
The College Park Marriott Hotel and Conference Center at the University of Maryland

The Biomedical Engineering Society and the US Food and Drug Administration have formed a partnership to co-host the BMES/FDA Frontiers in Medical Devices Conference, a meeting for researchers, engineers, clinicians and other professionals in the fields of designing, building and using medical devices.

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Early registration opens
February 23, 2017

Early registration deadline
April 11, 2017

For more information visit:
www.bmes.org/meddeviceconference
WELCOME TO THE 2016 ANNUAL MEETING of the Biomedical Engineering Society! The Biomedical Engineering Society’s Annual Meeting is the premier event for the Society and the field of biomedical engineering. Every fall it is the place to be to share and learn about cutting-edge research in all the disciplines of BME.

This year’s theme—“Transforming Discovery into Health Technology”—perfectly describes the work we do every day in our labs. It is a description we are striving to share with the public as the Society heads towards its 50th Anniversary in 2018. Bringing medicine and engineering together will be central to solving many of the health challenges human-kind faces; and as a member of BMES you will play a vital role in that effort.

It is no coincidence that this year’s meeting is being held in Minneapolis, a major hub of medical device innovation. BMES seeks to go beyond being the essential annual meeting for academics; we have set our sights on becoming the networking place-to-be for academics and industry in the biomedical engineering field.

One of those local innovators, Medtronic Chairman and CEO Omar Ishrak, will deliver a keynote address Thursday morning. Medtronic is a leading medical technology company, with more than $27 billion in annual revenue, and operations reaching more than 155 countries worldwide. The company offers technologies, solutions and therapies to treat a wide range of medical conditions, including cardiac and vascular diseases, respiratory, neurological and spinal conditions, diabetes, and more. Medtronic’s mission to alleviate pain, restore health, and extend life for millions of people around the world is perfectly in line with the goals of BMES.

Medtronic, along with St. Jude Medical, Boston Scientific and Smiths Medical, are holding tours of their facilities during the meeting. The tours are another example of the synergy being built between BMES and industry. Another step towards that goal is the Society’s new corporate memberships. The initial corporate members are Boston Scientific, Harris Skeele Corporation, Medtronic, St. Jude Medical and Smiths Medical. Many other organizations are in talks to join the Society as corporate members. This new program will surely make the Society stronger and benefit all its members.

Student and Early Career programming has been expanded for the 2016 meeting. The programming is specifically tailored for those navigating new careers. Topics include: BME Careers in Academia, BME Careers in Industry, BME Government and Alternative Careers, and Rapid Resume Reviews.

This is also the first year BMES will offer the Career Zone, scheduled for Thursday, October 6th and Friday, October 7th in the Exhibit Hall.

This new alternative to the career fair will bring together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market.

The terrific slate of keynote addresses starts Thursday morning with Omar Ishrak’s talk. Later that day, Nicholas Peppas will deliver the Pritzker Distinguished Lecture and on Saturday Jennifer Munson and Srinivas Sridhar will present the Rita Schaffer Young Investigator and Diversity lecturers, respectively.

Special thanks are due to Conference Chair Song Li, Vice Chair David Odde and Program Chair Cynthia A. Reinhart-King, BMES Staff, NSF, NIH, our sponsors and our meeting attendees. My very best wishes to you for an enjoyable and productive meeting!

Richard T. Hart, PhD
BMES President
Edgar C. Hendrickson Professor and Department Chair
BMES Fellow
Department of Biomedical Engineering
The Ohio State University
Columbus, OH
LETTER FROM THE CHAIRS

Song Li, PhD
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Chair, Department of Bioengineering
Professor, Department of Medicine
University of California, Los Angeles
Los Angeles, CA

Cynthia Reinhart–King, PhD
Annual Meeting Program Chair
Associate Professor
Biomedical Engineering
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David Odde, PhD
Annual Meeting Vice Chair
Professor, Department of
Biomedical Engineering
University of Minnesota
Minneapolis, MN
It is a great pleasure to welcome all of you to the 2016 BMES meeting in Minneapolis, Minnesota. Minneapolis is a hub of the medical device industry and a city full of innovation and inspiration. It is the perfect place to hold this BMES meeting with a theme of "Transforming Discovery into Health Technology".

The four day meeting program will encompass five exciting plenary sessions, 19 scientific tracks and numerous workshops and symposia. The scientific program will highlight the most recent advancements in the broad field of bioengineering and promote creativity and collaboration. This year’s expanding industry program reflects the theme of this meeting and the further development of partnership between academia and industry in the BMES community. The meeting will be kicked off by on-site tours at local medical device companies. You will hear from the leaders of Medtronic and The Gates Foundation in plenary sessions. There will be 8 sessions in industry programs that cover a variety of topics including Small Business Innovation Research (SBIR), Technology Transfer (STTR), and Venture Capital Pitches.

There will be 12 special sessions on career development and education. For example, the BMES-NSF Special Session on Research in Biomedical Engineering and Grant Writing will showcase NSF-funded research and researchers, foster collaboration and idea exchange, familiarize participants with NSF funding mechanisms, and provide strategies for preparing competitive grant proposals. A session on Educational Approaches to Best Prepare Students for Industry will focus on educational approaches to best prepare biomedical engineer students at both the undergraduate and graduate levels for a professional career in industry.

There will be many sessions that showcase the outreach activities at BMES. The Meet the Experts sessions will feature 5 specialized sessions covering topics that range from tips to applying for funding from program directors, reviewers, and funded investigators to a session featuring journal editors who will discuss how to navigate choosing a journal and judging impact. There are also sessions on the increasingly important topics of data-sharing, building international collaborations and creating connections with industry. Each of the Meet the Experts sessions will be a terrific opportunity to ask questions and network with leaders in the field.

The International Forum on Biomedical Engineering will bring together leaders of biomedical engineering from several countries to share global perspective of this field and forge international collaborations. The joint symposium with American Association of Anatomists will showcase the biological and engineering approaches in technology development and applications with a focus on the rapidly growing role of CRISPR/Cas9 and microRNA technologies in bioengineering.

This year we have record-breaking numbers of abstracts (2,675) and exhibitors (114). Posters and exhibitors will light up the exhibit hall. Discussions at the poster sessions will facilitate the in-depth interactions of the participants, and there will be numerous poster awards to recognize the excellent work by the poster presenters.

We would like to thank all of the track chairs, abstract reviewers and session chairs who have helped organize this meeting and shape the program. We thank all of the participants for attending this meeting and contributing your expertise to the program.

Special thanks to the industry committee, especially Ben Noe and Walt Baxter. We thank the support of BMES leadership and BMES administration, and the hard work by BMES Executive Director Edward Schilling, Meeting Director Debby Tucker, Education Director Michele Ciapa and Communications Director Doug Beizer. We also thank John White and the National Meetings Committee for guidance and support.

We look forward to meeting you at this exciting and inspiring BMES meeting!
Omar Ishrak has served as Chairman and Chief Executive Officer of Medtronic since June 2011. Medtronic is the world’s leading medical technology company, with more than $27 billion in annual revenue, and operations reaching more than 160 countries worldwide. Medtronic offers technologies, solutions and therapies to treat a wide range of medical conditions, including cardiac and vascular diseases, respiratory, neurological and spinal conditions, diabetes, and more. The Medtronic Mission is to alleviate pain, restore health, and extend life for millions of people around the world.

Since joining Medtronic, Omar has focused the company on three core strategies of Therapy Innovation, Economic Value and Globalization. These three strategies form the basis for Medtronic’s efforts to partner with its customers to drive high quality patient outcomes, expand patient access to healthcare, and lower costs in health care systems around the world. In 2014, Omar engineered the acquisition of Covidien, a $10 billion global manufacturer of surgical products and supplies. The acquisition of Covidien was the largest medical technology acquisition in the history of the industry.

Omar joined Medtronic from General Electric Company, where he spent 16 years, most recently as President and CEO of GE Healthcare Systems, a $12 billion division of GE Healthcare, with a broad portfolio of diagnostic, imaging, patient monitoring and life support systems. Omar also served as an Officer and a Senior Vice President of GE. Earlier in his career, Omar amassed 13 years of technology development and business management experience, holding leadership positions at Diasonics/Vingmed, and various product development and engineering positions at Philips Ultrasound.

He grew up in Bangladesh, earned a Bachelor of Science Degree and Ph.D. in Electrical Engineering from the University of London, King’s College.

Omar currently serves as co-chair of the World Economic Forum’s Health and Healthcare Community, which includes global leaders focused on shaping the future of health and healthcare. Key areas of focus for this community include promoting healthy behaviors, better management of future pandemics/epidemics, increasing global access to care, and increasing value in healthcare systems to advance healthcare delivery and improve patient outcomes.

Omar is a member of the Board of Trustees of the Asia Society, the leading educational organization dedicated to promoting mutual understanding and strengthening partnerships among peoples, leaders and institutions of Asia and the United States in a global context. He is also a member of the Minnesota Public Radio Board of Trustees.

The Wallace H. Coulter Award for Healthcare Innovation recognizes an outstanding individual who has demonstrated a lifetime commitment to and made important contributions to patient healthcare.
Designing the Next Generation of Intelligent Biomaterials and Hydrogels: Molecular Recognition and Advanced Protein and Cell Delivery

The field of biomaterials has become an integral part of biomedical engineering as it provides the foundations for the investigation and development of novel nano- and microstructures for organ replacement, carriers, targeting agents, biodegradable scaffolds, recognizable and physiologically-responsive systems, diagnostic devices, biosensors and combination products. Examining the great medical successes of the last 25 years we conclude that the existence of advanced biomaterials has allowed us to treat patients, improve their quality of life and develop new medical systems and devices that we could have not imagined 50 years ago. New design methods for intelligent biomaterials have allowed a wide range of biomedical applications. Indeed, engineering the molecular design of intelligent hydrogels by controlling recognition and specificity is the first step in coordinating and duplicating complex biological and physiological processes. We address design and synthesis characteristics of novel crosslinked networks capable of desirable biomaterial/protein interaction and protein release. We also discuss the dynamic behavior of artificial molecular structures capable of specific molecular recognition of biological molecules. We will also discuss recent studies on intelligent polymer carriers for protein delivery to specific sites, using responsive polymers to achieve pH- or temperature-triggered delivery, usually in modulated mode, and improvement of the behavior of their glyco- and cyto-adhesive behavior and cell recognition. Finally, intelligent cationic polymers have been investigated as biomaterials for drug delivery of nucleic acids because they can form polyelectrolyte complexes with negatively charged (anionic) nucleic acids, protecting the nucleic acid from degradation and enhancing cellular uptake and endosomal escape.

Nicholas A. Peppas is the Cockrell Family Regents Chaired Professor in the Departments of Biomedical and Chemical Engineering of the Cockrell School of Engineering, the Department of Surgery and Perioperative Care of the Dell Medical School, and the Division of Pharmaceutics of the College of Pharmacy. He is also the Director of the Institute of Biomaterials, Drug Delivery and Regenerative Medicine of the University of Texas at Austin. His work in biomaterials, biopolymer physics, protein and therapeutic agent delivery and bionanotechnology has made seminal contributions to the dynamic behavior of biomacro-molecules in complex biological environments with emphasis on solute (drug/protein) transport through three-dimensional macromolecular networks. A leading authority in biomaterials and drug delivery principles, his research blends modern molecular and cellular biology with engineering to analyze complex biological structures and to generate next-generation systems with enhanced applicability, reliability, and functionality and to design the next-generation of medical systems and devices for patient treatment.
Rethinking the Way We Do MRI: Magnetic Resonance Fingerprinting

The conventional MRI/NMR acquisition framework has worked so well that it has remained nearly constant for almost 50 years. In this talk we will discuss a new framework, Magnetic Resonance Fingerprinting (MRF), that we believe has the potential to overcome previous limitations and open up numerous new possibilities for MR. Instead of using a single “purified” pulse sequence, MRF uses a pseudorandomized pulse sequence which is simultaneously sensitive to multiple tissue properties. This rich signal no longer fits into the standard MR processing framework. Because of this, MRF uses pattern recognition to decode the acquired data. Besides providing high quality quantitative results for multiple MR parameters simultaneously from a single acquisition, MRF also provides a high level of suppression of measurement errors and in certain cases may provide higher sensitivity than traditional MR methods. MRF is also able to directly generate maps specific to individual tissue types, which should allow for earlier disease detection. Finally, MRF should practically simplify the clinical MR workflow, with the potential that the end user could just be presented with a single "scan" button.

Mark A. Griswold, PhD
Professor of Radiology, Biomedical Engineering (BME), Electrical Engineering and Computer Science (EECS), and Physics
Director of MRI Research
Case Western Reserve University
Cleveland, Ohio
Friday, October 7, 2016
10:15 am–11:45 am
Auditorium/ Minneapolis Convention Center

Mark Griswold, PhD, is a professor in the Department of Radiology at Case Western Reserve University and University Hospitals in Cleveland, Ohio, with secondary appointments in Biomedical Engineering, Physics, Electrical Engineering and Computer Science. Dr. Griswold received his BS in Electrical Engineering from the University of Illinois and his PhD in Physics from the University of Würzburg, Germany. Prior to joining Case Western Reserve, Dr. Griswold was director of the RF Coil Development Laboratory at Beth Israel Deaconess Medical Center/Harvard Medical School. He is a fellow of the American Institute of Medical and Biological Engineering (2012) and the International Society of Magnetic Resonance in Medicine (2009) and serves on the Board of Trustees of the International Society of Magnetic Resonance in Medicine (ISMRM).
Extraordinary Challenges and the Need for Extraordinary Competencies—The Role of the Biomedical Engineer

Here are some sobering statistics (cited from http://scienceforsociety.com/)

- Over 1 billion of the world’s population do not have access to electricity. Less than 10% of people have access to electricity in some countries

- 660 million lack access to safe water. The water crisis is considered by many experts as the #1 global risk for impact on society

- Almost a third of humanity (over 2 billion) lack access to adequate sanitation

- Life expectancy globally varies from above 80 (in advanced nations) to below 50 (in some developing nations), due to inadequate access to health care

- 16,000 children under the age of 5 die each day from preventable causes. 25% or more of children in 17 countries have never been to a primary school

None of these have easy answers. Throughout the world, extraordinary challenges require extraordinary competencies. In this talk, I will describe what the Bill & Melinda Gates Foundation is doing in the area of global health, with a focus in my area of expertise – diagnostics. I’ll discuss some of the lessons we are learning, and how it affects our work with our partners, whom we entrust to find real-world solutions to complex systemic problems in global health. I’ll discuss the need for innovative engineers, with a special emphasis for pragmatic, interdisciplinary systems thinking. I’ll wrap up with: 1) the single greatest deterrent to addressing these challenges, and 2) some advice for future generations of biomedical engineers - those of you who might find yourselves one day called by these extraordinary challenges.

Jim Gallarda is currently a Senior Program Officer with the Bill & Melinda Gates Foundation in Seattle, WA. He has over 25 years of industry experience in commercial infectious disease assay development and has overseen multiple teams developing immunodiagnostics & PCR systems for HIV-1, HIV-2, HCV, HBV and WNV. He now serves as a diagnostic lead for the Foundation’s efforts in tuberculosis & most recently, the Ebola crisis.
Interstitial Fluid Flow in the Brain Tumor Microenvironment

Glioblastoma is the deadliest form of brain cancer and is defined by the invasive nature of its cells. Invasion in the brain follows distinctive routes that correlate with interstitial and bulk flow pathways. In brain cancer, increased interstitial fluid flow develops due to heightened interstitial pressure in the tumor bulk interfacing with the relatively normal pressure of the surrounding brain tissue. This differential leads to fluid transport specifically through the invasive tissue edge of the tumor where cells are prone to both interact with the surrounding brain microenvironment and to evade localized, transport-limited therapies. To examine how interstitial fluid flow alters the invasion of brain cancer cells, we have developed a number of in vitro and in vivo methods to examine fluid flow and its effects on cellular responses. In vitro, we have found that interstitial flow can enhance invasion of brain cancer cells using cell lines and patient-derived glioma stem cells in tissue-engineered models of the brain-tumor interface. These effects are mediated simultaneously by both chemotactic and mechanotransduction mechanisms. In vivo, we have seen interstitial flow both correlate with and increase invasion of implanted cancer cells through the brain. By conducting in vivo measurements of interstitial flow using MRI techniques, we can correlate interstitial fluid flow to patterns of glial cell response, extracellular matrix deposition, and receptor activation in tumor-associated brain along these invasive pathways. These findings further implicate interstitial fluid flow as a driver of tissue morphology and indicate multiple mechanisms through which fluid flow can mediate cellular invasion in the brain.

Jennifer Munson, Ph.D. is an Assistant Professor of Biomedical Engineering at the University of Virginia. Dr. Munson received her Bachelor of Science in Chemical Engineering and Neuroscience from Tulane University in 2006. She worked at Genentech in Process Engineering before pursuing graduate study at Georgia Tech with Ravi Bellamkonda, Ph.D. Supported by a National Science Foundation Graduate Research Award, she developed liposomal nanocarriers to deliver a novel anti-invasive therapeutic to glioblastoma. During her Ph.D. she was awarded a Fulbright Fellowship to Switzerland to pursue independent study on the glioma microenvironment at L’Ecole Polytechnique Fédérale de Lausanne with Melody Swartz, Ph.D. After completing her Ph.D. in 2011, she returned to Switzerland as a Whitaker Scholar for post-doctoral training on the breast cancer microenvironment, focusing on changes that alter interstitial transport. She joined the University of Virginia in 2014, pursuing research interests related to the cancer microenvironment, drug delivery, and transport in brain and breast cancers. Her work includes the development of tissue engineered systems for the study of interstitial flow and tissue transport as well as translation of these systems for patient-specific drug screening. Her work has been published in journals such as Science Translational Medicine and Cancer Research. Her group at UVA is funded by the American Cancer Society, the Coulter Foundation for Translational Research, and the Kincaid Foundation.

BMES established this award in 2000 to honor Rita M. Schaffer, former BMES Executive Director. Rita’s gift of her estate, along with contributions from her family, friends, and associates, has enabled BMES to create the Rita Schaffer Young Investigator Award, which includes the Rita Schaffer Memorial Lecture.
The vision of the Nanomedicine Academy is to ensure access to specialized knowledge unconstrained by geography or economic status, provide access to training in knowledge and techniques in nanomedicine, and establish opportunities for collaboration across institutions in education and research, in order to train the future leaders in the emerging field of nanomedicine. Over the last several years the Nanomedicine Academy has established a new model of higher education that involves partnership and knowledge sharing between nodes of expertise in nanomedicine and Minority Serving Institutions (MSI). The Academy has created a scalable, interactive, reciprocal relationship among a large pool of minority students, and with leading experts in the field, established an evidence-based education program to attract and retain students from underrepresented minority populations. The initial partnering institutions are Northeastern University, University of Puerto Rico Mayaguez, Tuskegee University, Morgan State University, and Florida International University, as well as institutions in other countries. These unique programs have trained hundreds of graduate and undergraduate students in MSI, and led to institutional change in the form of new programs in nanomedicine.

Srinivas Sridhar, PhD
University Distinguished Professor of Physics, Biomedical Engineering and Chemical Engineering
Northeastern University
Boston, Massachusetts

Saturday, October 8, 2016
10:30 AM
Auditorium/Minneapolis Convention Center

Global Nanomedicine Academy: Broadening Participation and Diversity through Collaborative Education

Srinivas Sridhar, Ph.D. is University Distinguished Professor of Physics, Biomedical Engineering and Chemical Engineering at Northeastern University, and Lecturer on Radiation Oncology, Harvard Medical School.

An elected Fellow of the American Physical Society, Sridhar’s current areas of research are nanomedicine, neurotechnology and MRI imaging. His paper in Nature in 2003 was listed among Breakthroughs of 2003 by the journal Science.

As Founding Director of the Electronic Materials Research Institute at Northeastern University, Sridhar established a Nanomedicine Center for synthesis and characterization of nanoparticle formulations. Sridhar is passionately committed to training future scientists and engineers and providing access to knowledge to all particularly to those from under-represented minority communities. He has trained more than 120 faculty, postdoctoral fellows, scientists, and graduate and undergraduate students. He is Director of the Nanomedicine Academy funded by grants for NSF and NIH, whose vision is to providing training in nanomedicine nationally and globally. He is Director of CaNCURE: Cancer Nanomedicine Coops for Undergraduate Research, an NIH R25 program to provide research training in cancer nanomedicine. He is Director and PI of the NSF IGERT Nanomedicine Science and Technology Center. He developed several first-of-their kind courses in Nanomedicine. These unique programs have taught hundreds of graduate and undergraduate students in several minority serving institutions, and led to institutional change in the form of new programs in nanomedicine.
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- George Georgiou
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- Xuetao Cao
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The mission of the School of Biological and Health Systems Engineering at ASU is to create novel solutions to improve human health through research, education, and service to the community. The faculty in SBHSE has a wide range of research expertise with strengths in the following research areas: imaging, biosensors and instrumentation, molecular, cellular and tissue engineering, neural and rehabilitation engineering, synthetic biology and systems bioengineering.

Booth # 420

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Web: www.stevens.edu

Stevens Institute of Technology is a top-tier educational institution with a strong emphasis on research and innovation, particularly in the fields of technology and engineering. With its central location in Hoboken, New Jersey, the institute offers undergraduate and graduate programs in various disciplines.

Booth # 822

**Stony Brook University Bioengineering Department**
5281 SUNY
Stony Brook, NY 11794
Phone: 631-632-2302
Email: jessica.kuhn@stonybrook.edu
Web: www.bme.sunysb.edu

The mission of the BME department at Stony Brook University is to fully integrate the cutting edge of engineering and physical sciences with state-of-the-art biology to advance our understanding of biomedical problems, and to drive the development of therapeutics, diagnostics and medical devices. Areas of research expertise include biomechanics, bioelectricity, tissue engineering, bioinstrumentation, cellular and molecular bioengineering, and bioimaging.

Booth # 901

**Syracuse University Department of Biomedical and Chemical Engineering**
329 Link Hall
Syracuse, NY 13244
Phone: 315-443-1931
Email: topgrads@syr.edu
Web: http://eng-cs.syr.edu/our-departments/biomedical-and-chemical-engineering/

Prospective graduate students and faculty can learn about our graduate programs that offer cutting edge, multidisciplinary research and education in biomedical engineering in a truly collaborative setting within the Syracuse Biomaterials Institute. Interact with our faculty and graduate students on a one-to-one basis and learn about financial aid opportunities.
Booth # 214

**TA Instruments—Electro Force**

9625 West 76th Street #750
Eden Prairie, MN 55431
Phone: 952-278-3070
Email: electroforce@tainstruments.com
Web: www.tainstruments.com

Visit TA Instruments, the world leader in thermal analysis, rheology, and microcalorimetry instruments. TA Electro-Force materials test systems are available in a range of force capacities and are ideally suited for characterizing the mechanical properties of biomaterials, tissues, and medical devices. Ask about ElectroForce Access and our 3DCulturePro perfusion bioreactor.

Booth # 725

**Temple University**

College of Engineering,
Department of Bioengineering

1947 North 12th Street
Philadelphia, PA 19122
Phone: 215-204-3404
Email: doreen.aiello@temple.edu
Web: http://engineering.temple.edu/bioengineering

Booths # 701/703

**Texas A & M University**

Department of Biomedical Engineering

3120 TAMU
College Station, TX 77843
Phone: 979-845-5532
Email: bmen@tamu.edu
Web: http://engineering.tamu.edu/biomedical

The Department of Biomedical Engineering at Texas A&M University offers allows students to impact health outcomes in the areas of sensing and imaging, optics, orthopedic biomechanics, biomaterials, tissue engineering, biomolecular and cellular engineering, and more. The department's award-winning faculty have strong collaborations with medical and veterinary schools as well as industry. Offering graduate degrees at the master's and doctoral levels, this program provides an exceptional academic experience.

Booths # 722/724

**Tufts University**

Biomedical Engineering

4 Colby Street
Medford, MA 02155
Phone: 617-627-2580
Email: bme@tufts.edu
Web: www.engineering.tufts.edu/bme

Biomedical Engineering at Tufts University draws from core disciplines such as engineering, biology, computer science, physics, chemistry, and physiology emphasizing an interdisciplinary approach to research and education. Strong emphasis is placed on interactions with faculty in Arts and Sciences and the professional schools. The Tissue Engineering Resource Center (TERC) was initiated in August of 2004 as a Resource Center supported through the National Institutes of Health P41 program. The core themes in the Center focus on functional tissue engineering achieved through a systems approach—integrating cells, scaffolds and bioreactors to control the environment in vitro for translation in vivo.

Booth # 205

**Tulane University**

Department of Biomedical Engineering

500 Lindy Boggs Bldg.
New Orleans, LA 70118
Phone: 504-865-5897
Email: csteward@tulane.edu
Web: www.bmen.tulane.edu

Tulane’s Biomedical Engineering Department is located in the diverse cultural mecca of New Orleans and has been established since 1977. Degrees offered range from B.S. to Ph.D., and research includes biomechanics, biotransport, regenerative medicine, biomaterials and devices. Collaboration with the School of Medicine and numerous other centers are available and abounding.

Booth # 921

**The University of Akron**

Department of Biomedical Engineering

302 Buchtel Common
Akron, OH 44325-0302
Phone: 330-972-6650
Email: bme@uakron.edu
Web: http://bme.uakron.edu

The University of Akron offers MS and PhD degree programs in BME. These programs have an individualized curricular approach, designed in coordination with each student’s career plans. BME faculty are engaged in both basic and translational research areas, including, but not limited to, optics, microtechnology, biomaterials, biomechanics, and regenerative medicine.
The University of Arizona Biomedical Engineering

P.O. Box 210240
Tucson, AZ 85721
Phone: 520-626-9134
Email: bmegidp@email.arizona.edu
Web: www.bme.arizona.edu

The University of Arizona’s Biomedical Engineering Graduate Interdisciplinary Program offers opportunities to integrate engineering, mathematics, biology, and medicine in a collaborative multi-disciplinary environment with over 60 faculty mentors. Proximity to Medicine, and Health Sciences Colleges facilitates cutting-edge translational research in specialties such as cardiovascular engineering, imaging, nanotechnology, computational modeling and entrepreneurship.

University of Arkansas Biomedical Engineering

790 West Dickson Street, Room 120
Fayetteville, AR 72701
Phone: 479-575-4786
Email: kkarsted@uark.edu
Web: www.biomedical-engineering.uark.edu

The Biomedical Engineering Program at the University of Arkansas offers MS and PhD degrees. Our active faculty has research programs in: Organ Regeneration; Cell and Molecular Imaging; Nanobiotechnology; Molecular Genetics and Cell Biology in Disease Prevention; Biomaterials; Tissue Engineering; and Vaccine and Immunotherapy Delivery Systems. Stop by our booth and learn how well qualified students can earn $10,000 to $20,000 per year on top of standard assistantship stipends!

University of California, Berkeley Bioengineering

306 Stanley Hall, MC1762
Berkeley, CA 94720-1762
Phone: 510-642-5833
Email: bioeng@berkeley.edu
Web: http://bioeng.berkeley.edu/

The Department of Bioengineering at the University of California, Berkeley will be showcasing its novel research and academic programs, including the bachelor, Master of Engineering, Master of Translational Medicine, and PhD degrees. Come visit the UC Berkeley booth to speak with representatives and learn more about the department.
The University of California, Davis
Department of Biomedical Engineering
451 E. Health Sciences Drive, GBSF 2303
Davis, CA 95616
Phone: 530-752-1033
Email: bme@ucdavis.edu
Web: www.bme.ucdavis.edu
With 35 primary faculty and a graduate group of 75 faculty, BME at UC Davis combines exceptional teaching with state-of-the-art research to prepare students for careers in academics and industry. Come learn about our programs in bioinformatics, biomechanics, cellular and molecular systems, imaging, synthetic biology, and tissue engineering and regenerative medicine.

Booths # 414 / 416
University of California, Irvine
3120 Natural Sciences II
Irvine, CA 92697-2715
Phone: 949-824-3494
Email: bme@uci.edu
Web: www.eng.uci.edu/dept/bme

Booth # 109
UC San Diego
9500 Gilman Drive MC0412
San Diego, CA 92093
Phone: 858-822-3441
Email: gmoreira@ucsd.edu
Web: http://be.ucsd.edu/

Booth # 211
University of Chicago
Institute for Molecular Engineering
5640 South Ellis Avenue, ERC 299
Chicago, IL 60637
Phone: 773-834-1437
Email: ime@uchicago.edu
Web: http://ime.uchicago.edu
The IME PhD program equips students with engineering principles to analyze and design molecules for emerging applications, taking research beyond the boundaries of traditional engineering fields. Students work closely with faculty and peers in combining problem-solving skills with broad scientific expertise to build useful systems from the molecular level up.

Booth # 325
University of Colorado Denver/Anschutz Medical Campus
Department of Bioengineering
12705 E. Montview Blvd., Suite 100
Aurora, CO 80045
Phone: 303-724-5893
Email: bioengineering@ucdenver.edu
Web: www.ucdenver.edu/bioengineering

Booth # 720
University of Delaware
161 Colburn Lab
150 Academy Street
Newark, DE 19716
Phone: 302-831-4578
Email: edmanson@udel.edu
Web: www.bme.udel.edu
University of DelawareÆs Biomedical Engineering Department welcomes undergraduate and graduate students who are intellectually motivated, creative, and diverse individuals to join us. Our research focus areas: Musculoskeletal and Neural Engineering; Cancer Diagnosis and Therapy; Disease Modeling; Tissue and Regenerative Engineering.
**Booth # 709**

**University of Florida**  
Department of Biomedical Engineering  
1275 Center Drive, Biomedical Sciences Building JG-56  
P.O. Box 116131  
Gainesville, FL 32606  
Phone: 352-273-9222  
Email: info@bme.ufl.edu  
Web: www.bme.ufl.edu

UF BME is made possible by the vision and generosity of Dr. J. Crayton Pruitt and his family. Since its inception in 2002, the department continues to excel in interdisciplinary research that merges engineering with biology and medicine. The department offers both a graduate program and an undergraduate program (2012 inaugural class), with particular strengths in Neural Engineering, Imaging and Medical Physics, Biomaterials and Regenerative Medicine, and Biomedical Informatics and Modeling. In the past year, the department has grown to 22 faculty and will continue that growth up to 25-30. UF BME is one of only a few departments in the nation to be co-localized with a top-ranked medical school, veterinary school, and dental school. The department is also uniquely positioned to contribute to clinical translation of biomedical technologies because of the outstanding resources for entrepreneurship and commercialization in the Gainesville area.

**Booth # 915**

**University of Illinois at Chicago**  
851 S. Morgan Street, Room 218  
Chicago, IL 60607  
Phone: 312-996-2335  
Email: bioe@uic.edu  
Web: www.bioe.uic.edu

One of the first degree granting and accredited Bioengineering programs in the nation, since 1965 UIC Bioengineering offers B.S., M.S., Ph.D., M.D./M.S. and M.D./Ph.D. programs that emphasize translational research and innovative training that can include clinical immersion and industry-linked interdisciplinary medical product development. The Richard and Loan Hill Department of Bioengineering is led by 30 core and more than 100 affiliate faculty who collaborate with researchers in five major academic medical centers in Chicago—including UIC, home of the largest medical school in the country.

**Booth # 309**

**University of Illinois @ Urbana-Champaign**  
1304 W. Springfield Avenue, 1270 DCL  
Urbana, IL 61801  
Phone: 217-333-1867  
Email: bioengineering@illinois.edu  
Web: bioengineering.illinois.edu

With strengths in biomolecular imaging, bio-nanotechnology, computational bioengineering, cellular and tissue engineering, synthetic bioengineering, and health care systems engineering, the Department of Bioengineering at Illinois is addressing grand challenges in human health and sustainability. Come join a top-ranked engineering school and one of the fastest-growing, innovative bioengineering departments. We are committed to providing the best experience for our students and training future bioengineering leaders by incorporating diverse topics of science, engineering, technology and medicine into our teaching. We offer BS, MS, MEng, and PhD degrees and are driving the development of the new Carle Illinois College of Medicine, one of the nation’s first engineering-based medical schools.
Booth # 625
University of Iowa
Department of Biomedical Engineering
103 S. Capitol Street
Iowa City, IA 52242
Phone: 319-335-5632
Email: courtney-bork@uiowa.edu
Web: www.engineering.uiowa.edu/bme

The University of Iowa Department of Biomedical Engineering offers graduate research programs in the following research areas: Biomedical Imaging, Biomaterials, Cardiovascular Biomechanics, Bioinformatics, Musculoskeletal Biomechanics, Tissue Engineering and Cellular Analysis. The Department is located close to a tertiary-care teaching hospital, and the Colleges of Dentistry, Medicine, Nursing, and Public Health. Iowa City is ranked number 4 in the Top 10 College Destinations (AIER), is a UNESCO City of Literature, and is a Top 100 Adventure City (NatGeo Adventure). Stop by our booth for more information.

Booth # 409
University of Illinois @ Urbana-Champaign
Master of Engineering (Professional Master’s Program)
1304 W. Springfield Avenue
1270 Digital Computer Lab, MD-278
Urbana, IL 61801
Phone: 217-333-1867
Email: bioemeng@illinois.edu
Web: bioemeng.illinois.edu

Illinois’ Master of Engineering in Bioinstrumentation, with special focus on medical imaging, is an intensive professional degree program that is available on-campus as well as online. The program trains engineers to be industry leaders by combining rigorous graduate-level engineering coursework with fundamental business training on issues that confront professionals who develop products for biomedical imaging, medical diagnostics, genomics, and tools used in life science research. The program is designed as a unique discovery experience, offering greater technical depth than is possible in an undergraduate program. At Illinois, you’ll delve into the fine points of biometric sensors, imaging technology, and life-changing clinical devices. You’ll also gain the hands-on experience, leadership ability, and unparalleled skills needed to be successful in your chosen career.
New College. New Medicine.

Bioengineering at the University of Illinois at Urbana-Champaign is the driving force in the creation of the nation’s first engineering-based College of Medicine.

And an exciting part of the new college is the new Jump Simulation Center, offering hands-on medical education and research, with students and faculty in engineering and medicine working side by side. The center is being constructed in Everitt Laboratory, a campus landmark that is undergoing a $55+ million renovation and soon will be the new home of the Department of Bioengineering.

FOR MORE INFORMATION
EMAIL: bioengineering@illinois.edu
WEB: medicine.illinois.edu
A warm welcome and congratulations on attending another great Annual Fall Meeting of the Biomedical Engineering Society.

Come learn about Biomedical Engineering education offered by our Joint Graduate Program by visiting with us at the booth or our websites at:

www.memphis.edu/bme  or  www.uthsc.edu/bme

Booths # 821 / 823

University of Miami
Department of Biomedical Engineering
1251 Memorial Drive
Coral Gables, FL 33146
Phone: 305-284-2445
Email: bme.coe@miami.edu
Web: www.miami.edu/bme

Our undergraduate and graduate programs leading to the B.S., 5 year B.S./M.S, M.S and Ph.D. degrees provide graduates with the analytical and design skills required to solve problems at the interface of engineering and life sciences. Special features of our program include small class size, very strong ties with the University of Miami Miller School of Medicine, high level of student-faculty interaction, and a high percentage of undergraduate student participation in research and professional activities. The research areas of our Faculty include biomedical imaging, optics and lasers; neural engineering, biosignals and instrumentation; and biomechanics, biomaterials and tissue engineering.

Booth # 400

University of Michigan
Department of Biomedical Engineering
1125 Carl A. Gerstacker Building
2200 Bonisteel Blvd.
Ann Arbor, MI 48109-2099
Phone: 734-615-9412
Email: sldougl@umich.edu
Web: www.bme.umich.edu

The mission of the University of Michigan Department of Biomedical Engineering is to provide leadership in education, training and cutting-edge research by translating science and engineering to solve important challenges in medicine and life sciences to the benefit of humanity. The program’s primary emphasis is on biomedical engineering fundamentals, while allowing students to personalize their curriculum to prepare them for a wide variety of careers including academia, law, medicine, and business.

Booth # 917

University of Memphis/ University of Tennessee Health Sciences Center Biomedical Engineering
330 Engineering Technology Building
Herff College of Engineering
Memphis, TN 39152-3210
Phone: 901-678-3733
Email: eckstein@memphis.edu
Web: www.memphis.edu/bme

The UM/UT Joint Graduate Program offers M.S. and Ph.D. degrees in biomedical engineering with research specialization in biomaterials, tissue engineering, drug delivery, biomechanics, biomedical sensors, electrophysiology, and bioimaging. Emphasis in these disciplines is in dental/orthopedics, computational models (pulmonary, coronary, and musculoskeletal), sensor nano/microfabrication, and image processing and analyses.

Booth # 911

University of Memphis/ University of Tennessee Health Sciences Center Biomedical Engineering
330 Engineering Technology Building
Herff College of Engineering
Memphis, TN 39152-3210
Phone: 901-678-3733
Email: eckstein@memphis.edu
Web: www.memphis.edu/bme

The UM/UT Joint Graduate Program offers M.S. and Ph.D. degrees in biomedical engineering with research specialization in biomaterials, tissue engineering, drug delivery, biomechanics, biomedical sensors, electrophysiology, and bioimaging. Emphasis in these disciplines is in dental/orthopedics, computational models (pulmonary, coronary, and musculoskeletal), sensor nano/microfabrication, and image processing and analyses.

Booths # 821 / 823

University of Miami
Department of Biomedical Engineering
1251 Memorial Drive
Coral Gables, FL 33146
Phone: 305-284-2445
Email: bme.coe@miami.edu
Web: www.miami.edu/bme

Our undergraduate and graduate programs leading to the B.S., 5 year B.S./M.S, M.S and Ph.D. degrees provide graduates with the analytical and design skills required to solve problems at the interface of engineering and life sciences. Special features of our program include small class size, very strong ties with the University of Miami Miller School of Medicine, high level of student-faculty interaction, and a high percentage of undergraduate student participation in research and professional activities. The research areas of our Faculty include biomedical imaging, optics and lasers; neural engineering, biosignals and instrumentation; and biomechanics, biomaterials and tissue engineering.

Booth # 400

University of Michigan
Department of Biomedical Engineering
1125 Carl A. Gerstacker Building
2200 Bonisteel Blvd.
Ann Arbor, MI 48109-2099
Phone: 734-615-9412
Email: sldougl@umich.edu
Web: www.bme.umich.edu

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Booth # 917

University of Memphis/ University of Tennessee Health Sciences Center Biomedical Engineering
330 Engineering Technology Building
Herff College of Engineering
Memphis, TN 39152-3210
Phone: 901-678-3733
Email: eckstein@memphis.edu
Web: www.memphis.edu/bme

The UM/UT Joint Graduate Program offers M.S. and Ph.D. degrees in biomedical engineering with research specialization in biomaterials, tissue engineering, drug delivery, biomechanics, biomedical sensors, electrophysiology, and bioimaging. Emphasis in these disciplines is in dental/orthopedics, computational models (pulmonary, coronary, and musculoskeletal), sensor nano/microfabrication, and image processing and analyses.
EXHIBITOR BOOTHS AND INFORMATION

Booth # 615

University of Minnesota
Department of Biomedical Engineering
312 Church St. SE
7-105 Nils Hasselmo Hall
Minneapolis, MN 55455
Phone: 612-624-8396
E-mail: bmengp@umn.edu
Web: www.umn.edu/bme

The Department of Biomedical Engineering at the University of Minnesota is physically located at the intersection of the medical school, engineering, and physical sciences, and in the heart of LifeScience Alley (home to Medtronic, Boston Scientific, St. Jude Medical, plus 500 other FDA-registered medtech companies). Research conducted by the faculty spans the full spectrum, with particular depth in cardiovascular engineering, neural engineering, cell/tissue engineering, cancer bioengineering, and biomedical imaging/optics.

Booths # 403 / 405

University of North Carolina at Chapel Hill
NC State University
137 MacNider Hall
Chapel Hill, NC 27599
Phone: 919-445-6051
Email: vbberg@email.unc.edu
Web: www.bme.unc.edu

The Joint Department of Biomedical Engineering was founded in 2003 and is co-located at the University of North Carolina at Chapel Hill and NC State University. Linking the School of Medicine and College of Arts and Sciences at UNC-CH to the College of Engineering at NC State, the graduate program offers joint MS and PhD degrees in Biomedical Engineering in five core research areas including Rehabilitation Engineering, Regenerative Medicine, Medical Imaging, Biomedical Microdevices, and Pharmacoengineering. With over 30 tenured and tenure track core faculty members, our graduate program embraces interdisciplinary collaborations spanning the basic sciences through to clinical and translational applications.

Booth # 903

University of Oklahoma
Stephenson School of Biomedical Engineering
202 W Boyd Street, CEC 107
Norman, OK 73019
Phone: 405-325-5453
Email: bme@ou.edu
Web: www.ou.edu/coe/sbme

OU is home to the newest BME department in the nation, with established M.S. and Ph.D. programs. Located in a vibrant research and startup community with the nearby Oklahoma Health Sciences Center (OUHSC), the Oklahoma Medical Research Foundation, and various entrepreneurial entities, BME students and faculty work in a translational environment with physicians and companies. Faculty candidates are invited to visit us and inquire about Endowed Professorships, and students are encouraged to ask about Stephenson Graduate Fellowships and translational research partnerships with the OUHSC.

Booths # 900 / 902

University of Pittsburgh
Department of Bioengineering
306 CNBIO
300 Technology Drive
Pittsburgh, PA 15219
Phone: 412-624-6445
Email: ngm8@pitt.edu
Web: engineering.pitt.edu

The University of Pittsburgh Department of Bioengineering conducts world-class research and is home to faculty and students at both the graduate and undergraduate level who have won both nationally and internationally recognized awards. The department also has a close affiliation with the renowned University of Pittsburgh School of Medicine.

Booth # 608

University of Rochester
204 Robert E. Georgen Hall
Rochester, NY 14627
Phone: 585-275-3891
Email: donna.porcelli@rochester.edu
Web: www.bme.rochester.edu

The Graduate Program in Biomedical Engineering at the University of Rochester provides training at the Masters and Doctoral level. Multiple active centers and affiliated groups offer collaborative research in Biomedical Optics; Neuroengineering; Biomechanics; Medical Imaging; Biomaterials, Nanotechnology and Cell & Tissue Engineering. With access to over 50 laboratories on the River Campus and the adjacent Medical Center, students can tailor their own interdisciplinary and translational training experience. We also offer an MS program focused on Medical Technology & Innovation, including a clinical practicum and full-year design experience.

WHAT WE DO HERE IMPACTS PEOPLE’S LIVES:
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For questions, contact PJ Meek at pjmeek@ou.edu or (405) 325-5453.

To learn about the multiple Stephenson Endowed Professorships and Stephenson Graduate Fellowships, contact Michael Detamore, director of the Stephenson School of Biomedical Engineering at detamore@ou.edu.

The University of Oklahoma is an equal opportunity institution. www.ou.edu/eoo
Booth # 705

University of Southern California
Viterbi School of Engineering
3650 McClintock Ave, OHE 106
Los Angeles, CA  90089
Phone:  213-740-4488
Email:  viterbi.gradprogram@usc.edu
Web:  http://viterbi.usc.edu/gapp

Booth # 908

University of South Dakota
Biomedical Engineering
4800 North Career Avenue, Suite 221
Sioux Falls, SD  57107
Phone:  605-367-7763
Email:  mabeinfo@usd.edu
Web:  http://mabe.usd.edu
The Biomedical Engineering Graduate Program at the University of South Dakota works at the interface of engineering and medicine. Research training emphasizes engineering biomaterials that can repair or replace damaged tissues and treat critical diseases. Course curriculum reflects the interdisciplinary nature of biomedical engineering and includes coursework in biomaterials, biomechanics, and bioinformatics. Faculty candidates and students are encouraged to visit our booth for more information.

Booths # 308 / 310

University of Tennessee–Knoxville
1512 Middle Drive
414 Dougherty Engineering Bldg
Knoxville, TN  37996
Phone:  865-974-5115
Email:  mabeinfo@utk.edu
Web:  http://mabe.utk.edu
The University of Tennessee offers B.S., M.S., and Ph.D. degrees in BME. Graduate level research are organized as interdisciplinary through the Institute of Biomedical Engineering. Faculty from the College of Engineering, Graduate School of Medicine, College of Veterinary Medicine, and College of Education, Health, and Human Sciences work collaboratively to teach courses and perform research.

Booth # 411

The University of Texas Arlington
Bioengineering Department
500 UTA Blvd
Arlington, TX 76019
Phone:  817-272-2249
Email:  cbradfield@uta.edu
Web:  www.uta.edu/bioengineering
The Bioengineering Department at The University of Texas Arlington offers several research and scholarship opportunities for students interested in Biomaterials & Regenerative Tissue Engineering, Bioinstrumentation, Biomechanics, and Biomedical Imaging. Graduate students also have the option of earning a joint graduate degree with The University of Texas Southwestern Medical Center at Dallas. Those interested in our programs are strongly encouraged to visit Booth 411 at the exhibit to learn more!

Booths # 621 / 623

The University of Texas at Austin
Department of Biomedical Engineering
107 W. Dean Keeton, C0800
Austin, TX 78712
Phone:  512-471-3604
Email:  sbixby@mail.utexas.edu
Web:  www.bme.utexas.edu
The University of Texas at Austin’s Biomedical Engineering Department educates the next generation of biomedical engineers by offering B.S., M.S., and Ph.D. degrees. Scholars and students build interdisciplinary knowledge in areas such as bioinformatics, biomechanics, biomedical imaging and instrumentation, cellular and biomolecular engineering, and computational biomedical engineering, among others.

Booth # 223

University of Texas at Dallas
2850 Rutford Avenue
Richardson, TX  75080
Phone:  972-883-5155
Email:  ben.porter@utdallas.edu
Web:  www.be.utdallas.edu
The University of Texas at Dallas presents their Biomedical Engineering Degree programs to future students and the highly competitive Eugene McDermott Graduate Fellowship for outstanding PhD applicants. Information about UT Dallas’s research programs in bioinformatics, biomaterials, biomechanics, biomedical imaging and optics, biosensors, and neural engineering will also be available.

Booth # 1000

University of Texas at San Antonio
One UTSA Circle AET 1.102
San Antonio, TX  78249
Phone:  210-458-8529
Email:  teja.guda@utsa.edu
Web:  www.engineering.utsa.edu/BME/

Booth # 425

University of Toronto
Institute of Biomaterials & Biomedical Engineering
164 College Street
Rosebrugh Building, Room 407
Toronto, Ontario  M5S 3G9 Canada
Phone:  416-978-4841
Email:  jeffrey.little@utoronto.ca
Web:  www.ibbme.utoronto.ca
The U of T Institute of Biomaterials & Biomedical Engineering (IBBME) is a multidisciplinary research unit where investigators and students from engineering, medicine and dentistry collaborate with 10 major hospitals to develop solutions for our most pressing healthcare challenges. Our programs in biomedical and clinical engineering offer a world-class education at Canada’s #1 ranked university.
One of our distinctive strengths in interdisciplinary research is our relationship with Pitt’s School of Medicine and Schools of Health Sciences, as well as with the McGowan Institute for Regenerative Medicine. Bioengineering is also deeply embedded within clinical research at University of Pittsburgh Medical Center, one of the top ranked hospital networks in the country. Faculty have laboratories within clinical departments, which allow graduate students to apply engineering principles directly to patient care in bench-to-bedside settings.

Most importantly for our graduate students, Pitt is an urban campus in one of the most livable cities in the world. Its world-class research institutions, corporate headquarters, public amenities, healthcare, low cost of living and relative safety have earned Pittsburgh accolades from Forbes, Kiplingers, National Geographic, The Economist, and US News & World Report. Both the University and the City provide the perfect match for an outstanding graduate school environment.

**RESEARCH FOCUS AREAS**
- Biomaterials for Drug Delivery
- Tissue Engineering and Regenerative Medicine
- Nanomaterials for Biological Sensing
- Biomechanics in Tissue Engineering
- Regenerative Medicine
- Cellular Biomechanics
- Bioinformatics

Our Biomedical Engineering (BME) program focuses on the application of engineering and science methodologies to the analysis of biological and physiological problems and the development and delivery of biomedical technologies.

Our program is located in **Sioux Falls, South Dakota**, near the borders of Iowa and Minnesota at the junction of Interstates 90 and 29, putting it within a day’s drive of most major Midwestern cities.
The Department of Bioengineering and the SCI Institute are internationally recognized for research in biomaterials, drug delivery, neuroengineering, orthopedics, cardiovascular medicine, visualization, scientific computing, and image analysis, respectively. Together they offer BS, MS, and PhD training opportunities in a world class vacation destination located at the base of the Wasatch Range. The highly entrepreneurial and interdisciplinary environment is distinguished by its strong collaborative connections between clinical medicine, engineering and industry; a place where researchers can work and play hard.

University of Utah
36 S. Wasatch Drive, SMMB 3100
Salt Lake City, UT 84112
Phone: 801-581-8528
Email: erin.pugh@utah.edu
Web: www.bioen.utah.edu

A Closely Knit Community
Nestled into Utah’s Wasatch Mountain range, the Department of Bioengineering’s home (foreground) is located between the University Hospital & School of Medicine (upper left) and the College of Engineer Campus (just to the right out of frame) providing a clinically immersive engineering experience that is unique among BME training programs. Did you know that the Department of Bioengineering is one of the oldest and yet fastest growing Biomedical training programs in the nation? We rank 7th nationally in median h-index for core faculty, as determined by Google scholar. With over 125 faculty, our research strengths span every inch of clinical medicine. Not to mention that we are surrounded by unsurpassed natural beauty. Learn more about us at bioen.utah.edu

University of Virginia
P.O. Box 800762
Charlottesville, VA 22908
Phone: 434-924-5101
Email: ran2x@virginia.edu
Web: http://bme.virginia.edu

Using our perspective as engineers, we make groundbreaking discoveries in fields like systems biology and biomedical data sciences, medical imaging, and cellular and tissue engineering. We are co-located in the medical school, and our department’s remarkable tendency toward collaboration reflects a culture of cooperation that has been essential to UVA going all the way back to Thomas Jefferson.

University of Washington
Department of Bioengineering
3720 15th Avenue NE
Box 355061
Seattle, WA 98195
Phone: 206-616-3371
Email: bluek2@uw.edu
Web: http://depts.washington.edu/bioe/index.html

University of Washington Bioengineering is a world leader in bioengineering research, education, clinical applications, technology transfer, and service. Please visit booth 801 to discover how we are inventing the future of medicine. Our faculty and students are eager to talk to you!
PhD in Biomedical Engineering

Offered by the Department of Bioengineering at The University of Texas at Dallas, the Biomedical Engineering PhD program has over 20 research faculty with more than $20M in active funding from the NIH, NSF, DARPA and industry partners.

PhD applicants are eligible to be selected for a Eugene McDermott Graduate Fellowship, which includes a generous stipend, tuition, and a $10,000 annual discretionary budget.

Application Deadline: December 15, 2016

For More Information: 972.883.5155
bmenadvising@utdallas.edu
be.utdallas.edu
Booth # 504
University of Virginia
P.O. Box 800762
Charlottesville, VA  22908
Phone: 434-924-5101
Email: ran2x@virginia.edu
Web: http://bme.virginia.edu
Using our perspective as engineers, we make ground-breaking discoveries in fields like systems biology and biomedical data sciences, medical imaging, and cellular and tissue engineering. We are co-located in the medical school, and our department’s remarkable tendency toward collaboration reflects a culture of cooperation that has been essential to UVA going all the way back to Thomas Jefferson.

Booth # 801
University of Washington
Department of Bioengineering
3720 15th Avenue NE
Box 355061
Seattle, WA 98195
Phone: 206-616-3371
Email: bluek2@uw.edu
Web: http://depts.washington.edu/bioe/index.html
University of Washington Bioengineering is a world leader in bioengineering research, education, clinical applications, technology transfer, and service. Please visit booth 801 to discover how we are inventing the future of medicine. Our faculty and students are eager to talk to you!

Booth # 616
University of Wisconsin - Madison Biomedical Engineering Department
1550 Engineering Drive
Madison, WI 53706
Phone: 608-890-3573
Email: biomed@engr.wisc.edu
Web: www.engr.wisc.edu/bme/bme.html
Please visit our booth to learn more about the B.S., M.S., and Ph.D. programs in Biomedical Engineering at the University of Wisconsin-Madison. Staff, students, and faculty will be available to answer your questions and provide information on admissions, curriculum, and our world-class facilities and institution-wide research centers and institutes.

Booths # 609 / 611
Vanderbilt University
5824 Stevenson Center Drive
Nashville, TN 37235
Phone: 615-343-1099
Email: tina.shaw@vanderbilt.edu
Web: www.vanderbilt.edu
VU BME bridges Vanderbilt’s engineering, basic science departments, and its renowned medical center; an ideal location for engineering research at the interface of technology and medicine. Research strengths include image-based technologies, nanobiotechnology, biophotonics, modeling, biomaterials, bioregenerative engineering, bioMEMs. VU BME stimulates high impact research and provides unique educational opportunities.
Virginia Commonwealth University
401 W. Main Street
Richmond, VA 23284
Phone: 804-828-7956
Email: biomedicalengr@vcu.edu
Web: www.biomedical.engr.vcu.edu
VCU Biomedical Engineering has strong ties with the VCU Medical Center, School of Medicine, School of Dentistry, and Massey Cancer Center, and offers degrees at the Bachelor’s, Master’s, and Doctoral level. Research specialties include mechanobiology, regenerative medicine, orthopaedic biomechanics, rehabilitation engineering, and biomaterials. The department is actively recruiting faculty.

Virginia Tech-Wake Forest University School of Biomedical Engineering & Science
VT-WFU SBES:
317 Kelly Hall
325 Stanger Street
Mail Code 0298
Blacksburg, VA 24061
Phone: 540-231-8191
E-mail: mlawless@vt.edu
Web: www.sbes.vt.edu
The Virginia Tech - Wake Forest University, School for Biomedical Engineering and Sciences offers MS, PhD, MD/PhD, and DVM/PhD degrees. We have 76 biomedical engineering faculty with active research programs in tissue engineering, biomedical imaging, biomechanics, nano-medicine, & nanobioengineering, neuroengineering, translational cancer research, cardiovascular engineering, and other emerging fields.
EXHIBITOR BOOTHS AND INFORMATION

Booths # 508 / 510
Washington University in St. Louis
One Brookings Drive, Box 1097
St. Louis, MO 63120
Phone: 314-935-6164
Email: teadsalek@wustl.edu
Web: http://bme.wustl.edu/

In partnership with our world-class medical school and as part of a $550M research enterprise in life sciences and biomedical research, the Department of Biomedical Engineering at Washington University is a gateway to interdisciplinary, basic science and translational research training at the BS, MS and PhD level. More than 90 research mentors support over 120 BME PhD students in studies of regenerative medicine, imaging, cell and molecular systems, cardiovascular, neural, orthopedic, and cancer engineering. With adjacency to the largest public park in the USA, and over 75,000 sq ft of state-of-the-art facilities, the BME Department at Washington University provides the ideal intellectual, physical and collaborative climate to pursue a BS, MS, MEng, MS/MA, PhD or MD/PhD degree.

Booth # 522
Wayne State University
818 W. Hancock
Detroit, MI 48201
Phone: 313-577-1345
Email: nmurthy@wayne.edu
Web: www.bme.wayne.edu

The Biomedical Engineering Department at Wayne State University offers BS, MS, PhD and MD/PhD degrees. Ground breaking research in the use of biomaterials to aid in the regeneration of nerves and the tailoring of these materials to optimize cellular response, to the use of advanced human modeling to study the biomechanics of impact injuries, Wayne State will play a major role in the development of new standards to better the quality of human life.

Booth # 816
Whitaker International Program
Institute of International Education
809 United Nations Plaza
New York, NY 10017
Phone: 646-308-8850
Email: Aschaefer@iie.org
Web: www.whitaker.org

The Whitaker International Program provides funding to emerging U.S.-based leaders in biomedical engineering, with a goal of building international bridges. Grant projects–including research, coursework, public policy work – are intended to enhance both the recipient’s career and the BME field. Administered by the Institute of International Education.

GREAT MINDS
MULTIPLIED

Where innovation is a degree requirement.

The master’s and doctoral programs in biomedical engineering at WPI produce leaders and entrepreneurs highly valued in today’s workplace. Find your place here, among researchers who are seeking innovative ways to improve lives.

GRAD.WPI.EDU
MS
PhD
MD/PhD
DVM/PhD

APPLICATION DEADLINE: JAN. 1

www.sbes.vt.edu
**Booths # 322 / 324**

**Worcester Polytechnic Institute (WPI)**

100 Institute Road  
Worcester, MA 01609  
Phone: 508-831-5301  
Email: bme-web@wpi.edu  
Web: www.wpi.edu/+gradbme

Graduate students in WPI’s Biomedical Engineering (BME) Department collaborate with scientists and engineers across disciplines, seeking breakthroughs in regenerative medicine, innovations in bioinstrumentation, and major steps forward in healthcare. Whether in the classroom or the lab, the focus remains squarely on solving real-world problems. BME graduates have gone on to rewarding careers at major medical and biomedical research centers across academia, government, and the medical device industry.

---

**Booth # 321**

**Yale University**

55 Prospect Street  
New Haven, CT 06511  
Phone: 203-432-4262  
Email: deanna.lomax@yale.edu  
Web: www.seas.yale.edu/departments/biomedical-engineering

The booth will be staffed with graduate representatives and faculty from the department of Biomedical Engineering at Yale. The faculty and graduate representative will aim to describe the program to interested visitors and answer any questions regarding the program requirements and admissions process.
Whitaker International Program: Fellows, Scholars & Summer Programs

Grants For Biomedical Engineering Study or Research Abroad

The Whitaker International Program provides young biomedical engineers, and those in a related field, the opportunity to expand their geographic and academic horizons.

Potential activities to pursue overseas include:
- conducting research at an academic institution or with a corporation
- interning at a policy institute
- studying for a post-baccalaureate degree
- pursuing post-doctoral work

For more information, including program details, application requirements, and the online application, visit our website.

ACTIVITIES

A Whitaker International grant experience will ideally advance your career, while also advancing the goal of increased international collaboration in BME.

Activities could include:

Type of Awards:
- Fellows Award: one year award after receiving your bachelor’s degree.
- Scholars Award: for post-doctoral work.
- Summer Award: for BME coursework or research towards your Master’s or Ph.D. degree.

Phone: +212-984-5442

www.whitaker.org

INSTITUTE OF INTERNATIONAL EDUCATION

Institute of International Education, 809 United Nations Plaza, New York, NY 10017
www.whitaker.org
Meeting Location
Minneapolis Convention Center
1301 Second Ave South
Minneapolis, Minnesota 55403
612.335.6000

Hilton Minneapolis
1001 Marquette Avenue South
Minneapolis, Minnesota, 55403-2440
612.376.1000

Registration
Paid registration is required for admission to all meeting functions including scientific sessions, posters, exhibits, breaks and the BMES BASH on Friday evening. BMES cancellation policy may be found on any registration form. Any applicable refunds will be issued post-meeting. Substitutions are permitted with written permission from the original registrant. Additional social event tickets including the Celebration of Minorities in BME Luncheon, and the Women in BME Luncheon are separate and above BMES meeting registration.

On-Site Registration Hours
Wednesday, October 5 ............................................ 12:00 pm – 7:00 pm
Thursday, October 6 .................................................... 7:00 am – 6:00 pm
Friday, October 7 .......................................................... 7:00 am – 6:00 pm
Saturday, October 8 .......................................................... 7:00 am – 2:00 pm

Exhibits
Exhibit Halls B-C, Minneapolis Convention Center
Exhibits will be open:
Thursday, October 6 .................................................... 9:30 am – 5:00 pm
Friday, October 7 .......................................................... 9:30 am – 5:00 pm
Saturday, October 8 .......................................................... 9:30 am – 1:30 pm

Biotechnology Company Tours
Wednesday, October 5
2:30 pm–5:30 pm
Advance registration required
Buses will depart from the convention center entrance.

BMES Presenter Information
Platform Presentations
Each technical session room will be equipped with a PC-compatible computer with a USB port and PowerPoint along with an LCD projector, screen and a lectern with microphone.

During the half hour before your session begins, please upload your presentation onto the computer using a memory stick or flash drive. Because of the potential difficulty transferring some Mac files to PC format, we encourage you to avoid use of animation if there is a question about transferability.

Please do not try to connect your own laptop. Please note, it will not be possible to provide special equipment. Any additional equipment will need to be supported by the presenter. Although BMES has paid for WiFi throughout the convention center during the Annual Meeting, there will not be specific dedicated hard-wired internet access in the meeting rooms.

Sessions chairs should keep sessions on the listed schedule so attendees can move back and forth among sessions. In most cases, presentations should be done in twelve minutes, allowing three minutes for questions and answers and transition to the next speaker.

Poster Presentations
Posters will be presented Thursday, Friday and Saturday. Posters are to be displayed all day on assigned day. Authors must be present during specified viewing with authors as listed in the Scientific Program:

Thursday ........................................... 9:30 am–10:15 am and 2:30 pm–3:15 pm
Friday ....................................................... 9:30 am–10:15 am and 3:15 pm–4:00 pm
Saturday ...................................................... 9:30 am–10:15 am

All posters will be in the Exhibit Hall B-C in the Minneapolis Convention Center. Posters are numbered with a card corresponding to the numbers assigned in the program.

Speaker Ready Room
Registration Area, Exhibit Hall of the Minneapolis Convention Center
In the BMES Speaker Ready Room you will find cables, LCD projector and screen to practice your presentation. Please bring your own laptop.

Wednesday, October 5 ........................................... 1:00 pm – 5:00 pm
Thursday, October 6 .................................................... 7:00 am – 5:00 pm
Friday, October 7 .......................................................... 7:00 am – 5:00 pm
Saturday, October 8 .......................................................... 7:00 am – 2:30 pm
Program Highlights—Don’t Miss These Events!

Wednesday, October 5

Meet the Faculty Candidate Forum
3:30 pm–5:30 pm  Exhibit Hall B | CC

The "Meet-the-Faculty Candidate" poster session provides a great opportunity for faculty, recruiters, and Department Chairs to speak directly with recent PhD grads and post-doctoral researchers who are seeking faculty positions.

The BMES 2016 Annual Meeting Meet The Faculty Candidate Forum was only open to those who are actively on the market for the 2016–2017 recruiting cycle. Candidates submitted for consideration in August. The accepted candidates’ CVs can be viewed at www.bmes.org.

Welcome Reception
5:30 pm–7:00 pm  Hall B-C Foyer | CC

Light refreshments will be served. All registrants are invited to attend.

Wednesday, October 5

LGBT Dessert Social
8:00 pm–9:00 pm  Symphony III, Minneapolis Hilton

#additional registration and $10 ticket required.

Manu Platt, PhD, Associate Professor of Biomedical Engineering at the Georgia Institute of Technology and Emory University, is the speaker for the BMES LGBT dessert social hour. He will speak about navigating a career and life while feeling like an outsider, which has motivated him to create open and inclusive safe spaces for communities of outsiders. He will discuss intersectionality and the complexities of fusing orientation, ethnicity, gender, religion, education, family values and more that define each person’s unique approaches to solving problems as humans and as biomedical engineers. Introductory remarks will be made by Shelly Peyton, Assistant Professor of Chemical Engineering at the University of Massachusetts, Amherst. Prof. Platt’s talk will be followed by dessert and a cash bar.

LGBT Social Sponsored by:

Thursday, October 6

BMES State of the Society Address & Wallace H. Coulter Award for Healthcare Innovation Lecture
10:15 am  Auditorium | CC

Please join us for a dialogue with BMES President Rich Hart and other leaders of the Society.

Friday, October 7

BMES Bash at the Minneapolis Convention Center
8:30 pm–11:00 pm

Join us for a Dessert Party this year to celebrate the 2016 BMES Annual Meeting. We listened to our attendees and members, that they would like to enjoy dinner at the myriad of restaurants in downtown Minneapolis (more than 30 within walking distance of the convention center) and then cap the evening off with some dessert and networking.

Refreshment Breaks

Please note your meeting registration includes morning and afternoon refreshments breaks on Thursday, Friday and Saturday. All refreshment breaks will be in the Exhibit Hall.

Refreshment breaks are sponsored by:

Don’t forget to turn your BMES BASH ticket in for a wristband at the information or registration booths before Friday afternoon.
Celebration of Minorities in BME Luncheon

Thursday, October 6

Celebration of Minorities in BME Luncheon*
11:45 am–12:45 pm Ballroom A | CC
*additional registration and $25 ticket required.

This is the seventh year of this event hosted by the BMES Diversity Committee to create a community and network within the Society fostering support and professional development of minorities in BMES at all levels. Everyone is invited to attend, as diversity only increases when all groups play a part. The luncheon complements the Diversity Award lecture on Saturday and the Women in BME Luncheon on Friday.

Karl W. Reid, Ed.D.,
Executive Director of the National Society of Black Engineers (NSBE)

In this presentation, Dr. Reid will share his experience and perspective on barriers to an engineering education and profession, and highlight the NSBE vision to dramatically change the face of engineering by 2025.

Karl W. Reid, Ed.D. was named executive director of the National Society of Black Engineers (NSBE) on June 2, 2014, marking his return to the organization that gave him his first major leadership experience, 31 years earlier. For the past 17 years, he has been a leading advocate for increasing college access and opportunity for low-income and minority youth. Prior to NSBE Dr. Reid was the senior vice president for research, innovation and member college engagement for the United Negro College Fund (UNCF), where he oversaw new program development, research and capacity building for UNCF’s 37 historically black colleges and universities. Before his service at UNCF, he worked in positions of increasing responsibility to increase diversity at his alma mater, the Massachusetts Institute of Technology (MIT), which he left as associate dean of undergraduate education and director of the Office of Minority Education. While working at MIT, Dr. Reid earned his Doctor of Education degree at Harvard University. His thesis explored the interrelationship of race, identity and academic achievement.

Dr. Reid graduated from MIT, where he did his undergraduate and master’s work in materials science and engineering and was a Tau Beta Pi Scholar. He credits his membership in the NSBE chapter at MIT with giving a vital boost to his self-confidence and leadership skills. He joined the Society during his freshman year, was elected chapter vice president during his junior year and served as NSBE national chair for 1984–85. After graduating from MIT, Dr. Reid worked in the computer industry for 12 years. In 1991, five years into a successful career in sales and marketing with IBM Corporation, Dr. Reid read Jonathan Kozol’s “Savage Inequalities,” a seminal book about educational disparities in the U.S., which sparked his passion for bringing about positive change through education of African Americans.

Dr. Reid is now supporting NSBE’s National Executive Board and the Society’s 31,000 members in reaching the main goal of NSBE’s 10-year Strategic Plan: to move black students and professionals from underrepresentation to overrepresentation in engineering in the U.S., by producing 10,000 Black Engineers annually in the country, by 2025. Dr. Reid is a member of the DC STEM Network Advisory Council and the American Society of Civil Engineers’ “Dream Big” IMAX Movie Technical Advisory Council, and was recently named one of the “Top 100 Executives in America” by Uptown Professional magazine.

Diversity Luncheon is Sponsored by:
An Unorthodox Career Path: From Practicing Physician to Playing One on TV

Our career trajectories are shaped by a series of opportunities and our courage to grow and change. All too often, however, the decisions we make are constrained by the conventional boundaries of the professional designations behind our name. Dr. Archelle Georgiou started her professional life as a practicing physician but over the following 25 years, she made 7 major shifts that took her career from medicine to managed care to the media. The key to navigating this unorthodox path has been self-awareness of her innate talents. Dr. Georgiou will use examples from her personal experiences to describe why and how we should commit to our calling versus a traditional career storyline.

Archelle Georgiou, MD,
Founder of Georgiou Consulting

Dr. Archelle Georgiou started her professional life as a practicing physician but over the following 25 years, she made 7 major shifts that took her career from medicine to managed care to the media. The key to navigating this unorthodox path has been self-awareness of her innate talents. Dr. Georgiou will use examples from her personal experiences to describe why and how we should commit to our calling versus a traditional career storyline.

Dr. Archelle Georgiou is a physician, a “recovering” health-care industry executive, data lover, and health reporter. Her broad base of career experiences naturally let her look

at health through the eyes of doctors, patients, insurance companies, policy makers, and the media. She founded Georgiou Consulting in 2008 and uses this balanced perspective to help companies with innovative, effective healthcare solutions ignite the change they need for meaningful adoption and improved business results. Most of her clients are outside the traditional healthcare system.

Dr. Georgiou believes that the media has an important role to play in influencing consumers to take responsibility for their health. Since 2007, Dr. Georgiou has been an on-camera medical expert in Minneapolis-St. Paul, initially with Fox9News and currently with KSTP, the ABC affiliate. In her weekly segments and monthly half-hour specials, she’s covered more than 800 compelling health related topics, from the newest medical technology to patient advocacy to health insurance and the latest health care policy change. Archelle is recognized as a speaker with data-driven ideas that challenge the status quo and spark conversations about true health reform. She’s been invited to speak at forums including Tedx, Gallup, Mayo Clinic Transform, Wireless Health Sciences Alliance Summit, Wharton School of Business and Colgate University. She has appeared on Katie’s Take with Katie Couric, Fox Business News and Mehmet Oz & Friends. Her insights regarding change and leadership have been featured in several books including, Motivate Like A CEO and The Millionaire Mystique. In 2014, Dr. Georgiou received Minnesota Magazine’s Champion award for “an individual who has focused their efforts to elevate the profile/status of the state’s health care industry.”

Women in BME Luncheon is Sponsored by:

Bioengineering
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Engineering For Life
### Additional Meetings

*Most of these meetings/events are invitation only. Please check with the organizer.*

#### Wednesday, October 5

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMES Board of Directors Meeting</td>
<td>8:30 am–4:30 pm</td>
<td>Room 101HI</td>
</tr>
<tr>
<td>Organizer: Richard Hart</td>
<td></td>
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</tr>
<tr>
<td>AIMBE Board of Directors Meeting</td>
<td>1:00 pm–4:00 pm</td>
<td>Room 101F</td>
</tr>
<tr>
<td>Affiliate Event</td>
<td></td>
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<tr>
<td>Organizer: Milan Yager</td>
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<tr>
<td>AIMBE Academic Council Event</td>
<td>4:00 pm–5:00 pm</td>
<td>Room 101F</td>
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<tr>
<td>Affiliate Event</td>
<td></td>
<td></td>
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<tr>
<td>Organizer: Milan Yager</td>
<td></td>
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</tr>
<tr>
<td>CMBE SIG Business Meeting</td>
<td>5:00 pm–7:00 pm</td>
<td>Room 101G</td>
</tr>
<tr>
<td>Organizer: Elizabeth Loboa</td>
<td></td>
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</tr>
<tr>
<td>Council of Chairs Dinner &amp; Meeting</td>
<td>6:30 pm–9:00 pm</td>
<td>Salon E</td>
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<tr>
<td>Invitation Only</td>
<td></td>
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<tr>
<td>Organizer: Don Gaver</td>
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<tr>
<td>Industry Committee Planning Meeting</td>
<td>7:30 pm–8:30 pm</td>
<td>Boardroom 3</td>
</tr>
<tr>
<td>Invitation Only</td>
<td></td>
<td></td>
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<tr>
<td>Organizer: Ben Noe</td>
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#### Thursday, October 6

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity Committee Meeting</td>
<td>7:00 am–8:00 am</td>
<td>Room 101G</td>
</tr>
<tr>
<td>Organizer: Debra Auguste and Guillermo Ameer</td>
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<td></td>
</tr>
<tr>
<td>ABioM SIG Business Meeting</td>
<td>9:00 am–11:00 am</td>
<td>Room 101HI</td>
</tr>
<tr>
<td>Organizer: Kaiming Ye</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethics Subcommittee Meeting</td>
<td>9:30 am–10:30 am</td>
<td>Room 101G</td>
</tr>
<tr>
<td>Organizer: Subrata Saha</td>
<td></td>
<td></td>
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<tr>
<td>50th Anniversary Committee Meeting</td>
<td>1:00 pm–3:00 pm</td>
<td>Room 101G</td>
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<tr>
<td>Organizer: Martine LaBerge</td>
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#### Friday, October 7

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>Education Committee Meeting</td>
<td>7:00 am–8:00 am</td>
<td>Room 101G</td>
</tr>
<tr>
<td>Organizer: Donald Gaver</td>
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</tr>
<tr>
<td>National Meetings Committee/2017 Annual Meeting Planning Committee Meeting</td>
<td>8:00 am–10:00 am</td>
<td>Room 101HI</td>
</tr>
<tr>
<td>Organizer: John White and Shelly Sakiyama-Elbert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Affairs Subcommittee</td>
<td>8:00 am–9:00 am</td>
<td>Room 203A</td>
</tr>
<tr>
<td>Organizer: Damir Khismatullin</td>
<td></td>
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<tr>
<td>Medical Devices SIG Business Meeting</td>
<td>2:00 pm–3:00 pm</td>
<td>Room 101HI</td>
</tr>
<tr>
<td>Organizer: Devashish Shrivastava</td>
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</tr>
<tr>
<td>Membership Committee Meeting</td>
<td>3:30 pm–4:30 pm</td>
<td>Room 101G</td>
</tr>
<tr>
<td>Organizer: Kristen Billiar</td>
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</tr>
<tr>
<td>Design Competition Judges Meeting</td>
<td>3:30 pm–4:30 pm</td>
<td>Room 203A</td>
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<tr>
<td>Organizer: Liz DaSilva</td>
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</table>

#### Saturday, October 7

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Council of Industry Chapter Presidents–Invitation Only</td>
<td>8:00 am–9:00 am</td>
<td>Room 101F</td>
</tr>
<tr>
<td>Organizer: Ben Noe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Advisory Board Invitation Only</td>
<td>9:30 am–10:30 am</td>
<td>Room 101F</td>
</tr>
<tr>
<td>Organizer: Ben Noe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Affairs Subcommittee</td>
<td>9:30 am–10:30 am</td>
<td>Room 203A</td>
</tr>
<tr>
<td>Organizer: Art Ritter</td>
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</tr>
<tr>
<td>BMES Board of Directors Meeting</td>
<td>1:00 pm–3:30 pm</td>
<td>Room 101HI</td>
</tr>
<tr>
<td>Organizer: Lori Setton</td>
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</tbody>
</table>
Receptions located at the Minneapolis Hilton from 8:00 pm–10:00 pm

Thursday, October 6

**Boston University**  
Marquette IX

**Clemson Bioengineering**  
Marquette IV

**Cornell University**  
Marquette III

**Duke University**  
Rochester Room

**The George Washington University**  
Grand Ballroom A

**Wallace H. Coulter Department at Georgia Tech & Emory**  
Symphony I

**Johns Hopkins University**  
Biomedical Engineering Department  
Marquette I

**Marquette University/ Medical College of Wisconsin**  
Conrad C

**Northeastern University**  
Department of Chemical Engineering  
Grand Ballroom G

**The Ohio State University**  
Symphony III

**Purdue University, Weldon School of Biomedical Engineering**  
Conrad D

**Rensselaer Polytechnic Institute**  
Boardroom 3

**Rice University Bioengineering**  
Marquette VII

**UCLA Bioengineering Department**  
Symphony IV

**The University of Alabama at Birmingham**  
Grand Ballroom F

**University of California Irvine**  
Conrad A

**University of California San Diego**  
Grand Ballroom B

**University of Florida**  
Conrad B

**University of Illinois at Urbana-Champaign**  
Grand Ballroom C

**University of Michigan, Department of BiomedE**  
Directors Row 4

**University of Pennsylvania**  
Department of Bioengineering  
Marquette V

**University of Pittsburgh**  
Department of Bioengineering  
Directors Row 2

**University of Rochester**  
Grand Ballroom D

**University of Southern California- Viterbi School of Engineering**  
Marquette II

**University of Texas at Austin**  
Grand Ballroom E

**University of Utah, Department of Bioengineering**  
Symphony II

**University of Virginia**  
Red Wing

**University of Washington Bioengineering**  
Duluth Room

**University of Wisconsin-Madison Biomedical Engineering Department**  
Directors Row 3

**Vanderbilt University, Department of Biomedical Engineering**  
Marquette V

**Washington University in St. Louis**  
Marquette VIII

**Whitaker International Program**  
Directors Row 1
### Thursday, October 6

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am–9:00 am</td>
<td>Room 205</td>
<td><strong>Becoming a Biomedical Engineer... What you need to know and where do you fit in</strong>&lt;br&gt;Learn about the key areas of BME, what BME’s do and how they differ from other engineers. Explore the wide range of career options in industry, academia, clinical, government, research facilities and entrepreneurial. Hear about the BME work environment, and the job outlook to help you decide where you fit in.</td>
</tr>
<tr>
<td>9:15 am–10:15 am</td>
<td>Room 205</td>
<td><strong>BME Careers in Academia</strong>&lt;br&gt;Hear about the various career paths and opportunities in academia. Faculty will share their insights and experiences to help you prepare for a career in academia or decide if academia is right for you.</td>
</tr>
<tr>
<td>1:30 pm–2:45 pm</td>
<td>Room 205</td>
<td><strong>BME Careers in Industry</strong>&lt;br&gt;Explore the various industry options for BME professionals. Representatives from industry will share their career paths, educational training, insight into the hiring market, and suggestions for students and recent graduates who wish to pursue the same career.</td>
</tr>
<tr>
<td>2:45 pm–4:15 pm</td>
<td>Room 208AB</td>
<td><strong>Rapid Resume Review</strong>&lt;br&gt;<em>Members Only</em>&lt;br&gt;Experienced BME professionals will review an electronic or hard copy of your resume and work with you to make improvements.</td>
</tr>
<tr>
<td>3:00 pm–5:00 pm</td>
<td>Room 102D</td>
<td><strong>Coop/Intern and Industrial Relations Workshop</strong>&lt;br&gt;<em>Invitation Only</em>&lt;br&gt;One-on-one career coaching will take place in the BMES booth for members only.</td>
</tr>
</tbody>
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</tr>
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<tr>
<td>3:15 pm–4:30 pm</td>
<td>Room 205</td>
<td><strong>BME Government and Alternative Careers</strong>&lt;br&gt;Hear about the career paths and educational training as BME alumni share their experience and insight into working in the government, law, regulatory and consulting. Students and recent graduates will take away suggestions for how to pursue these careers.</td>
</tr>
<tr>
<td>9:00 am–5:30 pm</td>
<td>Exhibit Hall</td>
<td><strong>Career Zone</strong>&lt;br&gt;Join us for our new alternative career fair! The Career Zone is an area bringing together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market. Panel sessions begin at 8:00am and last for 60 or 90 minutes. Panel speakers will continue the discussion, take more questions, network and/or recruit in the Career Zone after their scheduled session.</td>
</tr>
</tbody>
</table>

### Student Chapter Tables

- Alpha Eta Mu Beta, The National Biomedical Engineering Honor Society
- Clemson University
- Rice University
- San José State University
- Stevens Institute of Technology
- University of Illinois, Urbana-Champaign
- University of Minnesota
- University of Oklahoma
- University of South Carolina
- University of Southern California
- University of Texas at San Antonio
Friday, October 7

8:30 am–9:30 am  Room 208CD

**BMES Student Chapter—Outstanding Chapter Best Practices**
Outstanding Student Chapter awardee Virginia Tech/Wake Forest, will provide their chapter best-practices along with, the Commendable Achievement awardee Clemson State University. During this workshop each chapter will have the opportunity to present their chapter’s goals and accomplishments. This will allow new and current student chapters an opportunity to ask questions, exchange ideas and implement new goals for their upcoming year.

9:00 am–10:30 am  Room 205

**Career Options for BME PhDs**
This session is designed specifically for BME PhD students and postdoctoral fellows. It brings together a panel of professionals with PhD degrees in BME or related disciplines employed in industry and academia. Each speaker will share their experiences and useful tips on what BME PhD students and postdocs need to do to land a job in industry or academia.

9:30 am–10:30 am  Room 208CD

**BMES Student Chapter–Mentoring and Chapter-Industry Best Practices**
Outstanding Mentoring awardee University of Illinois, Urbana-Champaign will provide their chapter best-practices along with, the Chapter-Industry awardee The Ohio State University. University of Illinois, Urbana-Champaign will discuss their goals and the success of their mentoring program and The Ohio State University will present their Chapter-Industry best practices. During this workshop, students will have the opportunity to ask questions, exchange ideas and implement new goals for their upcoming year.

1:45 pm–3:15 pm  Auditorium

**BMES Undergraduate Student Design Competition**
During this session we will bring together the top 6 winning design teams that were selected out of 22 applicants. The top 6 include Columbia University, Clemson University, Purdue University, Virginia Commonwealth University, University of Rochester and Rice University. This competition allows each design team to orally present their projects and students to ask questions after each presentation. Upon completion of all presentations, the judges will select and announce the top 3 winners.

2:30 pm–3:45 pm  Room 205

**BME Careers in Industry**
Explore the various industry options for BME professionals. Representatives from industry will share their career paths, educational training, insight into the hiring market, and suggestions for students and recent graduates who wish to pursue the same career.

4:15 pm–5:30 pm  Room 205

**BME Entrepreneurs**
Entrepreneurs discuss the translational path; how to take an idea from concept to commercial product. Hear about resources available to students interested in translating their technologies both within and outside the university, and licensing and start-up options. Panelists will also discuss the skills needed to work in a start-up.

9:00 am–5:30 pm  Exhibit Hall

**Career Zone**
Join us for our new alternative career fair! The Career Zone is an area bringing together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market.

Panel sessions begin at 9:00 am and last for 60 or 90 minutes, ending at 5:30 pm. Panel speakers will continue the discussion, take more questions, network and/or recruit in the Career Zone after their scheduled session.
The I Hotel and Conference Center • Champaign, Illinois • November 4, 2016

- Learn about BME career opportunities in industry, academia and clinical
- Present your research work at the poster session
- Network with your peers and leaders in the field
- Hear about entrepreneurship and alternative careers
- Learn how to market yourself

www.BMES.org/MWConf16

Abstract Submissions — www.BMES.org/MWConf16Abstracts
Registration — www.BMES.org/MWConf16Reg
Sponsorship and Exhibit Opportunities — www.BMES.org/MWConf16SponExh
Hotel and Travel — www.BMES.org/MWConf16HotelTravel
Alpha Eta Mu Beta (AEMB) Programs

Thursday, October 6

4:30 pm–5:15 pm  Room 200A/CC

Alpha Eta Mu Beta Annual Grand Meeting

Session Co-chairs: Dominic E. Nathan PhD, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wolfson, BS, Marcia A. Pool, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Kerri A. Green, MS and Teresa A Murray PhD.

At this annual grand meeting, members representing chapters nationwide will come together to discuss important contemporary events relating to AEMB. (Attendance is mandatory for all AEMB members). If you would like to learn more about AEMB or start a new chapter at your school, please consider attending this session and speaking to any of the national officers. This year there will be elections of national officers and members to the board of directors.

Thursday, October 6

6:30 pm–8:00 pm  Lounge A, Level 2/CC

Alpha Eta Mu Beta Reception

Session Co-chairs: Dominic E. Nathan PhD, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wolfson, BS, Marcia A. Pool, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Kerri A. Green, MS and Teresa A Murray PhD.

The Annual AEMB reception will be held at Lounge A, Level 2. New charters and national awards will be presented at this session. Furthermore, this session will serve as a networking opportunity to meet with other fellow members from AEMB chapters, representatives from industry and academia. This session is open to all AEMB student and faculty members. For tickets, please contact aemb@alphaetamubeta.org

Alpha Eta Mu Beta Annual Ethics Session

Friday, October 7

10:00 am  Room 200A/CC

Ethical Issues in Developing Tuberculosis Vaccines and Drugs

Session Co-chairs: Susan L. Craddock, PhD and Bhavit Vora, MS

Tuberculosis as of last year surpassed AIDS as the leading cause of infectious disease deaths in the world, yet there have been no new drugs or more effective vaccines developed in more than four decades. This is potentially changing with collaborative partnerships involving non-profits, university scientists, government and philanthropic financing, and pharmaceutical companies. Yet the attempts to develop new therapies for tuberculosis are not without critiques including whether money is better spent on single diseases rather than broader public health initiatives, whether enough is known about the tuberculosis bacterium to go ahead with clinical trials of new drug and vaccine candidates, and whether low-income countries affected by the disease should be leading these collaborations. These debates will be discussed in this talk, with the aim not to answer any of them definitively, but to elucidate what might be at stake in these collaborations and in the longstanding efforts to mitigate tuberculosis globally.

Alpha Eta Mu Beta (AEMB), the National Biomedical Engineering Honor Society, is committed to promoting ethics in the field of biomedical engineering. This year, AEMB is honored to host Dr. Susan Craddock from the University of Minnesota. Dr. Craddock's research focuses on social and political factors shaping the experience and patterns of, as well as responses to, infectious diseases. She has published on access to AIDS drugs, noncommercial clinical trials, and the roles of poverty, gender, and race on public health responses to tuberculosis. Her forthcoming book, Compound Solutions: Pharmaceutical Alternatives for Global Health, is on collaborative efforts to produce new tuberculosis vaccines and drugs for the first time in decades.
Student and Early Career Programs

Alpha Eta Mu Beta

Saturday, October 8

9:00 am–10:00 am

Room 200A/CC

Mentoring for INnovative Design Solutions (MINDS) Workshop

Session Co-chairs: Teresa A. Murray, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wolfson, BS, Marcia A. Pool, PhD, Kerri A. Green, MS and Dominic E. Nathan PhD.

Participation in this workshop is by invitation after successfully competing for a spot on a design team to address this year’s design/research topic (please see: http://www.alphaetamubeta.org/ for application instructions). Students will work in teams of 4 based on similar interests. Each team will have a mentor who will assist the team in creating a potentially marketable innovation. The mentor will help students incorporate key design considerations, including (i) market considerations for commercialization, (ii) design development and testing, (iii) quality control, (iv) regulatory strategy, and (v) intellectual property protection. After the workshop, students will meet virtually (e.g., via Skype) for up to 8 months to further refine their innovation. They will also be required to produce a more extensive presentation of their product, such as a video for a Kickstarter campaign, or a PowerPoint presentation for a group of potential investors. We will alert participants about opportunities for design contests, investment, and grant programs to further promote and develop their innovations. This program requires an 8 month commitment.

Friday, October 7

8:00 am–9:30 am

Room 200J/CC

Whitaker International Program: Funding Opportunity for Young Biomedical Engineers

The Whitaker International Program, founded in 2005 provides funding to emerging U.S.-based leaders in biomedical engineering to conduct a study and/or research project, with the underlying objective of building international bridges. Grant projects - including research, coursework, public policy work - are intended to enhance both the recipient’s career and the BME field. The goal of the Whitaker Program is to assist the development of professional leaders who are not only superb scientists, but who will advance the profession through an international outlook. The Whitaker Program has two sub-programs: Fellows and Scholars Program, and the Summer Program. For more information, including program details, the online application and deadlines, visit: http://www.whitaker.org.

Chair: Amie Schaefer
Program Officer, Whitaker International Program
Institute of International Education

Joseph Yu
Whitaker International Fellow, 2013
Host Institution: Imperial College London, UK

Topic: Comprehensive Training in Cardiovascular Research and Biomedical Engineering Entrepreneurship

Brandan Walters
Whitaker International Fellow, 2014
Host Institution: Eberhard Karls University of Tubingen, Germany

Topic: Quantifiably Controlling Mesenchymal Stem Cell Morphology by Application of Tuned Cyclic Strain and the Effects of These Changes on Smooth Muscle Cell Differentiation

Erin Coonahan
Whitaker International Fellow, 2013
Host Institution: Engineering World Health, Honduras

Topic: Technician Training Programs to Improve Access to Healthcare in Honduras

Colin Hisey
Whitaker International Fellow, 2015
Host Institution: University of Navarra, Spain

Topic: A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures

Alisha Geldert
Whitaker International Fellow, 2015
Host Institution: National University of Singapore

Topic: Investigation of Aptamer-based Sensing for Malaria Detection
Congratulates the 2016 CMBE Young Innovators!
September 2016 issue, edited by Tejal Desai and Michael King

See the Young Innovators present their work on Friday, October 7, 2016 at 1:45 and 4:00pm!

- Become a 2017 CMBE Young Innovator! Next competition is underway.
- Accepted authors will be invited to present their work in a special two-part platform session at the 2017 BMES Annual Meeting.
- To be eligible, candidates must hold a position at the Assistant Professor level or equivalent. BMES non-members are eligible and welcome.
- Self nominations should include manuscript title with 200-word abstract, and a 2-page NIH-style biosketch, emailed to mike.king@cornell.edu.

Key Dates for 2017 Young Innovators issue:
Nomination Deadline: November 4, 2016
Abstract Acceptance: December 9, 2016
Manuscript Submission: February 10, 2017
Print Publication: September 2017

Craig Duvall
Vanderbilt Univ.

Stacey Finley
Univ. Southern California

Gregory Hudalla
Univ. Florida

Steven Jay
Univ. Maryland

Christopher Jewell
Univ. Maryland

Xiaojun Lance Lian
Penn State Univ.

Ting Lu
Univ. Illinois Urbana-Champaign

Minglin Ma
Cornell Univ.

Erkin Seker
Univ. California Davis

Kandice Tanner
National Cancer Institute

Kathryn Whitehead
Carnegie Mellon Univ.

CMBE 2016

BMES
BIOMEDICAL ENGINEERING SOCIETY
Advancing Human Health and Well-Being™

BMES 2016 | Minneapolis
The Society takes great pleasure in honoring and recognizing the significant accomplishments and contributions its members have made in the diverse field of Biomedical Engineering.

On behalf of the Awards Committee we would like to thank all the members who submitted nominations and provided letters of support for all award nominees.

Congratulations to the following Award Winners:

**The Wallace H. Coulter Award for Healthcare Innovation**
Presented at Thursday morning plenary session at 10:15 am
**Omar Ishrak, PhD**
Medtronic

**Robert A. Pritzker Distinguished Lecture Award**
Presented at Thursday evening plenary session at 5:00 pm
**Nicholas A. Peppas, ScD**
University of Texas at Austin

**Rita Schaffer Young Investigator Award**
Presented at Saturday morning plenary session at 10:30 am
**Jennifer Munson, PhD**
University of Virginia

**Diversity Lecture Award**
Presented at Saturday morning plenary session at 10:30 am
**Srinivas Sridhar, PhD**
Northeastern University

**Innovation and Career Development Awards**
Presented Thursday at Engineering Low-Cost Solutions to Address Health Care Disparities session at 3:15 pm
**Angela Alexander-Bryant, PhD**
Clemson University
**Salma Ayoub**
University of Texas at Austin
**Lisa Cervia**
Duke University
**Paulette Foster**
North Carolina A & T State University
**Ruby Huynh**
Catholic University of America
**Juan Jimenez, PhD**
University of Massachusetts
**Maritza Jimenez**
University of Pittsburgh
**Meryem Pehlivaner**
Northeastern University
**Faisal Reza, PhD**
Yale University
**Evan Scott, PhD**
Northwestern University
**Woon-Hong Yeo, PhD**
Virginia Commonwealth University

**BMES Extended Abstracts: Design and Research Awards**
Presented at Friday morning plenary session at 10:15 am

**Graduate Students**
**Ali Bakhshinejad**
University of Wisconsin- Milwaukee
**Fidel Hernandez**
Stanford University
**Randall Meyer**
Johns Hopkins University
**Lei Wang**
Colorado State University
**Yang Zhu**
McGowan Institute for Regenerative Medicine

**Undergraduate Students**
**April Joy Aralar**
George Mason University
**Adam Berger**
University of Maryland
**Kevin Cyr**
Vanderbilt University
**Jack Dischler**
Wayne State University
**Nikan Namiri**
University of California, Los Angeles
**Erica Schwarz**
Johns Hopkins University
**Shania Shaji**
Widener University

**BMES Student Chapter Awards**
Presented at Saturday morning plenary session at 10:30 am

2016 Outstanding Achievement Award
**BMES Student Chapter at Virginia Tech/ Wake Forest University**

2016 Commendable Achievement Award
**BMES Student Chapter at Clemson University**

2016 Outstanding Mentoring Program Award
**BMES Student Chapter at University of Illinois, Urbana-Champaign**

2016 Outstanding Chapter-Industry Achievement Award
**BMES Student Chapter at The Ohio State University**

2015 Fleetest Feet Award
**BMES Student Chapter Virginia Tech/Wake Forest—46,680 miles**
**Honorable Mentions**

BMES Student Chapter at Johns Hopkins University
BMES Student Chapter at San Jose State University
BMES Student Chapter at University of Southern California

**Annals of Biomedical Engineering (ABME)**

**Most Downloaded**

*Hockey STAR: A Methodology for Assessing the Biomechanical Performance of Hockey Helmets.*
Bethany Rowson, Steven Rowson, Stefan M. Duma

**Most Cited**

*Biologic Scaffolds for Regenerative Medicine: Mechanisms of In vivo Remodeling.*
Ricardo Londono, Stephen F. Badylak

**Cardiovascular Engineering and Technology**

**Most Downloaded**

*The 'Sphere': A Dedicated Bifurcation Aneurysm Flow-Diverter Device.*
Thomas Peach, J. Frederick Cornhill, Anh Nguyen, Howard Riina, and Yiannis Ventikos

**Most Cited**

*Biodegradable Stents: Biomechanics Modeling Challenges and Opportunities.*
James E. Moore Jr., Joao S. Soares, Kumbakonam R. Rajagopal

**Cellular and Molecular Bioengineering**

**Most Downloaded**

Anna-Lena Cost, Pia Ringer, Anna Chrostek-Grashoff, and Carsten Grashoff

**Editor’s Choice Award**

*Probing the Biophysical Properties of Primary Breast Tumor-Derived Fibroblasts.*
Turi A. Alcocer, Francois Bordeleau, Shawn P. Carey, Marsha C. Lampi, Daniel R. Kowal, Sahana Somasegar, Sonal Varma, Sandra J. Shin, Cynthia A. Reinhart-King
Cellular and Molecular Bioengineering 2015, 8(1): 76–85.

Note: the Editor-in-Chief Michael King recused himself from this year’s Editor’s Choice selection process.

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**CONGRATULATIONS! BMES 2016 CLASS OF FELLOWS**

BMES Fellow status is a distinguished honor awarded to members with outstanding qualifications and experience, who have demonstrated exceptional achievement in the field of biomedical engineering. Recipients have also maintained a consistent record of membership and participation within the Society.

**FELLOWS RECIPIENTS**

Stelios Andreadis, PhD
Bahman Anvar, PhD
Jason H. T. Bates, PhD, DSc
John P. Fisher, PhD
Ali Khademhosseini, PhD
Sanjay Kumar, MD, PhD
Elizabeth G. Loboa, PhD
Angélique Louie, PhD
Béla Suki, PhD

Fellows will receive Awards at the Pritzker Lecture on Thursday, October 8, 2016 at 5:00pm.
Bioinformatics and Systems Biology
Amina Qutub
Rice University
Casim Sarkar
University of Minnesota

Biomaterials
Shelly Peyton
University of Massachusetts Amherst
Brendan Harley
University of Illinois UC

Biomechanics
Lance Davidson
University of Pittsburgh
Tanmay Lele
University of Florida

Biomedical Engineering Education
Monty Reichert
Duke University
Amy Lerner
University of Rochester

Biomedical Imaging and Optics
Richard Price
University of Virginia
Paolo Decuzzi
Instituto Italiano di Tecnologia

Cancer Technologies
Taher Saif
University of Illinois Urbana-Champaign
Nastaran Kuhn
National Cancer Institute, NIH

Cardiovascular Engineering
Kristyn Masters
University of Wisconsin
Anjelica Gonzalez
Yale University

Cellular and Molecular Bioengineering
Susan Thomas
Georgia Tech
Alisa Morss Clyne
Drexel University

Device Technologies and Biomedical Robotics
Dan Ratner
University of Washington
Walt Baxter
Medtronic

Drug Delivery
Michael King
Cornell University
Dan Zarraga
Genentech

Nano and Micro Technologies
Yaakov Nahmias
Hebrew University
Daniel Irimia
Harvard University

Neural Engineering
Michelle LaPlaca
Georgia Tech
Deanna Thompson
Rensselaer Polytechnic Institute

Orthopedic and Rehabilitation Engineering
Nadeen Chahine
Feinstein Institute
Luis Cardoso
The City College of New York

Respiratory Bioengineering
Susan Margulies
University of Pennsylvania

Stem Cell Engineering
Taby Ahsan
Tulane University
Eben Alsberg
Case Western Reserve

Tissue Engineering
Adam W. Feinberg
Carnegie Mellon University
Howard Matthew
Wayne State University

Translational Biomedical Engineering
Roger Kamm
Massachusetts Institute of Technology
Rashid Bashir
University of Illinois Urbana-Champaign

Undergraduate Research, Design & Leadership
Delphine Dean
Clemson University
Sherry Harbin
Purdue University
Thank you to our Reviewers for their Time and Effort

**Bioinformatics, Computational and Systems Biology**

Benjamin Cosgrove  
Ranjan Dash  
Colin Drummond  
Taeyouon Kim  
Pamela Kreeger  
Stacey Finley  
Ashlee Ford Versypt  
Jeff Holmes  
Mahendra Kavdia  
Matthew Lazzara  
Rob MacLeod  
Megan McClean  
Kathryn Miller-Jensen  
David Noren  
David Odde  
Jason Papin  
Shayn Peirce  
Amina Qutub  
Amanda Randles  
Casim Sarkar  
Cheemeng Tan  
Lufang Zhou

**Biologics**

Kyung Jae Jeong  
Ho-Wook Jun  
Salman Khetani  
Joseph Kinsella  
Vipul Kishore  
Kyle Lampe  
Jungwoo Lee  
Jennifer Leight  
Yan Li  
Xiaohua Liu  
Maureen Lynch  
Mary Beth Monroe  
Monica Moya  
Rene Olives-Navarrete  
Jennifer Patterson  
George Pins  
Jerald Redmond  
David Rubenstein  
Treena Arinzech  
Jai Rudra  
Alisha Sarang-Siemiwski  
Stephanie Seiditts  
Blanka Sharma  
Eduardo Silva  
Aleksander Skardal  
Cherie Stabler  
Jan Stegemann  
Joe Tien  
Alice Tomei  
Scott Verbridge  
William D Wagner  
Qun Wang  
Hui Wei  
Jeff Wolchok  
Young-sup Yoon  
David Zaharoff  
Ge Zhang  
Feng Zhao  
Donghui Zhu  
Janet Zoldan  
Silviya Zuytak

**Biomechanics**

Mohammad Abedinassab  
Kyle Allen  
Kartik Balachandran  
Janet Barzilia  
Kristen Billiar  
Dwight Bronson  
Ashley Brown  
Stuart Campbell  
Rhima Coleman  
Kareen Coulombe  
Jennifer Currey  
Guohao Dai  
Jaydip Desai  
Eno Ebow  
Steve Fening  
Matthew Fisher  
Bingmei Fu  
F. Scott Gayzik  
Keith Gooch  
Umut Gurkan  
Jeff Holmes  
Yujian Huang  
Jessica Isaacs  
Lance Kim  
Roland Kaunas  
Andrew Kemper  
Taeyouon Kim  
Ryan Koppes  
Murali Krishnamurthy  
Lik Chuan Lee  
Christopher Lemmon  
Susan Lessner  
Jun Liao  
Robert Allen  
Margaret Lowder  
Walter Murfee  
Ruth Ochia  
Muralidhar Padala  
Amit Pathak  
Robert Peattie  
Ferris Pfeiffer  
Christopher Price  
Ellie Rahbar  
Sharan Ramaswamy  
Christopher Raub  
Noah Rosenblatt  
Jonathan Rylander  
Ali Sadegh  
Saravan Kumar  
Shamugavelayudam  
Yan-Ting Shiu  
Joao Soares  
Kimberly Stroka  
Paul Sundaram  
Costin Untaroiu  
Antonio Valdevit  
Siqi Wang  
Vincent Wang  
Yong Yang  

**Biomedical Engineering Education**

Jeremy Ackerman  
Nastaran Alinezhadbalalami  
Robert Allen  
Casey Ankeny  
Janet Barzilia  
Kristen Billiar  
Gary Brookings  
Lola Brown  
Joel Bumgardner  
Daniel Cavanagh  
Ting Chen  
Olivia Ciado  
Jennifer Currey  
Thomas Everett  
Paul Fagette  
John Fisher  
Richard Goldberg  
Connie Hall  
Yujian Huang  
Jessica Isaacs  
Jennifer Kang-Mieler  
Murali Krishnamurthy  
Jacqueline Linnes  
Margaret Lowder  
Jean-Michel Maarek  
Rob MacLeod  
Ashwin Nair  
Ruth Ochia  
Raquel Perez-Castillejos  
Ferris Pfeiffer  
Brian Plouffe  
Marcia Pool  
Harcharan Ranu  
Jerald Redmond  
Katherine Reuther  
Mark Ruesegger  
Alisha Sarang-Siemiwski  
Steven Schreiner  
Erkin Seker  
Scott Sell  
Jesse Shearin  
Allison Sieving  
C. LaShan Simpson  
Anita Singh  
Deborah Wells  
Jenny Amos  
Conrad Zapanta  
Jason Zara

**Biomaterials**

Vinay Abhyankar  
Josephine Allen  
Deirdre Anderson  
Joel Bumgardner  
Gulden Camci-Unal  
Hao Cheng  
Lesley Chow  
Jeanine Coburn  
Mark Cronin-Golomb  
Roche de Guzman  
Tara Deans  
Craig Duval  
John Fisher  
Gargi Ghosh  
Daniel Alge  
Jordan Green  
Teja Guda  
Jiang He  
Rebecca Heise  
Ngan Huang  
Jeffrey Jacot
ABSTRACT REVIEWERS

Thank you to our Reviewers for their Time and Effort

Biomedical Imaging & Optics

Milad Akhlaghi Bouzan
Santosh Aryal
Carolyn Bayer
Kim Butts Pauly
Charles Caskey
Mark Cronin-Golomb
Wawrzyniec Dobrucki
Amber Doiron
Daniel Elson
Thomas Everett
Samuel Grant
Joan Greve
Teja Guda
Aysegul Gunduz
Jiang He
John Hossack
Song Hu
Schön Ingmar
Javier Jo
Kim Kelly
Jaehong Key
Alexander Klibanov
Abigail Koppes
Ana Martins
Luca Menichetti
Craig Meyer
Wilson Miller
Walter O’Dell
Rui Pereira
Adrian Podoleneau
Steven Poelzing
Christopher Price
Yi Wang
Baohong Yuan
Lufang Zhou

Cancer Technologies

Nastaran Alinezhadbalalami
Brian Booth
Katie Bratlie
Kris Dahl
Anthony Dickherber
Stacey Finley
Daniel Gallego-Perez
Gargi Ghosh
Cheryl Gomillion
Adam Hall
Xiaoming He He
Kazunori Hoshino
Anjana Jain
Mathumai Kanapathipillai
Yonghun Kim
Joseph Kinsella
Pamela Kreeger
Nastaran Kuhn
Matthew Lazzara
Jungwoo Lee
Jennifer Leight
Chien-Chi Lin
Wenge Liu
Song Lou
Susan McCarthy
Carolina Salvador Morales
Ashwin Nair
David Odde
Walter O’Dell
Amit Pathak
Harcharan Ranu
Taher Saif
Jessica Shearin
Kermyly Stroka
Ming Su
Scott Verbridge
Shunqiang Wang
Shannon Weigum
Ian Wong
Lori Young
David Zaharoff

Cardiovascular Engineering

Chad Abunassar
A. George Akingba
Robert Akins
B. Rita Alevriadou
Josephine Allen
Deirdre Anderson
Kartik Balachandran
Kristen Billiar
Lauren Black III
Eric Brey
Ashley Brown
Lola Brown
Stuart Campbell
Naomi Chesler
Olivia Cioido
Daniel Conway
Karen Coulombe
Ranjani Dash
Wawrzyniec Dobrucki
Eno Ebong
Thomas Everett
Bingmei Fu
F. Scott Gayzik
Anjelica Gonzalez
Keith Gooch
Joan Greve
Jeff Holmes
Ngan Huang
Thomas Hund
Jeffrey Jacot
Jian Jimenez
Lid Chuan Lee
Jun Liao
Margaret Lowder
Rob MacLeod
Rolle Marsha
Kristyn Masters
Karen May-Newman
Megan McCain
Walter Murfey
Muralidhar Padala
Robert Peattie
Shayn Peirce
Manu Platt
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Ramesh Raghupathy
Sharan Ramaswamy
Arthur Ritter
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Yan-Ting Shiu
Eduardo Silva
Joao Soares
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Horst von Recum
Siqi Wang
Sami Yazdani
Ying Zheng

Cellular and Molecular Engineering

Vinay Abhyankar
B. Rita Alevriadou
Kristen Billiar
Brian Booth
Ashley Brown
Stuart Campbell
Nilay Chakraborty
Hao Cheng
Kris Dahl
Guohao Dai
Ranjani Dash
Dennis Discher
Henry Donahue
Eno Ebong
Amir Farnoud
Stacey Finley
Bingmei Fu
Jason Gleichorn
Jordan Green
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Umut Gurkan
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Steven Jay
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Salman Khetani
Chandra Kothapalli
Pamela Kreeger
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Michael Lawrence
Matthew Lazzara
Christoph Lemmon
Susan Lessner
Jamal Lewis
Chien-Chi Lin
Maureen Lynch
Rolle Marsha
Venkat Maruthamuthu
Karen May-Newman
Megan McCain
Megan McLean
Kathryn Miller-Jensen
Kristen Mills
Melissa Moss
Walter Murfey
Keith Neeves
David Odde
Anthony Passerini
Amit Pathak
Robert Peattie
Ellie Rahbar
Alisha Sarang-Siemienski
Casim Sarkar
Karl Schilke
Daniel Schmidt
Evan Scott
Stephanie Seidilts
Joao Soares
Sarah Stabenfeldt
Kimberly Stroka
Ming Su
Paul Sundaram
Cheemeng Tan
Alice Tomei
Maribel Vazquez
William D Wagner
Yong Yang
Thank you to our Reviewers for their Time and Effort

Device Technologies and Biomedical Robotics
Mohammad Abedinnasab
Chad Abunassar
Robert Allen
Walt Baxter
Gary Brookin
Jaydip Desai
Daniel Elson
F. Scott Gayzik
Richard Goldberg
Seunghyun Kim
Ryan Koppes
Jacqueline Linnes
Muralidhar Padala
Ferris Pfeiffer
Harcharan Ranu
Daniel Ratner
Arthur Ritter
Steven Schreiner
Kevin Soucy
Ming Su
Alexandrina Untaroiu
Shunqiang Wang
Jia Yao
Xiaopeng Zhao

Drug Delivery
Daniel Alge
Nastaran Alinezhadbalalami
Katie Bratlie
Lola Brown
Hao Cheng
Jeannine Coburn
Kris Dahl
Roche de Guzman
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Horst von Recum
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Nano and Micro Technologies
Vinay Abhyankar
Chad Abunassar
Alptekin Aksan
Shyam Aravamudhan
Vince Beachley
Francois Berthiaume
Xuanhong Ceng
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Shunqiang Wang
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Orthopedic and Rehabilitation Engineering
Mohammad Abedinnasab
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Larry Bonassar
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Gary Brookin
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Luis Cardoso
Nadeen Chahine
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Eric Darling
Henry Donahue
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Steve Fening
John Fisher
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Clark Hung
Javier Jo
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Vincent Wang

Neural Engineering
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Aysegul Gunduz
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Mathumai Kanapathippillai
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Takashi Kozai
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Sabato Santaniello
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Anita Singh
Sarah Stabenfeldt
Stuart Tobet
Aijun Wang
Siqi Wang
Xuefeng Wei
Jeffrey Zahn
Xiaopeng Zhao

Minneapolis | BMES 2016
**Respiratory Bioengineering**
Said Audi  
Jason Bates  
Ranjan Dash  
Marcel Filoche  
Samir Ghadiali  
Rebecca Heise  
David Kaczk  
Arthur Ritter  
Bela Suki  
Daniel Tschumperlin  
Siqi Wang  
Tilo Winkler

**Stem Cell Engineering**
Treena Arinzeh  
Gulden Camci-Uinal  
Rhima Coleman  
Kris Dahl  
Guohao Dai  
Tara Deans  
John Fisher  
Patrick Hsieh  
Jeffrey Jacot  
Roland Kaunas  
Kristopher Kilian  
Chandra Kothapalli  
Chien-Chi Lin  
Maureen Lynch  
Rolle Marsha  
Walter Murfee  
Shayn Peirce  
Sharan Ramaswamy  
Stephanie Seidlits  
Blanka Sharma  
Eduardo Silva  
Jan Stegemann  
Emmanuel (Manolis) Tzanakakis  
Horst von Recum  
Kaiming Ye

**Tissue Engineering**
Ashutosh Agarwal  
Robert Akins  
Patrick Alford  
Deirdre Anderson  
Treena Arinzeh  
Randolph Ashton  
Kartik Balachandran  
Lauren Black Iii  
Lola Brown  
Gulden Camci-Uinal  
Stuart Campbell  
Tzahi Cohen-Karni  
Roche de Guzman  
Thomas Gaborski  
Jordan Green  
Teja Guda  
Jeffrey Jacot  
Kyung Jae Jeong  
Kristopher Kilian  
Deok-Ho Kim  
Abigail Koppes  
Mai Lam  
Jan Lammersing  
Kyle Lampe  
Haipeng Liu  
Rolle Marsha  
Howard Matthew  
Megan McCain  
Jordan Miller  
Monica Moya  
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 Rachelle Palchesko  
Sharan Ramaswamy  
Blanka Sharma  
Aleksander Skardal  
Sarah Stabenfeldt  
Kelly Stevens  
Paul Sundaram  
Harini Sundararaghavan  
Joe Tien  
William D Wagner  
Qun Wang  
Yong Yang  
Kaiming Ye

**Translational Biomedical Engineering**
A. George Akingba  
Deirdre Anderson  
Rashid Bashir  
Gary Bowlin  
Gary Brooking  
Wawrzyniec Dobrucki  
Thomas Everett  
Amir Farnoud  
Samuel Grant  
Aysegul Gunduz  
Samir Iqbal  
Roger Kamm  
Salman Khetani  
Jamal Lewis  
Carolina Salvador Morales  
Muralidhar Padala  
Kidong Park  
George Pins  
Jai Rudra  
Hui Wei  
David Zaharoff  
Pinar Zorlutuna

**Undergraduate Research, Design & Leadership**
Mohammad Abedinnasab  
Chad Abunassar  
Milad Akhlaghi Bouzan  
B. Rita Alevriadou  
Nastaran Alinezhadbalalami  
Janet Barzila  
Jason Bates  
Dwight Bronson  
Ashley Brown  
Daniel Cavanagh  
Jun Cheng  
Hansang Cho  
Lesley Chow  
Olivia Ciado  
Brady Culbreth  
Ranjan Dash  
Brian Dean  
Tara Deans  
Jaydip Desai  
Anthony Dickherber  
Paul Fagette  
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George Fercana  
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Drishya Nair  
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Rui Pereira  
Vipul Raikar  
Harcharan Ranu  
Jorge Rodriguez  
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Aleksander Skardal  
Paul Sundaram  
Aby Thyparambil  
William D Wagner  
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Jeffrey Willey  
Tong Ye  
Lufang Zhou
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<td>8:00 am–9:30 am</td>
<td><strong>Platform Sessions-Thurs-1</strong></td>
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<tr>
<td>9:00 am–10:00 am</td>
<td><strong>Industry Session: Intellectual Property: Patent Process</strong></td>
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<tr>
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<td>Room 201</td>
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<tr>
<td>9:30 am–5:00 pm</td>
<td><strong>Exhibit Hall Open</strong></td>
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<tr>
<td>9:30 am–10:15 am</td>
<td><strong>Poster Viewing with Authors &amp; Refreshment Break</strong></td>
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<tr>
<td>10:15 am–11:30 am</td>
<td><strong>Plenary Session</strong></td>
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<td>Auditorium</td>
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<td>State of the Society Rich Hart, PhD</td>
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<td>The Wallace H. Coulter Award for Healthcare Innovation Award Lecture</td>
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<td>Omar Ishrak</td>
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<tr>
<td>11:45 am–12:45 pm</td>
<td><strong>Celebration of Minorities in BME Luncheon</strong></td>
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<td>Ballroom A</td>
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<td>Additional Ticket Purchase Required</td>
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<tr>
<td>12:00 noon–2:00 pm</td>
<td><strong>Industry Session: Technology Transfer Pitches and Networking</strong></td>
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<tr>
<td></td>
<td>Room 201</td>
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<tr>
<td>1:00 pm–2:30 pm</td>
<td><strong>Platform Sessions-Thurs-2</strong></td>
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<td></td>
<td>Convention Center</td>
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<td>See pages 82–91</td>
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<tr>
<td>1:00 pm–2:30 pm</td>
<td><strong>Meet the Expert: NIH Funding: Meet Program Directors, Reviewers, and Awardees</strong></td>
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<tr>
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<td>Room 204</td>
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<td>See page 90</td>
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<tr>
<td>1:00 pm–5:00 pm</td>
<td><strong>Special Session: International Symposium on Biomedical Engineering</strong></td>
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<tr>
<td>2:15 pm–5:00 pm</td>
<td><strong>Industry Session: Special Industry Topics</strong></td>
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<tr>
<td>3:14 pm–4:45 pm</td>
<td><strong>Special Session: Engineering Low-Cost Solutions to Address Health Care Disparities</strong></td>
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<tr>
<td>3:15 pm–4:45 pm</td>
<td><strong>Plenary Session: Robert A. Pritzker Distinguished Lecture</strong></td>
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<tr>
<td>5:00 pm–6:00 pm</td>
<td><strong>Hosted Receptions–Minneapolis Hilton</strong></td>
</tr>
</tbody>
</table>

See pages 57 for list
### Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

#### OP-Thurs-1-1  
**Auditorium 1**

**Tracks:** Biomechanics, Cellular and Molecular Bioengineering

**The Nucleus and Cytoskeleton in Mechanobiology**  
*Chairs:* Jan Lammerding, Venkat Maruthamuthu

**8:00 am**  
**Activating the Nuclear Piston Mechanism to Generate Intracellular Pressure During 3D Tumor Cell Migration—INVITED**  
Ryan Petrie¹  
¹Drexel University, Philadelphia, PA

**8:15 am**  
**LINC Complex Disruption Enhances Nuclear Deformability and Cell Transit Through Narrow Constrictions**  
Gregory Fedorchak¹, Jineet Patel¹, Patricia Davidson², and Jan Lammerding¹  
¹Cornell University, Ithaca, NY, ²Institut Curie, Paris, France

**8:30 am**  
**As the Beating Heart Stiffens in Development, So Does the Nuclear Lamina**  
Sangkyun Cho¹, Stephanie Majkut¹, Kenneth Vogel¹, Amal Abbas¹, Manorama Tewari¹, Jerome Irianto¹, Andrea Liu¹, Sam Safran², and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA, ²Weizmann Institute, Rehovot, Israel

**8:45 am**  
**Regulation of Single Stress Fiber Mechanics by Cell Geometry and Actin Network Architecture**  
Elena Kassianidou¹, Christoph Brand², Ulrich Schwarz², and Sanjay Kumar¹  
¹UC Berkeley, Berkeley, CA, ²Institute for Theoretical Physics and BioQuant, Heidelberg University, Heidelberg, Germany

**9:00 am**  
**Force-history Dependence and Reinforcement of Actin Filaments at the Single Molecular Level**  
Hyunjung Lee¹, Shoichiro Ono², Suzanne Eskin¹, Cheng Zhu¹, and Larry McIntire¹  
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA

**9:15 am**  
**The Role of Cytoskeleton and Ion Channels In Cell Decision-Making Under Confinement**  
Alexandros Afthinos¹, Runchen Zhao¹, and Konstantinos Konstantopoulos¹  
¹The Johns Hopkins University, Baltimore, MD

### OP-Thurs-1-2  
**Auditorium 2**

**Track:** Cancer Technologies

**Emerging Technologies for Cancer Treatment**  
*Chairs:* Tony Dickherber, Keyue Shen

**8:00 am**  
**Toward Targeting the Physical Hallmarks of Tumors with Pulsed Electric Field Ablation Therapy—INVITED**  
Scott Verbridge¹, Jill Ivey¹, Eduardo Latouche¹, Akanksha Karitkar¹, Mike Sano², Zhi Sheng³, John Rosmeisl¹, and Rafael Davalos¹  
¹Virginia Tech, Blacksburg, VA, ²Stanford University, Stanford, CA, ³Virginia Tech Carilion Research Institute, Roanoke, VA

**8:15 am**  
**Prussian Blue Nanoparticle-based Photothermal Therapy Combined with Checkpoint Inhibition for Photothermal Immunotherapy of Neuroblastoma**  
Juliana Cano-Mejia¹, Elizabeth Sweeney¹, Rachel Burga¹, Catherine Bollard¹, Anthony Sandler¹, John Fisher², C. Russell ‘Y. Cruz¹, and Rohan Fernandes³  
¹Children’s National Health System, Washington, DC, ²University of Maryland, College Park, MD, ³Children’s National Health System, Washington, DC

**8:30 am**  
**Microporous Scaffolds For Early Detection of Circulating Pancreatic Cancer Cells**  
Grace Bushnell¹, Lidong Wang¹, Shreyas Rao², Rachel Dudek¹, Yining Zhang¹, Robert Oakes¹, Jacqueline Jeruss¹, Diane Simeone¹, and Lonnie Shea¹  
¹University of Michigan, Ann Arbor, MI, ²University of Alabama, Tuscaloosa, AL

**8:45 am**  
**Mapping Tumor Cell Drug Response as a Function of Matrix Context Using Combinatorial Cell Microarrays**  
Kerim Kaylan¹, Stefan Gentile¹, Lauren Milling¹, Kaustubh Bhinge², Farhad Kosari², and Gregory Underhill¹  
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Mayo Clinic, Rochester, MN

**9:00 am**  
**3D In Vitro Platform to Isolate Dormancy-Capable Cancer Cells**  
Julian Preciado¹, Eduardo Reategui¹, Emil Lou¹, Samira Azarín¹, and Alptekin Aksan¹  
¹University of Minnesota, Minneapolis, MN

**9:15 am**  
**A Mathematical Framework for Ultra-sensitive Detection of Cancer Using Activity-Based Biomarkers**  
Gabe Kwong¹  
¹Georgia Tech & Emory, Atlanta, GA
Thursday, October 6 | 8:00 am—9:30 am | Platform Session 1

**OP-Thurs-1-3**  
**Auditorium 3**

**Tracks: Biomechanics, Cardiovascular Engineering**

**Cardiovascular Biomechanics I**

**Chairs:** Ellie Rahbar, Saravan Kumar
Shanmugavelayudam

**8:00 am**

**Hemodynamic Reflex Compensation in Acute Infarction: Implications for Ventricular Remodeling**

Colleen M. Witzenburg¹, Wade Zhang¹, Brooke T. Sutherland¹, and Jeffrey W. Holmes¹  
¹University of Virginia, Charlottesville, VA

**8:15 am**

**Pulmonary Artery Stiffening is Evident by Changes in Nonlinear Mechanical Properties in Canine PAH**

Mark Golob¹, Gregory Wolf¹, Omid Forouzan¹, Ashley Mulchrone¹, Heidi Kellihan¹, Melissa Bates², and Naomi Chesler¹  
¹University of Wisconsin-Madison, Madison, WI, ²University of Iowa, Iowa City, IA

**8:30 am**

**Hydrostatic Stress Regulates Tissue Compaction, Polarity, and Matrix Stiffness in the Developing Atrioventricular Valve**

David Bassen¹, Rishabh Singh¹, Russell Gould¹, Philip Buskohl¹, and Jonathan Butcher¹  
¹Cornell University, Ithaca, NY

**8:45 am**

**Tsai-Hill Maximum-Work Theory: An Anisotropic Failure Criterion For Fibrous Biological Tissues**

Christopher Korenczuk¹, Lauren Votava¹, Rohit Dhume¹, and Victor Barocas¹  
¹University of Minnesota, Minneapolis, MN

**9:00 am**

**Adaptive Remodeling of the Right Ventricle Myocardium in Response to Pulmonary Hypertension: Towards Physical Understanding and Prediction**

Reza Avazmohammadi¹ and Michael Sacks¹  
¹University of Texas at Austin, Austin, TX

**9:15 am**

**Do Pressure-Volume Loops Accurately Measure Heart Tissue Stiffness? A Comparison with Biaxial Tensile Testing**

Rachel Childers¹, Aaron J. Trask¹, Jun Liu¹, Pamela A. Lucchesi², and Keith J. Gooch¹  
¹The Ohio State University, Columbus, OH, ²Nationwide Children’s Hospital Research Institute, Columbus, OH


**OP-Thurs-1-4**  
**Room 102AB**

**Track: Tissue Engineering**

**Bioreactor Systems for Tissue Engineering**

**Chairs:** Roche deGuzman, Harini Sundararaghavan

**8:00 am**

**Tissue Engineering Bioreactors for Regenerative Medicine and Study of Disease—INVITED**

Gordana Vunjak-Novakovic¹, Kacey Ronaldson¹, Sarindr Bhumiratana², and Keith Yeager¹  
¹Columbia University, New York, NY, ²epiBone, New York, NY

**8:30 am**

**Ex Vivo Arterial Culture for Assessment of Compliance–Induced Intimal Hyperplasia**

Diaz-Rodriguez¹, Jonathan Kulwatno¹, Juan Felipe Diaz Quiroz², Alysha Kishan², Allison Post², Elizabeth Cosgriff-Hernandez³, and Mariah Hahn¹  
¹Rensselaer Polytechnic Institute, Troy, NY, ²Texas A&M University, College Station, TX

**8:45 am**

**A Study of Matrix Remodeling in Aortic Heart Valve Cusps in Response to Tunable Biaxial Cylindrical Stress**

Ying Lei¹, Shirin Masjedi¹, and Zannatul Ferdous¹  
¹The University of Tennessee, Knoxville, Knoxville, TN

**9:00 am**

**Cardiac Valve Bioreactor Capable of Physiological Conditioning**

Brandon Tefft¹, Daniel Spoon¹, Ryan Hennessy¹, Nicholas Stoyles¹, Melissa Young¹, Soumen Jana¹, Dan Dragomir-Daescu¹, Robert Simari², and Amir Lerman¹  
¹Mayo Clinic, Rochester, MN, ²University of Kansas Medical Center, Kansas City, KS

**9:15 am**

**Tissue Engineered Tendon Grafts using Oscillatory Mechanostimulation**

Zachary Mussett¹, Mary E. Hoover¹, and Vassilios Sikavitsas¹  
¹University of Oklahoma, Norman, OK

**OP-Thurs-1-5**  
**Room 102C**

**Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering**

**Musculoskeletal Tissue Engineering**

**Chairs:** Elizabeth Loboa, Henry Donahue

**8:00 am**

**Strategies for Functional Tissue Engineering of Articular Cartilage—INVITED**

Clark Hung¹, Andrea Tan¹, Brendan Roach¹, Adam Nover¹, Alex Cigan¹, Robert Nims¹, Kacey Marra¹, and James Cook³  
¹Columbia University, New York, NY, ²University of Pittsburgh, Pittsburgh, PA, ³University of Missouri, Columbia, MO

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BMES 2016 | Minneapolis
Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

8:30 am  
**A Continuous Pore Size Gradient PLLA Scaffold for Os-**
**teochondral Regeneration**
Riccardo Gottardi1, Gioacchino Conoscenti2, Peter Alexander1, Paul Manner3, Vincenzo La Carrubba2, Valerio Brucato2, and Rocky Tuan1  
1University of Pittsburgh, Pittsburgh, PA, 2Università degli Studi di Palermo, Palermo, Italy, 3University of Washington, Seattle, WA

8:45 am  
**In Situ Tissue Regeneration Via Robust, Bio-**
**adhesive, and Cell-Infiltrating Supramolecular Gelatin**
Hydrogels
Liming Bian1, Qian Feng1, and Kongchang Wei1  
1Chinese University of Hong Kong, Shatin, Hong Kong

9:00 am  
**Microfluidic Flow Cell Array Printing for Engineered**
**IVD and Musculo-skeletal Tissues**
David Ede1  
1University of Utah, Salt Lake City, UT

9:15 am  
**Magnetic Sorting Offers Rapid, High-Throughput**
**Isolation of ALPL+ Cells from Lipoaspirate**
Bryan Sutermaster1 and Eric Darling1  
1Brown University, Providence, RI

9:00 am  
**Probing the Roles of Neutrophil Extracellular Trap**
**Components with Synthetic DNA-Histone Structures**
Cameron Louttit1, Priya Weerappul1,2, Taisuke Kojima1, Midori Maeda1, Cameron Yamanishi1, Shuichi Takayama1, and James Moon1  
1University of Michigan, Ann Arbor, MI, 2Wayne State University, Detroit, MI

9:15 am  
**Engineered T Regulatory Cells (Tregs) as a Multiple**
**Sclerosis Therapeutic**
Elissa Leonard1 and Jennifer Maynard1  
1University of Texas at Austin, Austin, TX

**OP-Thurs-1-7**  
**Room 101B**

**Tracks: Cellular and Molecular Bioengineering, Nano and Micro Technologies**

**Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)**

Chair: Caroline Jones, Noel Dahl

8:00 am  
**Ultrasensitive Detection of Secreted Proteins from**
**Single Cells Using Chemically-Amplified**
**Quantum Dots**
Vanessa Herrera1, Thuy Luu1, Robert Gutierrez2, Maha Rahim1, Frances McWhorter1, Wendy Liu1, and Jered Haun1  
1University of California, Irvine, Irvine, CA

8:15 am  
**µFLISA: A New Experimental and Computational**
**Platform for Analysis of Dynamic Secretomes to**
**Identify Precise Secretory Signatures of Stem Cell**
**Mediated Cardioprotection**
Kshitiz Kz1, David Ellison2, Yasir Suhai2, Junaid Afzal2, Laura Woo2, and Andre Levchenko1  
1Yale University, West Haven, CT, 2Johns Hopkins University, Baltimore, MD

8:30 am  
**A Multiplexed Digital Microfluidic Dispenser for**
**Quantitative Nanoliter Droplet Analysis**
Jinzhen Fan1,2,3, Baoqing Li2,3, Fernando Villarreal1, Brent Weyers1, Cheemeng Tan1, and Tingrui Pan1  
1University of Science and Technology of China, Hefei, China, 2University of Science and Technology of China, Hefei, China, 3University of Science and Technology of China, Hefei, China, People’s Republic of China

8:45 am  
**Capillary Electrophoresis Coupled with Micro Free**
**Flow Electrophoresis for High Speed Comprehensive**
**Two-Dimensional Analysis of Peptides**
Alexander Johnson1 and Michael Bowser1  
1University of Minnesota, Minneapolis, MN

9:00 am  
**Enabling Multiplexed Single-cell Measurement of**
**Angiogenic Receptors via Quantum dot (QD) Nano-**
**sensors: A High-throughput Quantification Approach**
Si Chen1 and P Imoukhuede1  
1University of Illinois at Urbana-Champaign, Champaign, IL,
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Room</th>
<th>Track</th>
<th>Chairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:15 am</td>
<td>Click Chemistry-Based DNA Labeling of Cells for Barcoding Applications</td>
<td>101C</td>
<td>OP-Thurs-1-8</td>
<td>Stefan Gentile¹ and Gregory Underhill¹ ¹University of Illinois at Urbana-Champaign, Urbana, IL</td>
</tr>
<tr>
<td>8:00 am</td>
<td>Tendon Injuries: Degeneration and Impaired Healing—INVITED</td>
<td>101C</td>
<td>OP-Thurs-1-8</td>
<td>Nelly Andarawis-Puri¹ ¹Cornell University, Ithaca, NY</td>
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<tr>
<td>8:30 am</td>
<td>A Nocturnal Role for Integrin Signaling from Mechanical Injury of Ligaments</td>
<td>101C</td>
<td>OP-Thurs-1-8</td>
<td>Sijia Zhang¹, Jasmine Lee¹, and Beth Winkelstein¹ ¹University of Pennsylvania, Philadelphia, PA</td>
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<tr>
<td>8:45 am</td>
<td>Characterization of Rodent Gait in Two Models of Osteoarthritis Pain</td>
<td>101C</td>
<td>OP-Thurs-1-8</td>
<td>Brittany Jacobs¹, Katherine Dunnigan¹, Margaret Pires-Fernandes¹, and Kyle Allen¹ ¹University of Florida, Gainesville, FL</td>
</tr>
<tr>
<td>9:00 am</td>
<td>Visualization of Cell Lineage and Proliferation on the Mineralizing Surface of Mechanically Loaded Tibias</td>
<td>101C</td>
<td>OP-Thurs-1-8</td>
<td>Heather Zannit¹ and Matthew Silva¹ ¹Washington University in St. Louis, Saint Louis, MO</td>
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<td>9:15 am</td>
<td>Simulated Microgravity Plus Immobilization Exacerbates Sarcopenia but not Osteopenia</td>
<td>101D</td>
<td>OP-Thurs-1-9</td>
<td>Toni Speacht¹, Andrew Krause¹, Jennifer Steiner¹, Charles Lang¹, and Henry Donahue² ¹Penn State, Hershey, PA, ²Virginia Commonwealth University, Richmond, VA</td>
</tr>
<tr>
<td>8:00 am</td>
<td>Hemodynamic and Morphological Characteristics of Mirror and Ipsilateral Cerebral Aneurysms</td>
<td>101D</td>
<td>OP-Thurs-1-9</td>
<td>Ravi Doddasomayajula¹ and Juan Cebral¹ ¹George Mason University, Fairfax, VA</td>
</tr>
<tr>
<td>8:15 am</td>
<td>Nitrite Regulates Mitochondrial Dynamics to Inhibit Vascular Smooth Muscle Cell Proliferation</td>
<td>101E</td>
<td>OP-Thurs-1-10</td>
<td>Christopher Reyes¹,², Sruti Shiva¹,²,³, Danielle Guimaraes¹, and Yinna Wang² ¹University of Pittsburgh, Pittsburgh, PA, ²Pittsburgh Heart, Lung and Blood Vascular Medicine Institute, Pittsburgh, PA, ³Center for Metabolism &amp; Mitochondrial Medicine, Pittsburgh, PA</td>
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<td>8:30 am</td>
<td>Hemodynamic Alterations Translate Into Distinct Cardiac Malformation Phenotypes</td>
<td>101E</td>
<td>OP-Thurs-1-10</td>
<td>Madeline Midgett¹ and Sandra Rugonyi¹ ¹Oregon Health &amp; Science University, Portland, OR</td>
</tr>
<tr>
<td>8:45 am</td>
<td>An In Silico Study of Hemodynamics in a Virtually Treated Growing Cerebral Aneurysm Model</td>
<td>101E</td>
<td>OP-Thurs-1-10</td>
<td>Chad Hyslop¹, Priya Nair¹, Mathew Mortensen¹,²,³, Jonathan Plasencio¹, Justin Ryan¹, Brian Chong¹, and David Frakes¹,² ¹SBHSE, Arizona State University, Tempe, AZ, ²EndoVantage, LLC, Scottsdale, AZ, ³Phoenix Children's Hospital, Phoenix, AZ, ⁴Mayo Clinic Hospital, Phoenix, AZ, ⁵ECEE, Arizona State University, Tempe, AZ</td>
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<tr>
<td>9:00 am</td>
<td>Minimum Wound Size for Clotting: Flowing Blood Coagulates on a Single Collagen Fiber Presenting Tissue Factor and von Willebrand Factor</td>
<td>101E</td>
<td>OP-Thurs-1-10</td>
<td>Shu Zhu¹, Maurizio Tomaiuolo¹, and Scott Diamond¹ ¹University of Pennsylvania, Philadelphia, PA</td>
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<tr>
<td>8:00 am</td>
<td>Mechanics Of Brain Tissue Measured By Cavitation Rheology</td>
<td>101D</td>
<td>OP-Thurs-1-9</td>
<td>Sualyneth Galarza¹, Aleksandar Mijailovic¹, Nathan Birch¹, Jessica Schifman¹, Alfred Crosby¹, Shelly Peyton¹, and Krystyn Van Vliet² ¹University of Massachusetts Amherst, Amherst, MA, ²Massachusetts Institute of Technology, Cambridge, MA</td>
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<tr>
<td>8:15 am</td>
<td>Thiol-epoxy/maleimide Ternary Networks as Softening Substrates for Bioelectronic Medicines</td>
<td>101D</td>
<td>OP-Thurs-1-9</td>
<td>Radu Reit¹, Haley Abitz¹, Neel Reddy¹, Shelbi Parker¹, Andrew Wei¹, Nicole Aragon¹, Milan Ho¹, Aaron Weittenhiller¹, Tong Kang¹, and Walter Voit¹ ¹The University of Texas at Dallas, Richardson, TX</td>
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<tr>
<td>8:30 am</td>
<td>Dynamic Modulation of Mechanically Tunable 3D ECM-Mimic for the Study of Dynamic Cell Response to Scaffold Mechanics</td>
<td>101E</td>
<td>OP-Thurs-1-10</td>
<td>Adam Munoz¹, Joseph Miller¹, Atrouli Chatterjee¹, and Cynthia Reinhart-King¹ ¹Cornell University, Ithaca, NY</td>
</tr>
</tbody>
</table>
8:45 am  Hyaluronic Acid-Based Hydrogels with Simultaneously Tunable Mechanical & Bioactive Properties
Madison Godesky1 and David Shreiber2
1Rutgers, The State University of New Jersey, New York, NY, 2Rutgers, The State University of New Jersey, Piscataway, NJ

9:00 am  Bio-Orthogonally Crosslinked, Engineered Protein Hydrogels with Tunable Mechanics and Biochemistry
Christopher Madl1, Lily Katz1, and Sarah Heilshorn1
1Stanford University, Stanford, CA

9:15 am  Viscoelastic Effect of Hydrogel Regulates Epithelial Morphogenesis
Yuan Yuan1, Kalyanaraman Vaidyanathan1, and Debanjan Sarkar1
1University at Buffalo, Buffalo, NY

* Biomaterials Track sponsored by

OP-Thurs-1-11  Room 200E
Tracks: Cardiovascular Engineering, Device Technologies and Biomedical Robotics

Cardiovascular Devices I

Chairs: Olivia Coiado, Lola Brown

8:00 am  Using Vagus Nerve Stimulation To Treat Hypertension And Hypertension-Induced Heart Disease
Elizabeth Annoni1, Xueyi Xie1, Steven Lee1, Kanchan Kulkarni1, Imad Libbus2, Bruce KenKnight2, John Osborn1, and Elena Tolkacheva1
1University of Minnesota, Minneapolis, MN, 2Cyberonics Inc., Houston, TX

8:15 am  Improving Cardiac Transplantation Using an Ex Vivo Perfusion Model and Pharmacological Posttreatment
Maria Seewald1, Erik Gaaschedelen1, Tinen Iles1, Lars Mattison1, Alexander Mattson1, Megan Schmidt1, and Paul Iaizzo1
1University of Minnesota, Minneapolis, MN

8:30 am  A Microwave-assisted Wireless Passive Stimulator of Cardiac Cells
Shyi Liu1, Ali Navaei1, Mehdi Nikkah1, and Junseok Chae1
1Arizona State University, Tempe, AZ

8:45 am  Myocardial Perfusion During Left Ventricular Assist Device Support in Normal & Heart Failure Calves
Kevin Soucy1, Dustin Phillips1, Guruprasad Giridharan1, Michael Sobieski1, Sumanth Prabhu1, Mark Slaughter1, and Steven Koenig1
1University of Louisville, Louisville, KY, 2University of Alabama at Birmingham, Birmingham, AL

9:00 am  Novel Nanomatrix Reduces Inflammation in Dynamic Conditions In Vitro and Dilates Arteries Ex Vivo
Grant Alexander1, Jeremy Vines1, Patrick Hwang1, Teayoun Kim1, Jeong-a Kim1, Brigitta Brot1, Young-Sup Yoon2, and Ho-Wook Jun1
1University of Alabama at Birmingham, Birmingham, AL, 2Emory University, Atlanta, GA

9:15 am  Detachable Small-scale Glass Microelectrode to Measure Transmembrane Potential in Contracting Hearts
Angel Moreno1, Mladen Barbic2, and Matthew Kay1
1The George Washington University, Washington, DC, 2The Howard Hughes Medical Institute, Janelia Research Campus, Ashburn, VA

OP-Thurs-1-12  Room 200F
Track: Device Technologies and Biomedical Robotics

Biosensors

Chairs: Daniel Ratner, Jeffrey LaBelle

8:00 am  Biosensor Array for Highly Sensitive and Rapid Detection of Wound Bacteria
Roya Sheybani1 and Anita Shukla1
1Brown University, Providence, RI

8:15 am  Capillary-Driven Fluidic Networks for Blood Typing via Silicon Photonic Biosensors
Shon Schmidt1, Alexander Wende1, Jonas Flueckiger2, Lukas Chrostowski2, and Daniel Ratner1
1University of Washington, Seattle, WA, 2University of British Columbia, Vancouver, BC, Canada

8:30 am  Development of an Iris Image Based Noninvasive Physiological Glucose Sensor: A Preliminary Clinical Trial
Niraj K. Gupta1 and Brent D. Cameron1
1University of Toledo, Toledo, OH

8:45 am  Real-Time Detection of Insulin Surrogate Markers with in Physiomimetic Islet Microsystems
Giovanni Lenguito1, Jonathan Witz1, Alejandro Caicedo1, and Ashutosh Agarwal1
1University of Miami, Miami, FL

9:00 am  Novel Algorithm For Multi-marker Detection In Electrochemical Impedance Spectroscopy
Chi Lin1, David Probst1, Lindsey Rider1, and Jeffrey LaBelle1
1Arizona State University, Tempe, AZ
9:15 am
Ultrasonic Transducer-Guided Electro-chemical Impedance Spectroscopy to Assess Lipid-Laden Plaques
Jianguo Ma,1 Yuan Luo,2 Rene Packard,1 Teng Ma,3 Yichen Ding,1 Parinaz Abiri,1 Yu-Chong Tai,2 Qifa Zhou,2 Kirk Shung,3 Rongsong Li,1 and Tzung Hsiai1
1University of California, Los Angeles, Los Angeles, CA, 2California Institute of Technology, Pasadena, CA, 3University of Southern California, Los Angeles, CA

OP-Thurs-1-13
Track: Biomaterials*
3D Printing and Advanced Biomaterial Manufacturing

Chairs: Kyung Jae Jeong, Teja Guda

8:00 am
Design and Characterization of Functional Microscale Bicuspid Valves Fabricated in Biocompatible Hydrogels
Samantha Paulsen¹, Bagrat Grigoryan¹, and Jordan Miller¹
¹Rice University, Houston, TX

8:15 am
Dual Crosslinking System for Stabilizing Filament-based 3D Printing of Hydrogel Structures
Christopher Highley¹, Liliang Ouyang²,³, Christopher Rodell¹, and Jason Burdick¹
¹University of Pennsylvania, Philadelphia, PA, ²Tsinghua University, Beijing, China, People’s Republic of China

8:30 am
Development of a Photoresponsive Scaffold for the Induced Release of Self-Assembled Nanostructures
Nicholas Karabin¹ and Evan Scott¹
¹Northwestern University, Evanston, IL

8:45 am
Silk Hydrogel-Based Bio-Functionalized Microfluidics
Siwei Zhao¹, Ying Chen¹, Benjamin Partlow¹, Anne Golding¹, Peter Tseng¹, Jeannine Coburn¹, Matthew Applegate¹, Jodie Moreau¹, Fiorenzo Omenetto¹, and David Kaplan¹
¹Tufts University, Medford, MA

9:00 am
3D Printing of a Cellularized Composite for Bone Repair
Caroline Murphy¹, Krishna Kolan¹, Ming Leu¹, and Julie Semon¹
¹Missouri S&T, Rolla, MO

9:15 am
3D Printing System to Fabricate Therapeutically Loaded Biopolymer Microthreads for Applications in Tissue Engineering
Meagan Carnes¹, Christopher Nycz², Jeremy Shui¹, Jacquelyn Claveau¹, Alex Markoski¹, Richard Eberheim¹, Gregory Fischer¹, and George Pins¹
¹Worcester Polytechnic Institute, Worcester, MA

* Biomaterials Track sponsored by ACS Biomaterials

Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

OP-Thurs-1-14
Room 200G
Track: Biomedical Engineering Education (BME)

Global Health Engineering 2.0: Building Educational Capacity in Africa

Chairs: William Reichert, Russell Jamison

8:00 am
The Rice University-University of Malawi Partnership: A Biomedical Engineering Capacity Building Initiative to Improve Health Care through Invention—INVITED
Maria Oden¹, Veronica Leautaud¹, Gregory Gamula¹, Theresa Mkandawire², and Rebecca Richards-Kortum¹
¹Rice University, Houston, TX, ²University of Malawi-The Polytechnic, Blantyre, Malawi

8:15 am
Interdisciplinary Solutions to Global Health Problems: A Collaboration Across Disciplines and Institutions—INVITED
Andrew Rollins¹, Henry Kiwumulo², David Mafigiri¹,², Janet McGrath³, and Robert Ssekitoleko¹
¹Case Western Reserve University, Cleveland, OH, ²Makerere University, Kampala, Uganda

8:30 am
Sustainable Biomedical Equipment Training: An Evidence-Based Model—INVITED
Brittany Zick¹, Dane Emmerling¹, Paige Scolaro¹, and Robert Malkin¹
¹Duke University, Durham, NC

8:45 am
Collaborations to Support Innovation in Biomedical Engineering in Africa—INVITED
Akinniyi Osuntoki¹, Akinwale Coker², Tania Douglas³, David Gatchell⁴, Robert Murphy⁵, and Matthew Glucksberg⁶
¹University of Lagos, Lagos, Nigeria, ²University of Ibadan, Ibadan, Nigeria, ³University of Cape Town, Cape Town, South Africa, ⁴Northwestern University, Evanston, IL, ⁵Northwestern University, Chicago, IL

9:00 am
Multinational Student Design Teams: Co-Identifying and Co-Defining Global Health Needs—INVITED
Kathleen Sienko¹, Elsie Effah Kaufmann², Samuel Obied³, Timothy Johnson¹, and Maria Young¹
¹University of Michigan, Ann Arbor, MI, ²University of Ghana -Legon, Accra, Ghana, ³Korle Bu Teaching Hospital, Accra, Ghana

9:15 am
Innovation & Design for Global Health In A Graduate BME Module: Engaging with Health Workers
Tinashe Mutsvangwa¹, Nailah Conrad¹, Oluwayotin Lawal², Folake Akintayo³, Muhammed Habeebu¹, Sunday Adetona¹, and Tania Douglas¹
¹University of Cape Town, Cape Town, South Africa, ²University of Ibadan, Ibadan, Nigeria, ³University of Lagos, Lagos, Nigeria
Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

OP-Thurs-1-15  Room 200C
Tracks: Biomedical Imaging and Optics, Tissue Engineering

Imaging Techniques in Tissue Engineering

Chairs: Paolo Decuzzi, Adam Feinberg

8:00 am
In Vitro MRI and In Vivo MRE of Mesenchymally Derived TE Constructs—INVITED
Shadi Othman
1University of the Pacific, Stockton, CA

8:30 am
Optical Clearing Affords Whole Organ Imaging and Morphometric Analysis of Cellular and Extracellular Matrix Remodeling Using a Murine Regenerating Bladder Model
Frank Marini1, Kyle Cowdrick1, Mona Zarifpour1, Christopher Booth2, Harsh Patolia2, Karl-Erik Andresson2, and George Christ1
1Wake Forest Institute of Regenerative Medicine, Winston-Salem, NC, NC, 2John Hopkins School of Medicine, Baltimore, MD, 3University of Virginia, Charlottesville, Charlottesville, VA

8:45 am
Diffuse Correlation Tomography to Accelerate Tissue-Engineering Approach for Improving Allografts
Songfeng Han1, Joseph B Vella2, Ashley R Proctor1, Danielle S W Benoit1, and Regine Choe1
1University of Rochester, Rochester, Rochester, NY, 2University of Rochester Medical Center, Rochester, NY

9:00 am
Single-photon Emission Computed Tomography (SPECT) Assessment of an Engineered Endothelium on ePTFE Vascular Grafts
Yidi Wu1, Bin Jiang1, Chad Haney1, and Guillermo Ameer1
1Northwestern University, Evanston, IL

9:15 am
Tracking Ocular Stem Cell Delivery and Tissue Regeneration with Ultra-sound and Photoacoustic Imaging
Kelsey Kubelick1, Eric Snider1, Heechul Yoon1, C. Ross Ethier1, and Stanislav Emelianov1
1Georgia Institute of Technology and Emory University, Atlanta, GA

OP-Thurs-1-16  Room 200H

Track: Drug Delivery

Nucleic Acid Delivery

Chairs: Craig Duvall, Kris Dahl

8:00 am
Targeted Nanoparticles for Delivery Of siRNA To Sites Of Early Onset Post-Traumatic Osteoarthritis
Sean Bedingfield1, Taylor Kavanaugh1, Caeley Gullett1, Thomas Werfel2, Hongik Cho2, Karen Hasty2, and Craig Duvall2
1Vanderbilt University, Nashville, TN, 2University of Tennessee, Memphis, TN

8:15 am
Reversal of Liver Fibrosis using L-tyrosine Polyurethane Nanoparticles Encapsulated with microRNA
Jeonghun Hyun1, Sihyung Wang1, Jieun Kim1, K. Madhusudana Rao1, Soo Yang Park2, Ilidoo Chung3, Chang-Sik Ha1, Sang-Woo Kim3, Youngmi Jung3, and Yang H. Yun2
1Pusan National University, Busan, Korea, Republic of, 2University of Akron, Akron, OH

8:30 am
High Content Analysis Platform for Optimization of CRISPR-Cas9 Delivery Strategies in Human Cells
Jared Carlson-Stevermer1, Benjamin Steyer1, Madelyn Goedland1, Meng Lou3, Lucille Kohlenberg1, Ryan Prestill1, and Krishanu Saha1
1University of Wisconsin-Madison, Madison, WI

8:45 am
Targeted Delivery of Brain-Penetrating Non-Viral GDNF Gene Vectors to the Striatum with MRI-guided Focused Ultrasound Reverses Neurodegeneration in a Parkinson’s Disease Model
Brian Mead1, Namho Kim2, Panagiotis Mastorakos1, Wilson Miller1, Jung Soo Suk2, Alexander Klibanov1, Justin Hanes2, and Richard Price1
1University of Virginia, Charlottesville, VA, 2Johns Hopkins University School of Medicine, Baltimore, MD

9:00 am
Essential Role of Endocytic Vesicles and Trafficking in Gene Delivery Via Electrotropnsection
Lisa Cervia1 and Fan Yuan1
1Duke University, Durham, NC

9:15 am
Nanotherapeutics for Combination Drug and Gene Therapy in Treating Glioblastoma Multiforme
Angela Alexander-Bryant1, Michael Lynn2, and Jeoung Soo Lee1
1Clemson University, Clemson, SC, 2Greenville Hospital System, Greenville, SC

OP-Thurs-1-17  Room 200B

Track: Translational Biomedical Engineering

Translation of Biomedical Products

Chairs: Roger Kamm, Andrew Smith

8:00 am
Move Over, Mice: How Integration of Systems Biology with Organs-on-Chips May Humanize Therapeutic Development—INVITED
Linda Griffith1
1MIT, Cambridge, MA

8:30 am
Point-of-Care Biochip to Quantify CD64 Expression for Sepsis Diagnosis
Umer Hassan1, Bobby Reddy1, Tor Jensen2,3, Manish Patel1, Emilee Flaugher1, Michael Rappleye1, Gillian Smith1, Zachary Price1, Paula Guevara1, Hiba Shahid1, Astha Tanna1, Tanmay Ghonge1, and Rashid Bashir1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Carle Foundation Hospital, Urbana, IL
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| 8:45 am| **A Stem Cell-Seeded Porous Hydrogel Patch for Treatment of Alveolar Air Leaks**  
Brandon Guenthart, Jinho Kim, John O'Neill, N. Valerio Dorrello, Matthew Bacchetta, and Gordana Vunjak-Novakovic  
Columbia University, New York, NY |
| 9:00 am| **Accelerating The Formation of Micro-vasculature-on-a-chip with Senescent Stromal Cells**  
Yang Xiao, Chang Liu, Jonathan Chen, Jing Zhou, Zhuo Chen, Vittorio Orlandi, Laura Niklason, and Rong Fan  
Yale University, New Haven, CT |
| 9:15 am| **The Development of a Thin-Filmed, Non-Invasive Tissue Perfusion Sensor To Quantify Capillary Pressure Occlusion Of Explanted Organs**  
Timothy O'Brien, Ali Roghanizad, Philip Jones, Charles Aardema, John Robertson, and Thomas Diller  
Virginia Tech, Blacksburg, VA |

**OP-Thurs-1-18 Room 200I**  
**Track: Respiratory Bioengineering**  
**Computational Modeling of the Respiratory System in Health and Disease**  
**Chairs:** Tilo Winkler, David Kacskas

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| 8:00 am| **A Statistical and Biophysical Model of the Young-to-Old Adult Human Lung For Predicting Function From Structure**  
Merryn Tawhai, Mahyar Osanlouy, Yuwen Zhang, Clair King, Margaret Wilsher, David Milne, Ching-Long Lin, Eric Hoffman, and Alya Clark  
University of Auckland, Auckland, New Zealand,  
Auckland District Health Board, Auckland, New Zealand,  
University of Iowa, Iowa City, IA |
| 8:15 am| **A Viscelastic Model of Alveolar and Alveolar Duct Dynamics in Bleomycin-induced Lung Injury**  
Bradford Smith, Lars Knudsen, Elena Lopez-Rodriguez, Lennart Berndt, Caroline Boden, Clemens Ruppert, Matthias Ochs, and Jason Bates  
University of Vermont, Burlington, VT, Hannover Medical School, Hannover, Germany, Justus-Liebig-University, Giessen, Germany |
| 8:30 am| **Regional Increase in Airway Wall Thickness Could Affect Overall Bronchoconstriction and Result in Airway Hyperresponsiveness in Asthma**  
Tilo Winkler  
Massachusetts General Hospital and Harvard Medical School, Boston, MA |

**8:45 am**  
**Mucociliary Clearance in Bronchial Bifurcations**  
Marcel Filoche, Michal Manolidis, Bruno Louis, Daniel Isabey, and James Grotberg  
Ecole Polytechnique, Palaiseau, France,  
Institut Mondor de Recherche Biomédicale, Créteil, France,  
Université Paris-Est, Créteil, France,  
ERL CNRS 7240, Créteil, France,  
University of Michigan, Ann Arbor, MI

**9:00 am**  
**A Novel Structural Predictor of Emphysema Progression Using a Network Model of Lung Tissue Deterioration**  
Jarred Mondoñedo and Béla Suki  
Boston University, Boston, MA,  
Boston University School of Medicine, Boston, MA

**9:15 am**  
**Optimization of Spectral Content in Oscillatory Ventilator Waveforms**  
Jacob Herrmann and David Kacskas  
University of Iowa, Iowa City, IA

**OP-Thurs-1-19 Room 200J**  
**Tracks: Neural Engineering, Nano and Micro Technologies**  
**Micro/Nano Tools in Neurosciences**  
**Chairs:** Cho Hansang, Abigail Koppes

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| 8:00 am| **Multifunctional Nanoporous Gold Coatings for Neuroengineering Applications**  
Erkin Seker  
University of California, Davis, Davis, CA |
| 8:15 am| **In Vivo Recording from Mouse Retinal Ganglion Cells Using Syringe-Injectable Electronics**  
Guosong Hong, Tian-Ming Fu, Mu Qiao, Joshua Sanes, and Charles Lieber  
Harvard University, Cambridge, MA |
| 8:30 am| **A Wireless Fully-Passive Neural Recorder Using RF Backscattering Effect**  
Shiyi Liu, Cedric Lee, Asimina Kiourti, John Volakis, and Junseok Chae  
Arizona State University, Tempe, AZ,  
The Ohio State University, Columbus, OH |
| 8:45 am| **Targeting Motoneurons Using Cholera Toxin-B Coated Protocells**  
Maria Gonzalez Porras, Paul Durfee, C. Jeffrey Brinker, Gary Sieck, and Carlos Mantilla  
Mayo Clinic, Rochester, MN,  
University of New Mexico, Albuquerque, NM |
9:00 am
Focused Ultrasound Mediated Drug Delivery from Polymeric Perfluorocarbon Nanoemulsions for Noninvasive Neuromodulation
Randall Meyer¹, Raag Airan¹, Nicholas Ellens¹, Qiuyin Ren¹, Callie Deng¹, Keyvan Farahani², Martin Pomper¹, Shilpa Kadam¹, and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD, ²National Cancer Institute/National Institutes of Health, Bethesda, MD

9:15 am
Fluorescent Cyclic Peptide Nanoparticles to Detect Amyloid-beta Aggregates in Alzheimer’s Disease
Leming Sun¹, Zhen Fan¹, Tao Yue¹, Yujian Huang¹, Jeff Kuret², Douglas Scharre³, and Mingjun Zhang¹
¹Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, ²Department of Molecular and Cellular Biochemistry, The Ohio State University College of Medicine, Columbus, OH, ³Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH

INDUSTRY SESSION
9:00 am–10:00 am Room 201
Intellectual Property: Patent Process
Chair: Ben Noe
The IP: Patent Process panel will give audience members an overview of what a patent is, types of patents, why to apply, the process and timing to apply for a patent, and a brief overview of infringement issues. Panelists will give audience members best practices and tips to consider when applying for a patent.

INDUSTRY SESSION
12:00 noon–2:00 pm Room 201
Technology Transfer Pitches and Networking
Chair: Ben Noe
This session will be a forum for select researchers and academics to pitch to companies interested in sponsoring research or licensing a technology. The technology topics will align with the commercial interests of the participating companies. All meeting attendees are welcome to sit in the audience to watch the pitches. Company representatives will be available after the pitches for questions and networking.
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

**OP-Thurs–2–1**  
**Auditorium 1**

**Tracks: Biomechanics, Cellular and Molecular Bioengineering**

**Mechanobiology of Cardiac and Smooth Muscle**

Chairs: Kimberly Stroka, Stuart Campbell

1:00 pm  
**Insights from Microtissue Models of Cardiomyopathy—INVITED**

Travis Hinson¹  
¹University of Connecticut Health Center, Farmington, CT

1:15 pm  
**Measuring Acto-myosin Mediated Mechanical Anisotropy of Vascular Smooth Muscle Cells**

Zaw Win¹, Justin Buksa¹, and Patrick Alford¹  
¹University of Minnesota, Minneapolis, MN

1:30 pm  
**Effects of Physiologic Stretch Pattern on the Endoplasmic Reticulum in Vascular Smooth Muscle Cells**

Elizabeth Bartolak-Suki¹ and Bela Suki¹  
¹Boston University, Boston, MA

1:45 pm  
**Subcellular Cytoskeleton Architecture Regulates Mechanohomeostasis of Vascular Smooth Muscle Cells**

Qianbin Wang¹, Xiaoyu Xu¹, Caroline Kopfler¹, and Weiqiang Chen¹  
¹New York University, Brooklyn, NY

2:00 pm  
**Elucidating Vascular Smooth Muscle Cell Mechano-Adaptation Laws**

Kerianne Steucke¹, Zaw Win¹, Taylor Stemler¹, Emily Walsh¹, and Patrick Alford¹  
¹University of Minnesota, Minneapolis, MN

2:15 pm  
**The Influence of Troponin C Isoforms on the Degree of Stretch Activation in Drosophila Jump Muscle**

Amy Loya¹, Devan Puhl¹, and Douglas Swank¹  
¹Rensselaer Polytechnic Institute, Troy, NY

**OP-Thurs–2–2**  
**Auditorium 2**

**Track: Cancer Technologies**

**Imaging Strategies and Molecular Profiling in Cancer**

Chairs: Kandice Tanner, Kaushal Rege

1:00 pm  
**Insights into Hallmarks of Early Carcinogenesis Using Nanoscale-Sensing Optical Microscopy—INVITED**

Vadim Backman¹  
¹Northwestern University, Evanston, IL

1:15 pm  
**Quantitative Mapping of Epidermal Growth Factor Receptor Endocytosis in Single Cancer Cells**

Phuong Le¹, Kristoffer Kilian¹, and Andrew Smith¹  
¹University of Illinois at Urbana Champaign, Urbana, IL

1:30 pm  
**Mitochondrial Morphology as a Biomarker of Cancer Phenotype and Drug Response**

Randy Giedt¹ and Ralph Weissleder¹  
¹Massachusetts General Hospital/Harvard Medical School, Boston, MA

1:45 pm  
**Spatially Resolved Chemistry Related to Tumor Progression Using Imaging ToF-SIMS**

Blake Bluestein¹, Fionnuala Morrish², David Hockenberry², and Lara Gamble¹  
¹University of Washington, Seattle, WA, ²Fred Hutchinson Cancer Research Center, Seattle, WA

2:00 pm  
**In Vivo Quantification of Cancer Cell-Surface Receptors Under Saturation Conditions by Generalized Paired-Agent Kinetic Model**

Negar Sadeghipour¹, Scott Davis², and Kenneth Tichauer¹  
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth, Hanover, NH

2:15 pm  
**Exploring Acoustic Angiography as an Early Radiation Therapy Response Evaluation Technique in Tumors**

Sunny Kaseji¹, Judith Rivera¹, Ryan Gessner², Sha Chang³, and Paul Dayton¹  
¹University of North Carolina- Chapel Hill/ North Carolina State University, Chapel Hill, NC, ²Sonovol, Chapel Hill, NC, ³UNC Chapel Hill School of Medicine, Chapel Hill, NC

**OP-Thurs–2–3**  
**Auditorium 3**

**Tracks: Biomechanics, Cardiovascular Engineering**

**Cardiovascular Biomechanics II**

Chairs: Kareen Coulombe, Joao Soares

1:00 pm  
**Pulmonary Arterial Biomechanics: Measurement, Modeling and Impact—INVITED**

Naomi Chesler¹  
¹University of Wisconsin, Madison, WI

1:30 pm  
**Interrelationships between In Vivo Tissue Stress and Interstitial Cell Deformations in the Mitral Valve Anterior Leaflet in Normal and Surgically Modified States**

Chung-Hao Lee¹, Kristen Feaver¹, Will Zhang¹, Robert Gorman², Joseph Gorman², and Michael Sacks¹  
¹The University of Texas at Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

1:45 pm
A Structural Model for the Lamellar Unit of Aortic Media Shows a Difference in the Local Stress-State for BAV and TAV Aneurysmal Tissue
James Thunes1, Julie Phillippi1, Thomas Gleason1, David Vorp1, and Spandan Maiti1
1University of Pittsburgh, Pittsburgh, PA

2:00 pm
Biomimetic Models to Study Cell Mechanobiology at the Blood-Brain Barrier
Kelsey Gray1, Marina Shumakovitch1, Dakota Katz1, and Kimberly Stroka1
1University of Maryland, College Park, College Park, MD

2:15 pm
Three-Dimensional Mechanical Behavior of the Ovine Carotid Artery Bifurcation—Insights from Geometry and Microstructure
Ryan Mahutga1, John Carruth1, Christopher Korenczuk1, and Victor Barocos1
1University of Minnesota, Minneapolis, MN

OP-Thurs-2-4 Room 102AB
Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering
Naturally-Derived and Extracellular Matrix Biomaterials in Tissue Engineering

Chairs: Bryan Brown, Jordan Miller

1:00 pm
Developmental ECM for Cardiac Regeneration and Repair—INVITED
Kyle Edmunds1, Corin Williams1, Whitney Stoppel1, Breanna Duffy2, Jacques Guyette2, Harald Ott1, Justin Weinbaum1, and Lauren Black1,2
1Tufts University, Medford, MA, 2Mass General Hospital, Boston, MA, 3University of Pittsburgh, Pittsburgh, PA, 4Tufts University School of Medicine, Boston, MA

1:30 pm
Properties of Remodeled ECM Scaffolds in the Temporomandibular Joint
Jesse Lowe1, William Chung1,2, Bryan Brown1,2, Scott Johnson1,2, Stephen Badyal1,2, and Aleandro Almarza1,2
1University of Pittsburgh, Pittsburgh, PA, 2McGowan Institute of Regenerative Medicine, Pittsburgh, PA

1:45 pm
Injectable Gel Scaffold Composed of Homogenized Acellular Tissue Conjugated with Gold Nanoparticles and Curcumin
Colten Snider1, David Grant1, Seth Sherman1, and Sheila Grant1
1University of Missouri, Columbia, MO

2:00 pm
Hybrid Scaffold of Aligned Electrospun Fiber and Fibroblast-derived Matrix for Cardiac Tissue Engineering
Muhammad Suhaeri1,2, Ramesh Subbiah1,2, Su-Hyun Kim1, Chong-Hyun Kim1, and Kwidoe Park1,2
1Korea Institute of Science and Technology, Seoul, Korea, Republic of, 2Korea University of Science and Technology, Daejon, Korea, Republic of

2:15 pm
Engineering a Pancreatic Islet Bioinstructive Microenvironment: A Comparative Study of Mouse and Human Islets
Clarissa Hernandez1, Kara Benninger1, Raghu Mirmira2, Robert Considine2, and Sherry Voytik-Harbin1
1Purdue University, West Lafayette, IN, 2Indiana University School of Medicine, Indianapolis, IN

OP-Thurs-2-5 Room 102C
Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering
Musculoskeletal Tissue Engineering II

Chairs: Jan Stegemann, Megan McCain

1:00 pm
Development of 2D and 3D Engineered Muscle Tissue Constructs—INVITED
Rebecca Duffy1 and Adam Feinberg1
1Carnegie Mellon University, Pittsburgh, PA

1:15 pm
Forward Engineering the Functionality of 3D Printed Skeletal Muscle-Powered Biological Machines
Caroline Cvetkovic1, Meghan Ferrall-Fairbanks2, Ritu Raman1, Manu Platt1, and Rashid Bashir1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Georgia Institute of Technology, Atlanta, GA

1:30 pm
Engineered Human Skeletal Muscle Tissue with Maintained Satellite Cell Pool
Jason Wang1, Mark Juhas1, Alastair Khodabukus1, and Nenad Bursac1
1Duke University, Durham, NC

1:45 pm
CRISPR Epigenome Editing to Promote Osteogenic Differentiation in Adipose-Derived Mesenchymal Stem Cells
Hunter Levis1, Niloofar Farhang1, Xue Yin1, Joshua Stover1, Brandon Lawrence1, and Robert Bowles1
1University of Utah, Salt Lake City, UT

2:00 pm
Injectable, Cell-Seeded, Modular Microtissues for Bone Regeneration in Critical Size Defects
Ramkumar Tiruvannamalai Annamalai1, Shailesh Agarwal1, Benjamin Levi1, and Jan Stegemann1
1University of Michigan, Ann Arbor, MI

2:15 pm
Validation of An Osteochondral Bioreactor Applied To Study The Protective Role Of Sex Hormones
Riccardo Gottardi1,2, Hang Lin1, Laura Iannetti1, Giovanna D’Urso1, Paolo Zunino2, Thomas Lozito1, Peter Alexander1, Paul Mannert1, Elizabeth Sefton1, Teresa Woodruff1, and Rocky Tuan1
1University of Pittsburgh, Pittsburgh, PA, 2Fondazione Ri.MED, Palermo, Italy, 3Politecnico di Milano, Milano, Italy, 4University of Washington, Seattle, WA, 5Department of Obstetrics and Gynecology, Chicago, IL

Minneapolis | BMES 2016
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<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
<th>Institution(s)</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Solving Drug Delivery Problems by Genetically Engineered Nanoparticles—INVITED</td>
<td>Ashutosh Chilkoti&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Duke University, Durham, NC</td>
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<tr>
<td>1:15</td>
<td>Design and Assembly of Nanostructured Polyvalent Biomaterials—INVITED</td>
<td>Ravi Kane&lt;sup&gt;1&lt;/sup&gt;, Chad Varner&lt;sup&gt;1&lt;/sup&gt;, Tania Rosen&lt;sup&gt;1&lt;/sup&gt;, and Anmar Arsiwala&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Georgia Tech, Atlanta, GA</td>
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<tr>
<td>1:30</td>
<td>Design, Construction and Application of an Ezrin Tension Sensor</td>
<td>Matthew Berginski&lt;sup&gt;1&lt;/sup&gt;, Andrew LaCroix&lt;sup&gt;1&lt;/sup&gt;, and Brenton Hoffman&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Duke University, Durham, NC</td>
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<tr>
<td>1:45</td>
<td>Engineering Synthetic Toehold Switch for Visualization of Single Cell microRNA Activity</td>
<td>Shue Wang&lt;sup&gt;1&lt;/sup&gt;, Nicholas Emery&lt;sup&gt;1&lt;/sup&gt;, and Allen Liu&lt;sup&gt;1&lt;/sup&gt;</td>
<td>University of Michigan, Ann Arbor, MI</td>
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<td>2:00</td>
<td>Highly Multiplexed Analysis of Cancer-specific T cells using DNA-barcoded peptide-MHC Tetramers</td>
<td>Shreyas Dahotre&lt;sup&gt;1,2&lt;/sup&gt; and Gabriel Kwong&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>Georgia Institute of Technology, Atlanta, GA, Emory University, Atlanta, GA</td>
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<td>2:15</td>
<td>Tunable Thermal Bioswitches for In Vivo Control of Microbial Therapeutics</td>
<td>Mohamad Abedi&lt;sup&gt;1&lt;/sup&gt;, Dan Piraner&lt;sup&gt;1&lt;/sup&gt;, Brittany Moser&lt;sup&gt;1&lt;/sup&gt;, Audrey Lee-Gosselin&lt;sup&gt;1&lt;/sup&gt;, and Mikhail Shapiro&lt;sup&gt;1&lt;/sup&gt;</td>
<td>California Institute of Technology, Pasadena, CA</td>
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<td>1:00</td>
<td>The Perivascular Niche Protects Disseminated Tumor Cells from Chemotherapy—INVITED</td>
<td>Patrick Carlson&lt;sup&gt;1&lt;/sup&gt;, Alexander Barrett&lt;sup&gt;2&lt;/sup&gt;, Kirk Hansen&lt;sup&gt;2&lt;/sup&gt;, and Cyrus Ghajar&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Fred Hutchinson Cancer Research Center, Seattle, WA, University of Colorado, Denver, Denver, CO</td>
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<td>1:15</td>
<td>Cell-secreted Fibronectin Supports Metastatic Latency in the Bone Marrow Matrix</td>
<td>Lauren Barney&lt;sup&gt;1&lt;/sup&gt;, Christopher Hall&lt;sup&gt;1&lt;/sup&gt;, Alyssa Schwartz&lt;sup&gt;2&lt;/sup&gt;, and Shelly Peyton&lt;sup&gt;1&lt;/sup&gt;</td>
<td>University of Massachusetts, Amherst, Amherst, MA</td>
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<td>1:30</td>
<td>The Energy Costs Associated with Cell Migration Through Collagen Gels</td>
<td>Marianne Lintz&lt;sup&gt;1&lt;/sup&gt;, Joseph Miller&lt;sup&gt;1&lt;/sup&gt;, Zachary Goldblatt&lt;sup&gt;1&lt;/sup&gt;, Aniqua Rahman&lt;sup&gt;1&lt;/sup&gt;, and Cynthia Reinhart-King&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Cornell University, Ithaca, NY</td>
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<td>1:45</td>
<td>Aligned Collagen Micro-tissues to Study Invasion of Cancer Cells on 3D Fiber Tracks</td>
<td>Arja Ray&lt;sup&gt;1&lt;/sup&gt;, Zachary Slama&lt;sup&gt;1&lt;/sup&gt;, Samantha Madden&lt;sup&gt;1&lt;/sup&gt;, and Paolo Provenzano&lt;sup&gt;1&lt;/sup&gt;</td>
<td>University of Minnesota, Twin Cities, Minneapolis, MN</td>
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<td>2:00</td>
<td>Evaluating Microenvironmental Changes Following Normal Tissue Irradiation: The Role of CD8+ T Cells in Breast Tumor Migration In Vivo</td>
<td>Marjan Rafat&lt;sup&gt;1&lt;/sup&gt;, Marta Vilalta&lt;sup&gt;1&lt;/sup&gt;, Todd Aguiler&lt;sup&gt;1&lt;/sup&gt;, Amato Giaccia&lt;sup&gt;1&lt;/sup&gt;, and Edward Graves&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Stanford University, Stanford, CA</td>
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<td>2:15</td>
<td>In Vitro Breast Tumor Model to Investigate the Role of Tumor Microenvironment in Disease Progression</td>
<td>Srivatsan Kidambi&lt;sup&gt;1&lt;/sup&gt;</td>
<td>University of Nebraska-Lincoln, Lincoln, NE</td>
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<tr>
<td>1:00</td>
<td>Glenoid Baseplate Micromotion In Reverse Total Shoulder Arthroplasty</td>
<td>Jennifer Anderson&lt;sup&gt;1&lt;/sup&gt;, John Tokish&lt;sup&gt;2&lt;/sup&gt;, Stefan Tolan&lt;sup&gt;2&lt;/sup&gt;, Richard Hawkins&lt;sup&gt;2&lt;/sup&gt;, Alan Marionneaux&lt;sup&gt;1&lt;/sup&gt;, and John DesJardins&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Clemson University, Clemson, SC, Steadman Hawkins Clinic of the Carolinas, Greenville, SC</td>
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<td>1:15</td>
<td>Impact of Tibiotalar Alignment on COP Trajectory in Patients with Severe Ankle Arthritis</td>
<td>Evan McConnell&lt;sup&gt;1&lt;/sup&gt;, Robin Queen&lt;sup&gt;1&lt;/sup&gt;, and Daniel Schmitt&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Virginia Tech University, Blacksburg, VA, Duke University, Durham, NC</td>
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Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

1:30 pm
Constraint Testing of Flat, Semi-Constrained, and Mobile Bearing Total Knee Replacements
Lucy Young1, Kyle Snethen1, Patrick Brandt1, Madeline Bebler1, Haley Leslie1, and Melinda Harman1
1Clemson University, Clemson, SC

1:45 pm
The Role of Task Expertise in Startle Evoked Movements
Maria Jose Quezada1 and Claire Honeycutt1
1Arizona State University, Tempe, AZ

2:00 pm
Modification of a Magnesium Based Metal for Internal Fixation Applications
Michael Sealy1, Dale Feldman2, Yeubin Guo3, and Jonah Sharkins2
1University of Nebraska, Lincoln, NE, 2UAB, Birmingham, AL, 3University of Alabama, Tuscaloosa, AL

2:15 pm
A Novel Distractive and Mobility-Enabling Lumbar Spinal Orthosis
Denis DiAngelo1 and Daniel Hillyard1
1University of Tennessee Health Science Center, Memphis, TN

OP–Thurs–2–9 Room 101D
Track: Stem Cell Engineering

Directing Stem Cell Differentiation I

Chair: Yuguo Lei, Gulden Camci-Unal

1:00 pm
The Role of Adipose-Derived Stem Cells in Skeletal Muscle Repair—INVITED
Viktoria Rybalko1, Pei-Ling Hsieh1, Roger Farrar1, and Laura Suggs1
1University of Texas at Austin, Austin, TX

1:30 pm
Characterization of Smooth Muscle Cells and Urothelial Cells Differentiated from Adipose Derived Stem Cells for Bladder Tissue Engineering Applications
Caitlyn Ambrose1 and Jiro Nagatomi1
1Clemson University, Clemson, SC

1:45 pm
Keratin Hydrogels Promote Smooth Muscle Differentiation from c-kit+ Human Cardiac Stem Cells
Benjamin Ledford1, Jamelle Simmons1, Miao Chen1, Lijuan Kan1, Mark Van Dyke1, and Jia-Qiang He1
1Virginia Tech, Blacksburg, VA

2:00 pm
Regulating Arterial Venous Differentiation of Pluripotent Stem Cells through Immobilized and Soluble Signals
Taylor Dorsey1, Diana Kim1, and Guohao Dai1
1Rensselaer Polytechnic Institute, Troy, NY

2:15 pm
Murine Cardiomyocyte Differentiation via Nutrient Deprivation-Mediated Activation of -catenin
Jangwook Jung1, Pablo Hofbauer1, Tanner Mc Ardle1, and Brenda Ogle1
1University of Minnesota-Twin Cities, Minneapolis, MN

OP–Thurs–2–10 Room 101E
Track: Biomaterials*

Biomaterial Scaffolds I

Chair: Katelyn Swindle-Reilly, Jeff Wolchok

1:00 pm
Multivariate Scaffold Designs that Mimic the Complexity of Tissue Interfaces—INVITED
Elizabeth Cosgriff-Hernandez1, Alysha Kishan1, Andrew Robbins1, Mingliang Jiang1, Veyssel Erel1, and Michael Moreno1
1Texas A&M University, College Station, TX

1:30 pm
Fabrication of Biphasic Scaffold for Treatment of Chronic Wound Healing
Allison Goins1,2, Vidhya Ramaswamy1, and Josepine Allen1,2
1University of Florida, Gainesville, FL, 2Institute for Cell and Tissue Science and Engineering, Gainesville, FL

1:45 pm
Engineering Synthetic Matrices to Guide Intestinal Organoid Morphogenesis
Victor Hernandez-Gordillo1, GiHun Choi1, Rebecca Carrier2, and Linda Griffith1
1Massachusetts Institute of Technology, Cambridge, MA, 2Northeastern University, Boston, MA

2:00 pm
Tunable, “Self-fitting” Shape Memory Polymer (SMP) Scaffolds for Cranial Bone Defect Repair
Lindsay Woodard1, Vanessa Page1, Kevin Kmetz1, and Melissa Grunlan1
1Texas A&M University, College Station, TX

2:15 pm
Development of a Biodegradable Polymer-Metal Composite as a Novel Biomaterial
Tyler Stahl1, Thomas Xu2, and Syam Nukavarapu1,2
1University of Connecticut, Storrs, CT, 2University of Connecticut Health Center, Farmington, CT

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

**OP-Thurs-2-11**  
Room 200E  
Tracks: Cardiovascular Engineering, Device Technologies and Biomedical Robotics  
Cardiovascular Devices II  
Chairs: Alexandrina Untaroiu, Varun Bhatia

1:00 pm  
Chronic Cyclic Vagus Nerve Stimulation has Beneficial Electrophysiological Effects on Healthy Hearts in the Absence of Autonomic Imbalance  
Steven Lee¹, Qinglu Li¹, Imad Libbus², Bruce H. KenKnight², Mary Garry¹, and Elena Tolkacheva¹  
¹University of Minnesota, Minneapolis, MN, ²Cyberonics Inc, Houston, TX

1:15 pm  
Quantitative Analyses of the Relative Distributions of Epicardial Adipose on Human Hearts  
Alexander Mattsson¹, Teri Whitman², Michael Eggen², and Paul laizoo²  
¹University of Minnesota, Minneapolis, MN, ²Medtronic PLC, Mounds View, MN

1:30 pm  
Development and Feasibility Testing of a Novel Left Ventricular Assist Device (LVAD) Outflow Graft Anastomosis Device (GrAD)  
Young Choi¹, Michael Sobieski¹, Guruprasad Giridharan¹, Michele Gallo¹,², Mark Slaughter¹, Zhongjun Wu¹, and Steven Koenig¹  
¹University of Louisville, Louisville, KY, ²University of Padua, Padua, Italy

1:45 pm  
A High-Throughput Microfluidic Device for the Selective Removal of Activated Granulocytes from Recirculating Whole Blood during Cardiopulmonary Bypass  
Briony Strachan¹, Hui Xia¹, Sean Gifford², and Sergey Shevkoplyas¹  
¹University of Houston, Houston, TX, ²Halcyon Biomedical Incorporated, Friendswood, TX

2:00 pm  
A Novel Design for a Decellularized Tissue Engineered Transcatheter Aortic Valve  
Melissa Young¹, Nicholas Styoles¹, Ryan Hennessy¹, Brandon Tefft¹, Soumen Jana¹, Rebecca Hennessy¹, and Amir Lerman¹  
¹Mayo Clinic, Rochester, MN, ²Mayo Clinic, Rochester, Afghanistan

2:15 pm  
Polyethylene Oxide Coated Controlled Drug-Eluting Balloons: In Vivo Evaluation in a Rabbit Model  
Jordan Anderson¹, Sujan Lamichhane¹, Daniel Engebretson¹, Gopinath Mani¹, Tyler Remund², Katie Pohlson², Amber Wolf³, and Patrick Kelly³  
¹University of South Dakota, Sioux Falls, SD, ²Sanford Research, Sioux Falls, SD, ³Sanford Health, Sioux Falls, SD

**OP-Thurs-2-12**  
Room 200F  
Track: Device Technologies and Biomedical Robotics  
Affordable Health Devices and Frugal Innovation  
Chairs: Daniel Ratner, Jacqueline Linnes

1:00 pm  
A Distributable Paper-based Diagnostic Kit for Point-of-Care Screening for Sickle Cell Disease  
Kian Torabian¹, Dalia Lezzar¹, Nathaniel Piety¹, Alex George¹, and Sergey Shevkoplyas¹  
¹University of Houston, Houston, TX, ²Baylor College of Medicine, Houston, TX

1:15 pm  
Rapid Paperfluidic Molecular Diagnostic for Field Detection of Cholera in Drinking Water in Haiti  
Taylor Moehling¹, Sonia Bhatt¹, Jacqueline Linnes¹, and Jacqueline Linnes¹  
¹Purdue University, West Lafayette, IN

1:30 pm  
Quantification of C-Reactive Protein using a Lateral Flow Immunoassay and a Smartphone-enabled Device  
Elizabeth Rey¹, Dakota O’Dell¹, Seoho Lee¹, and David Erickson¹  
¹Cornell University, Ithaca, NY

1:45 pm  
Improving Paper-based Protein Detection with Dehydrated Two-Phase Micellar Components  
David Pereira¹, Samantha Zhang¹, Benjamin Wu¹, and Daniel Kamei¹  
¹UCLA, Los Angeles, CA

2:00 pm  
A Simple Device for Bedside Washing of Stored Red Blood Cells  
Eszter Voros¹, Nathaniel Piety¹, and Sergey Shevkoplyas¹  
¹University of Houston, Houston, TX

**OP-Thurs-2-13**  
Room 200D  
Track: Bioinformatics, Computational and Systems Biology  
Systems Approaches to Therapy, Therapeutics, and Precision Medicine  
Chairs: Ashlee Ford Versypt, David Noren

1:00 pm  
Overcoming Adaptive Resistance and Fractional Response of Cancer Cells to Targeted Therapy  
Mohammad Fallahi-Sichani¹, Verena Becker¹, Gregory Baker¹, Sarah Boswell¹, Robert Everley¹, Jia-Ren Lin¹, and Peter Sorger¹  
¹Harvard Medical School, Boston, MA
1:15 pm  
Optimization of Acute Myeloid Leukemia Predictions with a Five-Fold Cross-Validated Genetic Algorithm  
Carlos Bueno1, Luiza Ferreira1, John Gawedzinski1, Sangheon Han1, Sohyun Park1, Trenton Piepergerdes1, and Amina Qutub1  
1Rice University, Houston, TX

1:30 pm  
Hidden Networks in Antibiotic Target Discovery  
Paul Jensen1,2, Zeyu Zhu2, and Tim van Opijnen2  
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Boston College, Chestnut Hill, MA

1:45 pm  
OntoBIDS: An Ontology Driven BioImage Dataset Discovery System.  
Menno VanDiermen1, Etienne Gnimpieba2, and Carol Lushbough1  
1University of South Dakota, Vermillion, SD, 2University of South Dakota, Sioux Falls, SD

2:00 pm  
Systems Pharmacology Predicts Antibiotic Spatial Distribution and Efficacy In TB Granulomas  
Elise Pienaar1, Jansy Sarathy2, Brendan Prideaux2, Veronique Dartois2, Denise Kirschner1, and Jennifer Linderman1  
1University of Michigan, Ann Arbor, MI, 2Public Health Research Institute and New Jersey Medical School, Newark, NJ

2:15 pm  
Cytoprofiling and Microscale Cis-co-culture for Predicting Therapy Resistance in Multiple Myeloma  
Jay Warrick1, Loren Stallcop1, Yasmin Alvarez-Garcia1, Dominique Lisiero1, Kenneth Chng1, Mailee Huynh1, Natalie Callander1, Shigeki Miyamoto1, and David Beebe1  
1University of Wisconsin Madison, Madison, WI

Wednesday, October 5 | 1:30 pm—2:30 pm | Platform Session 2

2:15 pm  
A Biomimetic Microfluidic Particle Tracker for Enumeration of White Blood Cells Subtypes and Quantification of Antigen Surface Expression Level  
Tannay Ghonge1, Bobby Reddy1, Anurup Ganguli1, Greg Damhorst1, Umer Hassan1, and Rashid Bashir1  
1University of Illinois at Urbana Champaign, Urbana, IL

2:00 pm  
The Importance of Nanoparticle Size and Ligand Density in Cell Modulation  
John Hickey1,2, Fernando Vicente-Zegarra1, and Jonathan Schneck2  
1Johns Hopkins University, Baltimore, MD, 2Johns Hopkins School of Medicine, Baltimore, MD

2:15 pm  
Micro-Physiological Systems to Study Endothelial Barrier Functions In Sepsis  
Tejas Khire1, Richard Waugh1, and James McGrath1  
1University of Rochester, Rochester, NY

OP-Thurs-2-15  
Room 200C

Tracks: Biomedical Imaging and Optics, Translational Biomedical Engineering  
Imaging Techniques in Clinical Translation  
Chairs: Wawrzyniec Dobrucki, Emily Day

1:00 pm  
Quantitative Analysis of Tympanic Membrane Mobility using Pneumatic Low Coherence Interferometry  
Jungeun Won1, Guillermo L. Monroy1, Paritosh Pandel1, Pin-Chieh Huang1, Ryan L. Shelton1, and Stephen A. Boppart1  
1University of Illinois at Urbana-Champaign, Urbana, IL

1:15 pm  
Development of Imaging Probe For Osteoarthritis Diagnosis  
Jun Zhou1, Shuxin Li1, Yihui Huang1, Jinglei Wu1, Yi Hong1, Joseph Borrelli2, and Liping Tang3  
1University of Texas at Arlington, Arlington, TX, 2Texas Health Arlington Memorial Hospital, Arlington, TX, 3Texas Health Arlington Memorial Hospital, Arlington, TX

1:30 pm  
Multi-Modal and Multiscale Measurement of Breast Cancer Metabolism In Vitro and In Vivo  
Benjamin Cox1,2,3, Joseph Szulczewski1,3, Kai Ludwig1, Erin Adamson1, David Inman1, Stephen Graves1, Justin Jeffery1, Jason McNulty1, Patricia Keely1,4, Kevins Eliceiri1,4, and Sean Fain1,4  
1University of Wisconsin at Madison, Madison, WI, 2Morgridge Institute for Research, Madison, WI, 3Laboratory for Optical and Computational Instrumentation, Madison, WI, 4UW Carbone Cancer Center, Madison, WI
1:45 pm  
**Evaluation of Computational Endomicroscopy Architectures for In Vivo Optical Biopsy**  
John Paul Dumas¹, Muhammad Lodhi¹, Waheed Bajwa¹, and Mark Pierce¹  
¹Rutgers, The State University of New Jersey, Piscataway, NJ  

2:00 pm  
**High-resolution In Vivo Imaging of a Centimeter-large Mouse Tumor using Ultrasound-switchable Fluorescence**  
Bingbing Cheng¹ and Baohong Yuan¹  
¹University of Texas at Arlington, Arlington, TX  

2:15 pm  
**Developing Monitors of Cerebral Hemodynamics for Extracorporeal Membrane Oxygenation Therapy**  
David Busch¹,², Constantine Mavroudis³, Genevieve Dupont-Thibodeau¹, Ann McCarthy¹, Tiffany Ko², Madeline Winters¹, John Newland¹, Kobina Mensah-Brown¹, Kaitlin Griffith⁴, Jennifer Lynch⁵, Peter Schwab⁶, Erin Buckley⁶, Arjun Yodh⁷, and Daniel Licht¹  
¹Children’s Hospital of Philadelphia, Philadelphia, PA, ²University of Pennsylvania, Philadelphia, PA, ³Hospital of the University of Pennsylvania, Philadelphia, PA, ⁴Temple University, Philadelphia, PA, ⁵New York University, New York, NY, ⁶Georgia Tech, Atlanta, GA  

**OP-Thurs-2-16  Room 200H**  
**Track: Drug Delivery**  
**Drug Delivery in Tissue Engineering and Medicine**  
Chairs: Steven Jay, Katie Bratlie.  

1:00 pm  
**Gradient Release of Cardiac Morphogen by Photo-responsive Polymer Micelles for Spatiotemporal Control of Embryonic Stem Cell Differentiation**  
Mukesh Gupta¹, Daniel Balikov¹, Young Chun¹, Douglas Sawyer¹, and Hak-Joon Sung¹  
¹Vanderbilt University, Nashville, TN, ²Maine Medical Institute, Scarborough, ME  

1:15 pm  
**Localized and Sustained Delivery of siRNA from Hydrogels to Enhance Fracture Healing**  
Yuchen Wang¹ and Danielle Benoit¹  
¹University of Rochester, Rochester, NY  

1:30 pm  
**Macrophage-mediated Degradation of Gelatin Microspheres for Release of Bone Morphogenetic Protein**  
Ramkumar Tiruvannamalai Annamalai¹, Paul Turner¹, William Carson¹, and Jan Stegemann¹  
¹University of Michigan, Ann Arbor, MI  

1:45 pm  
**Recombinant Elastin Based Nanoparticles for Targeted Gene Therapy**  
Dagmara Monfort¹ and Piyush Koria¹  
¹University of South Florida, Tampa, FL  

2:00 pm  
**Stable Nanodroplets for Controlled Drug Release and Monitoring Using Ultrasound**  
Yoonjee Park¹, Madison Taylor¹, Zhe Zhang¹, Courtney Collins¹, Hsuan-Yeh Pan¹, Eric Mahoney¹, Karla Mercado¹, Kevin Haworth¹, and Chia-Ying Lin¹  
¹University of Cincinnati, Cincinnati, OH  

2:15 pm  
**Oral Vaccine Delivery using Ragweed Pollen Grains**  
Md Jasim Uddin¹ and Harvinder Gill¹  
¹Texas Tech University, Lubbock, TX  

**OP-Thurs-2-17  Room 200B**  
**Track: Orthopaedic and Rehabilitation Engineering**  
**Articular Cartilage and Joints**  
Chairs: Clark Hung, Rhima Coleman  

1:00 pm  
**Bisphosphonate Rescues Articular Cartilage from Trauma Damage—INVITED**  
Yilu Zhou¹, Mengxi Lv¹, Shongshan Fan¹, Liyun Wang¹, and X. Lucas Lu¹  
¹University of Delaware, Newark, DE  

1:15 pm  
**Effect of Focal Chondral Defects on the Biphasic Mechanics of Cartilage in the Hip**  
Jocelyn Todd¹, Benjamin Ellis¹, Travis Maak¹, and Jeff Weiss¹  
¹University of Utah, Salt Lake City, UT  

1:30 pm  
**Direct Evidence for Tribological Rehydration Of Cartilage Via In Situ Quantification Of Solute Transport**  
Brian Graham¹, Axel Moore¹, David Burris¹, and Christopher Price¹  
¹University of Delaware, Newark, DE  

1:45 pm  
**A Novel Method for Early Diagnosis of Osteoarthritis**  
Mustafa Unal¹ and Ozan Akkus¹  
¹Case Western Reserve University, Cleveland, OH  

2:00 pm  
**Magnitude-Dependent and Inversely-related Osteogenic/Chondrogenic Differentiation of Human Mesenchymal Stem Cells Under Dynamic Compressive Strain**  
Christopher Horner¹, Koji Hirot¹, Junze Liu¹, Hyle Park¹, and Jin Nam¹  
¹University of California, Riverside, CA  

2:15 pm  
**Microscale Mechanics of The Interface Of Native And Repaired Articular Cartilage**  
Rebecca Irwin¹, Darvin Griffin¹, Amanda Meppelink², Itai Cohen¹, Mark Randolph², and Lawrence Bonassar¹  
¹Cornell University, Ithaca, NY, ²Massachusetts General Hospital, Boston, MA
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

**OP-Thurs-2-18**  Room 200I

**Track: Respiratory Bioengineering**

**Computational Mechanics of the Respiratory System**

**Chairs:** Jason Bates, Bela Suki

**1:00 pm**
Cost Functions to Predict Ventilator-Induced Lung Injury and Personalize Mechanical Ventilation
Katharine Hamlington1, Bradford Smith1, Gilman Allen1, and Jason Bates1
1University of Vermont College of Medicine, Burlington, VT

**1:15 pm**
Statistics of Liquid Plug Rupture Events in the Lung
Marcel Filoche1,2,3,4 and James Grotberg5
1Ecole Polytechnique, Palaiseau, France, 2Institut Mondor de Recherche Biomédicale, Créteil, France, 3Université Paris-Est, Créteil, France, 4ERL CNRS 7²40, Créteil, France, 5University of Michigan, Ann Arbor, MI

**1:30 pm**
Modeling Lung Mucous Flows with Particle Method
Hideki Fujioka1 and Donald Gaver III1
1Tulane University, New Orleans, LA

**1:45 pm**
The Audible Human Project: Study of Acoustic Transmission with a Fractal Based Model of the Human Airways
Brian Henry1 and Thomas Royston1
1University of Illinois at Chicago, Chicago, IL

**2:00 pm**
Chronic Assessment of Respiratory Muscle Function after Unilateral Phrenic Nerve Denervation
Obaid Khurram1, Gary Sieck1, and Carlos Mantilla1
1Mayo Clinic College of Medicine, Rochester, MN

**2:15 pm**
A Global Index for Characterizing Ciliary Beating Efficiency in Pulmonary Airways
Mathieu Bottier1,2,3, Marta Pena-Fernandez1,2,3, Gabriel Pelle1,2,3, Emilie Bequignon1,2,3, Daniel Isabey1,2,3, André Costel1,2,3, Estelle Escudier1,2,3, James Grotberg1,2,3, Jean-François Papon1,2,3, Bruno Louis1,2,3, and Marcel Filoche1,2,3,4
1Institut Mondor de Recherche Biomédicale, Créteil, France, 2Université Paris-Est, Créteil, France, 3ERL CNRS 7²40, Créteil, France, 4University of Michigan, Ann Arbor, MI, 5Ecole Polytechnique, Palaiseau, France

**OP-Thurs-2-19**  Room 200J

**Tracks: Neural Engineering, Tissue Engineering**

**Spinal Cord Tissue Engineering & Repair**

**Chairs:** Harini Sundararaghavan, Stephanie Seidlits

**1:00 pm**
Genome Engineering to Understand the Role of Interneurons in Recovery After Spinal Cord Injury—INVITED
Shelly Sakiyama-Elbert1 and Hao Xu1
1Washington University, St. Louis, MO

**1:15 pm**
Biomaterial-Mediated Gene Delivery Targeting Reduced Inflammation after Spinal Cord Injury—INVITED
Stephanie Seidlits1,2, Daniel Margul2,3, Ryan Boehler2, Dominique Smith2,3, Jonghyuk Park2, Aishani Atalwala1, Todor Kukushliev2, Mitchell Johnson3, and Lonnie Sheaf2,3
1UCLA, Los Angeles, CA, 2Northwestern University, Evanston, IL, 3University of Michigan, Ann Arbor, MI

**1:30 pm**
Local Delivery of Minocycline from Metal Ion-Assisted Self-Assembled Complexes Promotes Neuroprotection and Functional Recovery after Spinal Cord Injury
Zhicheng Wang1, Jia Nong1, and Yinghui Zhong1
1Drexel University, Philadelphia, PA

**1:45 pm**
Optimizing Vagus Nerve Stimulation Paired with Rehabilitation to Enhance Recovery after Spinal Cord Injury
Michael Darrow1, Andrea Ruiz1, Patrick Ganzer1, Abby Berry1, Elaine Lai1, Luz Barron Horta1, Alexa Gilfoyle1, Lea Simone1, and Seth Hays1
1University of Texas at Dallas, Richardson, TX

**2:00 pm**
Improvement of Schwann Cell Transplantation using Injectable Hydrogels after Spinal Cord Injury
Laura Marquardt1, Karen Dubbin1, Vanessa Douluames2, Giles Plant3, and Sarah Heilshorn1
1Stanford University, Stanford, CA, 2Stanford University School of Medicine, Stanford, CA

**2:15 pm**
Schwann Cell loaded PVDF-TrFE Scaffolds Promote Axon Regeneration after Spinal Cord Injury
Yee-Shuan Lee1, Siliang Wu2, Treena Arinzeh2, and Mary Bunger1
1University of Miami, Miami, FL, 2New Jersey Institute of Technology, Newark, NJ
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

OP-Thurs-2-20   Room 200A
Track: Bioinformatics, Computational and Systems Biology

Analysis of Cell Signaling II

Chairs: Kathryn Miller-Jensen, Mahendra Kavdia

1:00 pm
Multivariate Cell Signaling Control of Epithelial-Mesenchymal Transition—INVITED
Matthew Lazzara

University of Virginia, Charlottesville, VA

1:30 pm
Morphogens Regulate Spatiotemporal Patterning of Calcium Signaling in a Developing Epithelium
Jeremiah Zartman, Qinfeng Wu, Pavel Brodskiy, and Cody Narciso

University of Notre Dame, Notre Dame, IN

1:45 pm
A Computational and Experimental Analysis of the Role of Macrophages in Ovarian Cancer Metastasis
Molly Carroll, Harin Patel, and Pamela Kreeger

University of Wisconsin, Madison, WI

2:00 pm
JNK Pathway Activation Modulates Bypass Resistance to EGFR/HER2 Targeted Therapies
Aaron Meyer, Simin Manole, and Edward Richards

Massachusetts Institute of Technology, Cambridge, MA

2:15 pm
Modeling of Axon Membrane Skeleton Correlated with Sodium Propagation
Yihao Zhang, Vi Ha, and George Lykotrafitis

University of Connecticut, Storrs, CT

MEET THE EXPERT

1:00 pm–2:30 pm   Room 204

NIH Funding: Meet Program Directors, Reviewers, and Awardees

Organized by Tony Dickherber, PhD, Program Director, Innovative Molecular Analysis Technologies (IMAT) Program, Center for Strategic Scientific Initiatives, National Cancer Institute

This session will provide an overview of NIH funding opportunities and resources particularly well-suited to the BMES research community. BMES colleagues will offer insights and “lessons learned” from the perspective of winning these NIH awards as well as in serving on NIH review panels. The session will explore how researchers may develop strategies to align their research interests with NIH opportunities and priorities.

Panel Members:

• Michelle A. Berny-Lang, PhD, Program Director, Office of the Director, Center for Strategic Scientific Initiatives, National Cancer Institute (NCI)
• Tony Dickherber, PhD, Program Director, Innovative Molecular Analysis Technologies (IMAT) Program, Center for Strategic Scientific Initiatives, National Cancer Institute (NCI)
• Prof. Dawn Elliott, PhD, Director of Biomedical Engineering, University of Delaware
• Prof. Adam Engler, Dept. of Bioengineering, Sanford Consortium for Regenerative Medicine, University of California, San Diego
• Zeynep Erim, PhD, Program Director, Division of Interdisciplinary Training (DIDT), National Institute of Biomedical Imaging and Bioengineering (NIBIB)
• Prof. Linda Griffith, School of Engineering Professor of Teaching Innovation, Biological Engineering, and Mechanical Engineering, Massachusetts Institute of Technology
• Prof. Roger Kamm, Cecil and Ida Green Distinguished Professor of Biological and Mechanical Engineering, Massachusetts Institute of Technology
• Christine Kelley, PhD, Director, DDST, Division of Discovery Science & Technology (DDST), National Institute of Biomedical Imaging and Bioengineering (NIBIB)
• Nastaran Zahir Kuhn, PhD, Associate Director, Division of Cancer Biology, Program Director, Physical Sciences-Oncology, National Cancer Institute (NCI)
• Prof. Todd Sulchek, PhD, Associate Professor, Bioengineering, Georgia Institute of Technology
• Prof. Rong Fan, PhD, Associate Professor, Department of Biomedical Engineering, Yale University
SPECIAL SESSION
1:00 pm—2:30 pm Room 208CD
International Symposium on Biomedical Engineering
Chairs: Song Li, Damir Khismatullin
Biomedical engineering is a fast growing field. The purpose of this symposium is to provide an overview of biomedical engineering research and education around the world, and facilitate the collaboration.

Panel Members:
- Richard Hart, Ph.D., President, Biomedical Engineering Society, USA,
- Yubo Fan, Ph.D., President, Chinese Society of Biomedical Engineering.
- Anthony Weiss, Ph.D., President of Australia and New Zealand MBS
- Hanjoong Jo, Ph.D., Hanjoong Jo, President of the Korean American BME Society
- Michael Capuano, Vice-President of the Canadian Medical and Biological Engineering Society

SPECIAL SESSION
1:00 pm—4:00 pm Room 102E
Developing Best Practices for Graduate Training in Biomedical Innovation
Chairs: Gilda Barabino, Jeffrey Garanich
Many universities have begun offering specialized graduate training in the process of translating academic research into medical innovations that have real impacts on patient care. With this growth of the field, now is an opportune time to hold a collaborative conversation on shared themes, challenges such programs face, and new directions for enhanced impact.

INDUSTRY SESSION
2:15 pm—5:00 pm Room 201
Special Industry Topics
Chairs: Christopher Basciano
This session will include technical platform talks from industry professionals on a research or product. In addition, the BMES Cellular and Molecular Bioengineering SIG will hold a panel on Commercialization of Bone Regeneration products, and the BMES Medical Devices SIG will hold a session on V&V in medical devices.

2:15 pm
Quantitative Electroencephalography Dynamics in Prediction of Drowsy Driving on Simulator
Chaoyang Chen1, Chaofei Zhang2, Bo Cheng2, Wenjun Wang2, Chao Zeng3, Yang Zhou1, and John Cavanaugh1
1Wayne State University, Detroit, MI, 2Tsinghua University, Beijing, China, People’s Republic of, 3Shihezi University, Shihezi, China, People’s Republic of

2:30 pm
Intraoperative Surgical Monitor for Detection of Trauma during Cochlear Implantation
Christopher Giardina1, Tatyana Fontenot1, Andrew Pappa1, William Scott1, Kevin Brown1, and Harold Pillsbury1
1UNC School of Medicine, Chapel Hill, NC
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs-3-1**  
Auditorium 1  
Tracks: Biomechanics, Cellular and Molecular Bioengineering  
Substrate Effects in Mechanobiology  
Chairs: Brenda Ogle, Lance Kam  

3:15 pm  
Topographic Confinement of Epithelial Clusters Combines with Matrix Stiffness to Induce Mesenchymal Transition  
Samila Nasrollahi, Amit Pathak  
1Washington University in Saint Louis, Saint Louis, MO

3:30 pm  
Dendritic Cells Sense and Respond to Substrate Geometry  
Amy Bendell, Janis Burkhardt, and Daniel Hammer  
1University of Pennsylvania, Philadelphia, PA,  
2Children's Hospital of Philadelphia, Philadelphia, PA

3:45 pm  
Cell-Induced Alignment of Fibrous Extracellular Matrix in 3D Microfabricated Tissues  
Bryan Nerger, Alexandra Piotrowski-Daspit, and Celeste Nelson  
1Princeton University, Princeton, NJ

4:00 pm  
Regulation of Mitochondrial Function by Matrix Elasticity in Engineered Cardiac Tissues  
Davi M. Lyra-Leite, Nathan Cho, Nethika R. Ariyasinghe, Andrew P. Petersen, and Megan L. McCain  
1Laboratory for Living Systems Engineering, University of Southern California, Los Angeles, CA,  
2Keck School of Medicine of USC, Los Angeles, CA

4:15 pm  
Substrate Stiffness Modulates Rho/ROCK Expression in Human Keratinocytes  
Hoda Zarkoob, Sathivel Chinnathambi, Spencer Van Dorn, Jon Reed, John Selby, and Edward Sander  
1The University of Iowa, Iowa City, IA,  
2SRQ Bio, Inc., Sarasota, FL

4:30 pm  
Microtubule-Targeting Agents Alter Glioma Cell Stiffness-Sensing Behaviors  
Louis Prahl, Patrick Bangasser, Mahya Hemmat, Steven Rosenfeld, and David Odde  
1University of Minnesota, Minneapolis, MN,  
2Cleveland Clinic, Cleveland, OH

**OP-Thurs-3-2**  
Auditorium 2  
Track: Cancer Technologies  
Cancer Immunengineering  
Chairs: Ankur Singh, Mathumai Kanapathipillai  

3:15 pm  
Microenvironment Induced Impairments of T-cell Mechanosensing of Melanoma Antigens  
Cheng Zhu, Zhou Yuan, Nathan Rohrer, Prithiviraj Jothikumar, and Susan N. Thomas  
1Georgia Institute of Technology, Atlanta, GA

3:30 pm  
Precision Glycocalyx Editing as a Strategy for Cancer Immunotherapy  
Elliot Woods  
1UC Berkeley, Burlingame, CA

3:45 pm  
Engineering Artificial Lymph Nodes  
John Hickey, Hai-Quan Mao, and Jonathan Schneck  
1Johns Hopkins University, Baltimore, MD

4:00 pm  
Cell Membrane-Inserting Amphiphilic Bioconjugates for Enhancing Immunotherapies in Cancer  
Michael Zhang, Kelly Moynihan, Lili Mabardi, Debra Van Egeren, Darrell Irvine, and Gregory Szeto  
1University of Maryland Baltimore County, Baltimore, MD,  
2Koch Institute for Integrative Cancer Research, MIT, Cambridge, MA, 3Marlene and Stewart Greenebaum Cancer Center, University of Maryland, Baltimore, Baltimore, MD

4:15 pm  
Single-step Nanoparticle Antigen Presentation System for Tumor Immunotherapy  
Fredrick Kohlhapp, Brent Chesson, Erica Huelsman, Arman Nabatiyan, Jai Rudra, and Andrew Zloza  
1Rutgers Cancer Institute of New Jersey, New Brunswick, NJ,  
2Rutgers Cancer Institute of New Jersey, Galveston, TX,  
3Rush Medical University, Chicago, IL,  
4University of Texas Medical Branch, Galveston, TX

4:30 pm  
Engineering Therapeutic T Cells that Activate by Photothermal Triggers  
Ian Miller, Joe Maenza, Jason Weis, and Gabriel Kwong  
1Georgia Institute of Technology, Atlanta, GA,  
2Emory University, Atlanta, GA
Thursday, October 6 | 3:15 pm—4:45 pm | Platform Session 3

OP-Thurs-3-3 | Auditorium 3
Tracks: Biomechanics, Cardiovascular Engineering

Cardiovascular Biomechanics III

Chairs: Lik Chuan Lee, Naomi Chesler

3:15 pm
Hemodynamics Regulates Endothelial Glycocalyx Correlating to Modulation of Key Endothelial Functions—INVITED
Ming Cheng¹, Solomon Mensah¹, Ian Harding¹, and Eno Ebong¹
¹Northeastern University, Boston, MA

3:45 pm
A Novel Single-Beat Approach to Assess Right Ventricular Systolic Function in Pulmonary Hypertension
Alessandro Bellofiore¹, Eric Dinges², Rebecca Vanderpool³, Melanie Brewis⁴, Andrew Peacock⁵, Sanjiv Shah⁶, and Naomi Chesler⁷
¹San Jose State University, San Jose, CA, ²University of Wisconsin-Madison, Madison, WI, ³University of Pittsburgh, Pittsburgh, PA, ⁴Pulmonary Vascular Unit, Glasgow, United Kingdom, ⁵Northwestern University, Chicago, IL

4:00 pm
Exercise Decreases Arterial Stiffness and Mediates Effects of A High-Fat, High-Sugar Diet
Julie Kohn¹, Jenny Ma¹, Shweta Modi¹, Julian Azar¹, Adeline Chen¹, Stephanie Cheng¹, and Cynthia Reinhart-King¹
¹Cornell University, Ithaca, NY

4:15 pm
Role of Dobutamine in Coronary Blood Flow-Myocardial Volume Relationships: In Vivo Assessment with Sonomicrometry
John Stendahl¹, Nabil Boutagy¹, Nripesh Parajuli², Allen Lu¹, Imran Alkhail¹, Melissa Eberle¹, Ben Lin¹, Lawrence Staib², James Duncan², and Albert Sinusas¹
¹Yale School of Medicine, New Haven, CT, ²Yale School of Engineering and Applied Science, New Haven, CT

4:30 pm
Average Aneurysm Wall Stress and Displacement in the Common Carotid Artery Increase with an Increase in Aneurysm Size: Initial Results using Fluid-Structure Interaction Simulations
Simon Kudernatsch¹, Sampat Nidadavolu¹, and Donald R. Peterson²
¹Texas A&M University, College Station, TX, ²Texas A&M University-Texarkana, Texarkana, TX

OP-Thurs-3-4 | Room 102AB
Track: Tissue Engineering

Engineering Tissue Interfaces

Chairs: Howard Matthew, Anita Singh

3:15 pm
Gradient Biomaterials in Osteochondral and Trachea Defect Repair—INVITED
Michael Detamore¹
¹University of Kansas, Lawrence, KS

3:45 pm
Establishing Mechanically Active Synthetic Mucosal Interface in A Multi-Well Plat
Abhinav Sharma¹, Neil Forbes¹,²,³, and Jungwoo Lee¹,²,³
¹University of Massachusetts Amherst, Amherst, MA, ²Institute for Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA

4:00 pm
Osteotendinous Differentiation and Interfacial Toughening of A Multi-Compartment Collagen Scaffold
William Grier¹, Laura Mozdzen¹, and Brendan Harley¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

4:15 pm
Hydrogel Platform for Modeling the Dermoepidermal Junction In Vitro
Jangwook Jung¹, Wei-Han Lin¹, Jakub Tolar¹, and Brenda Ogle¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

4:30 pm
Localization and Quantification of Mineral Deposition at the Engineered Osteochondral Interface Following Three and Seven Days of Double Diffusion
Andreea Teodora Dinescu¹, Amy Chung¹, Esther Cory¹, and Robert Sah¹
¹University of California-San Diego, La Jolla, CA

OP-Thur-3-5 | Room 102C
Track: Tissue Engineering

Engineering Replacement Tissues

Chairs: Mai Lam, Harini Sundararaghavan

3:15 pm
Translation of Conformal Islet Encapsulation and Implementation of Nanocarriers-Based Refinements
Vita Manzolii,²,³, Diana Velluto¹, Maria M. Abreu¹, Freddy Gonzalez Badillo¹,², and Alice A. Tomei²,³
¹Diabetes Research Institute-University of Miami-Miller School of Medicine, Miami, FL, ²Department of Electronics, Information and Bioengineering-Politecnico di Milano, Milano, Italy, ³Department of Biomedical Engineering-University of Miami, Coral Gables, FL
3:30 pm
Optogenetic Regulation of Insulin Secretion in Pancreatic Cells
Fan Zhang¹ and Emmanuel Tzanakakis¹,²
¹Tufts University, Medford, MA, ²Tufts Medical Center, Boston, MA

3:45 pm
Engineering a Long-term and Highly Functional 3D Human Liver Model Using Silk Scaffolds
David Kukla¹, Salman Khetani¹, Whitney Stoppel¹, and David Kaplan²
¹University of Illinois at Chicago, Chicago, IL, ²Tufts University, Medford, MA

4:00 pm
Achieving Native Cartilage Compressive Properties in Engineered Neocartilage
Wendy Brown¹, Grayson DuRaine², Heenam Kwon¹, Jerry Hu¹, and Kyriacos Athanasiou¹
¹University of California Davis, Davis, CA, ²Oregon Health & Science University, Portland, OR

4:15 pm
Smart Self-Modulatory Release System Based on Bioactive Coating Modified 3D Printed Perfused Scaffold for Vascularized Bone Regeneration
Haitao Cui¹, Wei Zhu¹, Benjamin Holmes¹, Michael Plesniak¹, and Lijie Grace Zhang¹
¹The George Washington University, Washington, DC

4:30 pm
Tugba Ozdemir¹, Dakota Kelly¹, Eric Fowler¹, Daniel Zakheim¹, Daniel A. Harrington², Robert L. Witt¹,³,⁴, Mary C. Farach-Carson¹,², Swati Pradhan-Bhatt¹,³,⁴, and Xinqiao Jia¹
¹University of Delaware, Newark, DE, ²Rice University, Houston, TX, ³Thomas Jefferson University, Philadelphia, PA, ⁴Helen F. Graham Cancer Center & Research Institute, Christiana Care, Newark, DE

**OP-Thurs-3-6 | Room 101A**

**Track: Cellular and Molecular Bioengineering**

**Single Cell and Collective Migration**

**Chairs:** Dennis Discher, David Odde

3:15 pm
Collective Migration and Self-Organization in Epithelial-Mesenchymal Co-Cultures
Marielena Gamboa Castro¹, Susan Leggett¹, and Ian Wong¹
¹Brown University, Providence, RI

3:30 pm
Loss of Giant Obscurins Enhances Migration And Cell Dynamics In Pancreatic Ductal Epithelial Cells
Daniel Shea¹, Konstantinos Konstantopoulos¹, and Aikaterini Kontogianni-Konstantopoulos²
¹Johns Hopkins University, Baltimore, MD, ²University of Maryland School of Medicine, Baltimore, MD

3:45 pm
Role of Microtubules in Centrosome Positioning During 1D Migration
Katrina Adlerz¹ and Helim Aranda-Espinoza¹
¹University of Maryland, College Park, MD

4:00 pm
Mapping 3D Neutrophil Tractions on Micropatterned Stripes
Lauren Hazlett¹, Jonathan Estrada¹, Xian O’Brien¹, Jonathan Reichner¹, and Christian Franck¹
¹Brown University, Providence, RI

4:15 pm
A Novel Bioinspired Microfluidic Assay for Investigation of the Role of Protein Kinase C-delta (PKC) in Human Neutrophil-Endothelium Interaction During Acute Inflammation
Fariborz Soroush¹, Yuan Tang¹, Ting Zhang¹, Devon King¹, Sudhir Deosarkar¹, Balabhaskar Prabhakarpandian², Laurie Kilpatrick¹, and Mohammad Kiani¹
¹Temple University, Philadelphia, PA, ²CFD Research Corporation, Huntsville, AL

4:30 pm
Unjamming and Spreading of a Cellular Aggregate as a Model of Breast Cancer Migration
Karin Wang¹ and Jeffrey Fredberg¹
¹Harvard University, Boston, MA

**OP-Thurs-3-7 | Room 101B**

**Track: Cancer Technologies**

**Precision Medicine and Biomarkers**

**Chairs:** Farhan Chowdhury, Michael King

3:15 pm
Every Cancer Patient Deserves an Equation: Predicting Survival from Patient-Specific Models — INVITED
Kristin Swanson¹, Corbin Rayfield², Fillan Grady³, Andrea Hawkins-Daarud³, Pamela Jackson³, Eduardo Carrasco³, and Bernard Bendok³
¹Mayo Clinic Arizona, Phoenix, AZ, ²Mayo Clinic, Scottsdale, AZ, ³Mayo Clinic, Phoenix, AZ

3:30 pm
Key Gene Mutations for Increasing Migration of Brain Cancer Cells via Confinement
Loan Bui¹, Alissa Hendrick¹, Tamara Hill¹, Richard Leviner¹, and Young-Tae Kim¹
¹University of Texas at Arlington, Arlington, TX

3:45 pm
Development of Assays for Detecting Methylation in Cell-Free DNA at Single Copy Sensitivity and Single CpG-Site Resolution
Pornpat Athamanolap¹, Thomas II Pisanic¹, and Tza-Huei Wang¹
¹Johns Hopkins University, Baltimore, MD
4:00 pm  
Focused Ultrasound Reprograms Ethanol-Treated Prostate Cancer Cells Back to Normal  
Heng Yu1, Hakm Murad1, Daishen Luo1, and Damir Khismatullin1  
1Tulane University, New Orleans, LA

4:15 pm  
Targeted Nanosystems as Precision Tools for Cancer Diagnosis and Therapy  
Ester Kwon1, Jaideep Dudani1, Candice Gurbatii1, and Sangeeta Bhata1  
1Massachusetts Institute of Technology, Cambridge, MA

4:30 pm  
Next-generation Sequencing Reveals Distinct Genetic Features of Mechanically Isolated Tumorigenic Cells  
Farhan Chowdhury1, Michael Saul2, and Taekjip Ha3  
1Southern Illinois University Carbondale, Carbondale, IL, 2University of Illinois at Urbana-Champaign, Urbana, IL, 3Johns Hopkins University, Baltimore, MD

OP–Thurs–3–8  
Room 101C
Tracks: Biomechanics, Tissue Engineering  
Human Performance/Sports Biomechanics

Chairs: Costin Untaroiu, Jonathan Rylander

3:15 pm  
Voluntary Head Movements Exceed Football Impact Rotational Velocities Without Neurological Deficit  
Fidel Hernandez1, Jared Ostdiek1, Alec McGlaughlin1, Matt Garelli1, and David Camarillo1  
1Stanford University, Stanford, CA

3:30 pm  
Comparison of Pitching and Long-Toss Kinetics in Professional Baseball Players  
Janelle Cross1, Roger Caplinger2, and William Raasch1,2  
1Medical College of Wisconsin, Milwaukee, WI, 2Milwaukee Brewers Baseball Club, Milwaukee, WI

3:45 pm  
Evaluation of Head Impact Exposure in Youth Football Practice Drills  
Mireille Kelley1, Joeline Kane2, Mark Espeland2, Logan Miller1, Joel Stitzel1, and Jillian Urban1  
1Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, 2Wake Forest University, Winston-Salem, NC

4:00 pm  
Comparison of Objective Rating Techniques vs. Expert Opinion In The Validation Of Computational Human Body Models  
Matthew Davis1, Bharath Koya1, Jeremy Schap1, and F. Scott Gayzik1  
1Wake Forest School of Medicine, Winston-Salem, NC

4:15 pm  
Quantitative Assessment of Falls for Humans in a Safety Harness  
Gordon Cooke1,2 and Arthur Ritter2  
1US Army Armament Research, Development and Engineering Center, Picatinny Arsenal, NJ, 2Stevens Institute of Technology, Hoboken, NJ

4:30 pm  
Can Muscle Volume Be a Predictor of Motor Performance?  
Thanh Tran1, Katherine Knaus1, Peter Frank1, Geoffrey Handsfield1, Joseph Hart1, and Silvia Blemker1  
1University of Virginia, Charlottesville, VA

OP–Thurs–3–9  
Room 101D
Track: Stem Cell Engineering

Directing Stem Cell Differentiation II
Chairs: Melissa Krebs, Yuguo Lei

3:15 pm  
Cell-free Synthetic Vascular Grafts: A Blank Slate to Study Host Cell Infiltration and Transformation—INVITED  
Yadong Wang1, Kee-Won Lee1, Liwei Dong1, Chelsea Stowell1, Mario Solari1, and Vijay Gorantla1  
1University of Pittsburgh, Pittsburgh, PA

3:45 pm  
Differentiation of V2a Interneurons From Human Pluripotent Stem Cells  
Jessica Butts1,2, Dylan McCreedy1, Federico Mendoza-Camacho1, Tracey Hookway1, Praveen Taneja1, Linda Noble-Haeusslein3, and Todd McDevitt1,3  
1Gladstone Institutes, San Francisco, CA, 2Graduate Program in BioEngineering University of California San Francisco and Berkeley, San Francisco, CA, 3University of California–San Francisco, San Francisco, CA

4:00 pm  
Nanotopography Promoted Neuronal Differentiation of Human Induced Pluripotent Stem Cells  
Yuanwei Yan1, Liqing Song1, and Yan Li1  
1Florida State University, Tallahassee, FL

4:15 pm  
Maintenance of Neural Progenitor Cell Stemness in 3D Hydrogels Requires Matrix Remodeling  
Christopher Madl1, Ruby Dewi1, Cong Dinh1, Kyle Lampel1,2, Duong Nguyen1, Annika Enejder2, and Sarah Heilshorn1  
1Stanford University, Stanford, CA, 2University of Virginia, Charlottesville, VA, 3Chalmers University of Technology, Gothenburg, Sweden

4:30 pm  
Derivation of Cortical Spheroids from Human Induced Pluripotent Stem Cells in a Suspension Bioreactor  
Yuanwei Yan1, Liqing Song1, and Yan Li1  
1Florida State University, Tallahassee, FL
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs-3-10**  
Room 101E  
**Track: Biomaterials***  
**Biomaterial Scaffolds II**  
Chairs: Jeffrey Jacot, Guohao Dai  
3:15 pm  
**A Tissue-specific Matrix-incorporated Electrospun Scaffold for Meniscus Tissue Engineering**  
Jinglei Wu1, Cancan Xu1, Xingjian Gu1, and Yi Hong1  
1University of Texas at Arlington, Arlington, TX  
3:30 pm  
**Cardiac and Musculoskeletal Tissue Engineering using Cell- Laden Conductive Fibers**  
Afsoon Fallahi1, Iman Yazdi1, Ali Tamayol1, and Ali Khademhosseini1  
1Harvard Medical School, Cambridge, MA  
3:45 pm  
**In Vivo Study of Gold Nanoparticle-Collagen Gel For Soft Tissue Augmentation**  
Sheila Grant1, Xiajun Zhu2, Robert Brooks2, Dale DeVore2, and David Grant1  
1University of Missouri, Columbia, MO, 2Eternogen, LLC, Columbia, MO  
4:00 pm  
**Development of an Electrospun Scaffold with Tailorable Void Space for Dermal Wound Regeneration**  
Ryan Clohessy1, Karolina Stumbraite1, Barbara Boyan12, and Zvi Schwartz13  
1Virginia Commonwealth University, Richmond, VA, 2Georgia Institute of Technology, Atlanta, GA, 3University of Texas Health Science Center at San Antonio, San Antonio, TX  
4:15 pm  
**Hand-spun Micro/nanofibers for Cartilage Regeneration**  
Mingkun Wang1, Chunxiao Cui1, Mazen Ibrahim2, John Lawrence2, Maurizio Pacifici2, and Li-Hsin Han1  
1Drexel University, Philadelphia, PA, 2Children’s Hospital of Philadelphia, Philadelphia, PA  
4:30 pm  
**Three-Dimensionally Templated Hydrogels for Peripheral Nerve Injury Repair**  
Christopher Lack1, Stacy Porvasnik1, Monica Wall1, Andrew Garcia1, Carlos Rinaldi1, and Christine Schmidt1  
1University of Florida, Gainesville, FL

* Biomaterials Track sponsored by

**OP-Thurs-3-11**  
Room 200E  
**Tracks: Cardiovascular Engineering, Tissue Engineering**  
**Cardiovascular Tissue Engineering I**  
Chairs: Jordan Miller, Josephine Allen  
3:15 pm  
**Fundamental Questions about Lymphatic Biology and Implications for Tissue Engineering—INVITED**  
Walter Murfee1  
1Tulane University, New Orleans, LA  
3:45 pm  
**Heterogeneities in Vascular Stiffness Impact Endothelial Monolayer Integrity**  
Jacob VanderBurgh1, Julie Kohn1, and Cynthia Reinhart-King1  
1Cornell University, Ithaca, NY  
4:00 pm  
**Tissue Engineering Arterioles: The Role of Intraluminal Fluid-Derived Forces**  
Mahama Traore1, Richard Hongyi Li1, and Steven George1  
1Washington University in Saint Louis, Saint Louis, MO  
4:15 pm  
**Preventing Progression to Heart Failure: Anisotropic, Acellular, Silk-ECM Patches for Treatment of Myocardial Infarction**  
Whitney Stoppel1, Kelly Sullivan1, Jonathan Grasman1, Monique Foster1, David Kaplan1, and Lauren Black1  
1Tufts University, Medford, MA  
4:30 pm  
**Directing Vascular Regeneration In-Situ**  
Randall Smith Jr.1, Daniel Swartz2, and Stelios Andreidis13,4  
1SUNY at Buffalo, Buffalo, NY, 2Angiograft, LLC, Buffalo, NY, 3University at Buffalo, SUNY, Buffalo, NY, 4Center of Excellence in Bioinformatics and Life Sciences, Buffalo, NY

**OP-Thurs-3-12**  
Room 200F  
**Track: Nano and Micro Technologies**  
**Microscale Diagnostic Technologies**  
Chairs: Brian Plouffe, Nilay Chakraborty  
3:15 pm  
**Innovative Healthcare is in the Palm of Your Hand—INVITED**  
Luke Lee1  
1California Institute of Quantitative Biosciences UC Berkeley, Berkeley, CA  
3:45 pm  
**Smartphone-based Optofluidic Exosome Diagnostic for Concussion Recovery**  
Jina Ko1, Matthew Hemphill1, David Gabrieli1, Leon Wu1, Ravi Yelleswarapu1, Gladys Lawrence1, Wesley Pennycooke1, Anup Singh1, Dave Meaney1, and Dave Issadore1  
1University of Pennsylvania, Philadelphia, PA
Developing an In Vitro Platform to Study the Dormant Liver Stages of Plasmodium Vivax Malaria
Nil Gural1, Breanna Stillo1, Ani Galstian2, Alex Miller2, Rapathorn Patrapuvich3, Jetsuom Sattabongkot3, Sandra March3, and Sangeeta N. Bhatia1,2,4
1Massachusetts Institute of Technology, Cambridge, MA, 2Broad Institute, Cambridge, MA, 3Mahidol University, Bangkok, Thailand, 4Howard Hughes Medical Institute, Cambridge, MA

Spatially Mapped Gene Expression Analysis from Tissue
Anurup Ganguli1, Gregory Damhorst1, Carlos Duarte1, Tanmay Ghonge1, Farhad Kosari2, Christian Konopka1, Wawrzyniec Dobrucki1, and Rashid Bashir1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Mayo clinic cancer center-research, Rochester, MN

MAPS- Magnetically Actuated Protease Sensors For In Vivo Tumor Profiling
Simone Schurle1, JaiDeep S. Dudani1, Michael G. Christiansen1, Polina Anikeeva1, and Sangeeta Bhatia1
1Massachusetts Institute of Technology, Cambridge, MA

Engineering Mammalian Cells Using Systems Biology Models to Enhance Biopharmaceutical Development—INVITED
Nathan Lewis1
1University of California, San Diego, La Jolla, CA

Cost Based Methods for the Analysis of Genome-wide Human Metabolic Reconstructions
Andre Schultz1 and Amina Qutub1
1Rice University, Houston, TX

Integration of Comparative Toxicogenomics Data to Generate Biomarker Predictions with Rat and Human Metabolic Networks
Kristopher Rawls1, Edik Blais1, Glynis Kolling1, and Jason Papin1
1University of Virginia, Charlottesville, VA

Modeling the Detailed Kinetics and Nitric Oxide Inhibition of Mitochondrial Cytochrome c Oxidase
Venkat Pannala1, Amadou Camara1, Said Audi2, and Ranjan Dash1
1Medical College of Wisconsin, Milwaukee, WI, 2Marquette University, Milwaukee, WI

Systems Analysis Identifies Metabolic Components to Antibiotic Susceptibility and Tolerance
Jason Yang1,2, Sarah Wright1,2, and James Collins1,2
1Massachusetts Institute of Technology, Cambridge, MA, 2Broad Institute of MIT and Harvard, Cambridge, MA

Detection of Intact Influenza Virus from Clinical Samples Using Computationally Designed Affinity Proteins
Caitlin Anderson1, Eva-Maria Strauch1, Rosemichelle Marzan1, David Baker1, and Paul Yager1
1University of Washington, Seattle, WA

Leveraging Implantable Nanofluidic Technology for Longterm HIV Prophylaxis
Robert Hood1, Priya Jain2, and Alessandro Grattoni2
1University of Texas at San Antonio, San Antonio, TX, 2Houston Methodist Research Institute, Houston, TX

Field-Portable Holographic Microscope for Label-free Detection of Herpes Simplex Virus
Aniruddha Ray1, Ha Ho1, Mustafa Daloglu1, Euan Mcleod2, and Aydogan Ozcan1
1University of California, Los Angeles, CA, 2University of Arizona, Tucson, AZ

Magnetic Nanopore-based Sorting for Ultra-sensitive HIV Viral Load Detection
Nishal Shah1
1University of Pennsylvania, Philadelphia, PA

Paper-based Device for Gastroenteritis Detection Integrated With Sample Preparation Cartridge
Zhenyuan Lu1,2, Kshitij Ranjan1, Jacob Carrano2, Roland Schneider2, John Carrano2, and Shannon Weigum1
1Texas State University, San Marcos, TX, 2Paratus Diagnostics, LLC, Austin, TX
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs–3–15**
**Room 200C**

**Track: Biomedical Imaging and Optics, Biomechanics**

**Imaging Techniques in Biomechanics**

**Chairs:** F. Scott Gayzik, Mohammad H. Abedinnasab

**3:15 pm**

*In Vivo Characterization of the Human Skull-Brain Interface using Magnetic Resonance Elastography*

Andrew Badachhape¹, Ramona Durham¹, Brent Efron¹, Ruth Okamoto¹, Curtis Johnson², and Philip Bayly¹  
¹Washington University in St. Louis, St. Louis, MO, ²University of Delaware, Newark, DE

**3:30 pm**

*Quantitative Assessment of Cell Contractility Using Polarized Light Microscopy*

François Bordeleau¹, Joseph Miller¹, Wenjun Wang¹, and Cynthia Reinhart-King¹  
¹Cornell University, Ithaca, NY

**3:45 pm**

*Implementation of a 3D-2D Imaging-Based Approach for Accurate Quantification of Shoulder Motion Using a Clinically-Available Biplane Fluoroscope*

Joseph Mozingo¹, Mohsen Akbari-Shandiz¹, Dixon Magnuson¹, Cynthia McCollough¹, and Kristin Zhao¹  
¹Mayo Clinic, Rochester, MN

**4:00 pm**

*Investigation of In Vivo Human Brain Motion Under Head Accelerations*

Kaveh Laksari¹, Bradley Hammoor¹, Leland Pung², Kerstin Mueller¹, Huy Do¹, and David Camarillo¹  
¹Stanford University, Stanford, CA, ²Siemens Medical Solutions Inc., Malvern, PA

**4:15 pm**

*Forces Across Cell-Cell Junctions Contribute to Lumen Formation and Homeostasis in Epithelial Acini—INVITED*

Daniel Conway¹ and Vani Narayanan¹  
¹Virginia Commonwealth University, Richmond, VA

**4:30 pm**

*In Vivo Multi-Frequency Magnetic Resonance Elastography Of The Human Brain: Which Frequencies Matter?*

Mehmet Kurt¹, Han Lv¹,², Kaveh Laksari¹, Lyndia Wu¹, Karla Epperson¹, Kevin Epperson¹, Anne Sawyer¹, David Camarillo¹, Kim Butts Pauly¹, and Max Wintermark¹  
¹Stanford University, Stanford, CA, ²Beijing Friendship Hospital, Beijing, China, People’s Republic of China

**OP-Thurs–3–16**
**Room 200H**

**Track: Drug Delivery**

**Novel Materials and Self Assembly for Drug Delivery**

**Chairs:** Kyung Jae Jeong, Roche de Guzman

**3:15 pm**

*Engineering Protease-Responsive Microspheres from Self-Assembled Disordered Proteins*

Benjamin Schuster¹, Ranganath Parthasarathy¹, and Daniel Hammer¹  
¹University of Pennsylvania, Philadelphia, PA

**3:30 pm**

*Halide-Gated Molecular Release from Nanoporous Gold Thin Films*

Ozge Polat¹ and Erkin Seker¹  
¹University of California, Davis, Davis, CA

**3:45 pm**

*Design of Self-Assembled Multilayers for Immune Modulation*

Boyan Xia¹, Lisa Tostanoski¹, and Christopher Jewell¹,²,³  
¹University of Maryland-College Park, College Park, MD, ²University of Maryland Medical School, Baltimore, MD, ³Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD

**4:00 pm**

*Supramolecular Protein PEGylation*

Matthew Webber¹  
¹University of Notre Dame, Notre Dame, IN

**4:15 pm**

*Self-Assembly of ssDNA-Amphiphiles into DNA Nanotubes with Controlled Diameters and Lengths*

Huihui Kuang¹ and Efrosini Kokkoli¹  
¹University of Minnesota, Minneapolis, MN

**4:30 pm**

*Polymer Thin Film Device for Immuno-protective Encapsulation of Human Stem Cell Derived Insulin Producing Cells for the Treatment of Type 1 Diabetes*

Ryan Chang¹, Gaetano Faleo¹, Holger Russ¹, Matthias Hebrok¹, Qizhi Tang¹, and Tejal Desai¹  
¹University of California, San Francisco, San Francisco, CA
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs-3-17**  
**Room 200B**

**Track: Orthopaedic and Rehabilitation Engineering**

**Intervertebral Disc and Spine**

*Chairs: Robert Bowles, Beth Winkelstein*

**3:15 pm**

**Imaged Based Modeling to Investigate Pathomechanics of Disc Degeneration—INVITED**

Dawn Elliott¹, Amy Claeson¹, Brett Showalter¹, Edward Vresilovic², John Peloquin², John DeLucca³, Alexander Wright¹, James Gee¹, and Neil Malhotra³

¹University of Delaware, Newark, DE, ²Pennsylvania State University, Hershey, PA, ³University of Pennsylvania, Philadelphia, PA

**3:45 pm**

**Biomechanical Effect of Ischiofemoral Impingement and Femoral Version on Lumbar Facet Joint Loading**

Anthony Khoury¹,², Juan Gomez-Hoyos², Ricardo Schroder², Eric Johnson², Ian Palmer², and Hal Martin²

¹University of Texas Arlington, Dallas, TX, ²Baylor Research Institute, Dallas, TX

**4:00 pm**

**Analysis of Individual and Combined Annulus Fibrosus and Nucleus Pulposus Repair In Vitro**

Stephen Sloan, Jr.¹, Devis Galesso², Cynthia Secchieri², and Lawrence Bonassar¹

¹Cornell University, Ithaca, NY, ²Fidia Farmaceutici S.p.A., Padua, Italy

**4:15 pm**

**Evidence of Serum Response Factor Signaling In Nucleus Pulposus Cells of The Intervertebral Disc**

Bailey Fearing¹, Priscilla Hwang¹, Ruhang Tang², Devin Bridgen³, Liufang Jing³, Michael Kelly³, Munish Gupta², and Lori Setton¹

¹Washington University in St. Louis, St Louis, MO, ²Wayne State University School of Medicine, Detroit, MI, ³Duke University, Durham, NC

**4:30 pm**

**Epigenome Editing of Nociceptive Neurons Abolishes Degenerative IVD Induced Sensitization**

Joshua Stover¹, Nilofar Farhang¹, Brandon Lawrence¹, and Robby Bowles¹

¹University of Utah, Salt Lake City, UT

**OP-Thurs-3-18**  
**Room 200I**

**Track: Biomedical Engineering Education (BME)**

**Entrepreneurship and Innovation in Biomedical Engineering**

*Chairs: Kunal Mitra, Subrata Saha*

**3:15 pm**

**Educating Entrepreneurially Minded Biomedical Engineers—INVITED**

Douglas Melton¹

¹The Kern Family Foundation, Waukesha, WI

**3:45 pm**

**Helping Students Develop Strategies for Dealing with Unethical Behavior in the Workplace**

Jay Goldberg¹ and Kristina Ropella¹

¹Marquette University, Milwaukee, WI

**4:00 pm**

**MedTech Innovation Course: Improvement and Versatility of the Model**

Jawad Ali¹, Heather Haeberle², Sarah Mayes³, and Margo Cousins²

¹University of Texas at Austin, Dell Medical School, Austin, TX, ²University of Texas at Austin, Austin, TX, ³Alafair Biosciences, Austin, TX

**4:15 pm**

**Fostering Entrepreneurial Mindset in Biomedical Engineering Programs**

Mansoor Nasir¹ and Eric Meyer¹

¹Lawrence Technological University, Southfield, MI

**4:30 pm**

**Encouraging Curiosity, Connections and the Creation of Value in a Materials/Biomaterials Sequence: Part 1: Materials Science**

Gary Bledsoe¹ and Silviya Zustiak¹

¹Saint Louis University, St Louis, MO

**Thurs-3-19**  
**Room 200J**

**Track: Neural Engineering**

**Peripheral Nerve Stimulation and Repair**

*Chairs: Treena Arinzech, Erin Purcell*

**3:15 pm**

**Human Endothelial Cells Secrete Neurotropic Factors to Direct Axonal Growth**

Jonathan Grasman¹ and David Kaplan¹

¹Tufts University, Medford, MA

**3:30 pm**

**Physical Therapy Combined with a PCL/HA Nanofiber Conduit for Enhanced Peripheral Nerve Repair**

Tonya Whitehead¹, Jean Peduzzi², Assadollah Mazhari², Chaoyang Chen¹, John M. Cavanaugh¹, and Harini G. Sundararaghavan¹

¹Wayne State University, Detroit, MI, ²Wayne State University School of Medicine, Detroit, MI
3:45 pm  
Neuronal and Glial Optogenetic Stimulation for Accelerating Nerve Growth  
Seongjun Park1, Ritchie Chen1, Alex Senko1, Jueun Lee1, Jung Yun Yoon1, and Polina Anikeeva1  
1Massachusetts Institute of Technology (MIT), Cambridge, MA

4:00 pm  
Ultrasound Stimulation for Peripheral Nerve Repair  
Emily Ashbolt1, Marissa Puzan1, Daniel Ventre1, and Abigail Koppes1  
1Northeastern University, Boston, MA

4:15 pm  
Osseointegrated Neural Interface (ONI): A Novel Approach to Peripheral Nerve Interfaces.  
Aaron Dingle1, Joseph Novello1, Jared Ness1, Dan Hellenbrand1, Lisa Krugner-Higby1, Brett Nemke1, Yan Lu1, Sarah Brodnick1, Mark Markel1, David Goodspeed1, Justin Williams1, and Samuel Poore1  
1University of Wisconsin, Madison, WI

4:30 pm  
An Electro-Stimulation Integrated Device for Pain Management of Peripheral Neuropathy  
John MacDonald1, Rashad Armbrister1, and Udayan Das1  
1DeVry University, Chicago, IL

SPECIAL SESSION
3:15 pm–4:45 pm  
Room 208CD

Engineering Low-Cost Solutions to Address Health Care Disparities  
Chairs: Gilda Barabino, Cato Laurencin

This session will explore the role of biomedical engineering in addressing health disparities and more specifically the application of biomedical technologies in developing countries, with an eye toward their adaptation to address issues here in the U.S. Dr. Rebecca Richards-Kortum will open the session and be followed by a panel discussion of the wide range of opportunities for engineers interested in solving health disparities through novel low-cost engineering designs. Winners of the 2016 BME Innovation and Career Development Travel Award will be announced at the session.
Track: Biomaterials

Hydrogel Biomaterials

Th-1 Temperature and pH Dependent Degradation of AH6 3:1 and AH6 5:1 Poly[beta-amino ester] Polymers
Alexander Chen¹ and David Puleo¹
¹University of Kentucky, Lexington, KY

Th-2 Polypyrrole Poly-HEMA Based Hydrogels and Custom Culture Plate Design For Stem Cells Differentiation Induction Through Electric Field Application
Vincent Duriaux⁴, Christian Kotanen¹, and Anthony Guiseppe-Elie¹
¹Texas A&M, College Station, TX, ²University of Montpellier, Montpellier, France

Th-3 Nitric Oxide Releasing Fibrin Cleavage Products for Incorporation into Injectable PEG Hydrogels
Breeanne Spalding¹, Connor McCarthy¹, Bruce Lee¹, and Rupak Rajachar¹
¹Michigan Technological University, Houghton, MI

Th-4 Development of a Novel Nitric Oxide Releasing Fibrin Microgel Composite Hydrogel for Tendon Repair
Carly Joseph¹, Connor McCarthy¹, Hannah Fisher¹, Jacob Altscheffel¹, Adam Francis¹, Breeanne Spalding¹, Bruce Lee¹, and Rupak Rajachar¹
¹Michigan Technological University, Houghton, MI

Th-5 Optimization and Characterization of Actuating PEG/Acrylic Acid Hydrogels As Artificial Muscles
Daniel Browe¹, Matthew Sze¹, and Joseph Freeman¹
¹Rutgers University, Piscataway, NJ

Th-6 Novel Cellular Adhesion Properties on Poly(ethylene glycol) Dimethacrylate Hydrogels
Elizabeth Hernandez¹, Ann Babcock², Christina Lochner³, and Derek Doroski³
¹Franciscan University of Steubenville, Hannover, PA, ²Franciscan University of Steubenville, Elk Ridge, MD, ³Franciscan University of Steubenville, Steubenville, OH

Th-7 Hydrogen Peroxide Generation and Biocompatibility of Mussel Adhesive Moiety Modified Injectable Hydrogel
Hao Meng¹, Yuan Liu¹, and Bruce Lee¹
¹Michigan Technological University, Houghton, MI

Th-8 Fabrication of Injectable Macroporous Alginite Microbeads for Magnetically Actuated Drug Delivery
Jaeyun Kim¹ and Bom Yi Shin¹
¹Sungkyunkwan University, Suwon, Korea, Republic of

Th-9 Self-Assembly of Heterochiral Peptides with Varied Sequence Patterns
Alexey Koyfman¹, Charles Peak², Rajagopal Appavu¹, Akhilesh Gaharwar¹, and Jai Rudra¹
¹University of Texas Medical Branch, Galveston, TX, ²Texas A&M University, College Station, TX

Th-10 New Matrix End-Tethering Strategy Supports both Mechanosensing and Tissue-Mimetic Fiber Remodeling
Jessica Lee¹, Elena Kassianidou¹, James MacDonald¹, Matthew Francis², and Sanjay Kumar¹
¹University of California, Berkeley, Berkeley, CA, ²Lawrence Berkeley National Laboratory, Berkeley, CA

Th-11 Impedance Characterization of Polyaniline Nanofibers Chitosan Composites Using Modified Thin Film Electrodes
John Aggas³ and Anothony Guiseppe-Elie¹
¹Texas A&M, College Station, TX

Th-12 Self-healing of Thermal-induced Protein Hydrogel
Jun Chen¹, Xiaoyu Ma¹, and Yu Lei¹
¹University of Connecticut, Storrs, CT

Th-13 Fabrication of Multi-Compartmental Hydrogel Microparticles by Sequential Electrospinning Combined with Photopatterning Process
Kanghee Cho¹, Sung Ho Cha¹, Byung Ju Yun¹, Byoungyong Yoo¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

Th-14 Development of Hydrogel Therapeutic Delivery System for Traumatic Optic Neuropathy
Katelyn Swindle-Reilly¹, Nguyen Tram¹, Matthew Reilly¹, Kirstin Jones², and Randolph Glickman²
¹The Ohio State University, Columbus, OH, ²University of Texas Health Science Center at San Antonio, San Antonio, TX

Th-15 Circular Dichroism Spectroscopy: A New Approach To Monitor Collagen Fibrillogenesis
Kathryn Drzewiecki¹, Daniel Grisham¹, Vikas Nanda¹, and David Shreiber¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Th-16 Fibroblast to Myofibroblast Transitions In Hydrogels of Varying Stiffness
Anuraag Boddupalli¹ and Katie Bratlie¹
¹Iowa State University, Ames, IA

Th-17 Tissue Derived ECM Hydrogels: Using Matrix Solubilization to Control Material Properties
Robert Pouliot¹, Patrick Link¹, Nabil Mikhail¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

Th-18 Influence of Storage Conditions On The Physical Properties And Protein Release Of Polyethylene Glycol Hydrogel Microspheres
Saahil Sheth¹, Sara Jain¹, Kristen Polito¹, Scott Sell¹, and Silviya Zastka¹
¹Saint Louis University, St Louis, MO

Th-19 Collagen:Fibrin Hydrogels As Myogenic Grafts: Effects Of Blends And Mechanical Conditioning
Sarah Stagg¹,², Joo Ong¹,², Christopher Rathbone¹, and Teja Guda¹,²
¹University of Texas at San Antonio, San Antonio, TX, ²University of Texas Health Science Center, San Antonio, TX

Th-20 Mechanical Property of Surface Crosslinked Super Absorbent Polymer
Sooho Chang¹, Minso Kim¹, Donyoung Kang¹, Seunghee Oh¹, Won-Gun Koh¹, and HyungSuk Lee¹
¹Yonsei University, Seoul, Korea, Republic of

Th-21 Soft, Highly Compressive, and Conductive Cryogels for Use as Neuroprosthetic Electrodes
Rosa Ghatee¹, Anita Tolouei¹, Walter Besio¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI
**POSTER SESSION—THURSDAY**

**Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**

**Th-22**

**Comparative Study of Ultrasound Induced and Naturally Self-assembled Silk Fibroin-Wool Keratin Hydrogel Biomaterials**
Phuong-Trang Vu¹, Ye Xue¹, and Xiao Hu¹
¹Rowan University, Glassboro, NJ

**Th-23**

**Construction of Tissue Adhesive Based on Polymer-Inorganic Nanoparticle Interactions Promoting Cellular Infiltration**
Yuan Liu¹, Hao Meng¹, and Bruce Lee¹
¹Michigan Technological University, Houghton, MI

**Th-24**

**A Heterogeneous Fibrosis Model for Cancer Mechanobiology**
Dave Dingal¹, Yuntao Xia², and Dennis Discher²
¹University of Minnesota-Twin Cities, Minneapolis, MN

**Track: Biomechanics**

**Computational and Multiscale Modeling in Biomechanics**

**Th-25**

**Analyzing Hemodynamic Changes during Growth and Rupture of a Middle Cerebral Artery Aneurysm**
Alena Sejkorova¹,², Kendall Dennis³, Susheil Uthamaraj³, Emily Nordahl³, David Kallmes⁵, Giuseppe Lanzino², Ales Hejchl⁵, and Dan Dragomir Daescu³
³Masaryk Hospital, Ústí nad Labem, Czech Republic, ²Mayo Clinic, Rochester, MN

**Th-26**

**Virtual Surgery Study of Changes in Nasal Aerodynamics After Inferior Turbinate Reduction in Patients with Nasal Obstruction**
Azadeh A.T. Borojeni¹, Dennis O. Frank-Ito¹, Julia S. Kimbell¹, John S. Rhee¹, and Guilherme J. M. Garcia¹
¹Medical College of Wisconsin, Milwaukee, WI, ²Duke University, Durham, NC, ³University of North Carolina, Chapel Hill, NC

**Th-27**

**Optimized Simulation of Anulus Fibrosis Layers for Finite Element Model of Lumbar Spine: A Parametric and Sensitivity Study**
Chaudhry Hassan¹, Yue-Li Sun¹, Elissa Scannapieco¹, Gita Vikram¹, and Yi-Xian Qin¹
¹Stony Brook University, Stony Brook, NY

**Th-28**

**A Finite Element Homogenization Technique for Anisotropic Analysis of Ordered Axons**
Daniel Sullivan¹, John Georgiadis³, and Assimina Pelegri³
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Illinois Institute of Technology, Chicago, IL

**Th-29**

**Regional Residual Stress Analysis of Human Lens Capsule as a Function of Age**
David Zhang¹ and Matthew Reilly²
¹University of Texas at San Antonio, San Antonio, TX, ²The Ohio State University, Columbus, OH

**Th-30**

**Role of The Facet Capsular Ligament in Guiding Lumbar Spinal Motion**
Emily Bermel¹, Victor Barocas¹, and Arin Ellingson¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

**Th-31**

**Nonlinear Bending Dynamics of a Semiflexible Filament in 3D Brownian Fluctuation**
Jyothirmai Simhadri¹ and Preethi Chandran¹
¹Howard University, Washington, DC

**Th-32**

**The Role of Annular Tissues and Intraocular Pressure in Ocular Morphogenesis**
Nguyen Tram¹, Katelyn Swindle-Reilly¹, and Matthew Reilly¹
¹The Ohio State University, Columbus, OH

**Th-33**

**Tullio Phenomenon: Pathological Sound-Induced Vertigo**
Marta Iversen¹, John Carey¹, Charles Della Santina³, Wu Zhou², Hong Zhu³, and Richard Rabbitt¹
¹University of Utah, Salt Lake City, UT, ²Johns Hopkins University, Baltimore, MD, ³University of Mississippi Medical Center, Jackson, MS

**Th-34**

**Modified Corpectomy Model for Growing-Rods: Validation of Finite Element Analysis**
Mary Foltz¹,², Victor Barocas¹, Andrew Freeman¹,³, Joan Bechtold¹, and David Polly¹
¹University of Minnesota, Minneapolis, MN, ²Excelsior Center for Bone & Joint Research and Education, Minneapolis, MN, ³Fortus Medical, Minneapolis, MN

**Th-35**

**Probabilistic Distributions of Trabecular Bone Architecture May Reveal Nature’s Design Principles**
Matthew Kirby¹, Feng Zhao¹,², and Xiaodu Wang¹
¹University of Texas at San Antonio, San Antonio, TX, ²Beihang University, Beijing, China, People’s Republic of China

**Th-36**

**An In-Situ Approach to Estimate the Layer-Specific Biophysical State of Aortic Valve Interstitial Cells**
Rachel Buchanan¹ and Michael Sacks¹
¹The University of Texas at Austin, Austin, TX

**Track: Bioinformatics, Computational and Systems Biology**

**Algorithms for Computational/Systems Biology**

**Th-37**

**Identifying PET Biomarkers to Predict Conversion Of Mild Cognitive Impairment To Alzheimer’s Disease**
Alexandra Berges¹
¹Johns Hopkins University, Baltimore, MD

**Th-38**

**Application of Curve Fitting to Determine Rates of Inhibition of Elastase by Alpha-1 Antitrypsin**
Bryan Materi¹, Michael Adenson¹, and Robby Sanders¹
¹Tennessee Technological University, Cookeville, TN

**Th-39**

**Optimizing Tuberculosis Antibiotic Regimens Using a Computational Model of Granuloma Formation**
Joseph Cicchese¹, Elise Piensa¹, Jennifer Linderman¹, and Denise Kirschner²
¹University of Michigan, Ann Arbor, MI, ²University of Michigan Medical School, Ann Arbor, MI

**Th-40**

**Statistically Robust Detection of Group-Specific Signal from Specificity Determining Positions in Protein Families**
Roman Sloutsky¹ and Kristen Naegle¹
¹Washington University in St Louis, St Louis, MO

**Th-41**

**Using Logarithmic Spirals to Quantify Human Rib Geometry**
Sven Holcombe¹, Stewart Wang¹, and James Grotberg¹
¹University of Michigan, Ann Arbor, MI
Quantitative Characterization of Human Cognitive State Using Physiological Parameters
Dong Wang¹, Xinghua Jia¹, Caroline Lieser¹, Matthew Middendorf², Scott Galster², and Mingjun Zhang¹
¹Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, ²711th Human Performance Wing, Air Force Research Laboratory, WPAFB, OH

Track: Bioinformatics, Computational and Systems Biology
Dynamics of Biological Systems

Allostatic Breakdown of Multiple Homeostat Systems: A Computational Approach
Alison Acevedo¹ and Ioannis Androulakis¹²
¹Rutgers University, Piscataway, NJ, ²Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ

How Failure Propagates in Aging Tissues: Accelerated Implosion Hypothesis
Daniel Suma¹, Pinar Zorlutuna¹, and Dervis Vural¹
¹University of Notre Dame, Notre Dame, IN

Modeling Mouse Soleus Muscle Contraction
Joseph Palladino¹
¹Trinity College, Hartford, CT

The Role of the Hypothalamic-Pituitary-Adrenal (HPA) Axis In Modulating Seasonal Changes In Immunity
Kamau Pierre², Naomi Schlesinger¹, and Ioannis Androulakis¹
¹Wayne State University, Detroit, MI, ²Wayne State University, Detroit, MI

Hyperglycemia-induced Multi-layered Genomic Regulation Analysis
Hemang Patel¹ and Mahendra Kavdia²
¹Wayne State University, Detroit, MI, ²Wayne State University, Detroit, MI

Computer-driven Design and Experimental Testing of a Synthetic Microbial Community
Meghan Thonmes¹ and Daniel Segre¹
¹Boston University, Boston, MA

Defining Phenotypic Landscapes for Progenitor Cells
Zi Ye¹, Najaf Shah², and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN, ²University of Pennsylvania, Philadelphia, PA

Track: Bioinformatics, Computational and Systems Biology
Genomics, Transcriptomics, and Regulatory RNA Networks

Development of a High-Throughput Screen for Early-Life Predictors of Lifespan in C. elegans
Holly Kinser¹ and Zachary Pincus¹
¹Washington University in St. Louis, St. Louis, MO

Heterogenic MiRNA Regulation in Hyperglycemia-induced Endothelial Dysfunction
Hemang Patel¹ and Mahendra Kavdia²
¹Wayne State University, Detroit, MI, ²Wayne State University, Detroit, MI

Bioinformatic Insights into Toll-like Receptors in Macrophages
Shakti Gupta¹, Sindhu Raghunandan³, Andrew Caldwell¹, Merril Gersten¹, Srinivasan Ramachandran¹, and Shankar Subramaniam¹
¹University of California, San Diego, La Jolla, CA

Track: Bioinformatics, Computational and Systems Biology
Integration of Biophysics and Bioinformatics/Data-Driven Models

Detecting Epileptic Seizures with EEG Signals & Machine Learning Over Wearable Devices
Abdunasser Younes¹ and Abdelnasser Mooman¹
¹University of Waterloo, Waterloo, ON, Canada, ²Rochester Institute of Technology, Rochester, NY

Pathophysiology Informatics: Integrating Multi-scalar Experimental Data to Predict Pathology
Cassie Mitchell¹ and Grant Coan¹
¹Georgia Institute of Technology, Atlanta, GA

Immersive Visualization for Comparative Viewing of CFD Results with Associated Multiscale Data
John Venn¹, Christopher Larkee², and John LaDisa¹,³
¹Marquette University, Milwaukee, WI, ²Marquette University, Milwaukee, WI, ³Medical College of Wisconsin, Milwaukee, WI

Computational Investigation of Bidirectional Cargo Transport in Neurons
Kazuka Ohashi¹, John Fricks¹, and William Hancock¹
¹The Pennsylvania State University, State College, PA

Characterization of Optimal Strategy for Glenn Anastomosis using Statistical Shape Models
Prahad Menon¹, Craig Benzinger¹, and Haifa Hong²
¹Duquesne University, Pittsburgh, PA, ²Shanghai Jiaotong University School of Medicine, Shanghai, China, People’s Republic of China

Track: Bioinformatics, Computational and Systems Biology
Bioinformatics, Computational and Systems Biology—Other/Non-Specified

Diffusion Model Across a Blood-Brain Barrier Mimic for The Treatment Of Autism Spectrum Disorder
Jamelle Simmons¹, Luke Achenie¹, and Yong Woo Lee¹
¹Virginia Polytechnic Institute and State University, Blacksburg, VA

Computational Model-Driven Design of a Pharmacological Intervention During Muscle Regeneration
Kyle Martin¹, Chris Kegelman¹, Kelley Virgilio¹, Juliana Passipieri¹, George Christ¹, Shayn Peirce¹, and Silvia Blemker¹
¹University of Virginia, Charlottesville, VA

Diffusion Model Across a Blood-Brain Barrier Mimic for The Treatment Of Autism Spectrum Disorder
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Kyle Martin¹, Chris Kegelman¹, Kelley Virgilio¹, Juliana Passipieri¹, George Christ¹, Shayn Peirce¹, and Silvia Blemker¹
¹University of Virginia, Charlottesville, VA
Track: Biomaterials
Interpenetrating and Multi-Functional Biomaterials

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Sean Devlin¹, Nathan Spangenberg², Rohit Batish³, Daniel Hagaman⁴, Frank Ji⁴, and Peter Lelkes⁴
¹Temple University, Philadelphia, PA, ²Drexel University, Philadelphia, PA

Th-62
Study of Titanium-Zirconium Nanotubes on Commercially Available Roxolid Implants
Sai Bhosle¹, Sweetu Patel¹, Tolou Shokuhfar¹, and Cortino Sukotjo¹
¹University of Illinois at Chicago, Chicago, IL, ²Michigan Technological University, Chicago, IL

Track: Biomaterials
Biomaterials on a Chip

Th-63
The Effects of Polymerization Conditions on Biofabricated Chitosan Microbeams in Microfluidics
Santiago Correa¹, Phu Pham¹, Xiaolong Luo¹, and Christopher Raub¹
¹The Catholic University of America, Washington, DC

Th-64
The Effects of Multiple Spatial Inhomogeneities of ECM on Directed Cell Migration
Minji Whang¹ and Jungwook Kim¹
¹Sogang University, Seoul, Korea, Republic of

Th-65
Understanding Pathogen Microbial Physiology using a Biomimetic Biofilm
Sung-Ho Paek¹, Keith C. Heyde¹, and Warren C. Ruder¹
¹Virginia Tech, Blacksburg, VA

Track: Biomaterials
Advanced Characterization and Imaging of Biomaterial Environments

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Assessment of Mechanically Assisted Electrochemical Degradation of Alumina-TiC Composite in an Aqueous Environment
Hetal Maharaja¹
¹Clemson University, Clemson, SC

Th-67
Rapid High Resolution Multi-Parameter Characterization of Liposome-Protein Complexes by Nanoparticle Tracking Analysis
Ragy Ragheb¹, Edward Esposito¹, and Duncan Griffiths¹
¹Malvern Instruments, Westborough, MA

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Intercalator-induced Oscillatory Vibration of DNA Modified Micro-cantilever
Shandong Xu¹, Liyuan Ma¹, Shanshan Yuan¹, and Ming Su¹
¹Northeastern University, Boston, MA

Th-69
Impact of Lactoferrin and Lysozyme on Microbe Transport in Mucus
Taylor Carlson¹, Jaclyn Lock¹, and Rebecca Carrier¹
¹Northeastern University, Boston, MA

Th-70
Dual-Imaging Enabled Platform Biodegradable Scaffolds for Non-Invasive Imaging in Tissue Engineering
Dingying Shan¹, Zhifeng Liang¹, Yuncong Ma¹, Nanyin Zhang¹, and Jian Yang¹
¹The Pennsylvania State University, University Park, PA

Track: Biomaterials
Natural and Bioinspired Biomaterials

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Probing Biomolecular Interactions of High-density Lipoprotein Mimetic Nanomaterials with Amyloid-beta Peptide for the Treatment of Alzheimer’s Disease
Angel Santiago-Lopez¹, Yoshitaka Sei¹, and Yongtae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

Th-72
A Mechanically Tunable Interpenetrating Network of Gelatin-Methacrylate and Fibrous Collagen
Anthony Berger¹, Pamela Kreeger¹, and Kristyn Masters¹
¹University of Wisconsin-Madison, Madison, WI

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Prototyping Chip Style Microfluidic Devices for High Performance Fiber Production
Catherine Gruet-Henry¹ and Bradley Hoffmann¹
¹North Dakota State University, Fargo, ND

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Biomimetic Biodegradable Photoluminescent Polymers for Bone Tissue Engineering
Chuying Ma¹ and Jian Yang¹
¹Pennsylvania state university, state college, PA

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Silk-Zein Protein Composite Materials
Dave Jao¹, Ye Xue¹, Joseph Forys¹, Justin Buchichio¹, and Xiao Hu¹
¹Rowan University, Glassboro, NJ

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Adhesion and Alignment of Stem Cells on a Spider Silk Scaffolds after UV Sterilization
Katherine Hafner¹, Olivia Ross¹, Hannah Maeser¹, John Catoe¹, Marian Kennedy¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

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Functionnalization of Electrospun 3D Nanofibrous Polycaprolactone Scaffolds via Polydopamine Coating
Jacob Miszuk¹, Tao Xu¹, Yong Zhao¹, Hongli Sun¹, and Hao Fong²
¹University of South Dakota, Sioux Falls, SD, ²South Dakota School of Mines and Technology, Rapid City, SD

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Mechanical Response of the Tracheal System to Hemolymph Pressure in the Beetle Zophobas morio
Khaled Adjari¹, Hodjat Pendar¹, and Jake Socha¹
¹Virginia Tech, Blacksburg, VA

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Long Le¹, Michael Mkrtschjan², Brenda Russell², and Tejal Desai¹
¹University of California, San Francisco, San Francisco, CA, ²University of Illinois at Chicago, Chicago, IL

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Marc Thompson¹ and Mark Van Dyke¹
¹Virginia Tech, Blacksburg, VA
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Marcus Goudie¹, Elizabeth Brisbois², Jitendra Pant¹, Alex Thompson³, Joseph Potkay¹, and Hitesh Handa¹
¹University of Georgia, Athens, GA, ²University of Michigan, Ann Arbor, MI, ³VA Ann Arbor Healthcare Systems, Ann Arbor, MI

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Rebecca Goldstein¹, Vladimir Hlady¹, and Tara Deans¹
¹University of Utah, Salt Lake City, UT

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Promotion of Cell Migration within Wound Environments through Platelet-like-particle Mediated Matrix Deformation
Seema Nandi¹ and Ashley Brown¹
¹North Carolina State University and University of North Carolina at Chapel-Hill, Raleigh, NC

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Shangping Wang¹ and Gloria D. Elliott¹
¹University of North Carolina at Charlotte, Charlotte, NC

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Sharna Beahm¹, William Merritt¹, Timothy Becker¹, Connor Gonzalez¹, and Kayla Goodrich¹
¹Northern Arizona University, Flagstaff, AZ

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Ye Xue¹, Fang Wang¹, Maria Torculas¹, Jethro Medina¹, and Xiao Hu¹
¹Rowan University, Glassboro, NJ

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Yong Wang¹, Xiaolong Zhang¹, and Nan Zhao¹
¹The Pennsylvania State University, State College, PA

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Yoshiaki Hirano¹, Eri Nakatsuka¹, and Sachiro Kakinoki¹
¹Kansai University, Osaka, Japan

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Ahnryul Choi¹ and Frederick Mun²
¹Sungkyunkwan University, Suwon, Korea, Republic of, ²Carnegie Mellon University, Pittsburgh, PA

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Alexander Bina¹, John DesJardins¹, Greg Batt¹, and Steve Siclari¹
¹Clemson University, Clemson, SC

**Track: Biomechanics**
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Haley Leslie¹, Sean Flannery¹, Melissa Copeland¹, Shrutí Kaúl¹, Lucas Schmidt¹, Melissa McCullough¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

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¹Stanford University, Stanford, CA

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Tanimu Deleón-Nwaña¹ and Donald R. Peterson²
¹University of Connecticut, Storrs, CT, ²Texas A&M-Texarkana, Texarkana, TX

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Sarah Fitzgerald¹, Sammira Rais-Rohani¹, Bryn Brazile¹, Heath Baskin¹, Richard Summers², Robert Hester³, and Jun Liao¹
¹Mississippi State University, Mississippi State, MS, ²University of Mississippi Medical Center, Jackson, MS

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In Seok Han¹, Junghwa Hong¹, and Young Eun Kim²
¹Korea University, Sejong, Korea, Republic of, ²Dankook University, Yong-in, Gyeonggi-do, Korea, Republic of

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Ju Hwan Oh¹, Seung-Rok Kang¹, Sun-Hye Sin¹, Jin Young Min², and Tae Kyu Kwon¹
¹Chonbuk National University, Jeonju, Korea, Republic of, ²Corporation of Sonicworld, Jeonju, Korea, Republic of

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Bich Nguyen¹, Trung Le¹, and Ha Vo¹
¹Mercer University, Macon, GA

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Christina Webber¹ and Kenton Kaufman¹
¹Mayo Clinic, Rochester, MN

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Katrina Colucci-Chang¹, Caitlin Johnson¹, Zaineb Nawaz¹, Elizabeth Tarbox¹, Parag V. Chitnis¹, and Siddhartha Sikdar¹
¹George Mason University, Fairfax, VA
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Mary Arico¹ and Suhash Ghosh¹
¹University of Hartford, West Hartford, CT

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Michael Stokes¹, Luke Pietrykowski¹, Taylor Gambon¹, Brendan Greene¹, Caroline Bales¹, and John DesJardins¹
¹Clemson University, Clemson, SC

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Sara Naftali¹, Dennis Dashdevsky¹, and Anat Ratnovsky¹
¹Afeka–Tel Aviv Academic College of Engineering, Tel Aviv, Israel

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Sara Naftali¹, Guy Ateret¹, and Anat Ratnovsky¹
¹Afeka–Tel Aviv Academic College of Engineering, Tel Aviv, Israel

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Sayed Cyrus Rezvanifar¹, Stephen Conklin¹, and Brian L. Davis¹
¹The University of Akron, Akron, OH

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Devon Albert¹, Stephanie Beeman¹, Craig McNally¹, and Andrew Kemper¹
¹Virginia Tech, Blacksburg, VA

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Jeffrey Suhey¹, Derek Jones¹, James Gaewsky¹, Ashley Weaver¹, and Joel Stitzel¹
¹Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC

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Keegan Yates¹ and Costin Untaroiu¹
¹Virginia Tech, Blacksburg, VA

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Liying Zhang¹ and Paul Begeman¹
¹Wayne State University, Detroit, MI

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Omid Komari¹, William Bliss¹, Nicholas Toosi¹, and Kevin Toosi¹
¹Pittsburgh Biomechanics, Pittsburgh, PA

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Richard Watson¹ and Matthew Reilly¹
¹University of Texas San Antonio, Helotes, TX, ²The Ohio State University, Columbus, OH

Track: Biomechanics
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Shania Shaji¹, Anita Singh¹, Holly Sivott¹, Gabriele Gehron¹, Shadi Malaeb², and Maria Delivoria-Papadopoulosº
¹Widener University, Chester, PA, ²Drexel University College of Medicine, Philadelphia, PA

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Xin Ye¹, James Gaewsky¹, Derek Jones¹, Bharath Koya¹, Ryan Barnard¹, Ashley Weaver¹, and Joel Stitzel¹
¹Wake Forest University School of Medicine, Winston-Salem, NC, ²Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC

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Zachary Yokell¹, Don Nakmaili¹, and Rong Gan¹
¹University of Oklahoma, Norman, OK

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Zahra Asgharpour¹
¹Materialise N.V., Leuven, Belgium

Track: Neural Engineering
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Charlotte Mae Waits¹, Steven Kosmach², Susan Sergeant¹, Floyd H. Chilton¹, Charles S. Cox², and Elaheh Rahbar¹
¹Wake Forest School of Medicine, Winston-Salem, NC, ²University of Texas Health Science Center at Houston, Houston, TX, ³Texas A&M University, College Station, TX

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Christopher Lowe¹ and David Shreiber¹
¹Rutgers University, Piscataway, NJ

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Lin Tong¹, Ismael Perez¹, Patrick Arguello¹, and Deborah Won¹
¹California State University, Los Angeles, Los Angeles, CA

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Christopher Bertucci¹, Isabella Kronau¹, Sriram Ramamoorthy¹, Pankaj Karande¹, and Deanna Thompson¹
¹Rensselaer Polytechnic Institute, Troy, NY, ²Academy of the Holy Names Upper School, Troy, NY

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Shawn Mishra¹, Stephen Redenti², and Maribel Vazquez¹
¹City College of New York, New York, NY, ²Lehman College, Bronx, NY
### Track: Neural Engineering

#### Neurodegenerative Disease

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<td>¹Iowa State University, Ames, IA, ²Medical College of Wisconsin, Milwaukee, WI</td>
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<td>¹Med-X Research Institute, Shanghai, China, People’s Republic of China, ²Department of Neurology and Institute of Neurology, Ruijin Hospital affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, People’s Republic of China, ³Division of Biokinetics and Physical Therapy, University of Southern California, Los Angeles, CA, ⁴University of Southern California, Los Angeles, CA</td>
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<td>¹Cleveland Clinic, Cleveland, OH</td>
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<td>¹Stanford University, Stanford, CA, ²Duke University, Durham, NC, ³University of North Carolina, Chapel Hill, Chapel Hill, NC</td>
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<td>¹Mississippi State University, Starkville, MS, ²Center for Advanced Vehicular Systems, Starkville, MS, ³University of Buffalo, Buffalo, NY, ⁴U.S. Army Engineer Research and Development Center, Vicksburg, MS, ⁵Predictive Design Technologies, Starkville, MS, ⁶Columbia University, New York, NY</td>
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<td>¹New Jersey Institute of Technology, Newark, NJ, ²New Jersey Medical School, Newark, NJ</td>
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¹NC State University/UNC Chapel Hill, Raleigh, NC

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¹Marquette University, Milwaukee, WI

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¹Louisiana State University, Baton Rouge, LA

Th-162
Computer-Controlled Lower Limb Exoskeleton Ambulation System for Paraplegia
Yang Zhou¹, Chaoyan Chen¹, Yousef Alshahrani¹, Pan Tian², Jie Hu³, Mark Ming-Cheng Cheng¹, and John Cavanaugh¹
¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of China

Tracks: Orthopaedic and Rehabilitation Engineering, Neural Engineering Rehabilitation Engineering: Implantable Devices

Th-163
Development of Step Counting Algorithm from the Ambulatory Tibial Load Analysis System
Arad Lajevardi-Khosh¹, Ben Tresco¹, Ami Stuart¹, Tomasz Petelenz¹, and Robert Hitchcock¹
¹University of Utah, Salt Lake City, UT

Th-164
Wireless, Passive Magnetoelastic Sensor for Monitoring Stress At Orthopedic Implants
Govindan Suresh¹, Keat Ong¹, and Andrew Derouin¹
¹Michigan Technological University, Houghton, MI

Th-165
NPWT Effects Wound Healing Cues in Tissues Surrounding Percutaneous Devices
Saranne Mitchell¹, Sujee Jayapalina¹,², Robert Bowles¹, and Kent Bachus¹²
¹University of Utah, Salt Lake City, UT, ²Department of Veterans Affairs, Salt Lake City, UT

Track: Orthopaedic and Rehabilitation Engineering
Skeletal Muscle, Ligaments, Tendons, and Interfaces

Th-166
Effect of Collegiate Swim Training on Rotator Cuff Properties, Shoulder Strength, and Subjective Outcomes
Jack Dischler¹, Timothy Baumer¹, and Michael Bey¹
¹Henry Ford Hospital, Detroit, MI

Th-167
Creep Loading of Tendons Causes Extensive and Severe Fibril and Molecular-Level Damage
Khaled Hijazi¹, Kathy Singfield¹, and Samuel Veres¹,²
¹Saint Mary’s University, Halifax, NS, Canada, ²Dalhousie University, Halifax, Canada

Th-168
Rotator Cuff Grafts using Decellularized Porcine MSC Seeded Tendons Cultured in a Mechanical Stimulation
Chelsea E. Coffey¹, Younji Sohn¹, and Vassilios Sikavitsas¹
¹University of Oklahoma, Norman, OK

Track: Orthopaedic and Rehabilitation Engineering
Spine and Intervertebral Disc

Th-169
Thoracic Volume 3D Computational Modeling of Virtual Scheuermann’s Kyphosis with Wedging Fractures
Po-Chih Lee¹, Arthur Erdman¹, Charles Ledonio¹, and David Polly¹
¹University of Minnesota, Minneapolis, MN

Th-170
Augmentation of Energy Production of the Intervertebral Disc with Polyurethane Mass Transfer Device
Yu-Fu Wang¹ and Chun-Yuh Charles Huang¹
¹Department of Biomedical Engineering, University of Miami, Coral Gables, FL

Track: Orthopaedic and Rehabilitation Engineering
Orthopaedic and Rehabilitation Engineering

Th-171
Engineering an Inclusive and Conducive Learning Environment for Mobility-Challenged Students: A Case Study Evaluation of a Nigerian University
Abel Olorunnisola¹
¹University of Ibadan, Ibadan, Nigeria

Th-172
A Smart-Walker System for Fall Prevention and Rehabilitation
Bradley Willenberg¹, Sudeshna Pal², Lina Khan³, Christopher Cepeda³, Ross Pearlman³, Wilson Perez³, T’Jean Tomlinson³, Mario Pital³,², Patrick Pabilao³, Adam Golden³,², and Edward Ross³
¹University of Central Florida College of Medicine, Orlando, FL, ²University of Central Florida, Orlando, FL, ³Orlando VA Medical Center, Orlando, FL

Th-173
The Cell Response of 7F2 Osteoblasts to Low-Dose Radiation
Katelyn Truong¹, Suzanne Bradley¹, Matthew Rusin¹, Endre Takacs¹, and Delphine Dean¹
¹Clemson University, Clemson, SC
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Th-174**
Evaluation of Equestrian Helmet Energy Attenuation Performance
Anne Hoch¹, Linda McGrady¹,², Amy Ford¹, and Mei Wang¹,²
¹Medical College of Wisconsin, Milwaukee, WI, ²Marquette University, Milwaukee, WI

**Th-175**
Self Contained Bioreactor for Bone Regeneration
Pratima Labroo¹, Ching-wen Li², Himanshu Sant¹, Bruce Gale¹, Jill Shea¹, and Jay Agarwal¹
¹University of Utah, Salt Lake city, UT, ²National Ching Hsing University, Taipei, Taiwan

**Th-176**
GaitAssist: A Novel Technology to Mitigate Scissoring Gait in Patients with CP
Yu Xu¹, Jacob Schick¹, Kaiyuan Wang¹, Kevin Xin¹, Andie Seabrooke¹, Michael Ruiz¹, Michael Ruiz¹, Ana Ainechi¹, Alexander de la Vega¹, Alexander Hoon¹, Brittany DeCroes¹, Tara Johnson², and Robert Allen¹
¹Johns Hopkins University, Baltimore, MD, ²Kennedy Krieger Institute, Baltimore, MD

**Track: Biomedical Engineering Education (BME)**

**Th-177**
Ethical Challenges in Biomedical Engineering Education And Research
Subrata Saha¹ and Pamela Saha¹
¹SUNY Downstate Medical Center, Brooklyn, NY

**Th-178**
A Course in "Maker Activities" for a Master of Engineering Design and Commercialization
Brandon Kirkland¹, Ophelia Johnson¹, and Alan Eberhardt¹
¹University of Alabama at Birmingham, Birmingham, AL

**Th-179**
An Innovative and Collaborative Method for Introducing Industry Standards into Biomedical Engineering Curriculum at the University of Toronto
Andrey Shukalyuk¹ and Dawn Kilkenny¹
¹University of Toronto, Toronto, ON, Canada

**Th-180**
Performance of Students on Scholarships in the Biomedical Engineering Program at Universidad de los Andes
Diana Gaitan¹ and Juan Carlos Briceno¹
¹U de los Andes, Bogota, Colombia

**Th-181**
Molecules and Cells: Using Multiple Teaching Methods Promotes Long Term Retention
Eileen Haase¹ and Harry Goldberg¹
¹Johns Hopkins University, Baltimore, MD

**Th-182**
Developing Communication Skills in Biomedical Engineering Undergraduate Students through a Cross-Disciplinary Service Project
Jennifer Keshwan¹ and Krista Adams¹
¹University of Nebraska Lincoln, Lincoln, NE

**Th-183**
Moving from a Scientific Undergraduate Thesis Project to a Capstone Design Project: Challenges and Possibilities
Maria Fernanda Olarte-Sierra¹ and Juan Briceño¹
¹Universidad de los Andes, Bogota, Colombia

**Track: Biomedical Engineering Education (BME)**

**Th-184**
Designing Hands On Bioengineering Graduate Curriculum for Diverse Audiences
Adele Doyle¹
¹University of California Santa Barbara, Santa Barbara, CA

**Th-185**
The The Teaching Dead: Season III-2 Years Post Infection
Jeffrey La Belle¹, Stephanie Maxwell¹, Aldin Malkoc¹, Joseph Heath¹, and Kara Karanik¹
¹Arizona State University, Tempe, AZ

**Th-186**
The History of The BME-IDEA Meeting and Report-out for 2016
Joe Tranquillo¹ and Youseph Yazdi²
¹Bucknell University, Lewisburg, PA, ²Johns Hopkins University, Baltimore, MD

**Th-187**
Design of a Laminar Flow Hood for a Pediatric Hospital in Vietnam
Miiri Kotche¹, Barak Stoltz¹, Tejas Madhavan¹, Josh Shubert¹, Beny Romo¹, and Fatima Rizvi¹
¹University of Illinois at Chicago, Chicago, IL

**Track: Biomedical Engineering Education (BME)**

**Th-188**
A Master of Engineering in Design and Commercialization
Alan Eberhardt¹ and Lee Moradi³
¹University of Alabama at Birmingham, Birmingham, AL

**Th-189**
Using STEM to STEAM Initiatives to Create Multi-disciplinary Engineering Teams
Lola Brown¹ and Gilda Barabino¹
¹City College of New York, New York, NY

**Th-190**
Use of Needs Assessment to Improve "Empathize" Step In Design Thinking for Freshmen Bioengineers
Ruth Ochia¹
¹Temple University, Philadelphia, PA

**Th-191**
Executing a Business Start-Up Model to Refine Biomedical Engineering Training Tools
Sarah Rowlinson¹, Timothy Burg¹, and Karen Burg¹
¹Clemson University, Clemson, SC, ²University of Georgia, Athens, GA

**Th-192**
Encouraging Curiosity, Connections, and the Creation of Value in a Materials/Biomaterials Sequence: Part II Biomaterials
Silviya Zustiak¹ and Gary Bledsoe¹
¹Saint Louis University, St Louis, MO
Track: Biomedical Engineering Education (BME)

**Flipped Classrooms**

**Th-193**
Student-Graded Homework Using Compare/Contrast and Self-Explanation Exercises
Michael Caplan¹ and Nathan Kirkpatrick¹
¹Arizona State University, Tempe, AZ

**Track: Biomedical Engineering Education (BME)**

**Freshman-Level Engineering Discovery Classes**

**Th-194**
Osteocytes Density Reduction in Cortical Bone by Estrogen Deficiency and Functional Disuse and Countermeasure
Dongye Zhang¹, Nancy Rojas², Yi-Xian Qin¹, and Minyi Hu¹
¹Stony Brook University, Stony Brook, NY, ²Stony Brook University, Brooklyn, NY

**Track: Biomedical Engineering Education (BME)**

**Global Health**

**Th-195**
The Development of a Student-led Co-curriculum in Global Health Design: M-HEAL
Kevin Jiang¹, Jennifer Lee¹, and Mary Munsell¹
¹University of Michigan, Ann Arbor, MI

**Track: Biomedical Engineering Education (BME)**

**In Silico Demonstration**

**Th-196**
Chemical and Biomedical Engineering Educational MATLAB App for PK/PD Modeling of ACE-Inhibition
Grace Harrell¹, Alexandra McPeak¹, and Ashlee Ford Versypt¹
¹Oklahoma State University, Stillwater, OK

**Track: Biomedical Engineering Education (BME)**

**Laboratory-Based Teaching**

**Th-197**
A K-12 Engineering Education Module: Hands-On Approach to Helmet Design
Abigail Tyson¹, Bethany Rowson¹, and Steven Rowson¹
¹Virginia Tech, Blacksburg, VA

**Th-198**
Inquiry-Based Laboratories for Medical Electronics Course
Jean-Michel Maarek¹
¹University of Southern California, Los Angeles, CA

**Th-199**
Updating Biomechanics Materials Laboratory Class: Innovations in Student Reports
Michael Nowak¹
¹University of Hartford, West Hartford, CT

**Track: Biomedical Engineering Education (BME)**

**Th-200**
Tissue Engineering Scaffold Design for Sophomore Biomedical Engineering Students
Nicolas Mann¹, Daniel Infusino², Matthew Goldner³, and Vince Beachley⁴
¹Rowan University, Glassboro, NJ, ²Rowan University, Glassboro, NJ

**Th-201**
Integrating Biological Design-Thinking and The Scientific Method into Undergraduate Biomedical Engineering Curriculum
Ritu Raman¹, Marlon Mitchell³, Pablo Perez-Pinera⁴, Rashid Bashir⁵, and Lizzanne DeStefano⁶
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Georgia Institute of Technology, Atlanta, GA

**Th-202**
Functional Electrical Stimulation Laboratory for Introductory Courses in Biomedical Engineering
Seung-Jae Kim¹
¹California Baptist University, Riverside, CA

**Track: Biomedical Engineering Education (BME)**

**On-Line Education**

**Th-203**
Development of an Online Multistep Engineering Problem Solving Course Using LabVIEW
Samual Lines¹, Mehdi Shokoueinejad¹, and Amit Nimunkar¹
¹University of Wisconsin-Madison, Madison, WI

**Track: Biomedical Engineering Education (BME)**

**Biomedical Engineering Education (BME)**

**Th-204**
Development of a Patient-Focused Biomedical Engineering Program within a Small Liberal Arts University
Brian Plouffe¹
¹Regis College, Weston, MA

**Th-205**
A "Boot Camp" As In-laboratory Introduction to Research Methods for a Research Experiences for Undergraduates Program
Margo Cousins¹, Stephanie Young¹, Erin Dolan¹, Lynda Gonzalez¹, Brandi DeMont¹, Mia Markey¹, and Laura Suggs¹
¹University of Texas at Austin, Austin, TX

**Th-206**
VHA/NCI Big Data Scientist Training Enhancement Program: New Opportunities & Outcomes
Connie Lee¹, Sean Hanlon², and Michelle Berry-Lang²
¹Employee Education System, Veterans Health Administration, U.S. Department of Veterans Affairs, Washington, DC, ²Center for Strategic Scientific Initiatives, Office of the Director, National Cancer Institute, National Institutes of Health, Bethesda, MD

**Th-207**
Image Processing Tools for Contact Angle Assessment to Evaluate Wettability of Dental Materials
Rana Abdelsalam¹, Teresa Ryan¹, and Waldmer De Rijk¹
¹East Carolina University, Greenville, NC
Track: Biomedical Imaging and Optics

**Image Assisted Biological Modeling**

**Th-208**
An Automated Real-time Approach for Quantifying Phagocytosis and Reactive Oxygen Species Levels
André Paredes¹ and Jun Cheng¹
¹University of Illinois at Chicago, Chicago, IL

**Th-209**
Utilizing Noninvasive Imaging Techniques to Classify Radiation Response in a Pediatric Brain Tumor Model
Tien Tang, Janice Zawaski, Kathleen Francis, Amina Qutub, and M. Waleed Gaber
¹Rice University, Houston, TX, ²Baylor College of Medicine, Houston, TX

**Th-210**
Comparative Study of In Vivo Degradation Tracking and Modeling using Autofluorescent Protein Microspheres and Nanoparticles Suspension
Xiaoyu Ma, Jun Chen, Tai-Hsi Fan, and Yu Lei
¹University of Connecticut, Storrs, CT

**Image Guided Therapy and Surgery**

**Th-211**
Laser Interstitial Thermal Therapy for Minimally Invasive Ablation of Small Renal Tumors
Luis Fontaneda, Nelson Salas, and Karli Pease
¹University of Miami, Coral Gables, FL

**Th-212**
Paired-agent Fluorescence Imaging Improves Contrast of Cranial Nerves
Veronica Torres, Joshua Wewel, Richard Byrne, and Kenneth Tichauer
¹Illinois Institute of Technology, Chicago, IL, ²Rush University Medical Center, Chicago, IL

**Th-213**
Dual-modality Smartphone Fiber-optic Endoscope for Early Detection of Cervical Cancer in Low-Resource Settings
Xiangqian Hong and Bing Yu
¹The University of Akron, Akron, OH

**Image Informatics**

**Th-214**
Automated Segmentation of Prostate Tissue for Partial Wave Spectroscopy (PWS) Analysis using Non-rigid Registration and k-means Clustering Method
Qin Miao, Saurabh Bagalkar, Justin Derbas, Hariharan Subramanian, and Vadim Backman
¹Northwestern University, Evanston, IL, ²Nanocytomics LLC, Evanston, IL

**Th-215**
Characterization of Pulmonary Fibrosis on HRCT Images Using Deep Learning
Xavier Gonzalez, Diego Llarrull, Mirabela Rusu, and Ansaf Salleb-Aouissi
¹Columbia University, New York City, NY, ²University of Buenos Aires, School of Engineering, Ciudad de Buenos Aires, Argentina, ³General Electric, Niskayuna, NY

**Th-216**
An Automated Method for Low Resolution Optical Character Recognition on Pulse Volume Recording Image
Zhexuan Zhang, Uygar Teomete, and Weizhao Zhao
¹University of Miami, Coral Gables, FL

**Imaging Techniques in Neuroscience**

**Th-217**
Cerebral Blood Flow is Linked to EEG Bursting after Cardiac Arrest and Resuscitation
Christian Crouzet, Robert H. Wilson, Maryam H. Farahabadi, Afshin Bazrafkan, Donald Lee, Juan Alcocer, Bruce J. Tromberg, Yama Akbari, and Bernard Choi
¹UC Irvine, Irvine, CA

**Th-218**
Multicolor Scanning Plane Illumination Microscope for Imaging Embryonic Brain Development in Zebrafish
Nathan Hart, Holly Gibbs, Arne Lekven, and Alvin Yeh
¹Texas A&M University, College Station, TX

**Th-219**
Coupled Multivariate Empirical Mode Decomposition (MEMD) and Inverse Solution Method for Epilepsy Localization
Pegah Khosropanah, Abd Rahman Ranli, and Mohammad Hamiruce Marhaban
¹University Putra Malaysia, Serdang, Malaysia

**Th-220**
Modular Augmented Microscopy with Spatial Light Modulation
Summer Garland, Jeffrey Watson, Nikolay Martirosyan, Michael Lemole, and Marek Romanowski
¹University of Arizona, Tucson, AZ, ²Banner University Medical Center, Tucson, AZ

**Th-221**
Gradient Index Lens Implant Has Minimal Tissue Reaction & Does Not Affect Behavioral Tests
Seon A Lee, Kevin Holly, Vladimir Voziyanov, Stephanie Villalba, Rudi Tong, Holly Grigsby, Edward Glasscock, Ioannis Vlachos, Francis Szele, and Teresa Murray
¹Louisiana Tech University, Ruston, LA, ²LSU Health Sciences Center-Shreveport, Shreveport, LA, ³University of Oxford, Oxford, United Kingdom

**Th-222**
Investigating Neural Responses in Brain by Optic Fiber Detection
Wen-Ju Pan, Jacob Billings, Maysam Nezafati, Waqas Majeed, and Shella Keilholz
¹Emory University/Georgia Institute of Technology, Atlanta, GA

**Th-223**
Acoustoelectric Imaging of the EEG in a Human Head Phantom
Yexian Qin, Pier Ingram, and Russell Witte
¹University of Arizona, Tucson, AZ

**Th-224**
Sparsity and Smoothness Enhanced EEG Brain Imaging
Ying Li, Jing Qin, Yue-Loong Hsin, Stanley Osher, and Wentai Liu
¹University of California Los Angeles, Los Angeles, CA, ²Chung Shan Medical University, Taichung, Taiwan

**Molecular Imaging**

**Th-225**
Multimodal Photoacoustic Lifetime and Ultrasound Imaging System
Ekaterina Ippolito and Shai Ashkenazi
¹University of Minnesota, Minneapolis, MN
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**

**Th-226**
Ultra-Sensitive Detection of Circulating microRNA with Quantum Dots
Lucas Smith1, Yang Liu1, and Andrew Smith1
1University of Illinois, Urbana, IL

**Th-227**
Enhancing Reactivity of Antibody-Conjugated trans Cycloctenes for Biorthogonal Pretargeting
Maha Rahim1, Rajesh Kota1, Ting-ji Chu1, and Jered Haun1
1University of California Irvine, Irvine, CA

**Th-228**
Devising Novel Eu(III)-based pH-responsive Bio-probes for Selective Lysosome Imaging
Sergey Shuvaev1, Robert Pal1, Mark Fox1, and David Parker1
1Durham University, Durham, United Kingdom

**Th-229**
Staining Paired-Agent Model (SPAM) For Cell Surface Receptor Concentration Estimation in Thick Tissue Imaging
Xiaochun Xu1, Yu Wang2, Jonathan T.C. Liu2, Jialing Xiang3, and Kenneth M. Tichauer4
1Illinois Institute of Technology, Chicago, IL, 2University of Washington, Seattle, WA

**Th-230**
Experimental Investigation of the Impact of Excitation Beam on Chemical Concentration Sensitivity for X-ray Fluorescence Computed Tomography (XFCT)
Xu Dong1 and Guohua Cao1
1Virginia Tech, Blacksburg, VA

**Th-231**
Peptide Beacons for Protein Imaging in Live Cells
Zhenjiang Zhang1, Ciaran Lee1, Anirban Ray1, Sheng Tong1, and Gang Bao1
1Rice University, Houston, TX

**Track: Biomedical Imaging and Optics Molecular Probes**

**Th-232**
PEI-Coated Rare Earth Doped Nanoparticles as Dual-Modality Contrast Agent for Shortwave Infrared And Photoacoustic Imaging
Mei Chee Tan1, Shuqing He1, Nitish Thakor2, and Lun-De Liao2
1Singapore University of Technology and Design, Singapore, Singapore, 2National University of Singapore, Singapore, Singapore

**Th-233**
Reporter+Probe Biosensors: Toehold-Mediated Strand Displacement for Detection of MiR-29b-1-5p
Nicholas E. Larkey1, Corinne N. Brucks1, Natasha M. Smith1, and Sean M. Burrows1
1Oregon State University, Corvallis, OR

**Th-234**
Carbon Nanodot as Biocompatible Probe for in Vivo Imaging
Pantrika Krisanarungson1, Gregory Lecroy1, Fan Yang1, Yaping Sun1, and Bruce Gao1
1Clemson University, Clemson, SC

**Track: Biomedical Imaging and Optics MRI**

**Th-235**
Center Frequency Determination using Off-resonance Saturation in MRI
Eamon Doyle1,2, Jonathan Chia1, and John Wood2,3
1University of Southern California, Los Angeles, CA, 2Children’s Hospital of Los Angeles, Los Angeles, CA, 3Children’s Hospital of Los Angeles, Los Angeles, CA, 4Philips Healthcare, Cleveland, OH

**Th-236**
Development of a Custom 1H/31P Spectroscopy Coil for Canine Models of Muscular Dystrophy
Jeremy Sia1, Kurt Parizek1, Matthew Wilcox1, and Mary McDougall1
1Texas A&M University, College Station, TX

**Th-237**
Semi-automatic Image Processing of Craniospinal Morphometrics for Chiari Malformation
Maggie Eppelheimer1, Aintzane Arbizo1,4, James Houston1, Soroush Heidari Pahlavian1, Audrey Braun1, Dipankar Biswas2, Philip Allen1, Rick Labuda3, and Francis Loth1
1University of Akron, Akron, OH, 2Duke University, Durham, NC, 3Conquer Chiari, Wexford, PA

**Th-238**
Brain Matter Orientation Dispersion Changes Associated with Subconcussive Head Impact Exposure After A Single Season Of Youth Football
Naeim Bahrami1, Elizabeth Davenport2, Jillian Urban1, Yongkyoo Jung1, Joel Stitzel1, Joseph Maljjian3, and Christopher Whittow1
1Wake Forest University, Winston Salem, NC, 2University of Texas South Western, Dallas, TX

**Th-239**
Characterization of Structural Connectivity in Neural Ganglia: AGraph Theory Approach
Abdol Aziz Ould Ismail1,2, Ghoncheh Amouzande1,2, and Samuel Grant1
1Florida State University, Tallahassee, FL, 2National High Magnetic Field Laboratory, Tallahassee, FL

**Th-240**
Electrical Conductivity Mapping at 21.1 T
Ghoncheh Amouzande1,2 and Samuel Grant1
1Florida State University, Tallahassee, FL, 2National High Magnetic Field Laboratory, Tallahassee, FL

**Track: Biomedical Imaging and Optics Ultrasound Imaging**

**Th-241**
Circle of Willis Model for Transcranial Doppler Ultrasound Training
Conner Beyersdorf1, Benjamin Hage1, Edward Truemper1,2, and Greg Bashford1,2
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

**Th-242**
Novel Transcranial Doppler Headband for Simultaneous Measurement of Middle Cerebral and Basilar Artery Hemodynamics
Marissa Nitz1, Mohammed Alwatban1,2, Benjamin Hage1, Max Twedt1,2, Joie Patterson1, Julie Honaker1, Edward Truemper1,2, and Greg Bashford1,2
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

**Th-243**
Use of Shear Wave Ultrasound Vibrometry for Detection of Simulated Esophageal Malignancy in ex vivo Porcine Esophagi
Johnathon Aho1, Ivan Nenadic1, Sara Aristizabal Taborda1, Dennis Wigle1, Daniel Tschumperlin1, and Matthew Urban1
1Mayo Clinic, Rochester, MN

**Th-244**
Classification of Breast Tumor Using Texture Analysis
Viksit Kumar1, Max Mens1, Adriana Gregory1, Zeynnett Akkus1, Mahdi Bayat1, Mostafa Fatemi1, and Azra Alizad1
1Mayo College of Medicine, Rochester, MN
Th-245
Improved Contrast for High Frame Rate Imaging using Coherent Compounding Combined with Spatial Matched Filtering
Yang Lou¹ and Jesse Tong-Pin Yen¹
¹University of Southern California, Los Angeles, CA

Track: Cancer Technologies
Computational Modeling of Cancer Growth and Treatment

Th-246
Optimizing Tumor Contrast During Surgery: Ideal Imaging Agent Parameters for Paired-agent Methods.
Aakanksha Rangekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

Th-247
A Stochastic Model for Predicting Path Persistence of Cell Migration in a 3D Polymer Matrix
Benjamin Yeoman¹ and Parag Katira¹
¹San Diego State University, San Diego, CA

Th-248
Characterization of the Electrical Properties of Surgically Resected Human Healthy and Malignant Pancreatic Tissue in Response to Irreversible Electroporation for Treatment of Pancreatic Cancer
Suyashree Bhonsle¹, Andrea Rolong¹, Ahmad Safaai-Jazi¹, Clancy Clark¹, and Rafael Davalos¹
¹Virginia Tech, Blacksburg, VA, ²Wake Forest Baptist Baptist Medical Center, Blacksburg, VA

Tracks: Biomechanics, Cancer Technologies
Cancer Mechano biology

Th-249
Inhibition of Endothelial Nitric Oxide Synthase Decreases Breast Cancer Cell MDA-MB-231 Adhesion to Intact Microvessels Under Physiological Flows
Lin Zhang¹, Min Zeng¹, and Bingmei Fu¹
¹The City College of the City University of New York, New York, NY

Th-250
Forces Generated by Single Cells During Three-Dimensional Growth
Jianyong Huang¹, Liangli Wang¹, and Fan Yuan¹
¹Duke University, Durham, NC

Th-251
The Effect of Cancer Cell Secreted Factors on Local and Global ECM Remodeling by Fibroblasts and Force-mediated YAP Nuclear Localization
Kyung Hwa Choi¹ and Taher Saif¹
¹University of Illinois at Urbana Champaign, Urbana, IL

Th-252
Loading-Induced Interstitial Fluid Flow Was More Heterogeneous Than Matrix Strains in a 3D Bone Metastasis Model
Boyuan Liu¹, Gary Chang¹, Gabriela Kornilowicz¹, Suyue Han¹, Yahya Modarres-Sadeghi¹, and Maureen Lynch¹
¹UMass-Amherst, Amherst, MA

Th-253
Viscoelastic Correction of Stiffness-Dependent Growth Rates of Cancerous Human Breast Cells
Olaoluwa Adejibun¹, Elise Corbin¹,², and Rashid Bashir²
¹University of Illinois, Urbana Champaign, Urbana, IL, ²University of Pennsylvania, Philadelphia, PA

Th-254
Fluid Shear Stress Activates Epithelial-To-Mesenchymal Transition Genes in Luminal Breast Cancer Subtype
Ursula Triantafilliu¹, Nikki Klaassen², Andrew Raddatz¹, and Yonghyun Kim¹
¹University of Alabama, Tuscaloosa, AL, ²Kansas State University, Manhattan, KS

Th-255
Influence of Myoferlin on Cell Motility and Epithelial to Mesenchymal Transition in Eroltinib Resistant Lung Cancer Cells
YouJin Cho¹, Vasudha Shukla¹, Douglas Kniss¹,², and Samir Ghadiali¹,²
¹The Ohio State University, Columbus, OH, ²The Wexner Medical Center at The Ohio State University, Columbus, OH

Track: Cancer Technologies
Engineered Models of Cancer and the Tumor Microenvironment

Th-256
Substratum Stiffness Regulates Drug-induced Cancer Cell Dormancy
Alisya Anlas¹ and Celeste Nelson¹
¹Princeton University, Princeton, NJ

Th-257
Development of Lymph Node Construct for Investigating Prostate Cancer Metastasis
Amirhossein Hakamivala¹, Carlos Chicas¹, Jose Castro¹, Charls Wallace¹, Ashwin Nair¹, and Liping Tang¹
¹University of Texas at Arlington, Arlington, TX

Th-258
Microfluidic Device for Modeling the Invasive Tumor Microenvironment in Colon Carcinoma Three Dimensional Tumor Models
Eric Weaver¹,², Amanda Hummon¹, and Pinar Zorlutuna¹
¹University of Notre Dame, Notre Dame, IN, ²Harper Cancer Research Institute, Notre Dame, IN

Th-259
Rotational Collagen Alignment Using Acupuncture Needles Reveals Diversity in Contact Guidance
Jacob Nuhn¹, Juan Wang¹, and Ian Schneider¹
¹Iowa State University, Ames, IA

Th-260
3D Hydrogel-Based Microwell Arrays as a Tumor Microenvironment Model to Study Breast Cancer Growth
John Casey¹, Xiaoshao Yue¹, Trung Dung Nguyen¹, Victoria Zellmer¹, Siyuan Zhang¹, and Pinar Zorlutuna¹
¹University of Notre Dame, Notre Dame, IN

Th-261
A Novel Vascularized Three-Dimensional Tissue-Engineered Model for Breast Cancer Metastasis
Julia Jin¹, Rachel Akintayo¹, Ross Weinreb¹, Kerry Morrison¹, Julia Jin¹, Omer Kaymakcalan¹, Andrew Abadeer¹, Sarah Karinja¹, and Jason Spector¹
¹Weill Cornell Medical College, New York, NY

Th-262
Multiple Organ-on-a-Chip Platform for Metastasis Dynamic Studies
Julio Alenman¹ and Aleksander Skarda³
¹Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, ²Wake Forest School of Medicine, Winston Salem, NC, ³Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston Salem, NC

Th-263
Tracks: Technologies, Cancer Mechanobiology
Cancer Mechanobiology

Th-264
Computational Modeling of Tumor Growth and Treatment
Aakanksha Rangekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

Th-265
Optimizing Tumor Contrast During Surgery: Ideal Imaging Agent Parameters for Paired-agent Methods.
Aakanksha Rangekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

Th-266
A Stochastic Model for Predicting Path Persistence of Cell Migration in a 3D Polymer Matrix
Benjamin Yeoman¹ and Parag Katira¹
¹San Diego State University, San Diego, CA

Th-267
Characterization of the Electrical Properties of Surgically Resected Human Healthy and Malignant Pancreatic Tissue in Response to Irreversible Electroporation for Treatment of Pancreatic Cancer
Suyashree Bhonsle¹, Andrea Rolong¹, Ahmad Safaai-Jazi¹, Clancy Clark¹, and Rafael Davalos¹
¹Virginia Tech, Blacksburg, VA, ²Wake Forest Baptist Baptist Medical Center, Blacksburg, VA

Th-268
Inhibition of Endothelial Nitric Oxide Synthase Decreases Breast Cancer Cell MDA-MB-231 Adhesion to Intact Microvessels Under Physiological Flows
Lin Zhang¹, Min Zeng¹, and Bingmei Fu¹
¹The City College of the City University of New York, New York, NY

Th-269
Forces Generated by Single Cells During Three-Dimensional Growth
Jianyong Huang¹, Liangli Wang¹, and Fan Yuan¹
¹Duke University, Durham, NC

Th-270
The Effect of Cancer Cell Secreted Factors on Local and Global ECM Remodeling by Fibroblasts and Force-mediated YAP Nuclear Localization
Kyung Hwa Choi¹ and Taher Saif¹
¹University of Illinois at Urbana Champaign, Urbana, IL

Th-271
Loading-Induced Interstitial Fluid Flow Was More Heterogeneous Than Matrix Strains in a 3D Bone Metastasis Model
Boyuan Liu¹, Gary Chang¹, Gabriela Kornilowicz¹, Suyue Han¹, Yahya Modarres-Sadeghi¹, and Maureen Lynch¹
¹UMass-Amherst, Amherst, MA

Th-272
Viscoelastic Correction of Stiffness-Dependent Growth Rates of Cancerous Human Breast Cells
Olaoluwa Adejibun¹, Elise Corbin¹,², and Rashid Bashir²
¹University of Illinois, Urbana Champaign, Urbana, IL, ²University of Pennsylvania, Philadelphia, PA

Th-273
Fluid Shear Stress Activates Epithelial-To-Mesenchymal Transition Genes in Luminal Breast Cancer Subtype
Ursula Triantafilliu¹, Nikki Klaassen², Andrew Raddatz¹, and Yonghyun Kim¹
¹University of Alabama, Tuscaloosa, AL, ²Kansas State University, Manhattan, KS

Th-274
Influence of Myoferlin on Cell Motility and Epithelial to Mesenchymal Transition in Eroltinib Resistant Lung Cancer Cells
YouJin Cho¹, Vasudha Shukla¹, Douglas Kniss¹,², and Samir Ghadiali¹,²
¹The Ohio State University, Columbus, OH, ²The Wexner Medical Center at The Ohio State University, Columbus, OH

Th-275
Computational Modeling of Tumor Growth and Treatment
Aakanksha Rangekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

Th-276
Optimizing Tumor Contrast During Surgery: Ideal Imaging Agent Parameters for Paired-agent Methods.
Aakanksha Rangekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

Th-277
A Stochastic Model for Predicting Path Persistence of Cell Migration in a 3D Polymer Matrix
Benjamin Yeoman¹ and Parag Katira¹
¹San Diego State University, San Diego, CA

Th-278
Characterization of the Electrical Properties of Surgically Resected Human Healthy and Malignant Pancreatic Tissue in Response to Irreversible Electroporation for Treatment of Pancreatic Cancer
Suyashree Bhonsle¹, Andrea Rolong¹, Ahmad Safaai-Jazi¹, Clancy Clark¹, and Rafael Davalos¹
¹Virginia Tech, Blacksburg, VA, ²Wake Forest Baptist Baptist Medical Center, Blacksburg, VA

Th-279
Inhibition of Endothelial Nitric Oxide Synthase Decreases Breast Cancer Cell MDA-MB-231 Adhesion to Intact Microvessels Under Physiological Flows
Lin Zhang¹, Min Zeng¹, and Bingmei Fu¹
¹The City College of the City University of New York, New York, NY

Th-280
Forces Generated by Single Cells During Three-Dimensional Growth
Jianyong Huang¹, Liangli Wang¹, and Fan Yuan¹
¹Duke University, Durham, NC

Th-281
The Effect of Cancer Cell Secreted Factors on Local and Global ECM Remodeling by Fibroblasts and Force-mediated YAP Nuclear Localization
Kyung Hwa Choi¹ and Taher Saif¹
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Th-282
Loading-Induced Interstitial Fluid Flow Was More Heterogeneous Than Matrix Strains in a 3D Bone Metastasis Model
Boyuan Liu¹, Gary Chang¹, Gabriela Kornilowicz¹, Suyue Han¹, Yahya Modarres-Sadeghi¹, and Maureen Lynch¹
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Th-283
Viscoelastic Correction of Stiffness-Dependent Growth Rates of Cancerous Human Breast Cells
Olaoluwa Adejibun¹, Elise Corbin¹,², and Rashid Bashir²
¹University of Illinois, Urbana Champaign, Urbana, IL, ²University of Pennsylvania, Philadelphia, PA
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Poster Session—Thursday**

**Th-263**
Implantable Bioengineered Microenvironments to Study Human Tumor-Immune Interaction
Ryan Carpenter¹ and Jungwoo Lee¹,²,³
¹University of Massachusetts Amherst, Amherst, MA, ²Institute for Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA

**Th-264**
High-throughput Biomimetic 3D Models of Cancer Dormancy and Reactivation
Taraka Sai Pavan Grandhi¹, Thrimoorthy Potta¹, Indrani Deshpande¹, and Kaushal Rege¹
¹Arizona State University, Tempe, AZ

**Th-265**
Hydrogel-based *In Vitro* Glioblastoma Spheroid Models
Lindsay Hill¹, Anisa Ashraf¹, and Silviya Zustiak¹
¹Saint Louis University, St. Louis, MO

**Th-266**
A 3D Submucosal Microenvironment for Investigation of Fiber Alignment Induced Epithelial-to-Mesenchymal Transition in Colorectal Cancer Cells
Mahesh Devarasetty¹,², Aleksander Skardal¹,², and Shay Soker¹,²
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ²Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC

**Th-267**
Flow Response of Myeloid Derived Suppressor Cells in the Breast Tumor Microenvironment
Matthew Perez¹, Janet Cross¹, and Jennifer Munson¹
¹University of Virginia, Charlottesville, VA

**Th-268**
Three Dimensional (3D) High Density Tumor Microarray to Study the Influence of Stromal Cells on Cancer Invasion
Haripnder Saini¹, Karime Jocelyn Rosas Gomaz², Kiarash Rahmani², Robet Ros², and Mehdi Nikkhah²
¹Arizona State University, tempe, AZ, ²Arizona State University, Tempe, AZ

**Th-269**
High Throughput Oncology Drug Screening and Molecular Analysis Using Microtomed Tumor Spheroids
Pradip Shahi Thakuri¹, Stephanie Ham¹, Gary Luker², and Hossein Taverna¹
¹The University of Akron, Akron, OH, ²University of Michigan, Ann Arbor, MI

**Th-270**
Bioinspired DNA-Histone Complex to Study Metastasis-Promoting Activity of Neutrophil Extracellular Traps
Priyan Weerappuli¹, Cameron Louttit², Taisuke Kojima³, Midori Maeda¹, Cameron Yamanishi¹, Christopher Oliver¹, James Moon¹, and Shuichi Takayama¹
¹University of Michigan, Ann Arbor, MI, ²University of Southern California, Los Angeles, CA

**Th-271**
Dissecting the Role of Bone Marrow-Derived Progenitor Cells in Pancreas Cancer
Rachel Edwards¹, Mackenzie Callaway¹, Taylor Heim¹, Mitchell Ericsson², Marjorie Carlson¹, and Paolo Provenzano¹
¹University of Minnesota, Minneapolis, MN, ²University of Connecticut Health, Farmington, CT

**Th-272**
Comparative Analysis of Tumor Spheroid Generation Techniques for Differential In Vitro Drug Toxicity
Shreya Raghavan¹, Pooja Mehta¹, Eric Horst¹, Maria Ward¹, Katelyn Rowley¹, and Geeta Mehta¹
¹University of Michigan, Ann Arbor, MI

**Th-273**
Characterization of Growth Factor Stimulated MDA-MB-231 Breast Cancer Cell Migration
Tanzila Islam¹
¹Washington State University, Pullman, WA

**Th-274**
Self-assembly of Tumor Spheroids in a Bioprinted Heterogeneous 3D Tumor Stroma Model
Tao Jiang¹, Jose Gil Munguia-Lopez², Joel Grant¹, Sanahan Vijayakumar¹, and Joseph Kinsella¹
¹McGill University, Montreal, QC, Canada, ²Instituto Potosino de Investigación Científica y Tecnológica, A.C. (IPICYT), San Luis Potosi, Mexico

**Th-275**
Melanoma-Induced Endothelial Barrier Disruption via VEGF-cadherin Disassembly and Cell Contractility
Virginia Aragon-Sanabria¹, Esther Gomez¹, and Cheng Dong¹
¹The Pennsylvania State University, University Park, PA

**Th-276**
A Tumor-on-a-Chip Platform Recapitulating Hypoxic Microenvironments
Yuta Ando¹, Daniel Yen¹, Gabriel Rocha¹, and Keyue Shen¹
¹University of Southern California, Los Angeles, CA

**Tracks: Cancer Technologies, Nano and Micro Technologies**

**Th-277**
Micro/Nano Tools in Cancer (Diagnostics, Treatment)

**Th-278**
Multivalent Capture of Tumor Cells Using Microfluidic Devices
Anna Gams¹, Jinling Zhang¹, Weian Sheng¹, and Z. Hugh Fan¹
¹University of Florida, Gainesville, FL

**Th-279**
Smartphone-Compatible Magnetic Focusing for Detection of Circulating Tumor Cells
Ashwini Joshi¹, Reza Amin¹, Stephanie Knowlton¹, Alexander Hart¹, Bekir Yenilmez¹, Chung Yang¹, and Savas Tasoglu¹
¹University of Connecticut, Storrs, CT

**Th-280**
Photothermal Therapy Improves the Efficacy of a MEK Inhibitor in the Treatment of Malignant Peripheral Nerve Sheath Tumors
Elizabeth Sweeney¹, Rachel Burga¹, Chaoyang Li¹, Yuan Zhu¹, and Rohan Fernandes¹
¹Children’s National Medical Center, Washington, DC

**Th-281**
Optical Surveillance of Multi-Organ Metastatic Lesions using Rare Earth Albumin Nanoprobos
Harini Kantamneni¹, Margot Zevon¹, Laura Higgins¹, Derek Adler¹, Sheng Yang², Xinyu Zhao², Mei chee Tan³, Mark Pierce³, Richard Rimai¹, Vidya Ganapathy¹, Charles Roth¹, and Prabhas Moghe¹
¹Rutgers University, New Brunswick, NJ, ²Singapore University of Technology and Design, Singapore, Singapore

**Th-282**
Rapid, Surface-marker Specific Isolation of Exosomes for the Diagnosis of Cancer, Using Parallelized, Magnetic nanopores
Jina Ko¹, Neha Bhagwat¹, Stephanie Yee¹, Erica Carpenter¹, Ben Stanger¹, and Dave Issadore¹
¹University of Pennsylvania, Philadelphia, PA
Th-283  A Magnetic Micropore Chip for Rapid (< 1 hour) Unbiased Circulating Tumor Cell Isolation and In-situ RNA Analysis
Jina Ko¹, Neha Bhagwat¹, Stephanie Yee¹, Colleen Redlinger¹, Janea Romeo¹, Mark O’Hara¹, Arjun Raj¹, Erica Carpenter¹, Ben Stanger¹, and Dave Issadore¹
¹University of Pennsylvania, Philadelphia, PA

Th-284  Image-guided Radiosensitizing Polymersome Nanoparticles to Track and Treat Superficial Tumors
Murali Ramamoorthy¹, Sanaz Ebrahimi Samani¹, Simon Tran¹, and Joseph Kinsella¹
¹McGill University, Montreal, QC, Canada

Th-285  Detection of miRNA 21 and 141 in Prostate Cancer Blood Specimen using Nucleic Acid Sequence Based Amplification Lateral Flow Device
Babatunde James¹, Akinniyi Osuntokí¹, A.A. Oshodi¹, and O.A. Magbagbeola¹
¹University of Lagos, Lagos, Nigeria

Th-286  Population-based Detection of Cell Penetrating Peptide Uptake in a Microfluidic Droplet Trapping Array
Nora Safabakhsh¹, Silleipiri Charles¹, Manibarathi vaithiyanathan¹, Riad Elkhanaoui¹, and Adam Melvin¹
¹Louisiana State University, Baton Rouge, LA

Th-287  Quantification of Mammalian 5-Hydroxymethylcytosine Content by a Novel Solid-State Nanopore Assay
Osama Zahid² and Adam Hall²
¹Wake Forest University School of Medicine, Winston-Salem, United States Minor Outlying Islands, ²Wake Forest University School of Medicine, Winston-Salem, NC, United States Minor Outlying Islands

Th-288  Nanotextured Functionalized Substrates for Enhanced Identification of Metastatic Breast Cancer Cells
Nuzhat Mansur¹, Francisco J. Villarreal¹, Mohammad Raziul Hasan¹, Young-Tae Kim¹, and Samir M. Iqbal¹
¹University of Texas at Arlington, Arlington, TX

Th-289  Microfluidic Device for Motility and Biochemical Assessment in Parallel Drug Testing
Shiny Amalà Priya Rajan¹, Parker Hambright², Aleksander Skardal² ³ 4, and Adam Hall²
¹Virginia Tech/Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²Wake Forest University, Winston-Salem, NC, ³Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ⁴Comprehensive Cancer Center of Wake, Winston-Salem, NC

Th-290  Quantification of Cancer Cell Response to Therapy with Quantitative Phase Microscopy
Dian Huang¹, Diane N.H. Kim¹, Michael Teitel³, and Thomas Zangle¹
¹University of California, Los Angeles, Los Angeles, CA

Th-291  Preparation of Size-Controlled 3D Glioma Spheroid Models
You Jung Kang¹, Do Young Kim¹, and Sheereen Majd²
¹Pennsylvania State University, University Park, PA, ²University of Houston, Houston, TX

Th-292  Portable and Cost-effective Surface Plasmon Resonance Biosensor for Lung Cancer Early Detection
Chang Liu¹, Zijian An¹, Maxwell Eisenbaum¹, Nan Zhang¹, Qiaoqiang Gan¹, and Yun Wu¹
¹State University of New York at Buffalo, Buffalo, NY

Th-293  A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures
Colin Hisey¹, Miguel Martinez-Calderon², Qihane Mitxelena-Iribarren², S.M. Olazola², Maite Mukika², Sergio Arana², and Derek Hansford¹
¹The Ohio State University, Columbus, OH, ²CEIT-IK4 & Tecnun, Donostia-San Sebastián, Spain

Th-294  Multifunctional Block Copolymer Nanoparticles for Diagnostics of Folate Receptor-Positive Tumors
Jiahui Zhang¹, Yiming Huang¹, and Eilaf Egap¹
¹Georgia Institute of Technology & Emory University, Atlanta, GA, ²Emory University, Atlanta, GA

Th-295  Erythrocyte Membrane coated Bismuth Nanoparticles for Enhanced X-ray Radiation Therapy
Junjie Deng¹, Seng-Kah Ng¹, and Ming Su¹
¹Northeastern University, Boston, MA

Th-296  Cellular Uptake and Cytotoxicity Effects of SERS Tags for Use in Cancer Imaging
Manjari Bhamidipati¹ and Laura Fabris¹
¹Rutgers University, Piscataway, NJ

Th-297  Targeted Nanoparticle/Cancer Binding Mediated by Tumor Cell Over-expression of Sialic Acid Analogos.
Qiuyin Ren¹, Mohit Mathew¹, Randall Meyer¹, Kevin Yarema², and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD

Th-298  Carboplatin-Complexed and crGD-Conjugated Unimolecular Nanoparticles for Targeted Ovarian Cancer Therapy
Yuyuan Wang¹, Liwei Wang¹, Guojun Chen¹, and Sarah Gong¹
¹University of Wisconsin-Madison, Madison, WI

Th-299  Nano Size Effects for Magnetic Fluid Heating and Magnetic Resonance Imaging
Sheng Tong¹, Chris Quinto², and Gang Bao¹
¹Rice University, Houston, TX, ²Georgia Institute of Technology, Atlanta, GA

Th-300  Microfluidic Devices for Mechanical Dissociation and Filtration of Tumor Tissues into Single Cells
Xiaolong Qiu¹, Trisha Westerhof¹, Marissa Pennell¹, Xiaolong Qiu¹, Trisha Westerhof¹, Marissa Pennell¹, Katrina Henrikson¹, Edward Nelson¹, and Jered Haun¹
¹University of California, Irvine, Irvine, CA

Th-301  Radiation Enhanced Anti-metastatic Treatment Of Cancer With Radiation
Yuting Qiu¹, Seng Kah Ng¹, and Ming Su¹
¹Northeastern University, Boston, MA

Track: Cardiovascular Engineering

Th-302  Quantitative Analysis of HUVEC Tube Formation in Culture Under An Oxygen Gradient
Brice Boudehent¹, Kosuke Tsukada¹, and Kanae Kadokura¹
¹Keio University, Yokohama, Japan

Th-303  Inhibition of Mechanosensitive microRNA-199a Therapeutically Enhances Perfusion Recovery and Collateral Arteriogenesis
Joshua Heuslein¹ and Richard Price¹
¹University of Virginia, Charlottesville, VA
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm

**Th-304**  
Shear Stress Modulates Notch Signaling Mediated Vascular Repair  
Kyunj In Baek¹  
¹University of California Los Angeles, Los Angeles, CA

**Th-305**  
Nanoparticles for Protein Delivery And Gene Therapy: An Alternative Treatment For Hindlimb Ischemia  
Linda Nkoue², Subhash Banerjee³, Leping Tang¹, and Kytae Nguyen¹  
¹The University of Texas at Arlington, Arlington, TX, ²The University of Texas Southwestern Medical Center, Dallas, TX, Dallas, TX, ³VA North Texas Health Care System at Dallas, Dallas, TX

**Th-306**  
Three-dimensional Microfluidic Platform to Study the Role of Stromal Cells in Tumor Angiogenesis  
Supriya Nagaraju¹, Danh Truong², and Mehdi Nikkhah¹  
¹Arizona State University, Tempe, AZ, ²Arizona State University, Tempe, AZ

**Th-307**  
Alginates Hydrogels for Controlled Release of PRP  
Nagar Faramarzi¹, Iman Yazdi², Ali Tamayo³, Leon Ptaszek¹, Afroz Fallahi⁴, Jeremy N Ruskin⁵, and Ali Khademhosseini⁶  
¹University of Southern California, Los Angeles, CA, ²University Medicine, Salt Lake City, UT, ³University of Nebraska Medical Center, Omaha, NE, ⁴University of California Los Angeles, Los Angeles, CA, ⁵University of Utah School of Medicine, Salt Lake City, UT

**Th-308**  
The Effect of Media Type On Nerve Presence In Cultured Microvascular Networks With Blood Vessels And LYmphatics  
Nicholas Hodges¹, Ryan Barl¹, James Lane¹, and Walter Murfee¹  
¹Tulane University, New Orleans, LA

**Th-309**  
Alginates-Chitosan Hydrogels Provide a Sustained Gradient of S1P for Therapeutic Angiogenesis  
Priscilla Williams¹ and Eduardo Silva¹  
¹University of California, Davis, Davis, CA

**Th-310**  
Pro- and Anti-angiogenic VEGF-A Splice Variants Bind VEGFRs with Differential Affinities  
Spencer Mamer¹, Ashley Wittenkeller¹, and P. I. Imoukhuede¹  
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Th-311**  
Engineering Oriented Microvessels on Aligned Extracellular Matrix Scaffold  
Zichen Qian¹, Lijun Zhang¹, Mitch Tahtinen¹, Avik Ghosh¹, Qi Xing¹, and Feng Zhao¹  
¹Michigan Technological University, Houghton, MI

**Track: Cardiovascular Engineering**

**Blood and Bleeding Disorders**

**Th-312**  
Precise Gene Engineering and Drives for Hemoglobinopathies in Disparate, Minority Populations  
Faisal Reza¹ and Peter M. Glazer¹  
¹Yale University, New Haven, CT

**Th-313**  
Effects of Shear on P-selectin Deposition in Microfluidic Channels  
Nesreen Alsma³,², Eddie Shimp³, Christopher Lewis³, Kevin Lam¹, ³, and David Schmidtke¹⁴  
¹University of Texas at Dallas, Richardson, TX, ²University of Texas Southwestern, Dallas, TX, ³University of Oklahoma, Norman, OK, ⁴University of Texas at Dallas, Richardson, TX, ³University of Texas Southwestern, Dallas, TX

**Th-314**  
Role of Calcium During the Intra- and Extra-Cellular Cleavage of von Willebrand Factor by ADAMTS13  
Sriram Neelamegham¹, Shobhit Gogia³, and Anju Kelkar¹  
¹SUNY at Buffalo/University at Buffalo, Buffalo, NY

**Tracks: Cardiovascular Engineering, Biomechanics**

**Cardiovascular Biomechanics**

**Th-315**  
Patient-Specific Computational Modeling of the Left Atrium and Left Atrial Appendage: Application to Left Atrial Appendage Closure Devices  
Shahnaz Javani¹, Peyman Azadani², and Ali Azadani¹  
¹University of Denver, Denver, CO, ²University of Utah School of Medicine, Salt Lake City, UT

**Th-316**  
The Effect of Limb Flexion on Torsional Deformations and Stresses in the Human Femoropopliteal Artery  
Anastasia Desyatova¹, William Poulsen¹, Paul Deegan¹, Carol Lommeth¹, Jason MacTaggart¹, and Alexey Kamenskiy¹  
¹University of Nebraska Medical Center, Omaha, NE

**Th-317**  
Patient-Specific Computational Modeling of Hemodynamics in Pulmonary Arterial Hypertension  
Byron A Zambrano¹, Nathan Mclean¹, Liang Zhong¹, Ju Le Tan¹, Alberto Figueroa², Li Chuan Lee³, and Seungik Baek¹  
¹Michigan State University, East Lansing, MI, ²National Heart Centre Singapore, Singapore, ³Duke- NUS Medical School, Singapore, Singapore

**Th-318**  
Aesha Desai¹, Remi Peyronnet², Peter Kohl³, and Delphine Dean¹  
¹Clemson University, Clemson, SC, ²University Heart Centre Freiburg, Freiburg, Germany, ³University of Freiburg, Freiburg, Germany

**Th-319**  
Pre- and Post-Infarct Left Ventricular Myocardium: It’s Compressible  
Eder Medina¹, Devesh Sahu¹, Joseph H. Gorman III³, Robert C. Gorman³, and Michael Sacks¹  
¹University of Texas-Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

**Th-320**  
An In Vitro Assessment of Cardiac-Emboli Dynamics On Cerebral Perfusion for the Investigation of Vascular Occlusion In Acute Ischemic Stroke  
Fiona Malone¹, Patrick Delassus¹, Eugene McCarthy¹, Paul Fahy¹, and Liam Morris¹  
¹Galway Mayo Institute of Technology, Galway, Ireland

**Th-321**  
Exercise Decreases Arterial Stiffness and Mediates Effects Of A High-Fat, High-Sugar Diet  
Julie Kohn¹, Jenny Ma¹, Shweta Modit¹, Julian Azar¹, Adeline Chen¹, Stephanie Cheng¹, and Cynthia Reinhardt-King¹  
¹Cornell University, Ithaca, NY

**Th-322**  
Regulation of Human Cardiac Fibroblast Phenotype by Extracellular Matrix Elasticity  
Nathan Cho¹, Shadi Razipour¹, and Megan Schmidtke¹ ²  
¹University of California Los Angeles, Los Angeles, CA, ²University of California, Los Angeles, CA
Th-323  Hemodynamics of Porcine Left Ventricles before and after Myocardial Infarction  Vivek Vasudevan¹, Low Jia Jun Adriel¹, Sarayu Parimali², Smita Sampath², Chih-Liang Chin³, and Choon-Hwai Yap¹ ¹National University of Singapore, Singapore, Singapore, Singapore, ²Merck Sharp & Dohme, Singapore, Singapore

Track: Cardiovascular Engineering

Computational Modeling in Cardiovascular Systems

Th-324  Modeling Blood Flow Characteristics in Axial Propeller-Pumps Used as Left Ventricular Assist Devices  Alexandrina Untaroiu¹, Mihai Bleiziffer², and Antonio Delgado² ¹Tulane University, New Orleans, LA, ²Ochsner Medical Center, New Orleans, LA

Th-325  Prolonged Blood Residence Time on Transcatheter Aortic Valve Leaflets as a Permissive Factor in Valve Thrombosis  Koohyar Vahidkhah¹, Mohammad Barakat¹, Mostafa Abbasi¹, Shahnaz Jawan¹, Peyman Azadani², Anwar Tandar³, Danny Dvir², and Ali Azadani¹ ¹University of Denver, Denver, CO, ²University of Utah School of Medicine, Salt Lake City, UT, ³St Paul’s Hospital, Vancouver, BC, Canada

Th-326  GPU-Accelerated Hemodynamics Simulations in Vessels with Deformable Walls  Mike Zhu¹, John Gounley¹, and Amanda Randles¹ ¹Duke University, Durham, NC

Th-327  Laboratory Development of a Self-Powered FONTAN for Treatment of Congenital Heart Disease  Arka Das¹, Kristin Sverrisdottir¹, Janina Helwig¹, Gabriela Espinoza¹, Shanice Jones¹, Josean Ruiz¹, Eduardo Divo¹, Alan Kassab², and William Decamp³ ¹Emory Riddle Aeronautical University, Daytona Beach, FL, ²University of Central Florida, Central Florida, FL

Th-328  3D Simulation of Aortic Valve Hemodynamics Using Coupled CFD and FEM Approaches via ANSYS  Armin Aminiar³, Kadir Kirikcoppur¹, Magdi Yacoub², and Huseyin Cagatay Yalcin² ¹Istanbul Technical University, Istanbul, Turkey, ²Imperial College, London, United Kingdom, ³Qatar University, Doha, Qatar

Th-329  An Experimentally Validated Fluid-Structure Interaction Model of Left Ventricular Filling  Jae Ho Lee¹, Anmeet Bhalla¹, Boyce Griffith³, Milad Samaee², and Arvind Santhanakrishnan³ ¹University of North Carolina at Chapel Hill, Chapel Hill, NC, ²Oklahoma State University, Stillwater, OK

Th-330  Longitudinal CFD Infers Mechanisms of Thrombus Formation and Abdominal Aortic Aneurysm Expansion  Byron Zambrano¹, Farhad Jaberi¹, and Seungik Baek¹ ¹Michigan State University, East Lansing, MI

Th-331  Reduced-Order Simulation of Electric Propagation in Realistic Cardiac Tissue Models  Duong Vu¹ and Kwong Ng¹ ¹New Mexico State University, Las Cruces, NM

Th-332  Fluid Mechanics of the Human Fetal Right Ventricle at 20 Weeks Gestation  Hadi Wiputra¹, Chang Quan Lai¹, Guat Ling Lim², Joel Jia Wei Heng¹, Guo Lan¹, Sanah Merchant Soomar³, Arijit Biswas³, Citra Nurfarah Zaini Mattar², Hwa Liang Leo¹, and Choon Hwai Yap¹ ¹National University of Singapore, Singapore, Singapore, ²National University Health Systems, Singapore, Singapore

Th-333  Ebers, DaVinci and Euler: Can We Calculate the Pulse? Assumptions, Challenges and Opportunities in Modeling of Aortic Flow  Hisham Sherif²,³ ¹Christiana Hospital, Newark, DE, ²University of Delaware, Newark, DE

Th-334  Effects of Weight Function on Element Free Galerkin Simulation of Cardiac Propagation  Ian Sturdevant¹ and Kwong Ng¹ ¹New Mexico State University, Las Cruces, NM

Th-335  Shear Stress Induced NO Production Model: Effect of Spatial Heterogeneity in enos and CCE Channels  Jaimit Parikh¹, Kenneth Barbee¹, Donald Buerk¹, and Dov Jaron¹ ¹Drexel University, Philadelphia, PA

Th-336  Vortex Analysis of Intra-Aneurismal Hemodynamics in Cerebral Aneurysms  Kevin Sunderland¹ and Jingfeng Jiang¹ ¹Michigan Technological University, Houghton, MI

Th-337  A Computational Study of Role of Ascorbate in Improving Endothelial Dysfunction  Sheetal Joshi³ and Mahendra Kavdia¹ ¹Wayne State University, Detroit, MI

Th-338  Effects of Cardiac and Respiration Movements on Relative Phrenic Nerve Displacements  Maria Burbano¹, Lars Mattison¹, and Paul laizzo¹ ¹University of Minnesota, Minneapolis, MN

Th-339  Effects of Turbulent Eddies on Hemolysis in a Centrifugal Blood Pump  Mesude Ozturk¹, Edgar O’Rearl¹, Margaret Heck¹, Madison James¹, and Dimitrios Papavassiliou¹ ¹University of Oklahoma, Norman, OK

Th-340  Modeling the Effects of Volatile Anesthetics on L-type Ca²⁺ Channels and Ca²⁺ Induced Ca²⁺ Release in Cardiac Myocytes  Neeraj Manhas¹, Guilherme Garcia¹, Venkat Pannala¹, Wai Meng Kwo¹, Amadou K.S Camara¹, and Ranjan K Dash¹ ¹MCW, Milwaukee, WI

Th-341  Red Blood Cells Oxygen Transport in the Veto-placental Vasculature System of the Placenta  Zhenxing Wu¹ and Parisa Mirbod¹ ¹Clarkson University, Potsdam, NY

Th-342  A Novel Computational Model of the Carotid Artery to Determine Fluid Dynamic Effects on Plaque Instability  Scott Hymel², Kristy Cosgroove¹, T. Cooper Woods², Hernan Bazan², and Damir Khismatullin³ ¹Tulane University, New Orleans, LA, ²Ochsner Medical Center, New Orleans, LA, ³Tulane Medical School, New Orleans, LA
**Th-343**
Computational Analysis of Functional Mitral Regurgitation Repair Using Annuloplasty and Papillary Muscle Reposition
Thuy Pham¹, Fanwei Kong¹, Charles Primiano², John Elefteriades³, and Wei Sun¹
¹Georgia Institute of Technology, Atlanta, GA, ²Hartford Hospital, Hartford, CT, ³Yale Hospital, New Haven, CT

**Th-344**
A Mathematical Model for the Role of N2O3 in Enhancing Nitric Oxide Following Nitrite Infusion
Yien Liu¹, Donald Buerk¹, Kenneth Barbee¹, and Don Jaron¹
¹Drexel University, Philadelphia, PA

**Tracks: Cardiovascular Engineering, Biomechanics**

**Cardiovascular Biomechanics**

**Th-345**
Attribute-rich Models of the Mitral Valve Leaflets for Patient-specific Simulations
Amir Khalighi¹, Andrew Drach¹, Robert C. Gorman², Joseph H. Gorman³, and Michael S. Sacks¹
¹The University of Texas as Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

**Th-346**
Stochastic Models of the Mitral Valve Chordae Tendineae for High-fidelity Simulations
Amir Khalighi¹, Andrew Drach¹, Robert C. Gorman², Joseph H. Gorman³, and Michael S. Sacks¹
¹The University of Texas as Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

**Th-347**
Impact of Chronic Pulmonary Embolization on Arterial Stiffening
Ashley Mulchrone¹, Omid Forouzan¹, Kenneth Barbee¹, and Heath Baskin¹
¹University of Illinois at Chicago, Chicago, IL

**Th-348**
Head Torsion is Necessary for Cardiac S-looping
Ashok Ramasubramanian¹
¹Union College, Schenectady, NY

**Th-349**
Basement Membrane Remodeling Affects Contractile Mechanics to Increase Cardiac Function with Age
Ayla Sessions¹, Gaurav Kaushik¹, Sarah Parker², Koen Raedschelders², Rolf Bodmer², Jennifer E. Van Eyk², and Adam Engler¹
¹University of California, San Francisco, San Francisco, CA, ²Sanford Burnham Prebys Medical Discovery Institute, La Jolla, CA

**Th-350**
Investigating The Viscoelastic Properties of Tricuspid Valve Leaflets and Chordae Tendineae
Sallie Lin¹, Katherine Copeland¹, Bryn Brazier¹, Heath Baskin¹, Raj Prabhu¹, Lakiesha Williams¹, Ge Zhang², and Jun Liao¹
¹Mississippi State University, Mississippi State, MS, ²Northwestern University, Chicago, IL

**Th-351**
Modeling the Circumferential Changes of the Pulmonary Arteries in a PAH-Animal Model within the QLV Framework
Daniela Velez-Rendon¹, Erica Purseili¹, and Daniela Valdez-Jasso¹
¹University of Illinois at Chicago, Chicago, IL

**Th-352**
Right Ventricular Pressure-Volume Loop Analysis During Exercise in a Patient with PAH
Eric Dinges¹, Heather Shumaker¹, Alessandro Bellofiore², Jeanette Cheng³, Sanjiv Shah⁴, and Naomi Chesler²
¹University of Wisconsin-Madison, Madison, WI, ²San Jose State University, San Jose, CA, ³Northwestern University, Chicago, IL

**Th-353**
Axial Contributions of the Left and Right Pulmonary Arteries in Pulmonary Arterial Hypertension
Erica Purseili¹, Daniela Velez-Rendon¹, and Daniela Valdez-Jasso¹
¹University of Illinois at Chicago, Chicago, IL

**Th-354**
Mechanical Analysis of Venous Valves for Pediatric Heart Valve Replacement
Erin Roberts¹, Peter Hammer¹, Breanna Piekarski², Joyce Wong¹, and Sitaram Emani²
¹Boston University, Boston, MA, ²Boston Children’s Hospital, Boston, MA

**Th-355**
Numerical Simulation of Pulmonary Autograft Remodeling after Ross Procedure
Yue Xuan¹, Andrew Wisneski¹, Hesam Moghadam¹, Elaine Tseng¹, and Liang Ge¹
¹University of California San Francisco, San Francisco, CA

**Th-356**
Topological and Geometrical Analyses of 3D Epicardial Elastin Fiber Network
Xiaodan Shi¹, Song Zhang¹, Katherine Copeland¹, Yue Liu¹, Huajian Gao², and Jun Liao¹
¹Mississippi State University, Mississippi State, MS, ²Brown University, Providence, RI

**Track: Cardiovascular Engineering**

**Heart Valve Structure, Function, and Disease**

**Th-357**
Characterization of Three-dimensional Anisotropic Heart Valve Tissue Mechanical Properties at Various Rates of Deformation
Mustafa Abbasi¹, Mohammad Barakat¹, Koohyar Vahidkhah¹, and Ali Azadani¹
¹University of Denver, Denver, CO

**Th-358**
Overexpression of Catalase Impairs Aortic Valve Function and Accelerates Valvular Calcification in Mice
Caitlin Fermoyele¹, Carolyn Roos¹, Grace Casaclang-Verzosa¹, Bin Zhang¹, and Jordan Miller¹
¹Mayo Clinic, Rochester, MN

**Th-359**
Flow Field in Critical Aortic Valve Stenosis in Infants
Einz Pour Issa¹, Alexander T. Williams¹, Sana Nasim¹, Arash Moshtikorouf¹, Denise Medina¹, Lilliam Valdes-Cruz², Steven Bibeveski², Frank Scholl², Nikolaos Tsoukias¹, and Sharan Ramassamy¹
¹Florida International University, Miami, FL, ²Joe DiMaggio Children’s Hospital, Hollywood, FL

**Th-360**
Time Profile Analysis of Conventional Plain Geometric Orifice Area and Edged Geometric Orifice Area for Artificial Heart Valves
Kwonsoo Chun¹, Samir Saidi³, Daniel Harrington², and Henri Justino³
¹Baylor College of Medicine, Houston, TX, ²Rice University, Houston, TX, ³Baylor College of Medicine, Houston, TX
**Th-361**
A Comparative Study Between Transcatheter Aortic Valves and Surgical Bioprosthesis: Implications On Hemodynamics and Durability
Atieh Yousefi¹, Pablo Maureira², and Lakshmi Prasad Dasi³
¹The Ohio State University, Columbus, OH, ²CHU Nancy, Nancy, France

**Th-362**
Fluid Dynamics of Patient-Specific Stenotic Aortic Heart Valves
Ryan Oba¹, Amirsepehr Azimian¹, Atieh Yousefi Koupaei¹, Hoda Hatoun¹, Jennifer Dollery¹, Juan Crestanello¹, and Lakshmi Prasad Dasi³
¹The Ohio State University, Columbus, OH

**Th-363**
Predictive Model to Assess Coronary Obstruction During TAVI Implantation
Amirsepehr Azimian¹, Jennifer Dollery¹, Juan Crestanello¹, and Lakshmi Prasad Dasi³
¹The Ohio State University, Columbus, OH

**Th-364**
Static and Dynamic Culture Bioreactors for the Study of Hypoxia in Valve Disease
Matthew Sapp¹, Dragoslava Vekilov¹, Varun Krishnamurthy¹, Madeline Monroe¹, Saheba Bhatnagar¹, Christine Diaz¹, Rebecca Nikonowicz¹, and K. Jane Grande-Allen¹
¹Rice University, Houston, TX

**Th-365**
Biocompatibility Tests of a Carbothane Scaffold in Hybrid Tissue Engineered Heart Valves
Samuel Zuke¹, Hamed Alavi¹, and Arash Kheradvar¹
¹University of California, Irvine, Irvine, CA

**Th-366**
Histological Signatures of Splitting in Maternal Mitral Valve Chordae Tendineae
Brandon Scott¹ and Sarah Wells²
¹Dalhousie University, Halifax, Canada, ²Dalhousie University, Halifax, NS, Canada

**Th-367**
Causes for Myofibroblast Phenotype of Cells in Ventricularis Layer of a Porcine Aortic Valve Leaflet
Soumen Jana¹, Melissa Young¹, and Amir Lerman¹
¹Mayo Clinic, Rochester, MN

**Track: Cellular and Molecular Bioengineering**

**Biomanufacturing**

**Th-368**
Bio-manufacturing: Novel Platform for 3D Culture Models in Therapeutic Applications
John Bocinsky¹
¹Florida Institute of Technology, Melbourne, FL

**Th-369**
3D Laser Printing of Soybean Oil Epoxidized Acrylate for Highly Aligning Human Bone Marrow Mesenchymal Stem Cells
Shida Miao¹, Nthan, J Castro¹, Margaret Nowicki¹, Wei Zhu¹, José Almeida¹, Haitao Cui¹, Xuan Zhou¹, and Lijie Zhang¹
¹The George Washington University, Washington, DC

**Th-370**
Formulation of Biologics for Long Term Storage: Glass Transition Temperature and Formulation Stability of Trehalose-Phosphate Salt Blends in Humid Environments
Shima Ziaei¹, Babak Bagheri¹, and Gloria Elliott¹
¹University of North Carolina at Charlotte, Charlotte, NC

**Track: Cellular and Molecular Bioengineering**

**Cell Adhesion and Interactions with the Extracellular Matrix**

**Th-371**
In Vitro Validation of a Computational Model of Fibronectin Assembly
Devin Mair¹, Thomas Petet¹, Lewis Scott¹, Seth Weinberg¹, and Christopher Lemmon¹
¹Virginia Commonwealth University, Richmond, VA

**Th-372**
Myofibroblast Differentiation in Response to Conformational Changes in Fibronectin’s Integrin Binding Domain
Haylee Bachman¹, Gulcin Arslan², and Thomas Barker³
¹Georgia Institute of Technology, Atlanta, GA, ²Ege University, Izmir, Turkey, ³University of Virginia, Charlottesville, VA

**Th-373**
Non-Enzymatic Selective Osmotic Shock for The Isolation Of Human Islets
Kevin Enck¹, John McQuilling¹,², Sittadjody Sivanandane³, and Emmanuel Opara¹,²
¹Wake Forest University, Winston-Salem, NC, ²WFIRM, Winston-Salem, NC

**Th-374**
Thiol-ene Hydrogels as a Tool for Studying Macrophage Phagocytic Activity and Infection
Kirsten Brink¹, Adam Navara¹, Paul de Figueiredo¹, and Daniel Alge¹
¹Texas A&M University, College Station, TX

**Th-375**
Mechanophenotype Influences Cellular Organization and Morphology
Manisha Kanthila¹ and Eric Darling¹
¹Brown University, Providence, RI

**Th-376**
A Novel Approach of Simulating Directed Cell Migration towards the Stiffest ECM
Min-Cheol Kim¹, Rohan Abeyaratne³, Roger D. Kamm¹, and H. Harry Asada¹
¹Massachusetts Institute of Technology, Cambridge, MA

**Th-377**
Engineered Intestinal Microenvironments as Preclinical Drug Screening Platforms
Ruby Dewi¹, Rebecca DiMarco¹, and Sarah Heilshorn¹
¹Stanford University, Stanford, CA

**Th-378**
Band 3 Inhibitor as a Mediator of Erythrocyte Aggregation during the Onset of Thermal Burn Injury
Samantha WeberFishkin¹, Harrison Seidner¹, Geoffry Gunter¹, Semih Kuric¹, and Mary Frame¹
¹Stony Brook University, Stony Brook, NY, ²Arete Associates, Los Angeles, CA

**Th-379**
Role of E-Cadherin Adhesion In The Assembly Of Nascent Desmosomes
Omer Shafraz¹, Sara Stahley², Andrew Kowalczyk³, and Sanjeevi Sivasanker¹
¹Iowa State University, Ames, IA, ²Emory University School of Medicine, Atlanta, GA

**Th-380**
Effects of G to A Mutagenesis on Murine Leukemia Virus Gag Oligomerization
Vikram Puram¹, Megan Roth¹, Jessica Martin¹, and Louis Mansky¹
¹University of Minnesota-Twin Cities, Minneapolis, MN
Track: Cellular and Molecular Bioengineering

Cell Motility and Migration

Th-381
Automated Tracking of Wound Healing in Endothelial Cells Cultured on Different Substrates
Olga Chashchina¹, Valentin Laplau², Elizabeth Antoine³, and Abdul Barakat³
¹Ecole Polytechnique, Palaiseau, France

Th-382
Altering Cell Behavior and Morphology With Highly Ordered Nanostructured Surfaces
Amy Mants¹,², Charles Rice¹,², Derek Sekora¹,², Eva Franke-Schubert¹,³, Mathias Schubert¹,³, and Angela Pannier¹,²
¹University of Nebraska-Lincoln, Lincoln, NE, ²Center for Nanohybrid Functional Materials, Lincoln, NE

Th-383
Investigating Macrophage Plasticity and Migration in a 3D Wound Healing Model
Andrew Ford¹ and Padma Rajagopalan¹
¹Virginia Tech, Blacksburg, VA

Th-384
Characterization of Rho GDP-dissociation Inhibitor (RhoGDI) Function in Platelets
Anh Ngo¹, Owen McCarty¹, and Joseph Aslan¹
¹Oregon Health and Science University, Portland, OR

Th-385
Segregation of Mobile Nuclear Proteins Away from Chromatin When The Nucleus Is Constricted
Charlotte Pfeifer¹, Jerome Irianto¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

Th-386
Cell Spreading Dynamics on Colloidal Thin Films
Daniel Chester¹ and Ashley Brown¹
¹North Carolina State University and the University of North Carolina at Chapel-Hill, Raleigh, NC

Th-387
Implications of Vascular Remodeling Effects on the Quantity and Quality of Monocyte Adhesion in Flow
Erin Edwards¹,² and Susan Thomas¹
¹Georgia Institute of Technology, Atlanta, GA, ²Georgia Institute of Technology & Emory University, Atlanta, GA

Th-388
Genomic Variation in an Osteosarcoma Cell Line Caused by Pore Migration
Jerome Irianto¹, Charlotte R. Pfeifer¹, Yuntao Xia¹, Avathamsa Athirasa-la¹, Manu Tewari², Roger E. Greenberg³, and Dennis E. Discher¹
¹University of Pennsylvania, Philadelphia, PA

Th-389
Insight in Constricted Cell Migration: Tension on the DNA and Inhibition of Nuclear Processes
Jerome Irianto¹, Charlotte R. Pfeifer¹, Yuntao Xia¹, Roger E. Greenberg³, and Dennis E. Discher¹
¹University of Pennsylvania, Philadelphia, PA

Th-390
Expression of Mechanosensitive Channel of Large Conductance (MscL) in Mammalian Metastatic Cancer Cells for Study and Disruption of migration in narrow 3D conﬁnements
Johanna Heureaux¹
¹University of Michigan Ann Arbor, Ann Arbor, MI

Th-391
Collagen Fibrils Attached to Flexible Substrates Reveal the Role of Mechanics on Contact Guidance
Juan Wang¹, Jacob Nuhn¹, Anuraag Boddu-palli¹, Katie Bratlie¹, and Ian Schneider¹
¹Iowa State University, Ames, IA

Th-392
Osteoblast vs. MSC Migration under Fluid Shear
Brandon Riehl¹, Jeong Soon Lee¹, Ligyeom Ha¹, and Jung Yul Lim¹
¹University of Nebraska-Lincoln, Lincoln, NE

Th-393
Regulation of Chlamydomonas Flagella and Ependymal Cell Motile Cilia by Ceramide-Mediated Translocation of GSK3
Kara Hardin¹,²
¹Georgia Institute of Technology, Atlanta, GA, ²Medical College of Georgia, Augusta, GA

Th-394
Cell Division Dictates Patterns of Emergent Collective Angular Motion in Multicellular Tissues
Michael Siedlik¹, Sriram Manivannan¹, Ioannis Kevrekidis¹, and Celeste Nelson¹
¹Princeton University, Princeton, NJ

Th-395
A Computational Model to Predict How Chemokine Binding to Extracellular Matrix and Cell Arrangements Influence 3D Gradients and Cancer Cell Migration
Phillip Spinosa¹, Kathy Luker¹, Gary Luker¹, and Jennifer Linderman¹
¹University of Michigan, Ann Arbor, MI

Th-396
A 3D Multiplex Platform for Single Cell Chemotaxis
Steven Roberts¹ and Nitin Agrawal¹
¹George Mason University, Fairfax, VA

Th-397
Mechanical Interactions between Cells and Substrate Regulate Collective Migration
Abdel-Rahman Hassan¹, Thomas Biel¹, and Taeyoon Kim¹
¹Purdue University, West Lafayette, IN

Th-398
Inhibition of a DNA Repair Kinase ATM Leads to Cell Death in 3D Migration Independent of DNA Damage
Jerome Irianto¹, Yuntao Xia¹, Charlotte Pfeifer¹, Jiazheng Ji¹, Roger A. Greenberg³, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

Cellular and Molecular Immunoengineering

Track: Cellular and Molecular Immunoengineering

Th-399
Paired Heavy and Light Chain Antibody Repertoire Analysis to Inform Rational Vaccine Design
Brandon Dekosky¹
¹NIAID, Bethesda, MD

Th-400
Engorgement Leads to Qccumulation of Engineered Marrow Macrophages in a Rapid and Selective Clearance of Tumor Cells
Cory Alvey¹, Kyle Spinler², Jerome Irianto¹, Charlotte Pfeifer¹, Yuntao Xia¹, Sankyun cho¹, Dave Dingal¹, Jake Hsu¹, Manu Tewari¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA, ²University of California San Diego, La Jolla, CA
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Track: Cellular and Molecular Bioengineering**

**Subcellular Biophysics**

**Th-407**
Cell-Based FRET Biosensor For High-Throughput Screening Of Small Molecule Inhibitors Of Tumor Necrosis Factor Receptor 1 (TNFR1)
Chih Hung Lo¹, Andrew Lewis¹, Tory Schaaf², Benjamin Grant³, Nagamani Vunnam¹, Prachi Bawaskar³, David Thomas¹, and Jonathan Sachs¹
¹University of Minnesota, Minneapolis, MN
²University of Wisconsin-Madison, Madison, WI
³Virginia Polytechnic Institute and State University, Blacksburg, VA

**Th-408**
Unifying Cellular Bioelectromagnetic Phenomena: Dielectrophoresis and Electroporation
Daniel Sweeny¹, Temple Douglas², and Rafael Davalos²
¹Virginia Tech, Blacksburg, VA
²Virginia Polytechnic Institute and State University, Blacksburg, VA

**Th-409**
Cytoskeleton Mediated Alterations in Nuclear Morphology And Dimension
Dong-Hwee Kim¹, Bo Li², Jung-Won Park¹, Denis Wirtz², and Seant X. Sun²
¹Korea University, Seoul, Korea
²Johns Hopkins University, Baltimore, MD

**Th-410**
Stratum Corneum Lipid Composition Alters the Heterogeneous Growth of Staphylococcus Aureus
Joseph Cleary¹, Minyoung Kim², Claudia Marques³, and Guy German¹
¹Binghamton University, Binghamton, NY

**Th-411**
Muc1-induced Microvesicle Shedding in Breast Cancer: A Biophysical Phenomenon
LaDeirda Monet Roberts¹, Carolyn Shurer¹, Michael Hollander¹, and Matthew Paszek¹
¹Cornell University, Ithaca, NY

**Th-412**
Single-Molecule Imaging of Cytoplasmic Targets in Living Cells with Quantum Dots
Mohammad Zahid¹, Liang Ma¹, Sung Jun Lim¹, and Andrew Smith¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Th-413**
Spatial Characterization of Moisture Content in Desiccated Samples using Raman Microspectroscopy
Quinn Osgood¹, Jason Solocinski¹, Mian Wang¹, and Nilay Chakraborty¹
¹Children’s National Health System, Washington, DC
²Washington University, Bethesda, MD

**Th-414**
Scaffold Protein IQGAP1 Orchestrates Protein Trafficking and Membrane Processing in Epithelial Cells
Volker Schweikhard¹, Edward Samson¹, Jan Zimak¹, Tyler McLaughlin¹, David Tsao¹, and Michael Diehl¹
¹Rice University, Houston, TX

**Th-415**
Modeling Nanoscale Dynamics of Molecular Motors
Janak Jethva¹, Keith Mickolajczyk¹, John Fricks¹, and William Hancock²
¹University of California, Davis, Davis, CA
²Penn State University, University Park, PA

**Th-416**
Changes in Triglyceride-Rich Lipoprotein Composition in Response to a High-Fat Meal Promote Endothelial Inflammation in Hypertriglyceridemic Subjects
Anita Rajamani¹, Andrea Fernandez², Ying Wang³, Chongxu Sun¹, Scott Simon¹, and Anthony Passerini¹
¹University of California, Davis, Davis, CA
²Penn State University, University Park, PA

**Th-417**
A Novel Pulsing Protocol Based on Cancellation of Cancellation Effect
Enbo Yang¹, Chunrong Zhou¹, Andrei Pakhomov¹, and Shu Xiaó¹
¹Old Dominion University, Norfolk, VA

**Th-418**
Protein Characterization of Formalin-Fixed, Fluorescence-Activated Sorted Cell Subpopulations
Jessica Sadick¹, Molly Boutin¹, Diane Hoffman-Kim¹, and Eric Darling¹
¹Brown University, Providence, RI

**Th-419**
Ice Formation Characteristics during Cryopreservation with Trehalose as an Addtive
Jason Solocinski¹, Quinn Osgood¹, Mian Wang¹, and Nilay Chakraborty¹
¹University of Michigan Dearborn, Dearborn, MI

**Track: Cellular and Molecular Bioengineering**

**Cellular and Molecular Bioengineering**

**Subcellular Biophysics**

**Th-401**
Microenvironment Stiffness as A Control Mechanism of Phagocytosis By Tumor-Associated Macrophages
Jake Hsu¹, Cory Alvey¹, Yuntao Xia¹, Jerome Irianto¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

**Th-402**
Characterization of Human Stem Cell Derived Neutrophils
Laurel Hind¹, David Bennin¹, and Anna Huttenlocher¹
¹University of Wisconsin-Madison, Madison, WI

**Th-403**
A Microscale Testbed to Assay And Manufacture CAR T-Cell Immunotherapies
Nicole Piscopo³, Kirsti Walker³, Yasmin Alvarez-Garcia³, Loren Stallcop³, David Beebe³, Christian Capitini³, and Krishanu Saha¹
¹University of Wisconsin-Madison, Madison, WI
²Penn State University, University Park, PA
³Children’s National Health System, Washington, DC

**Th-404**
Cellular Backpacking as a Novel Tool for Nanoimmunotherapy
Rachel Burga², Catherine Bollard¹, C. Russell Cruz¹, and Rohan Fernandes²
¹Children’s National Health System, Washington, DC
²George Washington University, Washington, DC

**Th-405**
Immunoengineering of a Plug-and-(dis)play Hybridoma Platform
Sai Reddy¹
¹ETH Zurich, Basel, Switzerland

**Th-406**
Investigating the Role of the Extracellular Matrix on Macrophage Phenotype Polarization
Thuy Luu¹ and Wendy Liu¹
¹University of California, Irvine, Irvine, CA

**Th-407**
Cell-Based FRET Biosensor For High-Throughput Screening Of Small Molecule Inhibitors Of Tumor Necrosis Factor Receptor 1 (TNFR1)
Chih Hung Lo¹, Andrew Lewis¹, Tory Schaaf², Benjamin Grant³, Nagamani Vunnam¹, Prachi Bawaskar³, David Thomas¹, and Jonathan Sachs¹
¹Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN
²Department of Biochemistry, Molecular Biology and Biophysics, University of Minnesota, Minneapolis, MN
³Fluorescence Innovations Inc., Minneapolis, MN

**Th-408**
Unifying Cellular Bioelectromagnetic Phenomena: Dielectrophoresis and Electroporation
Daniel Sweeny¹, Temple Douglas², and Rafael Davalos²
¹Virginia Tech, Blacksburg, VA
²Virginia Polytechnic Institute and State University, Blacksburg, VA

**Th-409**
Cytoskeleton Mediated Alterations in Nuclear Morphology And Dimension
Dong-Hwee Kim¹, Bo Li², Jung-Won Park¹, Denis Wirtz², and Seant X. Sun²
¹Korea University, Seoul, Korea
²Johns Hopkins University, Baltimore, MD
³Tsinghua University, Beijing, China

**Th-410**
Stratum Corneum Lipid Composition Alters the Heterogeneous Growth of Staphylococcus Aureus
Joseph Cleary¹, Minyoung Kim², Claudia Marques³, and Guy German¹
¹Binghamton University, Binghamton, NY

**Th-411**
Muc1-induced Microvesicle Shedding in Breast Cancer: A Biophysical Phenomenon
LaDeirda Monet Roberts¹, Carolyn Shurer¹, Michael Hollander¹, and Matthew Paszek¹
¹Cornell University, Ithaca, NY

**Th-412**
Single-Molecule Imaging of Cytoplasmic Targets in Living Cells with Quantum Dots
Mohammad Zahid¹, Liang Ma¹, Sung Jun Lim¹, and Andrew Smith¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Th-413**
Spatial Characterization of Moisture Content in Desiccated Samples using Raman Microspectroscopy
Quinn Osgood¹, Jason Solocinski¹, Mian Wang¹, and Nilay Chakraborty¹
¹University of Michigan Dearborn, Dearborn, MI

**Th-414**
Scaffold Protein IQGAP1 Orchestrates Protein Trafficking and Membrane Processing in Epithelial Cells
Volker Schweikhard¹, Edward Samson¹, Jan Zimak¹, Tyler McLaughlin¹, David Tsao¹, and Michael Diehl¹
¹Rice University, Houston, TX

**Th-415**
Modeling Nanoscale Dynamics of Molecular Motors
Janak Jethva¹, Keith Mickolajczyk¹, John Fricks¹, and William Hancock²
¹University of California, Davis, Davis, CA
²Penn State University, University Park, PA

**Th-416**
Changes in Triglyceride-Rich Lipoprotein Composition in Response to a High-Fat Meal Promote Endothelial Inflammation in Hypertriglyceridemic Subjects
Anita Rajamani¹, Andrea Fernandez², Ying Wang³, Chongxu Sun¹, Scott Simon¹, and Anthony Passerini¹
¹University of California, Davis, Davis, CA
²Penn State University, University Park, PA

**Th-417**
A Novel Pulsing Protocol Based on Cancellation of Cancellation Effect
Enbo Yang¹, Chunrong Zhou¹, Andrei Pakhomov¹, and Shu Xiaó¹
¹Old Dominion University, Norfolk, VA

**Th-418**
Protein Characterization of Formalin-Fixed, Fluorescence-Activated Sorted Cell Subpopulations
Jessica Sadick¹, Molly Boutin¹, Diane Hoffman-Kim¹, and Eric Darling¹
¹Brown University, Providence, RI

**Th-419**
Ice Formation Characteristics during Cryopreservation with Trehalose as an Addtive
Jason Solocinski¹, Quinn Osgood¹, Mian Wang¹, and Nilay Chakraborty¹
¹University of Michigan Dearborn, Dearborn, MI
**Th-420**
**Estimation of Intracellular pH at Low Temperatures: Implications in Cryobiology**
Eric Rosiek¹, Manal Makki¹, Quinn Osgood¹, Ben Li¹, and Nilay Chakraborty¹
¹University of Michigan Dearborn, Dearborn, MI

**Th-421**
**Combinatorial Antimicrobial Efficacy of Non-thermal Jet Plasma and Chlorhexidine (CHX) Digluconate on Pseudomonas Aeruginosa Biofilm**
Tripti Thapa¹ and Halim Ayan¹
¹University of Toledo, Toledo, OH

**Th-422**
**Simulation on Calcium Inflow via Pathways of Cell Membrane in Response to 600ns Electrical Pulse**
Wanfei Bo¹, Hairong Yin¹, Jingchao Tang¹, and Yubin Gong¹
¹University of Electronic Science and Technology of China, Chengdu, China, People's Republic of

**Th-423**
**Quantifying Macrophage Protease Secretion Reveals Variability in Rates, Production, and Stability**
Ken Brandon¹,², W. Andrew Shockey³, and Manu O. Platt³
¹Oakwood University, Huntsville, AL, ²University of Alabama-Huntsville, Huntsville, AL, ³Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, Atlanta, GA

**Track: Device Technologies and Biomedical Robotics**
**Affordable Health Devices and Frugal Innovation**

**Th-424**
**Phone’s Application as Seizures Alarm for Epilepsy Patients**
Daniel Jimenez-Mendoza¹, Jose de Jesus Bernal-Alvarado¹, Ma, Isabel Delgadillo-Holtfort¹, and Jose Marco Balleza Ordaz¹
¹University of Guanajuato Campus Leon, Leon, Guanajuato, Mexico

**Th-425**
**Development of Low-cost Impedimetric Biosensors for Clinical Diagnostics and Water Testing**
Jacqueline Rohde¹, Andrew Cobb¹, Ryan Gilbert¹, Zachary Hawks¹, John DesJardins¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

**Th-426**
**An Automated Selective Condenser for Collection of Glucose in Exhaled Breath**
Divya Tankasala¹, Laura Jamicich¹, Shubhankar Takle¹, Ann Rundell¹, and Jacqueline Linnes¹
¹Purdue University, West Lafayette, IN

**Th-427**
**A Smartphone Device and App for Self-Monitoring Blood Alcohol Content (BAC)**
Alex Hille¹, Vivian Ramirez¹, John Gendi¹, Marvin Packer², and Herbert Voigt¹
¹Boston University, Boston, MA, ²Harvard Vanguard Medical Associates Atrius, Boston, MA

**Th-428**
**Design and Testing of a Novel Anesthetic Gas Analyzer for use in Low-Resource Areas**
Patrick Kolbay¹, Joseph Orr¹, and Kai Kück¹
¹University of Utah, Salt Lake City, UT

**Th-429**
**Behavioral Analysis Automation for Music and Emotion-based Robotic Therapy for Children with ASD**
Rachael Bevilli¹, Srinel Nizambah¹, Chung Hyuk Park¹, Myoungwoon Jeon², and Ayanna Howard³
¹The George Washington University, Washington, DC, ²Michigan Technological University, Houghton, MI, ³Georgia Institute of Technology, Atlanta, GA

**Track: Device Technologies and Biomedical Robotics**
**Biosensors**

**Th-430**
**Establishing The Basis for Quantitative Spark-Induced Breakdown Spectroscopy (SIBS) Toxin Detection Technology**
Carmen Gondhalekar¹, Eva Biela¹, Bartek Rajwa¹, Euiwon Bae¹, Valery Patsekin¹, Jennifer Sturgis¹, Huisung Kim¹, Jyll-Joon Do¹, Larry Stanker², and Paul Robinson¹
¹Purdue University, West Lafayette, IN, ²USDA, ARS, Albany, CA

**Th-431**
**Electrochemical Detection of Pseudomonas aeruginosa in Polymicrobial Environments**
Clara Romero Santiven¹, Hunter Sismaet¹, and Edgar Goluch¹
¹Northeastern University, Boston, MA

**Th-432**
**Point of Care Multimarker Sensor for Trauma**
David Probst¹ and Carissa Henricksen²
¹LeTourneau University, Longview, TX, ²Michigan Technological University, Houghton, MI

**Th-433**
**Design of a Micro-interdigitated Electrode Array for High-throughput Biomarker Quantification**
Houssem Eddine Amor¹,², Paul Marsh¹, Achraf Ben Amar², Carissa Henricksen², and HUNG CAO¹
¹University of Washington Bothell, Seattle, WA, ²École de technologie supérieure, Montreal, QC, Canada

**Th-434**
**Progress Toward an Optical Cavity Based Sensor with a Chained Differential Detection through Refractive Index Measurements**
Seunghyun Kim¹, Donggee Rho¹, and Jess Lichtenberg¹
¹LeTourneau University, Longview, TX, ²North Dakota State University, Fargo, ND

**Th-435**
**A Miniaturized LTCC-based pH Sensing System**
Houssem Eddine Amor¹,², Paul Marsh¹, Achraf Ben Amar², Ammar Kouki², and HUNG CAO¹
¹University of Washington Bothell, Seattle, WA, ²École de technologie supérieure, Montreal, QC, Canada

**Th-436**
**Rapid Antimicrobial Susceptibility Testing at the Single Cell Level**
Hui Li¹, Yi Lu¹, and Pak Wong¹
¹The Pennsylvania State University, University Park, PA

**Th-437**
**Electrochemical Detection of Clinical Pseudomonas aeruginosa Isolates using AC Voltammetry**
Hunter Sismaet¹, Elizabeth Hirsch¹, and Edgar Goluch¹
¹Northeastern University, Boston, MA

**Th-438**
**Novel Measurement of Intra-Abdominal Pressure in Women during Daily Activities and Exercise**
Johanna de Gennaro¹, Stefan Niederauer¹, Tanner Coleman¹, Tomasz Petelenz¹, and Robert Hitchcock¹
¹University of Utah, Salt Lake City, UT

**Poster Session—Thursday**

**Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**
**Posters Session—Thursday**

**Thursday, October 6 | 9:30 am—5:00 pm | Poster Session | Exhibit Hall BC**

**Th-439**

An Ultrasensitive Biosensor for Rapid Viral Pathogen Detection

Lei Wang¹, Milena Veselinovic¹, Lang Yang¹, Brian Geiss¹, Tom Chen¹, and David Dandy¹

¹Colorado State University, Fort Collins, CO

**Th-440**

DNA Detection Based on Nanoplasmon-Enhanced Molecular Beacons

Akash Kannegulla¹, Ye Liu¹, and Li-Jing Cheng¹

¹Oregon State University, Corvallis, OR

**Th-441**

Highly Sensitive Nucleic Acid Detection Using Quantum Dot-Fullerene Based Molecular Beacons

Ye Liu¹, Akash Kannegulla¹, and Li-Jing Cheng¹

¹Oregon State University, Corvallis, OR

**Th-442**

Salmonella Detection Using Magnetic Sensors: High Sensitivity and High Throughput

Maria Torija¹, Kevin Dorfman², Lorena Maldonado-Camargo³, Carlos Rinaldi², Julian Sheats¹, Srinand Sreevatsan⁴, Mark Tondra⁵, and Peter Mueller¹

¹NVE Corporation, Eden Prairie, MN, ²University of Minnesota, Minneapolis, MN, ³University of Florida, Gainesville, FL, ⁴University of Minnesota, St. Paul, MN, ⁵Diagnostic Biosensors, St. Paul, MN

**Th-443**

Directed Irradiation Synthesis On Surface Topography and Biosensing Properties Of TiO2-coated Photonic Crystal (PC) Fluorescence Biosensors

Ming Kit Cheng¹, Akshath Shetty¹, and Jean Allain¹

¹University of Illinois Urbana Champaign, Urbana, IL

**Th-444**

Acquisition of Inter-Abdominal Pressure as a Predictor of Pelvic Floor Disorder in Post-Partum Women

Stefan Niederauer¹, Johanna de Gennaro¹, Robert Hitchcock¹, and Tomasz Petelenz¹

¹University of Utah, Salt Lake City, UT

**Th-445**

The Effect of Distribution of Facial Surface Points on Target Registration Error in Contour-based Registration for Neuronavigation

Hyun-Joon Park¹, Teayong Sim¹, Hakje Yoo¹, Ahnryul Choi¹, Ki-Young Shin², and Joung Hwan Mun¹

¹Sungkyunkwan University, Suwon, Korea, Republic of, ²Korea Electro-technology Research Institute, Ansan, Korea, Republic of

**Th-446**

Hand-Held Device for the Location of Sentinel Node Biopsy Markers in Breast Cancer Surgery

Cody Jordan¹, Joseph Wilson¹, Scott Slaney¹, Lucas Schmidt¹, Vipul Raikar¹, Melissa McCullough¹, Nancy Demore¹, and Delphine Dean¹

¹Clemson University, Clemson, SC, ²Medical University of South Carolina, Charleston, SC

**Th-447**

Fingerprinting Technology Measuring Stimulated Sweat Secretion Rate to Diagnose Cystic Fibrosis

Yu-Hao Peng¹, Daniela B Salinas¹, and Jean-Michel Maarek¹

¹University of Southern California, Los Angeles, CA, ²Children Hospital Los Angeles, Los Angeles, CA

**Th-448**

Improving Poly(p-dioxanone) Strength Retention in a Novel Implantable Wound Closure Device

Jesse Butch¹, Daniel Mazzucco¹, and Julian Trowbridge¹

¹ZSX Medical, Philadelphia, PA

**Th-449**

Lab-on-a-chip Self-assembly of Fluorescent Peptide-based Nanoparticles for Blood-based Diagnosis of Alzheimer’s Disease

Leming Sun¹, Zhen Fan¹, Tao Yue¹, Jesse Fine¹, Eun-Mee Lee¹, Rebecca Davis², Jeff Kuret³, Douglas Scharre², and Mingjun Zhang¹

¹Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, ²Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH, ³Department of Molecular and Cellular Biochemistry, The Ohio State University College of Medicine, Columbus, OH

**Th-450**

First Pass Metabolism of Acetaminophen on a Modular, Low Cost, Two Tissue Body-on-a-chip Platform

Yang Yang¹ and Mandy Esch¹

¹Syracuse University, Syracuse, NY

**Tracks: Device Technologies and Biomedical Robotics, Orthopaedic and Rehabilitation Engineering**

**Musculoskeletal Robotics and Biomechatronics in Rehabilitation**

**Th-451**

Designing A Rapidly Responding Actuation for Medical Robotic Exoskeleton Joints

Yousuf Alshahrani¹, Chaoyan Chen¹, Yang Zhou¹, Pan Tian¹, Jie Hu², Jin Qi², John Cavanaugh¹, and Mark Ming-Cheng Cheng¹

¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of

**Th-452**

The Development of a Tongue-Controlled Access Device for Power Mobility

Michelle Kern¹, James Sharp¹, Alissa Smith¹, Lisa Kenyon¹, and John Farris¹

¹Grand Valley State University, Grand Rapids, MI

**Th-453**

Development Of A Novel 3D Printed, Low Cost Bionic Hand

Jonah Robison¹, Andrew Sedler¹, Chris Hicks¹, Megan Sech¹, Ben Bryla¹, and Melissa McCullough¹

¹Clemson University, Clemson, SC

**Th-454**

Evaluating Exoskeleton Assistance using Instantaneous Metabolic Cost Measures

Richard Nuckols¹, Tracy Giest¹, and Gregory Sawicki¹

¹UNC Chapel Hill and NC State University, Raleigh, NC
Track: Translational Biomedical Engineering
Models, Phantoms and Surrogates for Device Validation

Th-455
Computational and Experimental Models of Prosthetic Heart Valve Dynamics
Boyce Griffith¹, Ebrahim Kolahdouz², Amneet Bhalla¹, Thomas Caranasos³, and Lawrence Scotten⁴
¹University of North Carolina at Chapel Hill, Chapel Hill, NC, ²University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, NC, ³VSI, Victoria, BC, Canada

Th-456
In Vitro System for Testing Optical Heart Rate Monitors
Kevin Bellows¹,², Cody Lewis², Richard Horner², Lee Hudson², John Hanks¹,³, and Gerard Coté⁴
¹Texas A&M University, College Station, TX, ²Texas A&M Engineering Experiment Station, College Station, TX

Th-457
Creating a Validation Dataset for Intracranial Pressure Monitoring Metrics using Gaussian Fitting
Maria Qadri¹, Shabbar Danish², and William Craelius¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ

Th-458
Dynamic Myocardial Phantom for the Calibration of Multimodal Imaging Protocols and Modeling Methods
Hiba Shahid¹, Joshua Au¹, Nathan Cornell², Viraat Goel¹, Pierce Hadley¹, Alexander Hasnain¹, Jacob Haynie¹, Boeun Hwang¹, Joshua Lew¹, Bara Saadah¹, Teresa Yang¹, Hugh Yeh¹, Brad Sutton¹,², and Lawrence W. Dobrucki¹,³
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Beckman Institute of Advanced Science and Technology, Urbana, IL

Th-459
In Vitro Neurovascular Model Development for Accurate Biomaterials Testing and Characterization
Anne Marie Holter¹, Timothy Becker¹, Kayla Goodrich¹, and Connor Gonzalez¹
¹Northern Arizona University, Flagstaff, AZ

Track: Translational Biomedical Engineering

Th-460
Upregulation of IRF5 In Inflammatory Monocytes Promotes Phenotype Switching During Recruitment On Aortic Endothelium.
Alfredo Hernandez¹
¹UC Davis, Davis, CA

Th-461
Synergistic Ablation of Tumors In Vivo by High-Intensity Focused Ultrasound and Ethanol
Hakm Murad¹, Gray Halliburton¹, Daishen Luo¹, and Damir Khismatullin¹
¹Tulane University, New Orleans, LA

Track: Biomaterials
Integration of Biomaterials and Devices

Th-462
Biocompatibility and Adhesion Testing of Hydroxyapatite Coatings Deposited By Sol-gel Dip Coating
Alexander DeHaan¹, Maritza Fuerte¹, and Guna Selvaduray¹
¹San Jose State University, San Jose, CA

Th-463
Thermo-Mechanical Properties and Actuation Profiles of Shape Memory Polyurethane-urea Foams
Alexandra Easley¹, Duncan Maitland¹, and Sayyeda M. Hasan¹
¹Texas A&M University, College Station, TX

Th-464
Towards Fast & Gentle Cell Isolation: Integrating Microfluidics & Secondary Anchor Targeted Cell Release
Ali Ansari¹ and P. Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Th-465
Laser Irradiation of Mg Alloys: Reduced Kinetics and Enhanced Biocompatibility
David Florian¹, Michael Melia¹, Fritz Steuer¹, John Scully¹, and James Fitz-Gerald¹
¹University of Virginia, Charlottesville, VA

Th-466
Anti-Inflammatory Coatings of Hernia Repair Meshes
Dmitry Gil¹, James Rex¹, William Cobb², and Alexey Vertegel¹
¹Clemson University, Clemson, SC, ²Greenville Health System, Greenville, SC

Th-467
Microstructured Titanium Surfaces Mediate Markers of Bone Modelling
Ethan M. Lotz¹, Michael B. Berger¹, Zvi Schwartz¹, and Barbara D. Boyan¹
¹Virginia Commonwealth University, Richmond, VA

Th-468
Synthesis and Characterization of Biostable Shape Memory Polyurethane-urea Foams
Grace Fletcher¹, Sayyeda Hasan¹, Andrew Weems¹, Mary Beth Browning Monroe¹, Alexandre Easley¹, and Duncan Maitland¹
¹Texas A&M University, College Station, TX

Th-469
Importance of Macrophage Activation in Inflammation and Stem Cell Recruitment Following Biomaterial Implantation
Kelly Hotchkiss¹, Sarah Tracy¹, and Rene Olivares-Navarrete¹
¹Virginia Commonwealth University, Richmond, VA

Th-470
A Gelatin-Based Adhesive Combined with Polydopamine Coating to Enhance Tissue Integration of Medical Implant
Thanh Dinh¹ and Kyung Jae Jeong¹
¹University of New Hampshire, Durham, NH

Th-471
Surface Patterning of an Alkylsilane Coated Layer to Control Corrosion Rate of Magnesium Devices
Laura Fulton¹, Avinash Patil¹, and Ela Benashi¹,²,³
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh Department of Oral Biology, Pittsburgh, PA, ³McGowan Institute for Regenerative Medicine, Pittsburgh, PA

Th-472
(Moved to Oral Saturday 3-3)
Th-473  
Osteoclast Mediated Bone Resorption is Attenuated by Modified Titanium Surfaces  
Michael Berger¹, Ethan Lotz¹, Sharon Hyzy¹, Barbara Boyan², and Zvi Schwartz²³  
¹Virginia Commonwealth University, Richmond, VA, ²Georgia Institute of Technology, Atlanta, GA, ³University of Texas Health Science Center at San Antonio, San Antonio, TX

Th-474  
Novel Hydroxapatite Coatings Reduced Degradation of Magnesium Implants and Promoted Bone Marrow Mesenchymal Stem Cell Adhesion.  
Qiaomu Tian¹, Laura Rivera-Castaneda¹, Arash Aslani², and Huinan Liu³  
¹University of California Riverside, Riverside, CA, ²N² Biomedical LLC, Bedford, MA, ³University of California Riverside, Riverside, CA

Th-475  
Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices  
Rachael Muschalek¹, Landon Nash¹, Ryan Jones¹, and Duncan Maitland¹  
¹Texas A&M University, College Station, TX

Th-476  
Towards a Biosective Surface for Treatment of Sepsis in a Hemoperafusion Blood Censeding Device  
Ramya Raman¹, John Lahman¹, Bonan Yu¹, Adam Higgins¹, and Karl Schilke¹  
¹Oregon State University, Corvallis, OR

Th-477  
Preliminary SEM and EDS Analysis of Novel Surface Modification After 1000 Cycles of Wear Testing  
Sarah Helms¹, Golnaz Najaf Tomaraei¹, Marian Kennedy¹, and John DesJardins¹  
¹Clemson University, Clemson, SC

Th-478  
Comparison of Large-pore And Small-pore Polypropylene Surgical Mesh: Structural, Mechanical and Histological Analysis  
Xinyue Lu¹, Britney Cotton¹, Megan Hanschke¹, Todd Heniford², and Melinda Harman¹  
¹Clemson University, Clemson, SC, ²Carolinas HealthCare System, Charlotte, NC

Track: Drug Delivery  
Targeted or Responsive Delivery Systems

Th-482  
A Novel Platform to Study Particle Deposition in the Lung  
Adam Sonnenberg¹, Elizabeth Bartolák-Suki¹, and Béta Suki¹  
¹Boston University, Boston, MA

Th-484  
Study of SN-38 Distribution from Injectable Polymeric Depots in Tumor-Bearing Mice  
Chawan Manaspon¹ and Norased Nasongkla¹  
¹Department of Chemical and Biomolecular Engineering, Sogang University, ²1 Baekbeom-ro, Mapo-gu, Seoul, Korea, Republic of, ³Interdisciplinary program of Integrated Biotechnology, Sogang University, ²1 Baekbeom-ro, Mapo-gu, Seoul, Korea, Republic of

Th-486  
Mesoporous Silica Nanoparticles for Targeting a Novel Chemokine For Cancer Therapeutics  
Michael Harris¹, Timothy Pearce¹, Thomas Pengo¹, and Efrosini Kokkoli¹  
¹University of Minnesota-Twin Cities, Minneapolis, MN

Th-487  
Tumor-Targeting Upconversion-Nanoparticle-Based Unimolecular Micelles for Simultaneous Chemotherapy, Photodynamic Therapy, and Fluorescence Imaging for Neuroendocrine Cancer Therapy  
Guojun Chen¹, Renata Jaskula-Sztu², April Harrison³, Corinne Vokoun¹, Liwei Wang³, Kevin Eliceiri³, Herbert Chen³, and Shaoqin Gong³  
¹UW-Madison, Madison, WI, ²University of Alabama at Birmingham, Birmingham, AL, ³University of Wisconsin-Madison, Madison, WI

Th-490  
Adaptable Griffiths in Delivery from Polymer Blend Electrospun Fibers  
Jinghua Duan¹ and Jill Steinbach-Rankins¹  
¹University of Louisville, Louisville, KY

Th-491  
One-step Versus Two-step Conjugation of Lysine-based ADCs: Comparison Of Payload Loading, Distribution, And Overall ADC Stability  
Keith Arlotta¹  
¹University of Utah, Salt Lake City, UT

Th-492  
A11 Minibody-Conjugated, Polypeptide-Based Gold Nanoshells for Targeted Photothermal Therapy  
Kevin Chen¹, Kristine Mayle¹, Kathryn Dem¹, Vincent Wong¹, Shijun Sung¹, Ke Ding¹, April Rodriguez¹, Scott Knowles¹, Zachary Taylor¹, Hong Zhou¹, Warren Grundfest¹, Anna Wu¹, Timothy Deming¹, and Daniel Kamei¹  
¹University of California at Los Angeles, Los Angeles, CA

Th-493  
Electrospun Polymeric Fibers for Long-Term Protection against HIV and HSV-2  
Kevin Tyo¹ and Jill Steinbach-Rankins¹  
¹University of Louisville, Louisville, KY

Th-494  
Functionalization of Endothelial Cells for Magnetically Targeted Delivery to Stented Blood Vessels  
Mark Battig¹, Ilia Fishbein¹, Ivan Alferiev¹, Robert Levy¹, and Michael Chorny¹  
¹The Children’s Hospital of Philadelphia, Philadelphia, PA

Th-495  
Aptamer-Amphiphile Micelles Targeting a Novel Chemokine For Cancer Therapeutics  
Michael Harris¹, Timothy Pearce¹, Thomas Pengo¹, and Efrosini Kokkoli¹  
¹University of Minnesota-Twin Cities, Minneapolis, MN
Track: Drug Delivery

Th-506 Enhancing CD1-restricted T Cell Vaccination with Multi-adjuvant-loaded Nanomaterials
Dina Kats¹, Shaobin Shang², Chung-Ru Wang ², and Evan Scott¹
¹Northwestern University, Evanston, IL, ²Northwestern University, Chicago, IL

Th-507 Nano-polysomemers Facilitate Enzyme Replacement Therapy Efficacy to the Brain
Jessica Kelly¹,²,³, Douglas Martin²,³,⁴, and Mark Byrne¹,²,³
¹Biomimetic & Biobridged Materials, Biomedical Devices, and Drug Delivery Laboratories, Department of Chemical Engineering, Auburn University, Auburn, AL, ²Scott-Ritchey Research Center, College of Veterinary Medicine, Auburn University, Auburn, AL, ³US Dept of Education GAANN Graduate Fellowship Program in Biological & Pharmaceutical Engineering, Auburn University, Auburn, AL, ⁴Department of Anatomy, Physiology, and Pharmacology, College of Veterinary Medicine, Auburn University, Auburn, AL, ⁵Biomimetic & Biobridged Materials, Biomedical Devices, and Drug Delivery Laboratories, Department of Biomedical Engineering, Rowan University, Glassboro, NJ

Track: Nano and Micro Technologies

Bioinspired Micro/Nano Devices

Th-508 Mechanical Stimulation and Stiffness Characterization Device for Electrospin Cell Culture Scaffolds
Soliman Alhudaithy¹, Devina Jaiswal², Namdev Shelke², Sangamesh G. Kumbar², and Kazunori Hoshino¹
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health Center, Farmington, CT

Th-509 Microfluidic Transcellular Monitoring of Cell-Nanomaterial Interaction For Translational Nanomedicine
Yoshitaka Sei¹, Erisa Sula¹, and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

Tracks: Nano and Micro Technologies, Translational Biomedical Engineering

Micro/Nano Tools in Global Health

Th-510 Investigation into Nonspecific Fluorescence Recovery in a FRET-Based Aptasensor
Alisha Geldert¹, Kenry¹, and Chwee Teck Lim¹
¹National University of Singapore, Singapore, Singapore

Th-511 Inducing Tissue Plasticity and Repair via Nanochannel-mediated Gene Delivery
Daniel Gallego-Perez¹, Durba Pal¹, Subhadip Ghatak¹, Natalia Higuta Castro¹, Shamita Mathew¹, Surya Gnyawali¹, Lingqian Chang¹, Wu Lu¹, Jose Otero¹, L. James Lee¹, and Chandan Sen¹
¹The Ohio State University, Columbus, OH

Th-512 Magnetic Removal of Free Hemoglobin: A Method to Reduce Hemolysis-Induced Platelet Activation
Kelli Simms¹, Nadeem Wajih ³, Daniel Kim-Shapiro², and Elaeha Rahbar²
¹Wake Forest School of Medicine, Winston Salem, NC, ²Wake Forest University, Winston Salem, NC, ³Wake Forest School of Medicine, Winston Salem, NC

POSTER SESSION—THURSDAY

Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**POSTER SESSION—THURSDAY**

**Th-513**
Computational Integration of Nano-scale Physical Biomarkers and Cognitive Assessments for Diagnosis and Prediction of Alzheimer’s Disease
Tao Yue1, Xinghua Jia1, Jennifer Petroso2, Dong Wang1, Zhen Fan1,2, Lening Sun1,3, Jesse Fine1, Rebecca Davis1, Scott Galster1, Jeff Kuret1, Douglas Scharre2, and Mingjun Zhan1
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Department of Biomedical Sciences, The Ohio State University, Columbus, OH, 3Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH, 4Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH, 5711th Human Performance Wing, Air Force Research Laboratory, WPAFB, OH, 6Department of Molecular and Cellular Biochemistry, The Ohio State University College of Medicine, Columbus, OH

**Th-514**
Nonparticle Assay for Detection of a Preeclampsia Biomarker using Surface Enhanced Raman Spectroscopy
Monika Schechinger1, Haley Marks1, Mahua Choudhury1, and Gerard Cote1,2
1Texas A&M, College Station, TX, 2Texas A&M Engineering Experiment Station, College Station, TX

**Th-515**
Simulation of Magnetic Particle Capture for Extracorporeal Magnetic Separation of Inflammatory Cytokines for Cardiopulmonary Bypass (CPB) procedures
Olivia Lanier1, Camilo Velez1, and Jon Dobson1
1University of Florida, Gainesville, FL

**Th-516**
Time-Domain Encoded Optofluidics for Multiplexed, Lock-in Detection of Fluorescent Signals
Venkata Yelleswarapu1 and David Issadore1
1University of Pennsylvania, Philadelphia, PA

**Th-517**
Magnetic Particle Capture as a Surrogate Measure for Synovial Fluid Viscosity
Yash Shah1, Lorena Maldonado-Camargo1, Neal Patel1, Elena Yarmola1, Carlos Rinaldi1, Jon Dobson1, and Kyle Allen1
1University of Florida, Gainesville, FL

**Th-518**
Instrument-free Assay for Monitoring Bladder Cancer with High Specificity and Sensitivity in Resource Poor Settings
Abhinav Acharya1, Andres Correa1, Tatum Tarin1, and Steven Little1
1University of Pittsburgh, Pittsburgh, PA

**Th-519**
A Smartphone-Enabled Portable Diagnostics for Iron Deficiency in Resource-Limited Settings
Balaji Srinivasan1, Seoho Lee1, Dakota O’Dell1, David Erickson1, and Saurabh Mehta2
1Cornell University, Ithaca, NY

**Th-520**
Biomimetic Nanotopography to Control Cell Adhesion on an Artificial Cornea
Elena Liang1, Mary Nora Dickson1, Cristina Kenney1, Marjan Farid1, Roger Steinert1, and Albert Yee1
1University of California, Irvine, Irvine, CA

**Th-521**
Tunable Wax-ink Valves for Multistep Paper-fluidic Diagnostics
Elizabeth Phillips1, Tori Clift1, and Jacqueline Linnes1
1Purdue University, West Lafayette, IN

**Th-522**
Breaking the Diagnostic Barrier: Paper-Based Assay for Simplified Sickle Cell Diagnosis
Kevin Cyr1, Christina Marasco1, and Jennifer Colby2
1Vanderbilt Institute for Integrative Biosystems Research and Education, Nashville, TN, 2Vanderbilt University Medical Center, Nashville, TN

**Th-523**
Modeling the Early Stages of Fatty Liver Disease and Fibrosis in Microengineered Human Liver Cultures
Matthew Davidson1 and Salman Khetani1,2
1Colorado State University, Fort Collins, CO, 2University of Illinois at Chicago, Chicago, IL

**Th-524**
Detection Signal Amplification based on Cyclic Catch-and-Release
Michael Jacobs1 and Frederick Haselton1
1Vanderbilt University, Nashville, TN

**Th-525**
Paper-Based Test for Indirect Screening of Newborns for Sickle Cell Disease
Nathaniel Piety1, Alex George2, Sonia Serrano3, Maria Lanzi1, Palika Patel1, Maria Noli1, Silvina Kahan1, Damian Nirenberg3, Joao Camanda1, Gladstone Airewele1, and Sergey Shevkopylas1
1University of Houston, Houston, TX, 2Baylor College of Medicine, Houston, TX, 3Angola Sickle Cell Initiative, Cabinda City, Angola

**Th-526**
Elongation Processing to Enhance Macromolecular Orientation and Strength of Electrospun Nanofibers
David Brennan1, Dave Jao1, Xiao Hu1, and Vince Beachley1
1Rowan University, Glassboro, NJ

**Th-527**
Effects of Solvent and Process Parameters on the Structures and Functions of Micellar Nanocrystals
Gang Ruan1, Yuxiang Sun1, Xinyi Ding1, Ning Han1, Jun Wang1, and Xiaoya Yu1
1Nanjing University, China, Nanjing City, China, People’s Republic of China

**Th-528**
Control of Shape and Optical Property of Anisotropic Gold Nanomaterials by the Reduction of Silver Ion
Hyon Bin Na1, Bong-Geun Kim1, Jong-Won Lee1, and Dujin Kim1
1Myongji University, Yongin, Korea, Republic of Korea

**Th-529**
Graphene Quantum Dots: An Alternative Filler to Nanocomposite And Their Biomedical Applications
Navathej Gobi1, Darshan Vijayakumar1, Chaitra Ramesh1, Shambhavi Kashyap1, and S. Sathish Narayanan1
1San Jose State University, San Jose, CA

**Th-530**
Dependence of Nanotextured Titanium Orthopedic Surfaces on Electrolyte Fluoride Concentration
Radheshyam Tewari1, Sachin Bhosle1,², and Craig Friedrich1
1Michigan Technological University, Houghton, MI, 2Michigan Technological University, Houghton, MI

**Th-531**
Three-Dimensional Microfabrication of Biodegradable Polymers for Biomedical Applications
Thanh Nguyen1
1University of Connecticut, Storrs, CT
Track: Nano and Micro Technologies

Micro/Nano Tools in Infectious Diseases

Th-532
Mycobacterium smegmatis Biofilm Response to Time-Varying and Nanoparticle Encapsulated Antibiotic Concentrations in a Microfluidic Device
Loc Truong¹, Norman Bae², Allen Wang³, and Benjamin Hawkins¹
¹San Jose State University, San Jose, CA

Th-533
Measurement of C-Reactive Protein Using CdSe/ZnS Quantum Dots Through Its Spectral Intensity Values
Kalpana Ramakrishnan¹ and Shahnila Raza¹
¹Rajalakshmi Engineering College, Chennai, India

Th-534
Hollow Silica Microspheres for Buoyancy-assisted Bioseparation
Lichen Xiang¹, Erica Osta¹, Linying Li², Gabriel López²,³, and Shannon Weigum¹
¹Texas State University, San Marcos, TX, ²Duke University, Durham, NC, ³University of New Mexico, Albuquerque, NM

Th-535
Structural Antibacterial Properties of Carbon-Infiltrated Carbon Nanotube Coatings
Stephanie Morco¹, Anton Bowden¹, Brian Jensen¹, and Dustin Williams²
¹Brigham Young University, Provo, UT, ²University of Utah, Salt Lake City, UT

Tracks: Nano and Micro Technologies, Cellular and Molecular Bioengineering Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)

Th-536
Rare Biomarker Quantification Through Integrated Dielectrophoretic and Plasmonic Based Fluorescence Enhancement
Logeeshan Velmanikam¹, Michael Fondakowski¹, Ivan Lima¹, and Dharmakeerthi Nawaratna¹
¹North Dakota State University, Fargo, ND

Th-537
Determining the Size of Biomolecule-Tagged Nanoparticles by Brownian Motion Quantification
Katherine Clayton¹, Janelle Salameh¹, Julia Fraser¹, Nelida Vazquez-Portalatin¹, Alyssa Panitch¹, Steven Wereley¹, and Tamara Kinzer-Ursem¹
¹Purdue University, West Lafayette, IN

Th-538
Femtoliter Droplet Confinement of Pneumococcus Pairs for Single Event Transformation Assay
Martin Brennan¹, Donald Morrison¹, and David Eddington¹
¹University of Illinois at Chicago, Chicago, IL

Th-539
Ultrasonic Microfluidic Assay for Genome-wide DNA methylation Analysis and Precision Medicine
Sai Ma¹, Zhixiong Sun¹, Hehuang Xie¹, Chen Sun¹, Travis Murphy¹, and Chang Lu¹
¹Virginia Tech, Blacksburg, VA

Th-540
Development of a Microfluidic Device for Trapping, Transforming, and Monitoring Gene Expression of Individual Tobacco Protoplasts
Tayler Schimel¹, Mary-Anne Nguyen¹, Stephen Sarles¹, and Scott Lenaghan¹
¹University of Tennessee, Knoxville, TN

Track: Respiratory Bioengineering
Computational Modeling of the Respiratory System in Health and Disease

Th-541
Quantitative Yeast Cell Dynamics in Static Chemical Gradients
Thanh Vo¹, Phu Pham¹, John S. Choy¹, and Xiaolong Luo¹
¹Catholic University of America, Washington, DC

Th-542
Ingested Nanoparticles Alter Gastrointestinal Tract Enzyme Function and Mineral Absorption
Zhongyuan Guo¹, Nicole Martucci¹, Gabriella Shull¹, Elad Tako², and Gretchen Mahler¹
¹Binghamton University, Binghamton, NY, ²U.S. Department of Agriculture, Ithaca, NY

Th-543
Multi-scale Modeling Of Parenchymal/Airway Interactions
Jason Ryan¹, Hideki Fujikaka¹, David Halpern², and Donald Gaver¹
¹Tulane University, New Orleans, LA, ²University of Alabama, Tuscaloosa, AL

Th-544
Integrating Videoendoscopic Observations into Computational Models of Eustachian Tube Function
Justo Torres-Rodriguez¹ and Samir Ghadiali¹
¹The Ohio State University, Columbus, OH

Th-545
Relationship Between CT-based Lung Mechanics and BODE index in COPD
Sandeep Bodduveli¹, Surya Bhattacharya², Sarah Gerard¹, John Newell Jr.¹, Mark Dransfield², Eric Hoffman¹, and Joseph Reinhardt¹
¹The University of Iowa, Iowa City, IA, ²The University of Alabama, Birmingham, AL

Th-546
Integrated Model of Lung Mitochondrial Tricarboxylic Acid Cycle and Electron Transport System
Xiao Zhang¹, Ranjan Dash², Venkat Pannala³, Anne Clough¹, Amadou Camara³, Elizabeth Jacobs³, and Said Audi¹
¹Marquette University, Milwaukee, WI, ²Medical College of Wisconsin, Milwaukee, WI, ³Zablocki VA Medical Center, Milwaukee, WI

Track: Respiratory Bioengineering
Mechanics and Mechanobiology of the Lung and Airways

Th-547
Incorporating Macrophages into an In-vitro Model of Mechanically-Induced Lung Inflammation
Christopher Bobba¹ and Samir Ghadiali¹
¹The Ohio State University, Columbus, OH

Th-548
Influence of Substrate Stiffness on Fibrogenic Response of Fibroblasts to Carbon nanotubes
Kai Wang¹, Lin Shi¹, and Yong Yang¹
¹West Virginia University, Morgantown, WV

Th-549
Modulating Mechno-Transduction and Middle Ear Inflammation using miR-146a
Natalia Higuita-Castro¹, Vasudha Shukla¹, J. Douglas Swarts ², and Samir N. Ghadiali¹
¹The Ohio State University, Columbus, OH, ²University of Pittsburgh, Pittsburgh, PA
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm

Track: Respiratory Bioengineering
Pulmonary Cell and Matrix Biology

Th-550
Differentiation of Lung Fibroblasts to Airway Smooth Muscle (ASM): Towards a Tractable In Vitro Model
Joshua Morgan¹, Peter Sariano¹, and Jason Gleghorn¹
¹University of Delaware, Newark, DE

Th-551
Identification of Ventilation Type During Anesthesia Period in Operating Rooms
Ali Jalali¹, Luis Ahumada¹, Jorge Galvez¹, and Mohamed Rehman¹
¹Children's Hospital of Philadelphia, Philadelphia, PA

Track: Respiratory Bioengineering
Respiratory Bioengineering

Th-552
Non-Invasive, Real time, Affordable Monitoring of Hemoglobin and Vital parameters for ICU patients
Harsh Modi¹, David Weldon¹, and Mehmet Kaya¹
¹Florida Institute of Technology, Melbourne, FL

Th-553
Study on CO2 Rebreathing Device for Sleep Apnea Treatment by Means of CFD Analysis and Experiment
Mehdi Shokoueinejad², Arman Pazouki², Jake Levin¹, Fa Wang¹, Chris R. Fernandez², Samuel J. Rusk¹, and John G. Webster⁴
¹University of Wisconsin-Madison, Madison, WI, ²California State University, Los Angeles, CA, ³EnsoData, Inc., Madison, WI, ⁴UW-Madison, Madison, WI

Th-554
Design and Implementation of a Sensitive Sensor for the Measurement of Flow in Mice
Samer Bou Jawde¹, Bradford Smith², Jason Bates², and Bela Suk²
¹Boston University, Boston, MA, ²University of Vermont, Burlington, VT

Track: Drug Delivery
Drug Delivery in Tissue Engineering

Th-555
Controlled Release of Bone Morphogenetic Protein-2 from Thiol-Ene Click Hydrogels
Faraz Jivan¹, Ken Munoeka¹, and Daniel Alge¹
¹Texas A&M University, College Station, TX

Th-556
Control Release Anesthetics to Enable An Integrated Anesthetic-MSC Therapeutic
Timothy Maguire¹, Mollie Davis¹, Ilenea Marrero-Berrios², Charles Zhu², Chris Gaughan³, Jonathan Weinberg⁴, Devasena Manchikalapati⁴, Joseph Schianodi-Cola⁴, Martin Yarmush², Rene Schluss⁴, and Joel Yarmush³
¹Beau Ridge Pharmaceuticals, New York, NY, ²Rutgers University, ³New York Methodist Hospital, Brooklyn, NY, ⁴Technical University Munich, Munich, Germany

Th-557
Highly Efficient Encapsulation of Small-molecule N-acetylcysteine Within PLGA Nanoparticles
Nicholas Murphy³ and Kyle Lampe³
³University of Virginia, Charlottesville, VA

Th-558
An Intestinal Trojan Horse as Regenerative Therapy for Inflammatory Bowel Disease
Zahra Davoudi¹ and Qun Wang¹
¹Iowa State University, Ames, IA

Th-559
Lung Surfactant Coatings Improve Nanoparticle Uptake and Retention in Lung Epithelial Cells
Roshni Iyer¹, Canvan Xu¹, Yi Hong¹,², Connie Hsia³,², and Kytae Nguyen¹,²
¹The University of Texas at Arlington, Arlington, TX, ²Joint Graduate Program in Biomedical Engineering–University of Texas at Arlington and University of Texas Southwestern Medical Center, Dallas, TX, ³University of Texas Southwestern Medical Center, Dallas, TX

Th-560
Modeling Transdermal Drug Delivery Via Diffusion Through a Porous, Thin-Walled Suture
Stephanie Jorgensen¹, Pedro Arce¹, and Jonathan Sanders¹
¹Tenessee Technological University, Cookeville, TN

Th-561
Micro-CT Based Imaging of Metallic Nanoparticles for Tracking Microspheres following Intra-articular Drug Delivery
Taylor Comte¹, Daniel Leib¹, Nathan Reed¹, Elizabeth Leimer¹,²,³, Matthew Silva¹, and Lori Setton¹
¹Washington University in St. Louis, St. Louis, MO, ²Duke University, Durham, NC, ³Albany Medical College, Albany, NY

Th-562
Control-released Basic Fibroblast Growth Factor in Photocrosslinkable Scaffold Promotes Vascularized Skin Tissue Regeneration Using Human Umbilical Cord-derived Mesenchymal Stem Cells
Xiao-Fei Zhang¹ and Xiaofeng Cui¹,²,³,⁴
¹Wuhan University of Technology, Wuhan, China, People's Republic of, ²Stemorgan Therapeutics, Albany, NY, ³Rensselaer Polytechnic Institute, Troy, NY, ⁴Technical University Munich, Munich, Germany

Th-563
VEGF-PLGA Nanoparticles Promote Vascularization In Vitro and In Vivo
Yasin Oduk¹, Ramaswamy Kannappan¹, Wuqiang Zhu¹, and Jianyi Zhang¹
¹University of Alabama at Birmingham, Birmingham, AL

Th-564
Dual Delivery of TGF-β Receptor II Binding Peptide and Oxygen to Control Cardiac Fibrosis
Zhaobo Fan³, Minghuan Fu¹, and Jianjun Guan¹
¹Ohio State University, Columbus, OH

Track: Tissue Engineering
Bioreactor Systems for Tissue Engineering

Th-565
Generation of Dissolved Oxygen Concentration Gradient Inside of Microfluidic Chip without Additional Gas Supplies or Chemicals
Heeyeong Jang¹ and Sang-Hoon Lee¹
¹Korea University, Seoul, Korea, Republic of, ²Korea University, KU-KIST graduate school, Seoul, Korea, Republic of

Th-566
Experimental and Computational Models of Mass Transport Within 3D Collagen-Matrigel Hydrogels
Lauren Marshall¹, Roy Koomullil¹, Andra Frost¹, and Joel Berry¹
¹University of Alabama at Birmingham, Birmingham, AL

Th-567
Bioreactor Design for Tissue Engineered Cornea
Patrick Scalis¹, Chris Kotchever¹, and Elizabeth Orwin¹
¹Harvey Mudd College, Claremont, CA
**Track: Tissue Engineering**

**Evaluation of Pulsed Electromagnetic Field Exposure System for Chondrocyte Proliferation**
Song-I Chun¹, Tae hyung Kim¹, and Chi-woong Mun¹
¹Inje University, Gimhae, Korea, Republic of

**Clinical Translation of Engineered Tissues**

**Track: Tissue Engineering**

**Non-invasive Assessments to Track Human White Adipose Tissue Engineered Models In Vitro**
Rosalyn Abbott¹, Carlo Alonzo¹, Francis Borowsky¹, Irene Georgakoudi¹, and David Kaplan¹
¹Tufts University, Medford, MA

**Engineering Replacement Tissues**

**Track: Tissue Engineering**

**Negative Pressure Enhances Cellular Infiltration into Electrospun Fibrous Scaffolds**
Azadeh Timnak¹,², Jonathan A. Gerstenhaber¹,³, Yeh-al Har-el¹,², and Peter I. Lelkes¹,²
¹Department of Bioengineering, College of Engineering, Temple University, Philadelphia, PA, ²Temple Institute for Regenerative Medicine and Engineering (TIME), Temple University, Philadelphia, PA

**The Effects of Hypoxic Cell Expansion and Tissue Culture on Auricular Cartilage Engineering**
Benjamin Cohen¹ and Lawrence Bonassar¹
¹Cornell University, Ithaca, NY

**Blow-spun Chitosan/PEG/PLGA Nanofibers as a Novel Tissue Engineering Scaffold**
Diane Bienek¹ and Wojtek Tutak¹
¹ADA Foundation, Gaithersburg, MD

**Contributions of BMP Proteins in Cardiac Repair Cell functionality and Angiogenesis in a 3D in vitro Model**
Isabella Palazzia¹, Bruce Sun¹, Gregory Lallos¹, Cecile Terrenoire¹, and Donald Freytes¹,²,³
¹The New York Stem Cell Foundation Research Institute, New York, NY, ²North Carolina State University, Raleigh, NC, ³University of North Carolina-Chapel Hill, Chapel Hill, NC

**Development of a Bio-inspired Hybrid Nanosack for Islet Transplantation in the Omentum**
Patrick Hwang¹, Dong-Jin Lim¹, Grant Alexander¹, Anath Shalev¹, Wanxing Cui¹, Shawn Gilbert¹, and Ho-Wook Jun¹
¹University of Alabama at Birmingham, Birmingham, AL, ²Medstar Georgetown Hospital, Washington, DC

**Tissue Engineered Cartilaginous Trachea Using Chondrocyte-Seeded Polymer Scaffolds**
Timothy Holzberg¹, Ting Guo¹, Joshua Bedwell², Diego Preciado², George Zalzal², and John Fisher¹
¹University of Maryland, College Park, MD, ²Children’s National Medical Center, Washington, DC

**Evaluation of Pulsed Electromagnetic Field Exposure System for Chondrocyte Proliferation**
Song-I Chun¹, Tae hyung Kim¹, and Chi-woong Mun¹
¹Inje University, Gimhae, Korea, Republic of

**Track: Tissue Engineering**

**Human and Organ on a Chip**

**A Soft Microfluidic Device as an In Vitro Model for Studying Mechanobiology of Tubular Organs**
Hyeonji Yu¹, Dongwon Kang¹, Kwangin Shin¹, Minji Whang¹, and Jungwook Kim¹
¹Sogang University, Seoul, Korea, Republic of

**Cell-Matrix and Cell-Cell Interactions in Endothelial Barrier Models on Porous Glass Membranes**
Stephanie Casillo¹, Ana Peredo¹, Andrea Mazzochi¹, and Thomas Gaborski¹
¹Rochester Institute of Technology, Rochester, NY

**Novel Mechanisms of Non-Coding Genomic Regulation Identified in Cardiac Disease-in-a-dish Models**
Aditya Kumar¹, Stephanie Thomas¹, Kirsten Wong¹, Kevin Tenerelli¹, Valentina Lo Sardo¹, William Ferguson¹, Eric Topol²,³, Kristin Baldwin², and Adam Engler¹,²
¹University of California, San Diego, La Jolla, CA, ²The Scripps Research Institute, San Diego, CA, ³Scripps Translational Science Institute, La Jolla, CA, ⁴Sanford Consortium for Regenerative Medicine, San Diego, CA

**Co-patterning of Living Tissues In 3D-Printed Microfluidic Chips**
Christiane Nguyen¹, Stephanie Knowlton², Chu Hsiang Yu², and Savas Tasoglu²
¹University of Connecticut, Danbury, CT, ²University of Connecticut, Storrs, CT

**Human Colon Biopsy Slices Ex Vivo: Impacts of Oxygen and Bacteria**
Luke Schwertfeger¹, Erica Borresen¹, Elizabeth Ryan¹, and Stuart Tobe³
¹Colorado State University, Fort Collins, CO

**Effect of Gelatin Patterning and Stiffness on the Culture of Podocytes for Glomerulus-on-a-chip**
Ellery Jones¹, Matthew Ishahak¹, Alla Mitrofanova², Alessia Fornoni², and Ashutosh Agarwal¹
¹University of Miami, Coral Gables, FL, ²University of Miami, Miami, FL

**Endogenous Signals Shape Phenotype of Primary Hepatocytes Cultured in Microchambers**
Pantea Gheibi¹, Amranul Haque¹, Yandong Gao¹, Elena Foster¹, Kyung Jin Son¹, Jungmok You¹, Gulnaz Stybayeva¹, Dipali Patel¹, and Alexander Revzin¹
¹University of California, Davis, CA, ²University of Notre Dame, Notre Dame, IN

**A Tissue Engineered Model of Aging**
Aylin Acun¹, Dervis Vural¹, and Pinar Zorlutuna¹
¹University of Notre Dame, Notre Dame, IN

**Design and Development Of An In Vitro Vascular Model Using 3D Printing-enabled Hydrogel Casting Technique**
Pranav Soman¹, Liang Yang¹, Shivkumar Shridhar¹, and Melissa Gerwitz¹
¹Syracuse University, Syracuse, NY

**Vessel Growth Response to Controlled Oxygen Gradients in a Microfluidic Platform**
Sandra Lam¹, Yunli Chu¹, Alan Soetikno², and Steven George¹
¹Washington University in St. Louis, St. Louis, MO
Track: Tissue Engineering

**Engineering Tissue Interfaces**

**Th-586**

Nanostructuring to Improve Osseointegration of Titanium Implants in Spinal Reconstruction

Alethia Barnwell1, Sandra Arias1, Akshath Shetty1, and Jean Paul Allain1
1University of Illinois Urbana-Champaign, Urbana, IL

**Th-587**

Fabrication and Characterization of Poly(-amino ester) Hydrogel Microspheres with Tailorable Size and Properties

Amir Najzaradeh3 and David Puleo2
1University of Kentucky, Lexington, KY, 2University of Kentucky, Lexington, KY

**Th-588**

Exploring Synergy Between Mechanical and Bioinstructive Cues for the Tendon:Bone Interface

Brittany Banik1 and Justin Brown1
1The Pennsylvania State University, University Park, PA

**Th-589**

Nanotopography-Induced Neuromuscular Junction Assembly

Eunkyung Ko2, Seung-Jung YU2, Jooyeon Park2, Sung Gap Im2, Marni Boppard1, Rashid Bashir1, and Hyunjoon Kong1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Korea Advanced Institute of Science and Technology, Daejeon, Korea

**Th-590**

Optimizing The Growth and Characterization of Retinal Pigment Epithelial Cells

Ian Wadsworth1, Harshit Singh1, Lori Caldwell2, Zach Jensen2, Bret Hansen1, Randy Lewis1, and Elizabeth Vargis1
1Utah State University, Logan, UT

**Th-591**

Biomimetic Surface Modification of PLLA Scaffolds for Bone Tissue Engineering

Cortes Williams1, Nathan R. Richbourg1, Ariel Chloe Cross1, and Vassilios Sikavitsas1
1University of Oklahoma, Norman, OK

**Th-592**

Biocompatibility of Plasma Immersion Ion Implantation Surface Treated Shape Memory Polymer

Xinying Cheng1, Alexey Kondyurin2, Marcela M.M. Bilek2, Shisan Bao1,4,5, and Lin Ye1
1Centre for Advanced Materials Technology, School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney, NSW0006, Australia, 2Applied and Plasma Physics, School of Physics, the University of Sydney, NSW0006, Australia, 3Discipline of Pathology and School of Medical Science, University of Sydney, NSW0006, Australia, 4Bosch Institute, the University of Sydney, NSW0006, Australia, 5Charles Perkins Centre, the University of Sydney, NSW0006, Australia

Track: Tissue Engineering

**Naturally-Derived and Extracellular Matrix Biomaterials in Tissue Engineering**

**Th-593**

Increasing Modulus of Perfusion-Decellularized Kidney Organ Scaffolds to Enhance Recellularization

Alexey Goloubev1, Andres Rubiano3, Alicia Brown1, Edward Ross1, Chelsey Simmons3, and Bradley Willenberg1
1University of Central Florida College of Medicine, Orlando, FL, 2University of Florida, Gainesville, FL

**Th-594**

Fiber-Embedded Scaffolds for Tricuspid Heart Valve Tissue Engineering

Alison Jacob1, Ayasha Khanam2, and Howard Matthew1
1Wayne State University, Detroit, MI, 2University of Michigan, Ann Arbor, MI

**Th-595**

Mechanical Bioeffects Contribute to Ultrasound-Induced Pro-Migratory Collagen Activity

Emma Grygotsis1, Diane Dalecki1, and Denise Hocking1
1University of Rochester, Rochester, NY

**Th-596**

Considerations for Using The Resazurin Reduction Assay For Temporal Quantification of Cell Number In Tissue Engineering and Three-Dimensional Perfusion Culture Applications

Joseph Uzarski1, Michael DiVito1, William Miller2, and Jason Wertheim1,3,4
1Northwestern University Feinberg School of Medicine, Chicago, IL, 2Northwestern University, Evanston, IL, 3Jesse Brown VA Medical Center, Chicago, IL, 4Northwestern University, Chicago, IL

**Th-597**

Crosslinking of the Human Amniotic Membrane using Riboflavin and UVA

Julien Arrazalaga1 and Matthias Nollert1
1University of Oklahoma, Norman, OK

**Th-598**

Perlecan Domain I Gradients Establish Growth Factor Gradients in Hydrogels for Salivary Engineering

Kelsea M. Hubka1, Brian J. Grindel1, Swati Pradhan-Bhatt1,2,3, Robert L. Witt1,4, Daniel D. Carson1, Daniel A. Harrington1, and Mary C. Farach-Carson1
1Rice University, Houston, TX, 2Helen F. Graham Cancer Center & Research Institute, Christiana Care, Newark, DE, 3University of Delaware, Newark, DE, 4Thomas Jefferson University, Philadelphia, PA

**Th-599**

Chemical and Topographical Cues for Modulating Macrophage Activation States

Melissa Wrobel1 and Harini Sundararaghavan1
1Wayne State University, Detroit, MI

Track: Tissue Engineering

**Stem Cells in Tissue Engineering**

**Th-600**

Assessment of Thrombogenicity of Human Adipose-derived Stem Cells

Anh La1 and Robert Tranquillo1
1University of Minnesota, Minneapolis, MN

**Th-601**

Mechanical Stimulation Increases RNA-level Expression of Knee Meniscus Genes in Adipose-derived Stromal Cells

Elizabeth Meier1, Bin Wu1, Aamir Siddiqui1, Donna Tepper1, Michael Longaker3, and Mai Lam1,2
1Wayne State University, Detroit, MI, 2Henry Ford Health System, Detroit, MI, 3Stanford University, Stanford, CA

**Th-602**

Biodegradable Porous Microspheres as a Stem Cell Vehicle and Controlled Drug Delivery Platform

Eric Sandhurst1 and Hongli Sun1
1University of South Dakota, Sioux Falls, SD

**Th-603**

The Effect of Electro-active PEGDA Hydrogels on Mesenchymal Stem Cells

Kriti Gupta1
1Rutgers University, Kendall Park, NJ
Th-604  Utah-Mesenchymal Stem Cell Sheet Technology for the Advancement of Stem Cell Transplantation Therapy
Sophia Bou-Ghannam¹
¹University of Utah, Salt Lake City, UT

Th-605  NR2F2 Regulates Chondrogenesis of Human Mesenchymal Stem Cells in Bioprinted Cartilage
Guifang Gao¹, Xiao-Fei Zhang¹, Karen Hubbell², Guohao Dai³, Arndt Schilling⁴, Tomo Yonezawa⁵, and Xiaofeng Cui¹,²,⁴,⁵
¹Wuhan University of Technology, Wuhan, China, People’s Republic of, ²Stemorgan Therapeutics, Albany, NY, ³Rensselaer Polytechnic Institute, Troy, NY, ⁴Technical University Munich, Munich, Germany, ⁵Nagasaki University, Nagasaki, Japan

Th-606  Wnt-YAP Interactions during Neural Tissue Patterning of Human Induced Pluripotent Stem Cells
Julie Bejoy¹, Liqing Song¹, and Yan Li¹
¹Florida State University, Tallahassee, FL

Track: Tissue Engineering

Tissue Engineering

Th-607  Developing Primers for Multiplexed PCR of Human Neural Progenitor Cells
Alena Casella¹ and Rebecca Kuntz Willits¹
¹The University of Akron, Akron, OH

Th-608  Fabrication of Electrospun Branched-Clusters as Fundamental Building Units for Tissue Engineering
Ben Minden-Birkenmaier¹, Gretchen Selders¹, and Gary Bowlin¹
¹University of Memphis, Memphis, TN

Th-609  The Effects and Mechanisms of Electromagnetic Stimuli on Cultured Rabbit Corneal Fibroblasts
Deval Gupta¹ and Nathan Miller¹
¹Harvey Mudd College, Claremont, CA

Th-610  Reproducible Construction of Honeycomb Concave Microwell Arrays for 3D Microtissues Engineering
Geonhui Lee¹, JaeSeo Lee², and SangHoon Lee²
¹Korea University, Seoul, Korea, Republic of, ²Korea University, Seoul, Korea, Republic of

Th-611  Electrospinning Collagen and Gelatin Fibers To Model The Extracellular Matrix Of The Corneal Stroma
Cesar Orellana¹ and Kelly McConnell¹
¹Harvey Mudd College, Claremont, CA

Th-612  A Bioinspired Culture Medium Prolongs the Functional Lifetime of Human Liver Cells in Culture
Matthew Davidson¹ and Salman Khetani¹,²
¹Colorado State University, Fort Collins, CO, ²University of Illinois at Chicago, Chicago, IL

Th-613  Resveratrol Releasing Scaffolds to Promote Lipid Metabolism in Adipose Tissue
Michael Hendley¹ and Michael Gower¹
¹University of South Carolina, Columbia, SC

Th-614  Mimicking the Bone Microenvironment to Study Cellular Activity on a Calcium Phosphate Scaffold
Karen Burg¹,² and Olsen Horton²
¹University of Georgia, Athens, GA, ²Clemson University, Clemson, SC

Th-615  Role of Extracellular Matrix and Electrospun Polymer Fiber Diameter on Mammalian Cell Guidance
Priyanka Ruparelia¹, Ramakrishna Sharma², Lifeng Zhang³, Shyam Aravamudhan⁴, and Dennis LaJeunesse¹
¹University of North Carolina at Greensboro, Greensboro, NC, ²North Carolina A&T State University, Greensboro, NC
<table>
<thead>
<tr>
<th>Event Type</th>
<th>Time</th>
<th>Location</th>
<th>Details</th>
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<td>Platform Sessions–Fri-1</td>
<td>8:00 am–9:30 am</td>
<td>Convention Center</td>
<td>See pages 136-142</td>
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<tr>
<td>Meet the Expert: Collaborations for International Research</td>
<td>8:00 am–9:30 am</td>
<td>Room 204</td>
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<tr>
<td>Special Session: AAA-BMES Symposium: Genome Editing Strategies in Bioengineering</td>
<td>8:00 am–9:30 am</td>
<td>Room 208AB</td>
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<tr>
<td>Industry Session: SBIR/STTR</td>
<td>8:00 am–9:00 am</td>
<td>Room 201</td>
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<tr>
<td>Industry Session: Reimbursement</td>
<td>9:15 am–10:15 am</td>
<td>Room 201</td>
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<tr>
<td>Exhibit Hall Open</td>
<td>9:30 am–5:00 pm</td>
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<tr>
<td>Poster Session</td>
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<tr>
<td>Poster Viewing with Authors &amp; Refreshment Break</td>
<td>9:30 am–10:15 am</td>
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<tr>
<td>Plenary Session</td>
<td>10:15 am–11:45 am</td>
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<tr>
<td>NIBIB Lecture</td>
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<td>Rethinking the Way We Do MRI: Magnetic Resonance Fingerprinting Mark A. Griswold, PhD</td>
</tr>
<tr>
<td>Industry Session: Healthcare Innovation with Physicians</td>
<td>12 noon–1:30 pm</td>
<td>Room 201</td>
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<tr>
<td>Platform Sessions–Fri-2</td>
<td>1:45 pm–3:15 pm</td>
<td>Convention Center</td>
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<tr>
<td>Meet the Expert: Meet the Journal Editors</td>
<td>1:45 pm–3:15 pm</td>
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<tr>
<td>Industry Session: Mobile/Digital Health</td>
<td>2:00 pm–3:00 pm</td>
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<tr>
<td>Poster Viewing with Authors &amp; Refreshment Break</td>
<td>3:15 pm–4:00 pm</td>
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<tr>
<td>Industry Session: Investment Pitches and Partnering</td>
<td>3:15 pm–5:15 pm</td>
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<tr>
<td>Special Session: KOSOMBE-US-KOREA Joint Workshop on BME</td>
<td>3:15 pm–6:15 pm</td>
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<tr>
<td>Platform Sessions–Fri-3</td>
<td>4:00 pm–5:30 pm</td>
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<tr>
<td>Industry Session: Healthcare Innovation with Physicians</td>
<td>12 noon–1:30 pm</td>
<td>Room 201</td>
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<tr>
<td>Meet the Expert: Collaborations with Industry</td>
<td>4:00 pm–5:30 pm</td>
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<tr>
<td>Special Session: Educational Approaches to Best Prepare Students for Industry</td>
<td>4:00 pm–5:30 pm</td>
<td>Room 208CD</td>
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<tr>
<td>Special Plenary Session</td>
<td>5:45 pm–6:30 pm</td>
<td>Auditorium</td>
<td>Extraordinary Challenges and the Need for Extraordinary Competencies—The Role of the Biomedical Engineer Jim Gallarda</td>
</tr>
<tr>
<td>BMES Dessert Bash</td>
<td>8:30 pm–11:00 pm</td>
<td>Ballroom AB/CC</td>
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</table>
**Friday, October 7 | 8:00 am–9:30 am | Platform Session 1**

**OP-Fri-1-1**  
**Auditorium 1**  
**Tracks: Cellular and Molecular Bioengineering, Biomechanics Testing, Modeling, and Exploiting Mechanobiology**

**Chairs:** Christopher Lemmon, Guohao Dai

**8:00 am**  
**Mechanical Amplification of Tumor Death Using Polymeric Nanoparticles**  
Michael Mitchell¹ and Robert Langer¹  
¹MIT, Cambridge, MA

**8:15 am**  
**High Throughput Label-Free Cell Viability Assay Using Deformability Cytometry**  
Mahdokht Masaeli¹, Dewal Gupta², and Dino Di Carlo²  
¹Stanford University, Stanford, CA, ²UCLA, Los Angeles, CA

**8:30 am**  
**Combinatorial ECM Arrays Reveal the Effects of Biomechanics In Liver Progenitor Differentiation**  
Andreas Kourouklis¹, Kerim Kaylan², and Gregory Underhill²  
¹University of Illinois Urbana-Champaign, Urbana, IL, ²University of Illinois Urbana Champaign, Urbana, IL

**8:45 am**  
**To Be, or Not to Be: Cellular Homeostasis to Mechanical Perturbations**  
Shinuo Weng¹, Yue Shao¹, Weiqiang Chen¹,², and Jianping Fu¹  
¹University of Michigan-Ann Arbor, Ann Arbor, MI, ²New York University, New York, NY

**9:00 am**  
**Effects of Compaction and Stretch on Cell Alignment in 3D Constructs: Testing a Proposed Model**  
Kellen Chen¹ and Jeffrey W. Holmes¹  
¹University of Virginia, Charlottesville, VA

**9:15 am**  
**Modeling the Influence of Substrate Young’s Modulus, Adhesion Size, and Cell Geometry on Cell Traction**  
Ghaidan Shamsan¹ and David Odde¹  
¹University of Minnesota Twin Cities, Minneapolis, MN

**OP-Fri-1-2**  
**Auditorium 2**  
**Tracks: Cancer Technologies, Nano and Micro Technologies 3D Microfluidic Cancer Models**

**Chairs:** Ian Wong, Matt Kinsella

**8:00 am**  
**3D Printed Biomimetic Nanocomposite Matrix for the Study of Breast Cancer Bone Metastasis**  
Wei Zhu¹, Robert Glazer², and Lijie Grace Zhang¹  
¹The George Washington University, Washington, DC, ²Georgetown University Medical Center, Washington, DC

**8:15 am**  
**Micropalpation: Analysis of Cancer Spheroid Stiffness Using Microtweezers**  
Devina Jaiswal¹, Zichao Bian¹, Alexander Almeida¹, Guoan Zheng¹, Kevin Claffey², and Kazunori Hoshino¹  
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health Center, Farmington, CT

**8:30 am**  
**Miniaturized High-Content Imaging Assays on 3D Cultured Cell Microarrays for Mechanistic Toxicity**  
Pranav Joshi¹, Akshata Datar¹, Alexander Roth¹, Kyeong Nam Yu¹, and Moo-Yeeal Lee¹  
¹Cleveland State University, Cleveland, OH

**8:45 am**  
**Recreating 3D Tumor Microenvironment on a Chip for Screening Drug Delivery Systems**  
Yuan Tang¹, Fariborz Sorosh¹, Bin Wang¹,², Balabhaskar Prabhakarpandian¹, and Mohammad Kiani¹  
¹Temple University, Philadelphia, PA, ²Widener University, Chester, PA, ³CFD Research Corporation, Huntsville, AL

**9:00 am**  
**Roles of Interstitial Flows in Breast Cancer Cell Invasion Using a 3D Microfluidic Model**  
Yu Ling Huang¹, Chih-kuan Tung², Anqi Zheng³, Beum Jun Kim¹, and Mingming Wu¹  
¹Cornell University, Ithaca, NY, ²North Carolina A&T State University, Greensboro, NC, ³Icahn School of Medicine at Mount Sinai, New York, NY

**9:15 am**  
**Role of Lymphatic-Mimicking Small-Scale Fluid Shear Stress on Survival, Integrin Signaling, and Drug Response in Aggressive Human Lymphoid Tumors**  
FNU Apoorva¹, Ye Tian¹, and Ankur Singh¹  
¹Cornell University, Ithaca, NY

**OP-Fri-1-3**  
**Auditorium 3**  
**Tracks: Biomechanics, Neural Engineering Concussion Biomechanics**

**Chairs:** Jason Luck, Yujian Huang

**8:00 am**  
**Helmet Add-Ons Contribute to a Reduction in the Magnitude of Head Impacts Among Football Athletes**  
Kristopher Hendershot¹, Kelsey Evans¹, Lindsay Lee¹, Sanam Patel¹, Christopher Rothfus², Brian Liu², Nicole Kosoris², Shean Phelp³, Russell Gore³, David Wright³, Tamara Espinoza¹, and Michelle LaPlaca⁴  
¹Emory University, Atlanta, GA, ²Georgia Tech Research Institute, Atlanta, GA, ³Shepherd Center, Atlanta, GA, ⁴Georgia Tech / Emory University, Atlanta, GA

**8:15 am**  
**In Vivo Strains Vary by Brain Tissue Type and Cortical Region with Mild Angular Head Acceleration**  
Deva Chan¹, Andrew Knutsen², Yuan-Chiao Lu³, Sarah Yang³, Philip Bayly⁴, John Butman⁴, and Dzung Pham¹  
¹Henry M Jackson Foundation, Bethesda, MD, ²Institute for Defense Analyses, Alexandria, VA, ³Uniformed Services University of the Health Sciences, Bethesda, MD, ⁴George Washington University, St. Louis, St. Louis, MO, ³Radiology and Imaging Sciences, Bethesda, MD
8:30 am
Investigation of Football Head Impacts Through Development of a Dynamic Model
Michael Fanton1, Fidel Hernandez1, and David Camarillo1
1Stanford University, Stanford, CA

8:45 am
Investigation of Intraparenchymal Head Injury Mechanisms through Multivariate FE Simulation
Derek Jones1, Jillian Urban1, Ashley Weaver1, and Joel Stitzel1
1Wake Forest University, Winston-Salem, NC

9:00 am
Assessment of Single Season Accumulation of Head Impact Exposure in Youth Athletes
Jillian Urban1,2, Mireille Kelley1,2, Logan Miller1,2, Derek Jones1,2, and Joel Stitzel1,2
1Wake Forest School of Medicine, Winston Salem, NC, 2Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston Salem, NC

9:15 am
Astrocyte Reactivity Following Blast Exposure Involves Aberrant Histone Acetylation
Zachary Bailey1, Michael Grinter1, and Pamela VandeVord1,2
1Virginia Tech, Blacksburg, VA, 2Salem Veterans Affairs Medical Center, Salem, VA

OP–Fri–1–4
Room 102AB
Tracks: Cardiovascular Engineering, Tissue Engineering
Cardiovascular Tissue Engineering II
Chairs: Kareen Coulombe, Kartik Balachandran

8:00 am
Engineered In Vitro Disease Models for the Development and Validation of New Cardiac Therapies—INVITED
Kelly Sullivan1, Whitney Stoppel1, Breanna Duffy1, David Kaplan1, and Lauren Black1,2
1Tufts University, Medford, MA, 2Tufts University School of Medicine, Boston, MA

8:30 am
In Vivo Anastomosis and Perfusion of a 3D Printed PEG Hydrogel Containing Microvascular Networks
Samantha Paulsen1, Carol Chen2, Bagrat Grigoryan1, Nicholas Calafat1, Pavan Atluri2, and Jordan Miller1
1Rice University, Houston, TX, 2University of Pennsylvania, Philadelphia, PA

8:45 am
Temporal Control of ECM Composition in Ex Vivo Heart Valve Organ Cultures
Ana Porras1, Hongyu Rao1, Curtis Brandt1, and Kristyn Masters1
1University of Wisconsin-Madison, Madison, WI

9:00 am
Fabrication of Human Cardiac Tissue Using 3D Printing of High Resolution, ECM-Inspired Scaffolds
Molly Kupfer1, Ling Gao2, Jongwook Jung1, Patrick Zhang3, Libang Yang4, Quyen Tran1, Visar Ajeti1, Brian Freeman1, Paul Campagnola3, Jianyi Zhang1,2, and Brenda Ogle1,2
1University of Minnesota-Twin Cities, Minneapolis, MN, 2University of Minnesota-Twin Cities, Minneapolis, MN, 3University of Wisconsin-Madison, Madison, WI

9:15 am
Engineered hiPSC-Cardiac Tissue Propagates Electrical Impulses to Host in Infarcted Rat Hearts
Kareen Coulombe1, Fabiola Munarin1, Tae Yun Kim1,2, Ulrike Mendel1,2, and Bum-Rak Choi1,2
1Brown University, Providence, RI, 2Rhode Island Hospital, Providence, RI

OP–Fri–1–5
Room 102C
Track: Biomaterials*
Biomaterials for Immunoengineering I
Chairs: Silviya Zustiak, Qun Wang

8:00 am
Combinatorial Delivery of Multiple TLR Agonists Via Polymeric Pathogen Like Particles Synergistically Enhances Innate And Adaptive Immune Responses
Ranjna Madan-Lala1, Pallab Pradhan1, and Krishnendu Roy1
1Georgia Institute of Technology, Atlanta, GA

8:15 am
Expansion of Exhausted T Cells via Electrospun Poly(Dimethyl Siloxane)-based Fibrous Meshes
Alex Dang1, Danielle Bogdanowicz1, Helen Lu1, Lance Kam1, Jennifer Brown2, and Stacey Fernandes2
1Columbia University, New York, NY, 2Harvard Medical School, Boston, MA

8:30 am
Antibody-Modified-Conduit Blood Filtration: an Extra-corporeal Immune-Modulating Therapy for Sepsis
Andre Shomorony1,2,3, Brian McAlvin2, and Daniel Kohane2
1Harvard Medical School, Boston, MA, 2Boston Children’s Hospital, Boston, MA, 3Massachusetts Institute of Technology, Cambridge, MA

8:45 am
Revisiting the Immunogenicity (or Tolerogenicity) of Poly (lactic-co-glycolic acid)
Riley Allen1, Jeff Ma1, and Jamal Lewis1
1University of California, Davis, Davis, CA

9:00 am
pH-Dependent Vomocytosis of PLGA Microparticles from Dendritic Cells
Amir Bolandparvaz1, Jeffry Ma1, and Jamal Lewis1
1University of California, Davis, Davis, CA
### Friday, October 7 | 8:00 am–9:30 am | Platform Session 1

**9:15 am**
Modification of PLGA Microparticles with the Immunomodulatory Protein CD200 Promotes Phagocytosis and Anti-inflammatory Cytokine Secretion by Macrophages
Esther Chen¹, Shu-Hui Chu¹, Andrea Tenner¹, and Wendy Liu¹
¹University of California, Irvine, Irvine, CA

* Biomaterials Track sponsored by

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**OP-Fri-1-7**

**Room 101B**

**Track: Cancer Technologies**

**Engineered Models of Glioma and the Tumor Microenvironment**

**Chairs:** Aleksander Skardal, Cyrus Ghajar

**8:00 am**

Development and Characterization of Spontaneous Glioblastoma Mouse Models
Chao Liu¹, Rebecca Klank², Ghaidan Shamsan³, S. Joseph McFarren¹, Brooke Braman¹, Taner Akkin¹, David Largaespada¹, and David Odde¹
¹University of Minnesota, Minneapolis, MN

**8:15 am**

Glioma Cell Invasion is Significantly Enhanced in Composite Hydrogel Matrices Composed of Chondroitin 4- and 4,6-Sulfated Glycosaminoglycans
Meghan Logun¹, Nicole Bisel¹, Emily Tanasse², Wujun Zhao¹, Bhagya Gunasekera¹, Leidong Mao¹, and Lohitash Karumbaiah¹
¹University of Georgia, Athens, GA, ²Boise State University, Boise, ID

**8:30 am**

Analyzing Hypoxia Induced Epigenetic Variations in Cell Subpopulations in the Tumor Microenvironment
Megan Cox¹, Yan Zhu¹, Yuan-Pang Hsieh¹, Chang Lu¹, and Scott Verbridge¹
¹Virginia Tech, Blacksburg, VA

**8:45 am**

Brain-mimetic Hydrogels to Study Development of Glioblastoma Resistance to EGFR Inhibition
Weikun Xiao¹, Rongyu Zhang¹, Songping Sun¹, Arshia Ehsanipour¹, Christopher Walthers¹, Jesse Liang¹, Lisa Ta¹, David Nathanson¹, and Stephanie Seidlits¹
¹University of California, Los Angeles, CA

**9:00 am**

Rui Pereira¹, Chiara Manneschi¹, Marco Francardi¹, Anna Lisa Palange¹, Ajuu Lee¹, and Paolo Decuzzi¹
¹IIT-Italian Institute of Technology, Genova, Italy

**9:15 am**

An In Vitro Model of Glioblastoma Multiforme
Hemamylammal Sivakumar¹, Mahesh Devarasetty¹, and Aleksander Skardal¹
¹Wake Forest School of Medicine, Winston-Salem, NC

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**OP-Fri-1-6**

**Room 101A**

**Tracks: Bioinformatics, Computational and Systems Biology, Cellular and Molecular Bioengineering**

**Theory and Practice of Synthetic Biology**

**Chairs:** Casim Sarkar, Megan McClean

**8:00 am**

Spatial Segregation of Synthetic Circuit Output Using the Cell Surface
Felicia Scott¹, Keith Heyde², and Warren Ruder¹
¹Virginia Tech, Blacksburg, VA, ²Virginia Polytechnic Institute and State University, Blacksburg, VA

**8:15 am**

A Toolkit for Optogenetic Control of Gene Expression in Saccharomyces Cerevisiae
Cameron Stewart¹ and Megan McClean¹
¹UW-Madison, Madison, WI

**8:30 am**

Elucidating Response Dynamics of Multivalent Signal Transduction Hubs
Wesley Errington¹, Patrick Holec¹, and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

**8:45 am**

Cell Lineage Tracing Using Nuclease Barcoding
Stephanie Tzouanas Schmidt¹, Stephanie Zimmerman², Jianbin Wang³, Stuart Kim¹, and Stephen R. Quake¹
¹Stanford University, Stanford, CA, ²Univ. of Washington, Seattle, WA, ³Tsinghua University, Beijing, China, People’s Republic of

**9:00 am**

Bow-tie Signaling Topology Vulnerable to Age-Associated Decline
Matthew Crane¹, Kenneth Chen¹, Peter Swain², and Matthew Kaeberlein¹
¹University of Washington, Seattle, WA, ²University of Edinburgh, Edinburgh, United Kingdom

**9:15 am**

Employing Biomimetic Systems for Understanding the Affects of the Human Microbiome
Keith Heyde¹ and Warren Ruder¹
¹Virginia Polytechnic Institute and State University, Blacksburg, VA
Friday, October 7 | 8:00 am–9:30 am | Platform Session 1

**OP–Fri–1–8**  Room 101C

**Track: Biomechanics**

**Injury Biomechanics I**

Chairs: Jaydip Desai, Matthew Fisher

**8:00 am**

**Adult Human Finite Element Models for Simulating Pedestrian Accidents**

Costin Untaroiu¹, Wansoo Pak¹, Yunzhu Meng¹, and Scott Gayzik²

¹Virginia Tech, Blacksburg, VA, ²Wake Forest University, Winston-Salem, NC

**8:15 am**

**Evaluation of Hearing Protection Devices to Blast Exposure Using Human Temporal Bone and 3D Ear Model**

Rong Gan¹, Don Nakmali¹, and Kegan Leckness¹

¹University of Oklahoma, Norman, OK

**8:30 am**

**Foot Flight after a Simulated Misstep Predicts Ladder Fall Severity**

Erika Pliner¹ and Kurt Beschorner¹

¹University of Pittsburgh, Pittsburgh, PA

**8:45 am**

**Changes In Bone Mass After Body Weight Supported Treadmill Training In Spinal Cord Injury Rats**

Gabrielle Gehron¹, Brittany King², Jaclyn Witko³, Jennifer Kadowiec⁴, and Anita Singh¹

¹Widener University, Chester, PA, ²Rowan University, Glassboro, NJ

**9:00 am**

**Accurate Detection of On-Field Football Head Impacts Using an Instrumented Mouthguard**

Lyndia Wu¹, Calvin Kuo¹, Jesus Loza², Mehmet Kurt¹, Kaveh Laksarí¹, Daniel Seniñ³, Scott Anderson¹, Logan Miller², Jillian Urban², Joel Stitzel², and David Camarillo¹

¹Stanford University, Stanford, CA, ²Wake Forest University, Winston-Salem, NC

**9:15 am**

**Potential Injury Prevention Benefits of an Intersection Driver Assistance System**

John Scanlon¹ and Hampton Gabler¹

¹Virginia Tech, Blacksburg, VA

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**OP–Fri–1–9**  Room 101D

**Track: Tissue Engineering**

**Printing and Patterning in Tissue Engineering**

Chairs: Monica Moya, Ashutosh Agarwal

**8:00 am**

**Stereolithography of Engineered Tissues Containing Interpenetrating Vascular Networks—INVITED**

Jordan Miller¹

¹Rice University, Houston, TX

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**OP–Fri–1–10**  Room 101E

**Track: Biomaterials***

**Advanced Characterization and Imaging of Biomaterial Environments**

Chairs: Jai Rudra, Christopher Jewell

**8:00 am**

**Optical Anisotropy Contrast Microscopy: Imaging Ellipsometry of Cells Cultured On Birefringent Nanostructures Enables Live-Cell Label-Free Observation of Cell Features And Cell-Substrate Interactions.**

Albert Nguyen¹, Tadas Kaspustin², Darin Pee³, Eva Franke-Schubert¹, Angela Pannier¹, and Mathias Schubert¹

¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Michigan, Ann Arbor, MI

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**Platform Sessions—Friday—1—8:00 am—9:30 am**

**Minneapolis**
**Friday, October 7 | 8:00 am–9:30 am | Platform Session 1**

8:30 am  
Do Ingested Emulsifiers Disrupt the Intestinal Mucus Barrier?  
Jaclyn Lock¹, Taylor Carlson¹, Charles Evans¹, and Rebecca Carrier¹  
¹Northeastern University, Boston, MA

8:45 am  
Evaluating a Biodegradable Piezoelectric Composite Scaffold for Cartilage Tissue Engineering  
Ateka Khader¹ and Treena Arinzeh¹  
¹New Jersey Institute of Technology, Newark, NJ

9:00 am  
Imaging Pulmonary Distribution and Residence Time of Nano-in-Micro Particles  
Joscelyn Mejias¹–² and Krishnendu Roy¹–²  
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA

9:15 am  
Computational Analysis of Biomaterial-Based VEGF Delivery for Regenerative Medicine  
Lindsay Clegg¹ and Feilim Mac Gabhann¹  
¹Johns Hopkins University, Baltimore, MD

* Biomaterials Track sponsored by

OP–Fri–1–12  
Room 200E  
Track: Respiratory Bioengineering  
Experimental Respiratory Mechanobiology  
Chairs: Rebecca Heise, Said Audi

8:00 am  
Dynamic Imaging During Cyclic Stretch Reveals Pulmonary Endothelial Response to Thrombin Challenge  
Arkaprava Dan¹, Ryan Huang¹, and Deborah Leckband¹  
¹University of Illinois, Urbana-Champaign, Urbana, IL

8:15 am  
Cell-extracellular Matrix Interactions Play a Critical Role in the Origin of Hyperreactivity of Airway Smooth Muscle Cells in Asthma  
Harikrishnan Parameswaran¹, Ramaswamy Krishnan², Michael Smith¹, and Kenneth Lutchen¹  
¹Boston University, Boston, MA, ²Beth Israel Deaconess Medical Center, Boston, MA

8:30 am  
Controlled Delivery of Therapeutic Cells and Microparticles into Target Lung Airways  
Jinho Kim¹, John O’Neill¹, Brandon Guenthart¹, N. Valerio Dorrello¹, Matthew Bacchetta¹, and Gordana Vunjak-Novakovic¹  
¹Columbia University, New York, NY

8:45 am  
Stiffness of Human Lung Tissue: An AFM Study on Aging and Tissue Thickness Effects  
Delphine Sicard¹, Laura Fredenburgh², and Daniel Tschumperlin¹  
¹Mayo Clinic, Rochester, MN, ²Brigham and Women’s Hospital, Boston, MA

9:00 am  
Alveolar Type II Epithelial Cells Exhibit Age-dependent Differential Response to Mechanical Stretch and Monocyte Recruitment  
Michael Valentine¹, Joseph Herbert¹, Franck Kamga Gnizeko¹, Matthew Schneck¹, Angela Reynolds¹, and Rebecca Heise¹  
¹Virginia Commonwealth University, Richmond, VA

9:15 am  
VE-cadherin Signals and Substrate Stiffness Regulate Force Transduction Through Endothelial Monolayers  
Robert Andresen Eguiluz¹, Mohammed Munim¹, and Deborah Leckband¹  
¹University of Illinois at Urbana-Champaign, Urbana, IL

OP–Fri–1–12  
Room 200F  
Track: Nano and Micro Technologies  
Drug Screening Technologies  
Chairs: Nilay Chakraborty, Jacqueline Linnes

8:00 am  
Therapeutic Drug Monitoring of Antibiotics and Antifungals from Serum Using SERS  
Adam Berger¹ and Ian White¹  
¹University of Maryland, College Park, College Park, MD

8:15 am  
Droplet-on-demand Platform for Combinatorial Screening of Drugs in C. elegans  
Guillaume Aubry¹ and Hang Lu¹  
¹Georgia Institute of Technology, Atlanta, GA

8:30 am  
A Bioengineered Multi-organoid Body-on-a-Chip Platform for Advanced Drug Screening  
Mahesh Devarasetty¹, Steven Forsythe¹, Sean Murphy¹, Thomas Shupe¹, Sang-Jin Lee¹, John Jackson¹, James Yoo¹, Shary Soket¹, Colin Bishop¹, Anthony Atala¹, and Aleksander Skarda¹  
¹Wake Forest School of Medicine, Winston-Salem, NC

8:45 am  
Collagen Microtissues Facilitate Large-scale Studies of Cell-matrix Interactions  
Alexandra Crampton¹, Marie-Elena Brett¹, and David Wood¹  
¹University of Minnesota, Minneapolis, MN

9:00 am  
Point-of-Detection Single-Cell Microchip for High-Throughput, Multiplexed Analysis of Cancer Cells  
Jun Wang¹  
¹SUNY Albany, Albany, NY
9:15 am
Anaerobic Conditions Reduce Damage to Red Blood Cells during Hypothermic Storage
Nathaniel Piety1, Julianne Stutz1, Nida Yilmaz1, Hui Xia1, Tatsuro Yoshida2, and Sergey Shevkoplyas1
1University of Houston, Houston, TX, 2New Health Sciences Inc., Bethesda, MD

OP–Fri–1–13
Room 200D
Track: Biomedical Imaging and Optics
Molecular Imaging

Chairs: Santosh Aryal, Rui Pereira

8:00 am
Development of a Protease-Activatable Nanoprobe for Molecular Imaging with Dual Energy CT
Jeffrey Ashton1, Cristian Badea2, and Jennifer West1
1Duke University, Durham, NC, 2Duke University Medical Center, Durham, NC

8:15 am
Using Indocyanine Green as a Control Agent in Paired-agent Fluorescence Imaging for Sentinel Lymph Node Metastases Detection
Chengyue Li1, Xiaochun Xu1, and Kenneth M. Tichauer1
1Illinois Institute of Technology, Chicago, IL

8:30 am
High-Definition Infrared Spectroscopic Imaging: Towards Automated Cancer Histopathology
Shachi Mittal1, Tomasz Wrobel2, L. Suzanne Leslie2, Andre Kadjacsy Balla3, and Rohit Bhargava1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Beckman Institute for Advanced Science and Technology, Urbana, IL, 3University of Illinois at Chicago, Chicago, IL

8:45 am
Exploratory Spectral Analysis for Comparison of High-Definition Infrared Imaging of Colon Samples with Standard-Definition Fourier Transform Infrared Imaging
Suamya Tiwari1, Shachi Mittal1, Tomasz Wrobel2, and Rohit Bhargava1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Beckman Institute for Advanced Science and Technology, Urbana, IL

9:00 am
High Speed and High Definition Characterization of Prostate Cancer By Infrared Spectroscopic Imaging
Tomasz Wrobel1, Andre Kadjacsy-Balla2, and Rohit Bhargava1
1University of Illinois, Urbana, IL, 2University of Chicago, Chicago, IL

9:15 am
Chemical Imaging of the Tumor Microenvironment with ToF-SIMS
Lara Gamble1, Blake Bluestein1, Daniel Graham1, Fionnuala Morrish2, David Hockenbury2, and Peggy Porter2
1University of Washington, Seattle, WA, 2Fred Hutchinson Cancer Research Center, Seattle, WA

OP–Fri–1–14
Room 200G
Track: Translational Biomedical Engineering
Micro/Nano Tools in Medicine

Chairs: Xuanhong Cheng, Shannon Weigum

8:00 am
Translating and Commercializing Biophotonics Imaging Technologies for Point-of-Care Devices—INVITED
Stephen Boppart1
1University of Illinois at Urbana-Champaign, Urbana, IL

8:30 am
Point-of-Care Compatible Sustained-Release Synthetic Biomarkers to Monitor Imminent Onset of Disease
Jaideep Dudani1, Colin Buss1, Reid Akana1, Gabriel Kwong2, and Sangeeta Bhatia1
1Massachusetts Institute of Technology, Cambridge, MA, 2Georgia Institute of Technology, Atlanta, GA

8:45 am
Point-of-care Diagnosis of M. Tuberculosis using Combined Immunomagnetic Enrichment and Acid-fast Staining
Nishal Shah1
1University of Pennsylvania, Philadelphia, PA

9:00 am
Rapid Screening/Diagnosis of Tuberculosis from Breath Using Functionalized TiO2 Nanotube Array Sensing Platform
Dhiman Bhattacharyya1, Mano Misra1, and Swomitra Mohanty2
1University of Utah, Salt Lake City, UT

9:15 am
Label-free Field Screening of Schistosoma haematobium Eggs in Urine Samples Using a Cost-effective Smartphone Based Microscope
Hatrice Ceylan Koydemir1, Isaac I. Bogoch2, Derek Tseng1, Richard K.D. Ephraim1, Evans Duah3, Joseph Tee4, Jason R. Andrews5, and Aydogan Ozcan1
1University of California Los Angeles, Los Angeles, CA, 2University of Toronto, Toronto, Canada, 3University of Cape Coast, Ghana, Ghana, 4Volta River Authority, Ghana, Ghana, 5Stanford University, Stanford, CA

OP–Fri–1–15
Room 200C
Tracks: Biomechanics, Bioinformatics, Computational and Systems Biology
Computational and Multiscale Modeling in Biomechanics I

Chairs: Taeyoon Kim, Siqi Wang

8:00 am
Subject-Specific Models to Predict Ankle Kinematics with Dual-Fluoroscopy as a Reference Standard
Jennifer Nichols1, Koren Roach1, Niccolo Fiorentino1, and Andrew Anderson1
1University of Utah, Salt Lake City, UT
8:15 am  
Frequency-Dependent Penetration of Vibrotactile Stimulus In The Pacinian Corpuscle  
Julia Quindlen¹, Burak Guclu², Eric Schepis³, and Victor Barocas¹  
¹University of Minnesota, Minneapolis, MN, ²Bogaziçi University, Istanbul, Turkey, ³Syracuse University, Syracuse, NY

8:30 am  
A Chemo-Mechanical Computational Model for Cancer Cell Invasion in Stroma  
Hossein Ahmadzadeh¹, Marie Webster¹, Ashani Weeraratna¹, and Vivek Shenoy¹  
¹University of Pennsylvania, Philadelphia, PA

8:45 am  
A Predictive Multiscale Model of Simulating Shear-Induced Platelet Activation  
Peng Zhang¹, Chao Gao¹, Jawaad Sheriff¹, Marvin Slepian², Yuefan Deng¹, and Danny Bluestein¹  
¹Stony Brook University, Stony Brook, NY, ²University of Arizona, Tucson, AZ

9:00 am  
Tuning the Force Sensitivity of a Force Transducer at Intercellular Cadherin Adhesions  
Deborah Leckband¹, Samantha Barrick¹, Jing Li¹, Alokananda Ray¹, and Emad Tajkhorshid¹  
¹University of Illinois, Urbana, IL

9:15 am  
A Bio-chemo-mechanical Model for Nuclear Mechanics During Cell Transmigration  
Xuan Cao¹, Emad Moeendarbary², Philipp Isermann³, Patricia Davidson³, Anya Burkart², Jan Lammerding³, Roger Kamm², and Vivek Shenoy¹  
¹University of Pennsylvania, Philadelphia, PA, ²Massachusetts Institute of Technology, Cambridge, MA, ³Cornell University, Ithaca, NY

8:45 am  
Physicochemical and Biological Factors in Drug Eluting Stent Design—INVITED  
Yen-Lane Chen¹  
¹Boston Scientific, New Brighton, MN

9:00 am  
Engineering Antibody Fabs for Long Acting Delivery to the Eye—INVITED  
Devin Tesar¹  
¹Genentech, South San Francisco, CA

OP–Fri–1–17  
Room 200B  
Track: Device Technologies and Biomedical Robotics

Wearable Sensors and Devices  
Chairs: Walt Baxter, Gary Brooking

8:00 am  
Flexible Electronics and Data Interpretation Methods for Physiologic Monitoring—INVITED  
Todd Coleman¹  
¹University of California, San Diego, La Jolla, CA

8:30 am  
MouthLab Tricorder Is Optimized for Rapid Medical Assessment  
Jianzhou Xu¹, Yuankui Zhu¹, Hai Tang¹, Yang Hong¹, David Feller-Kopman¹, and Gene Fridman¹  
¹Johns Hopkins University, Baltimore, MD

8:45 am  
Development of a Reverse Iontophoresis Based Noninvasive Real Time Transdermal Biomarker Sensing Platform  
Niraj K. Gupta¹, Yongsoon Hwang¹, and Brent D. Cameron¹  
¹University of Toledo, Toledo, OH

9:00 am  
A Wearable Wireless Multiple-Lead ECG Sensor Embedded in a Flexible Finger Ring  
Quan Dong¹, Mona Zaghoul¹, and Zhenyu Li¹  
¹George Washington University, Washington, DC

9:15 am  
Clinical Validation of a New Consumer Sleep Monitoring Device  
Erik Zavrel¹  
¹Cornell University, New York, NY
MEET THE EXPERT
8:00 am–9:30 am
Room 204

Collaborations for International Research
Organized by Dr. Jerry S.H. Lee, Deputy Director for Cancer Research and Technology, White House Cancer Moonshot Task Force

With advanced technologies shrinking the hurdles associated with conducting research in a global community, the need to develop and sustain international collaborations is critical for 21st century science. Panelists will share experiences developing, sustaining, and supporting international collaborations.

Panel Members:

• Owen McCarty, PhD FAHA, Professor & Interim Chair of Biomedical Engineering, Oregon Health & Science University
• Paul Pearlman, Science Policy Advisor, National Institutes of Health, National Cancer Institute, Center for Global Health
• Ryan Pawell, Founder and CEO of Indee
• Syril D. Pettit, Executive Director, Health and Environmental Sciences Institute (HESI)

SPECIAL SESSION
8:00 am–9:30 am
Room 208AB

JOINT AAA-BMES SYMPOSIUM:
Genome Editing Strategies in Bioengineering

Chairs: Lynne Opperman, Geert Schmid-Schonbein

8:00 am
Precision Genome Editing for Treating Single-gene Disorders
Ciaran Lee1 and Gang Bao1
1Rice University, Houston, TX

8:20 am
New MicroRNA Biotechnology to Inhibit Inflammation and Regenerate Bone
Brad Amendt1
1Craniofacial Anomalies Research Center, University of Iowa Carver College of Medicine

8:40 am
Using CRISPR-Cas9 to Unravel the Role of Glycans during Human Leukocyte-Endothelial Cell Adhesion
Sriram Neelamegham1
1State University of New York, Buffalo, NY

9:00 am
Mouse Models of Human Genetic Diseases Created by CRISPR/Cas9-mediated Genomic Engineering
Yongbo Lu1
1Department of Biomedical Sciences, Texas A&M University College of Dentistry, Dallas TX
SPECIAL SESSION

8:00 am–9:30 am  Room 200J

Whitaker Session
Chair: Amie Schaefer
Program Officer, Whitaker International Program Institute of International Education

Joseph Yu
Whitaker International Fellow, 2013
Host Institution: Imperial College London, UK
Topic: Comprehensive Training in Cardiovascular Research and Biomedical Engineering Entrepreneurship

Brandan Walters
Whitaker International Fellow, 2014
Host Institution: Eberhard Karls University of Tubingen, Germany
Topic: Quantifiably Controlling Mesenchymal Stem Cell Morphology by Application of Tuned Cyclic Strain and the Effects of These Changes on Smooth Muscle Cell Differentiation

Erin Coonahan
Whitaker International Fellow, 2013
Host Institution: Engineering World Health, Honduras
Topic: Technician Training Programs to Improve Access to Healthcare in Honduras

Colin Hisey
Whitaker International Fellow, 2015
Host Institution: University of Navarra, Spain
Topic: A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures

Alisha Geldert
Whitaker International Fellow, 2015
Host Institution: National University of Singapore
Topic: Investigation of Aptamer-based Sensing for Malaria Detection

INDUSTRY SESSION–SBIR/STTR

8:00 am–9:00 am  Room 201

Chairs: Ben Noe

This panel will give an overview of SBIR and STTR grants, including requirements, how to apply, best practices to consider, and watch outs to avoid.

INDUSTRY SESSION–Reimbursement

9:15 am–10:15 am  Room 201

Chairs: Ben Noe

This panel will discuss the current landscape and policies surrounding reimbursement for drugs, devices, procedures, and therapies and its impact on manufacturers.

INDUSTRY SESSION

12:00 noon–1:30 pm  Room 201

Healthcare Innovations with Physicians
Chair: Ben Noe

One of the challenges in biomedical engineering careers is developing an understanding of current and anticipated unmet clinical needs, and how to address those needs with existing and new technologies. The audience will be treated to a detailed view, from clinicians, on how real-world problems in orthopedics, neurology, and transplantation can be addressed with biomedical engineering solutions.
<table>
<thead>
<tr>
<th>Time</th>
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<th>Location</th>
<th>Title</th>
<th>Chairs</th>
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<tbody>
<tr>
<td>1:45 pm</td>
<td>Exercise Increases the Population of Myofibroblasts and Enhances the Pericellular Matrix in Fatigue Damaged Tendons</td>
<td>Auditorium 1</td>
<td>Rebecca Bell1, N. Remi Gendron2, Matthew Anderson2, Evan L. Flatow2, and Nelly Andarawis-Puri1</td>
<td>Cornell University, Ithaca, NY; Cahn School of Medicine at Mount Sinai, New York, NY</td>
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<tr>
<td>2:00 pm</td>
<td>Effects of Mechanical Stimulation on Collagen Synthesis in Aged Human Dermal Fibroblasts</td>
<td>Auditorium 1</td>
<td>Arabet De Jesus1, Sathivel Chinnathambi1, Mariam El-Hattab1, Douglas Henstrom1, and Edward Sander1</td>
<td>University of Iowa, Iowa City, IA</td>
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<tr>
<td>2:15 pm</td>
<td>Piezo1 Regulates Mechanotransductive Release of ATP from Human RBCs</td>
<td>Auditorium 1</td>
<td>Jiandi Wan1, Eyup Cinar1, Sitong Zhou1, James DeCourcey1, Yixuan Wang2, and Richard Waugh3</td>
<td>Rochester Institute of Technology, Rochester, NY; University of Science and Technology, Beijing, China, People’s Republic of; University of Rochester, Rochester, NY</td>
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<tr>
<td>2:30 pm</td>
<td>Improving the Contractile Properties of Mesenchymal Stem Cells by Expressing NANOG</td>
<td>Auditorium 1</td>
<td>Aref Shahini2, Fanagiotis Mistriotis2, Mohammadnabi Asmani2, Ruogang Zhao2, and Stelios Andreadi2</td>
<td>University at Buffalo, The State University of New York, Buffalo, NY</td>
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<tr>
<td>2:45 pm</td>
<td>Keratin 8/18 Regulation of Collective Epithelial Cell Contractility</td>
<td>Auditorium 1</td>
<td>Francois Bordeleau1, Charles-Antoine Lamontagne2, Cynthia Reinhart-King1, Yves De Koninck2, and Normand Marceau2</td>
<td>Cornell University, Ithaca, NY; Université Laval, Quebec, QC, Canada</td>
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<tr>
<td>3:00 pm</td>
<td>Epidermal Growth Factor Receptor Mediates E-cadherin Force Transduction in Epithelia</td>
<td>Auditorium 1</td>
<td>Deborah Leckband1, Ismaeel Muhamed1, Jun Wu1, Poonam Sehgal1, and Xinyu Kong1</td>
<td>University of Illinois, Urbana, IL</td>
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<tr>
<td>1:45 pm</td>
<td>Single Cell Cytokine Analysis of Circulating Hematopoietic Cells in Myeloproliferative Diseases</td>
<td>Auditorium 2</td>
<td>Rong Fan1</td>
<td>Yale University, New Haven, CT</td>
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<tr>
<td>2:00 pm</td>
<td>Detection of an Ovarian Cancer Biomarker Via an Implantable Single-Walled Carbon Nanotube Biosensor</td>
<td>Auditorium 2</td>
<td>Ryan Williams1, Christopher Lee1, Thomas Galassi2, Maria Sireno1, Janki Shah1, Jackson Harvey2, Douglas Levine1, and Daniel Heller1</td>
<td>Memorial Sloan Kettering Cancer Center, New York, NY; Weill Cornell Medicine, New York, NY</td>
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<tr>
<td>2:15 pm</td>
<td>Isolation and Molecular Profiling of Tumor-specific Extracellular Vesicles Using Microfluidic Technologies</td>
<td>Auditorium 2</td>
<td>Eduardo Reategui1, Kristian van der Vos2, Charles P. Lai3, Mahnaz Zeinali1, Leonor Balaj1, David T. Ting2, Brian V. Nahed1, Xandra O. Breakefield1, and Shannon L. Stott1</td>
<td>Center for Engineering in Medicine, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA; Massachusetts General Hospital Cancer Center, Harvard Medical School, Charlestown, MA; Department of Neurology, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA; Department of Medicine, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA; Massachusetts General Hospital Brain Tumor Center/Pappas Center for Neurooncology, Boston, MA</td>
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<tr>
<td>2:30 pm</td>
<td>Microfluidic Digital Melt Array for Accessing Rare Methylation Biomarkers in Cancer</td>
<td>Auditorium 2</td>
<td>Christine O’Keefe1, Thomas Pisanic1, Pornpat Athamanolop1, Helena Zec1, and Tza-Huei Wang1</td>
<td>Johns Hopkins University, Baltimore, MD</td>
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<tr>
<td>2:45 pm</td>
<td>Rapid Microfluidic Analysis Of Primary Tumor Cell Viscoelasticity</td>
<td>Auditorium 2</td>
<td>Lionel Guillou1, Joanna Dahl2, Jung Ming Lin2, Abdul Barakat1, Julien Husson1, Susan Muller2, and Sanjay Kumar2</td>
<td>Ecole Polytechnique, Palaiseau, France; UC-Berkeley, Berkeley, CA</td>
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<tr>
<td>3:00 pm</td>
<td>Adhesion-based Tumor Cells Capture Using Nanotopography</td>
<td>Auditorium 2</td>
<td>Lin Shi1, Kai Wang1, and Yong Yang1</td>
<td>West Virginia University, Morgantown, WV</td>
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### OP–Fri–2–3  
**Tracks: Biomechanics, Neural Engineering**  
**Traumatic Brain Injury Biomechanics & Repair**

**Chairs:** Liying Zhang, Deva Chan  

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<tr>
<th>Time</th>
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<th>Authors</th>
<th>Affiliations</th>
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<tbody>
<tr>
<td>1:45 pm</td>
<td>Biomechanical Response, Neuropathology and Biomarker Expression in an Experimental Model of Traumatic Brain Injury—INVITED</td>
<td>Liying Zhang(^1), John Cavanaugh(^1), Yan Li(^1), and Srinivas Kallakuri(^1)</td>
<td>(^1)Wayne State University, Detroit, MI</td>
</tr>
<tr>
<td>2:00 pm</td>
<td>The Spatial and Temporal Deformation Pattern of the Brain from Blunt Trauma</td>
<td>Brian Swenson(^1), Chen Miao(^1), Namas Chandra(^1), and Bryan Pfister(^1)</td>
<td>(^1)New Jersey Institute of Technology, Newark, NJ</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>Quantifying Hypothermia Treatment Efficacy on 3D Neuronal Cultures Following Traumatic Brain Injury</td>
<td>Mark Scimone(^1,2), Alana Levine(^1), Jonathan Estrada(^2), Harry Cramer(^1,2), Paul Hopkins(^1,2), and Christian Franck(^1,2)</td>
<td>(^1)Center for Biomedical Engineering, Brown University, Providence, RI, (^2)School of Engineering, Brown University, Providence, RI</td>
</tr>
<tr>
<td>2:30 pm</td>
<td><em>In Situ</em> Estimation of Strain Thresholds for Axon Failure as a Function of Macrosopic Stretch</td>
<td>Sagar Singh(^1), Assimina Pelegri(^1), and David Shreiber(^1)</td>
<td>(^1)Rutgers University, Piscataway, NJ</td>
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<tr>
<td>2:45 pm</td>
<td>Comparative Modeling of Blast- and Impact-Induced Traumatic Brain Injury</td>
<td>Andrew Fisher(^1), Olga Minaeva(^1), Chad Tagge(^1), Mark Wojnarowicz(^2), Amanda Gaudreau Balderrama(^1), Juliet Moncaster(^2), Noel Casey(^2), Robin Cleveland(^3), Andrew Anderson(^1), William Moss(^4), Ann McKeever(^5,5), and Lee Goldstein(^1,2)</td>
<td>(^1)Boston University, Boston, MA, (^2)Boston University School of Medicine, Boston, MA, (^3)University of Oxford, Oxford, United Kingdom, (^4)Lawrence Livermore National Laboratory, Livermore, CA, (^5)Boston VA Healthcare System, Jamaica Plain, MA</td>
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<tr>
<td>3:00 pm</td>
<td>A Smart Helmet Based On Wearable MEMS Sensors and A Soft Airbag To Prevent Head Trauma</td>
<td>Mehmet Kurt(^1), Neil Hildick Smith(^1), Michael Fanton(^1), and David Camarillo(^1)</td>
<td>(^1)Stanford University, Stanford, CA</td>
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### OP–Fri–2–4  
**Tracks: Cardiovascular Engineering, Tissue Engineering**  
**Cardiovascular Tissue Engineering III**

**Chairs:** Brenda Ogle, Pinar Zorlutuna  

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<th>Time</th>
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<tr>
<td>1:45 pm</td>
<td>Tissue Engineered Models for Characterizing Vascular Mechano-Adaptation—INVITED</td>
<td>Patrick Alford(^1), Zaw Win(^1), Kerianne Steucke(^1), and Eric Haid(^1)</td>
<td>(^1)University of Minnesota, Minneapolis, MN</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>Development of Novel Antioxidant-Nitric Oxide Donor Hybrid Compound and Its Carrier for PAD Treatment</td>
<td>Duong Le(^1), Aneetta Kuriakose(^1), Suchismita Acharya(^1), and Kytai Nguyen(^1)</td>
<td>(^1)University of Texas at Arlington, Arlington, TX</td>
</tr>
<tr>
<td>2:30 pm</td>
<td>Mechanocompatible Polymer-Extracellular Matrix Composites for Vascular Tissue Engineering</td>
<td>Bin Jiang(^1), Rachel Suen(^1), Jiao-Jing Wang(^2), Zheng Zhang(^2), Jason Wertheim(^2), and Guillermo Ameer(^1)</td>
<td>(^1)Northwestern University, Evanston, IL, (^2)Northwestern University, Chicago, IL</td>
</tr>
<tr>
<td>2:45 pm</td>
<td>Injectable Hydrogels as a Regenerative Medicine Therapy for Peripheral Arterial Disease</td>
<td>Abbygail Foster(^1), Lei Cai(^1), Ruby Dewi(^1), Zachary Strassberg(^1), Ngan Huang(^1), and Sarah Heilshorn(^1)</td>
<td>(^1)Stanford University, Stanford, CA</td>
</tr>
<tr>
<td>3:00 pm</td>
<td>Exercise-Induced iPS-based Disease Modeling of Human Hypertrophic Cardiomyopathies</td>
<td>Zhen Ma(^1), Sangmo Koo(^1), Mohammad Mandegar(^2), Nathaniel Huebsch(^2), Brian Siemons(^1), Costas Grigoropoulos(^1), Bruce Conklin(^2), and Kevin Healy(^1)</td>
<td>(^1)University of California, Berkeley, Berkeley, CA, (^2)Gladstone Institute, San Francisco, CA</td>
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### OP–Fri–2–5  
**Track: Biomaterials**

**Biomaterials for Immunoengineering II**

**Chairs:** Ioannis Zervantonakis, Jungwoo Lee  

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<th>Time</th>
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<tr>
<td>1:45 pm</td>
<td>Improved Deliveries of Anti-Cancer Immunogenic Factors Using Magnetically Responsive Biomaterials</td>
<td>Anita Tolouei(^1) and Stephen Kennedy(^1)</td>
<td>(^1)University of Rhode Island, Kingston, RI</td>
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<tr>
<td>2:00 pm</td>
<td>Dendritic Cells Treated with Extracellular Indoleamine 2,3 Dioxynogenase Maintain an Immature Phenotype and Suppress Antigen-specific T cell Proliferation</td>
<td>Evelyn Bracho-Sanchez(^1), Azadeh Hassanazadeh(^1), Mark Wallet(^1), and Benjamin Keselowsky(^1)</td>
<td>(^1)University of Florida, Gainesville, FL</td>
</tr>
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2:15 pm  
Combination Nanovaccine Induces Rapid Protective Immunity against Yersinia pestis  
Sean Kelly¹, Danielle Wagner-Muniz², Thomas Dubensky², Bryan Bellerire³, Michael Wannemuehler¹, and Balaji Narasimhan¹  
¹Iowa State University, Ames, IA, ²Aduro Biotech, Berkeley, CA

2:30 pm  
Keratin Biomaterials Augment Anti-Inflammatory Macrophage Phenotype In-Vitro  
Michele Waters¹, Pamela Vandevord¹, and Mark Van Dyke¹  
¹Virginia Tech, Blacksburg, VA

2:45 pm  
The Effect of Substrate Rigidity on Induction of Regulatory T cells from Conventional T cells  
Neha Nataraj¹, Joong-Hyun Lee¹, Alex Dang¹, and Lance Kam¹  
¹Columbia University, New York, NY

3:00 pm  
Serum Albumin Controls Charge-Mediated Adhesion and Isolation of Cancer Cells and Leukocytes Under Flow  
Michael Mitchell¹, Carlos Castellanos², and Michael King²  
¹MIT, Cambridge, MA, ²Cornell University, Ithaca, NY

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

OP–Fri–2–6  
Room 101A  
OP–Fri–2–7

OP–Fri–2–6  
Room 101A

Track: Cellular and Molecular Bioengineering  
Gene Delivery and Genome Bioengineering

Chairs: Angela Pannier, Pablo Perez-Pinera

1:45 pm  
Biologics Delivery to the Central Nervous System: Tools for In Vivo Cell Engineering—INVITED  
Suzie Pun¹, Drew Sellers¹, Yilong Cheng¹, Kevin Tan¹, David Peeler¹, and Philip Horner²  
¹University of Washington, Seattle, WA, ²Houston Methodist, Houston, TX

2:00 pm  
Optimization of RNAi Nanomedicines for Breast Tumor Therapy—INVITED  
Craig Duvall¹, Samantha Sarett¹, Thomas Werfel¹, Meredith Jackson¹, Taylor Kavanaugh¹, Todd Giorgio¹, Dana Brantley-Sieders¹, and Rebecca Cook¹  
¹Vanderbilt University, Nashville, TN

2:15 pm  
Genome Editing to Correct Duchenne Muscular Dystrophy—INVITED  
Charles Gersbach¹, Christopher Nelson¹, and Jacqueline Robinson-Hamm¹  
¹Duke University, Durham, NC

2:30 pm  
Exploring The Effect of Chromatin State On CRISPR/Cas9 Activity  
Ciaran M Lee¹, Timothy H Davis¹, Yidan Pan¹, Harshavardhan Deshmukh¹, and Gang Bao¹  
¹University of Houston, Houston, TX

2:45 pm  
Development of Photoactivatable CRISPR-plus Technology  
Piyush K. Jain¹, Vyas Ramanan¹, Arnout G. Schepers¹, Nisha S. Dalvie¹, Apeksha Panda¹, Heather E. Fleming¹, and Sangeeta N. Bhatia¹,²,³,⁴  
¹Massachusetts Institute of Technology, Cambridge, MA, ²Department of Medicine, Brigham and Women’s Hospital, Boston, MA, ³Broad Institute, Cambridge, MA, ⁴Howard Hughes Medical Institute, Cambridge, MA

3:00 pm  
Point-of-Care Mutation Detection in Rare Genetic Disorders  
Michael Caplan¹, David Carpentieri², Mitchell Shub², Emily Thompson¹, Logan Taysom¹, Scott Johnson¹, Ryan Bath¹, Ryan Fisher¹, Alexander Carpentieri¹, and Theodore Hall¹  
¹Arizona State University, Tempe, AZ, ²Phoenix Children’s Hospital, Phoenix, AZ

OP–Fri–2–7  
Room 101B

Tracks: Cancer Technologies, Biomechanics  
Cancer Mechanobiology I

Chairs: Gabe Kwong, Scott Verbridge

1:45 pm  
Nuclear Rupture and Mechanics during Cancer Cell Migration in Confined Environments—INVITED  
Jan Lammerding¹  
¹Cornell University, Ithaca, NY

2:00 pm  
Extracellular Matrix Stiffness Regulates Tumor Vasculature Phenotype  
Francois Bordeleau¹, Brooke Mason¹, Emmanuel Lollis¹, Michael Mazzola¹, Sahana Somasegar¹, Joseph Califano¹, Christine Montague¹, Danielle LaValley¹, John Huynh¹, Yashira Negron Abril¹, Robert Weiss¹, Lawrence Bonassar¹, Jonathan Butcher¹, and Cynthia Reinhart-King¹  
¹Cornell University, Ithaca, NY

2:15 pm  
A Bulky Glycocalyx Drives Proliferation in the Metastatic Niche  
Elliot Woods¹  
¹UC Berkeley, Burlingame, CA

2:30 pm  
Cancer-Associated Fibroblasts Exhibit Stiffness Dependent Matrix Deformations and Vascularization Potential  
Mary Kathryn Sewell-Loftin¹, Taylor Hughes¹, Elizabeth Crist¹, Samantha van Hove¹, Gregory Longmore¹, and Steven George¹  
¹Washington University in St. Louis, St. Louis, MO
2:45 pm  
**HEMICA-Hydrogel Encapsulated Micro-channel Array In Cancer Metastasis**  
Alexandros Afthinos¹, Runchen Zhao¹, Adam Suppes¹, and Konstantinos Konstantopoulos¹  
¹The Johns Hopkins University, Baltimore, MD

3:00 pm  
**Stiffness-Induced Evolution of EGF and Integrin Signaling Alters Cancer Cell Motility via Calpain 2**  
Alyssa Schwartz², Christopher Hall¹, and Shelly Peyton¹  
¹University of Massachusetts Amherst, Amherst, MA

### OP-Fri-2-8  
**Track: Biomechanics**

#### Injury Biomechanics II

**Chairs:** Jaydip Desai, Matthew Fisher

1:45 pm  
**Changing Fibrous Architecture of The Periodontal Ligament Due to Periodontitis Modeled With A Transverse Isotropic Hyperelastic Model**  
David Nedrelow¹ and Victor Barocas¹  
¹University of Minnesota, Minneapolis, MN

2:00 pm  
**Evaluation of Brain Response Following Head Impact in Youth Athletes Using an Anatomically Accurate Finite Element Model**  
Logan Miller¹,², Mireille Kelley¹,³, Derek Jones¹,³, Jillian Urban¹,³, Steven Rowson¹,⁴, and Joel Sitzel¹,³  
¹Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²Wake Forest University School of Medicine, Winston Salem, NC, ³Wake Forest University School of Medicine, Winston-Salem, NC, ⁴Virginia Tech, Blacksburg, VA

2:15 pm  
**Characterization of Thoracic Loading as a Result of Same Level Forward Braking**  
Stephanie Beeman¹ and Andrew Kemper¹  
¹Virginia Tech, Blacksburg, VA

#### Thoracoabdominal Injury Risk in a Human Model as Result of Pre-Crash Braking

2:30 pm  
**Lego-inspired Organ-on-a-Chip Gelatin Methacryloyl Microfluidic System**  
Julio Aleman¹,²,³, Yu Shrike Zhang⁴,⁵, Aleksander Skardal⁶,⁷, and Ali Khademhosseini⁸,⁹  
¹Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, ²Wake Forest School of Medicine, Winston Salem, NC, ³Biomaterials Innovation Research Center, Cambridge, MA, ⁴Harvard-MIT Division of Health Sciences and Technology, Cambridge, MA, ⁵Wyss Institute for Biologically Inspired Engineering, Boston, MA, ⁶Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston Salem, NC, ⁷Comprehensive Cancer Center of Wake Forest University School of Medicine, Winston Salem, NC

2:45 pm  
**Investigation of CSF Cavitation As An Injury Mechanism Of Traumatic Brain Injury**  
Allen Yu¹, Barclay Morrison III², David Meaney³, and Cameron Bass³  
¹Duke University, Durham, NC, ²Columbia University, New York, NY, ³University of Pennsylvania, Philadelphia, PA

3:00 pm  
**Development and Validation of Infant Skull Fracture Predictors for Low-Height Falls**  
Marzieh Memari¹, Brittany Coats², Ingrid Lan¹, Sarah Sullivan¹, and Susan Margulies¹  
¹University of Pennsylvania, Philadelphia, PA, ²University of Utah, Salt Lake City, UT

### OP-Fri-2-9  
**Room 101D**

**Tracks: Tissue Engineering, Nano and Micro Technologies**

#### Organ-on-Chip Models for Study of Disease and Drug Discovery I

**Chairs:** Yaakov Nahmias, Salman Khetani

1:45 pm  
**Microengineered Physiological Biomimicry: Human Organs-on-Chips—INVITED**  
Dan Dongeun Huh¹  
¹University of Pennsylvania, Philadelphia, PA

2:15 pm  
**Real-Time Monitoring of Metabolic Function In Liver-On-Chip Microdevices Tracks The Dynamics Of Mitochondrial Dysfunction**  
Danny Bavli¹, Sabina Tsytkin-Kirschenzweig¹, Sebastian Prill², Elishai Ezra³, Magnus Jaeger²,³, and Yaakov Nahmias¹  
¹The Hebrew University of Jerusalem, Jerusalem, Israel, ²Fraunhofer Institute for Cell Therapy and Immunology, Potsdam, Germany, ³Federal Institute for Risk Assessment, Berlin, Germany

2:30 pm  
**Human Pulmonary Thrombosis-on-a-Chip**  
Abhishek Jain¹,²,³, Riccardo Barriell⁴, Andries van der Meer¹, Akiko Mamamoto³, Karen De Ceunynck², Omozaanvbo Aisiku², Monich Otiene³, Calvert Louden³, Geraldine Hamilton⁴, Robert Flaumenhaft², and Donald Ingber¹,³,⁷  
¹Wyss Institute for Biologically Inspired Engineering at Harvard University, Boston, MA, ²Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, ³Boston Children’s Hospital, Harvard Medical School, Boston, MA, ⁴Cedar Sinai Medical Center, Los Angeles, CA, ⁵Janssen Pharmaceutical Research and Development, Spring House, PA, ⁶Emulate Inc., Boston, MA, ⁷Harvard Paul A. Johnson School of Engineering, Cambridge, MA
3:00 pm
Miniaturized iPS-Cell Derived Micro-Heart Muscles for Physiologically Relevant Drug Response Analyses
Nathaniel Huebch1,2, Nikhil Deveshwar3, Peter Loskill3, Zhen Ma3, Luke Judge1,2, Mohammed Mandegar1, Casey Gifford3, Tamer Mohammed4, Anurag Mathur3, Annie Truong4, Cade Fox5, Po-Lin So5, Kathryn Ivey6, Tejal Desai6, Kevin Healy5, and Bruce Conklin1,2
1Gladstone Institute of Cardiovascular Disease, San Francisco, CA, ²University of California, San Francisco, San Francisco, CA, ³University of California, Berkeley, Berkeley, CA

OP–Fri–2–10
Room 101E
Track: Biomaterials*

Biomaterials for Probing the Biological Functions of the Glycocalyx—INVITED
Kamil Godula1
1University of California, San Diego, La Jolla, CA

2:15 pm
A Simple and Scalable Method To Retrieve Natural Mucin For Functional Reconstitution Of Mucosal Barrier
Abhinav Sharma2, Neil Forbes2,3, and Jungwoo Lee1,2,3
1University of Massachusetts Amherst, Amherst, MA, 2Institute for Applied Life Sciences, Amherst, MA, 3Molecular and Cellular Biology Graduate Program, Amherst, MA

2:30 pm
Design and Synthesis of Di-Block Copolymer for Boundary Lubrication of Articular Cartilage
Zhexun Sun1, Elizabeth Feeney1, Sierra Cook1, Can Zhou1, Ya Guan1, Delphine Gourdon1, Lawrence Bonassar1, and David Putnam1
1Cornell University, Ithaca, NY

2:45 pm
Synthetic Communication Between Artificial and Natural Cells
Yunfeng Ding1, Eliza Morris1, and Cheemeng Tan1
1University of California Davis, Davis, CA

3:00 pm
Fibrin and Fibrinogen Differentially Regulate Macrophage Inflammatory Activation
Jessica Hsieh1,2, Thi Tran1,2, Elliot Botvinick1,2, and Wendy Liu1,2
1University of California, Irvine, Irvine, CA, 2Edwards Life-sciences Center for Advanced Cardiovascular Technology, Irvine, CA

* Biomaterials Track sponsored by

OP–Fri–2–11
Room 200E
Track: Neural Engineering

Neural Disease
Chairs: Xiaopeng Zhao, Levi Wood

1:45 pm
Biological Ice-Nine: Resolving The Structural Conversion, Aggregation and Neurotoxicity Of Prion Proteins at the Single Molecule Level
Chi-Fu Yen1, Dilsan Harischandra1, Anumantha Kanthasamy1, and Sanjeevi Sivasankar1
1Iowa State University, Ames, IA

2:00 pm
Deep Brain Stimulation Recorrelates Cortical Beta Power with Gait Speed in a Parkinsonian Rat Model
Christian Polar1, Alan Dorval1, and Mark Lehmkuhle1
1University of Utah, Salt Lake City, UT

2:15 pm
Gender Differences Identify Inflammatory Cytokines Correlated with Alzheimer’s Disease Severity
Levi Wood1, Johnathan Long1, and Michael Griffin1
1Georgia Institute of Technology, Atlanta, GA

2:30 pm
Modeling Neuropsychiatric Disorder Circuitry with Induced Neurons
Joseph Fantuzzo1, Lidia De Filippis2, Ronald Hart1, Zhiping Pang1, and Jeffrey Zahn1
1Rutgers University, Piscataway, NJ, 2Robert Wood Johnson Medical School, New Brunswick, NJ

2:45 pm
Reinforcement Learning for Phasic Disruption of Pathological Oscillations in a Model of Parkinson’s Disease
Logan Grado1, Matt Johnson1, and Tay Netoff1
1University of Minnesota, Minneapolis, MN

3:00 pm
Pericyte Viability and Inflammatory Response in Alzheimer’s and Diabetic Microenvironments
Laura Weinstock1, John Long1, and Levi Wood1
1Georgia Institute of Technology, Atlanta, GA

OP–Fri–2–12
Room 200F
Track: Cellular and Molecular Bioengineering

CMBE Young Innovators I
Chairs: Tejal Desai, Daniel Hammer, Michael King

1:45 pm
Drug-Eluting Conformal Coatings on Individual Cells—INVITED
Minglin Ma1
1Cornell University, Ithaca, NY
2:00 pm  
An Ecological Understanding of Quorum Sensing-Based Bacteriocin Synthesis—INVITED  
Ting Lu¹  
¹University of Illinois at Urbana-Champaign, Urbana, IL

2:15 pm  
Lipidoid Tail Structure Strongly Influences siRNA Delivery Activity—INVITED  
Christopher Knapp¹ and Kathryn Whitehead¹  
¹Carnegie Mellon University, Pittsburgh, PA

2:30 pm  
Interrogating Canonical Wnt Signaling Pathway in Human Pluripotent Stem Cell Fate Decisions using CRISPR-Cas9—INVITED  
Xiaojun Lian¹  
¹Penn State University, University Park, PA

2:45 pm  
Mechanisms of Reduced Astrocyte Surface Coverage in Cortical Cells on Nanoporous Gold Films—INVITED  
Christopher Chapman¹, Hao Chen¹, Marianna Stamou², Pamela Lein³, and Erkin Seker¹  
¹University of California, Davis, Davis, CA

3:00 pm  
Craig Duvall¹, Kameron Kilchrist¹, Brian Evans¹, and Colleen Brophy¹  
¹Vanderbilt University, Nashville, TN

OP-Fri-2-13  
Room 200D

Track: Bioinformatics, Computational and Systems Biology

Single-Cell Measurements and Models

Chairs: Benjamin Cosgrove, Amanda Randles

1:45 pm  
Loss of GDF11 Tumor Suppression by Intracellular Retention in Single Triple-negative Breast Cancer Cells—INVITED  
Sameer Bajikar¹, Chun-Chao Wang², Michael Borten¹, Kristen Atkins¹, and Kevin Janes¹  
¹University of Virginia, Charlottesville, VA, ²National Tsing Hua University, Hsinchu, Taiwan

2:15 pm  
Illumination of Muscle Stem Cell Functional Diversity from Hierarchically-Organized Single-Cell RNA-Sequencing  
Sharon Soueid-Baumgarten¹, Francis Chen¹, Brenton Munson¹, and Benjamin Cosgrove¹  
¹Cornell University, Ithaca, NY

2:30 pm  
Profiling Dense RNA Molecules in Single Cells by Correlation FISH  
Ahmet Coskun¹ and Long Cai¹  
¹California Institute of Technology, Pasadena, CA

2:45 pm  
Single-Cell Analyses Reveal Phenotypic and Functional Heterogeneity of Circulating Tfh cells in Human Systemic Lupus Erythematosus  
Rong Fan¹ and Jonathan Chen¹  
¹Yale University, New Haven, CT

3:00 pm  
Determining the Role of Fractional Occupancy in Single Cell Drug Response  
Matt Dubach¹, Katherine Yang¹, and Ralph Weissleder¹  
¹Harvard Medical School, Boston, MA

OP-Fri-2-14  
Room 200G

Track: Biomedical Engineering Education (BME)

Biomedical Design

Chairs: Matthew Glucksberg, Kathleen Sienko

1:45 pm  
Risk-free Student Self-Assessment of Design Projects  
Michael Caplan¹  
¹Arizona State University, Tempe, AZ

2:00 pm  
Incorporation of Needs Finding Improves Student Understanding in a Bioengineering Design Course  
Bilal Ghosn¹  
¹Rice University, Houston, TX

2:15 pm  
A Device to Simultaneously and Accurately Measure Heart Rate and Acceleration  
Rachel Yung¹, Michael Mudgett¹, and Eileen Haase¹  
¹Johns Hopkins University, Baltimore, MD

2:30 pm  
User-Centered Design in a Biomedical Engineering Module: Addressing Hearing Loss in the Elderly  
Nailah Conrad¹, Tinashe Mutsvangwa¹, Anastasia Doyle¹, and Tania Douglas¹  
¹University of Cape Town, Cape Town, South Africa

2:45 pm  
Teaching Engineering Design for Global Engagement: Understanding Constraint  
Russell Jamison¹  
¹Virginia Commonwealth University, Richmond, VA

3:00 pm  
Cross-Disciplinary Design Teams for Biomedical Engineering Design  
Conrad Zapanta¹, Wayne Chung¹, and Corrine Bacigal¹  
¹Carnegie Mellon University, Pittsburgh, PA
2:00 pm  
**Effect of NGF Delivering Conduit On Peripheral Nerve Regeneration**  
Pratima Labroo¹, Isak Goodwin¹, Brett Davis¹, Kyle Edwards¹, Scott Ho¹, Himanshu Sant¹, Bruce Gale¹, Jill Shea¹, and Jay Agarwal¹  
¹University of Utah, Salt Lake City, UT

2:15 pm  
**Implantable Devices for Drug Delivery: How Electric Fields Across Nanochannels Can Be Leveraged For Next Gen Personalized Medicine.**  
Giacomo Bruno¹,², Thomas Geninatti¹,³, Giulia Rizzo², Danilo Demarchi², and Alessandro Grattoni¹  
¹Houston Methodist Research Institute, Houston, TX, ²Politecnico di Torino, Turin, Italy, ³University of Chinese Academy of Sciences, Beijing, China, People’s Republic of China

2:30 pm  
**Off-Target Effects of Nanoparticle (NP)-Mediated siRNA Delivery to Mesenchymal Stem Cells (MSCs)**  
Dominic Malcolm¹,², Janet Sorrells¹, and Danielle Benoit¹,²  
¹University of Rochester, Rochester, NY, ²University of Rochester Medical Center, Rochester, NY

2:45 pm  
**A Magnetic Switch for Controlling Viral Gene Delivery In Vivo**  
Sheng Tong¹, Haibao Zhu¹, and Gang Bao¹  
¹Rice University, Houston, TX

3:00 pm  
**Targeting Host Alveolar Macrophages via Mannosylated Antibiotic Prodrug Polymers**  
Jasmin Chen¹ and Daniel Ratner¹  
¹University of Washington, Seattle, WA

OP-Fri–2–17  
**Track: Orthopaedic and Rehabilitation Engineering**  
**Bone**

**Track: Drug Delivery II**

**OP-Fri–2–16**  
**Room 200H**

**OP-Fri–2–15**  
**Room 200C**

**Tracks: Biomechanics, Bioinformatics, Computational and Systems Biology**

**Computational and Multiscale Modeling in Biomechanics II**

**Chairs:** Siqi Wang, Taeyoon Kim

1:45 pm  
**A Chemo-mechanical Model for Cell-mediated Fiber Recruitment, Focal Adhesion Growth and Extracellular Matrix Mechanosensing in Fibrillar Microenvironments**  
Xuan Cao¹, Ehsan Bani², Brendon Baker², Jason Burdick³, Christopher Chen⁴, and Vivek Shenoy⁵  
¹University of Pennsylvania, Philadelphia, PA, ²University of Utah, Salt Lake City, UT

2:00 pm  
**Role of Plantar Fascia and Heel Pad in Simulating Axial Impact to the Lower Leg**  
Carolyn Hampton¹ and Michael Kleinberger¹  
¹ARL, Aberdeen Proving Grounds, MD

2:15 pm  
**Prestrain, Deformation, and Growth in a Porcine Model of Skin Expansion**  
Adrian Buganza Tepole¹, Michael Gart², Chad Purnell², Arun Gosain², and Ellen Kuhl³  
¹Purdue University, West Lafayette, IN, ²Lurie Children’s Hospital, Northwestern University, Chicago, IL, ³Stanford University, Stanford, CA

2:30 pm  
**Pulmonary Contusion Modeling in Reconstructions of Frontal Motor Vehicle Collisions**  
James Gaewsky¹, Derek Jones¹, Ashley Weaver¹, and Joel Stitzel¹  
¹Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC

2:45 pm  
**A Lumped Parameter Model of Fiber Recruitment in the Extracellular Matrix during Biaxial Stretch**  
Samer Bou Jawde¹, Jason Bates², and Bela Suki¹  
¹Boston University, Boston, MA, ²University of Vermont, Burlington, VT

**OP-Fri–2–16**  
**Room 200H**

**Track: Drug Delivery**

**Topics in Drug Delivery II**

**Chairs:** Horst von Recum, Carolina Salvador Morales

1:45 pm  
**Formulating Subcutaneous Entecavir Implants for Chronic Hepatitis B Treatment**  
Steven Henry¹, Stephanie Barrett¹, Seth Forster¹, Ryan Teller¹, Zhen Yang¹, Gregory Doto¹, Michael Ruth¹, Takayuki Tsuchiya¹, Lee Klein¹, and Marian Gindy¹  
¹Merck & Co., West Point, PA

Friday, October 7 | 1:45 pm–3:15 pm | Platform Session 2
2:45 pm
Reduced Bacterial Growth on Titanium Screws with Nanophase TiO2 Surface Treatment
Garima Bhardwaj1 and Thomas Webster1
1Northeastern University, Boston, MA

3:00 pm
Ultrastuctural Changes in Osteogenesis Imperfecta Bone: Synchrotron Study of a Murine Model
Jitin Samuel1, Abusaleh Ahsan1, and Xiaodu Wang1
1University of Texas at San Antonio, San Antonio, TX

OP–Fri–2–18
Room 200I

Track: Biomaterials*

Drug Delivering Biomaterials I

Chairs: Jerald Redmond, Kimberly Stroka

1:45 pm
Quinacrine Mediated Sensitization of Glioblastoma (GBM) Cells to TRAIL through MMP-sensitive PEG Hydrogel Nanocarriers
Pelin Erkoc1, Ahmet Cingoz1, Tugba Bagci-Onder1, and Seda Kizilel1
1Koc University, Istanbul, Turkey

2:00 pm
Discrete Polymeric Nanowires as a Platform for Immunomodulation and Tissue Engineering
Colin Zamecnik1, Margaret Lowe2, David Patterson2, Michael Rosenblum2, and Tejal Desai2
1UCB-UCSF Joint Graduate Program in Bioengineering, San Francisco, CA, 2University of California, San Francisco, San Francisco, CA

2:15 pm
Shear-Reversible Nonaqueous Nanocomposites for Local Delivery of Combination Drugs
Anthony Tabet1, Vinh Tran1, Macallum Brabender1, and Chun Wang1
1University of Minnesota, Minneapolis, MN

2:30 pm
Post-Implantation Drug Reloading of Devices Is Not Affected By Bacterial Biofilm
Erika Cyphert1, Sean Zuckerman1, and Horst von Recum1
1Case Western Reserve University, Cleveland, OH

2:45 pm
Bioglass and Growth Factor Substrate Additives for Mesenchymal Stem Cell Induction
Roche de Guzman1, Daniel Foyt1, Vasilios Lianos1, Emily Diaz2, Miguel Hutchinson1, Bethany Dill1, and Grzegorz Polak1
1Hofstra University, Hempstead, NY

3:00 pm
Sustained Release of siRNA via Tethering to Hydrogels
Nicholas Kwon1, Minh Khanh Nguyen1, Alex Gilewski1, Samantha Wilner2, Keith Maier2, Matthew Levy2, and Eben Alsbeg1
1Case Western Reserve University, Cleveland, OH, 2Albert Einstein College of Medicine, Bronx, NY

* Biomaterials Track sponsored by

OP–Fri–2–19
Room 200J

Track: Cardiovascular Engineering
Heart Valve Structure, Function and Disease I

Chairs: Gretchen Mahler, Arash Keradvar

1:45 pm
Role of Proinflammatory NFkB Signaling in Regulating Aortic Valve Calcific Potential
Terence Gee1, Emily Farrar1, Kevin Hsu1, Bin Zhou2, and Jonathan Butcher1
1Cornell University, Ithaca, NY, 2Albert Einstein College of Medicine, Bronx, NY

2:00 pm
Decreased Cell Adhesion Strength Promotes Endothelial to Mesenchymal Transformation
Jonathan Bramsen1, Sudip Dahal1, Sara Mina1, Chris Maiorana1, Guy German1, Bruce Murray2, Peter Huang3, and Gretchen Mahler1
1Binghamton University, Department of Biomedical Engineering, Binghamton, NY, 2Binghamton University, Department of Mechanical Engineering, Binghamton, NY

2:15 pm
CD44 Signaling Promotes Mineralization in an In Vitro Model of CAVD
Lauren Baugh1 and Lauren Black1
1Tufts University, Medford, MA

2:30 pm
The Distribution of Cell Spread Area and Stress Fiber Alignment in Aggregates Indicates a Role for Cell Tension in Calcific Aortic Valve Disease
Heather Cirka1, Vivian Liang1, and Kristen Billiar1
1Worcester Polytechnic Institute, Worcester, MA

2:45 pm
Patient-Specific Modeling of Transcatheter Aortic Valve Implantation: An In-Vitro Study
Hoda Hatoun1, Atieh Yousefi1, Pablo Maureira2, Jennifer Dollery3, Juan A. Crestanello1, and Lakshmi Prasad Dasi1
1The Ohio State University, Columbus, OH, 2CHU de Nancy, Nancy, France, 3Division of Cardiothoracic Surgery, Wexner Medical Center, The Ohio State University, Columbus, OH

3:00 pm
Effect of Positioning and Heart Beating on Transcatheter Aortic Valve Performance
Matteo Bianchi1, Ram Ghosh1, Gil Marom1, Oren Rotman1, Marvin Slepian1, and Danny Bluenstein1
1Stony Brook University, Stony Brook, NY
MEET THE EXPERT
1:45 pm–3:15 pm Room 204
Meet the Journal Editors
Organized by Dr Pep Pàmies, Chief Editor, Nature Biomedical Engineering

The ever growing amounts of increasingly accessible scientific results as well as growing competition for funding have increased the demands for researchers to show the quality, impact and reach of their scientific publications. Yet there is ample disagreement on how to measure impact and reach. A panel of editors will discuss strategies for researchers in biomedical engineering to improve the dissemination of their results. The session will feature 5-min presentations from each of the panel members and a round-table discussion.

Panel members:
- **Prof Kam Leong**
  Department of Biomedical Engineering, Columbia University, and Editor-in-Chief of Biomaterials
- **Prof Michael King**
  Department of Biomedical Engineering, Cornell University, and Editor-in-Chief of Cellular and Molecular Bioengineering
- **Prof David Odde**
  Department of Biomedical Engineering, University of Minnesota, and Editorial Board Member,
- **Biophysical Journal**
- **Dr Pep Pàmies**
  Chief Editor, Nature Biomedical Engineering

SPECIAL SESSION
2:00 pm–5:00 pm Room 102DEF
BMES-NSF Special Session on Research in Biomedical Engineering and Grant Writing
*pre-registration required

BMES and the National Science Foundation (NSF) will convene a special session focused on innovative research in biomedical engineering and grant writing. The session will bring together NSF Bioengineering and Engineering Healthcare grantees, young investigators, junior and senior faculty, and post-doctoral fellows for idea exchange and networking related to conducting and funding cutting-edge research in BME. The session will showcase NSF funded research and researchers, foster collaboration and idea exchange, familiarize participants with NSF funding mechanisms, and provide strategies for preparing competitive grant proposals, in particular NSF CAREER, EAGER and unsolicited grant applications. The research areas where the NSF Biomedical Engineering Program supports fundamental and transformative research will also be discussed. This material is based upon work supported by the National Science Foundation under Grant No. CBET-1628295. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

INDUSTRY SESSION—Mobile/Digital Health
2:00 pm–3:00 pm Room 201
Chairs: Ben Noe

The Mobile/Digital Health panel will discuss latest news and trends including, but not limited to, the following topics: personalized medicine, big data, health and fitness apps, and integration of devices and high tech.

INDUSTRY SESSION—Investment Pitches and Partnering
3:15 pm–5:15 pm Room 201
Chairs: Ben Noe

This session will feature four venture capitalists who will be hearing pitches from start-up companies for funding opportunities. All meeting attendees are welcome to sit in the audience to watch the pitches.

SPECIAL SESSION
3:15 pm–6:15 pm Room 208AB
The 4th US-Korea Joint Workshop on Biomedical Engineering
Chair: Hanjoong Jo, Ho-Wook Jun

Korean American Biomedical Engineering Society (KBMES) would like to invite you to the Fourth Korea-US Joint Biomedical Engineering Workshop. The objective of the Joint Workshop is to promote cooperation, collaboration and networking between the two societies and their members of the Korea Society of Medical and Biological Engineering (KOSOMBE) and Biomedical Engineering Society (BMES). This Joint Workshop is planned for two sessions. We will have a total of 9 plenary/invited speakers (including Prof. Roger Kamm in MIT and Prof. Lonnie Shea in Univ. of Michigan) from the U.S. and Korea spanning the two sessions, followed by a dinner reception (“Korean Night”) for all participants.
OP–Fri–3–1  
Auditorium 1

Tracks: Cellular and Molecular Bioengineering, Biomechanics
Mechanobiology of the Vascular and Nervous Systems

Chairs: Patrick Alford, Rhima Coleman

4:00 pm
Antagonism of the Serotonin 2B receptor Prevents Pathologic Biomechanical Remodeling in a Mouse Model of Familial Pulmonary Arterial Hypertension
Nathaniel Bloodworth¹, Erica Carrier¹, James West¹, Alison Schroer¹, Santhi Gladson¹, Sheila Shay¹, Joshua Hutcheson¹, and David Merryman¹
¹Vanderbilt University, Nashville, TN, ²Florida International University, Miami, FL

4:15 pm
A Biomimetic Platform Reveals Novel Mechanisms for Regulation of Microvascular Function via Hemodynamic Shear Stress
William Polacheck¹,², Matthew Kutys¹, and Christopher Chen¹
¹Boston University, Boston, MA, ²Harvard University, Boston, MA

4:30 pm
Shear Stress Modulates Endothelial VCAM-1 Expression via Endoplasmic Reticulum Stress Response Pathways
Keith Bailey¹, Scott I Simon¹, and Anthony Passerini¹
¹UC Davis, Davis, CA

4:45 pm
Shear Stress Modulates Endothelial Cell Glucose Uptake and Endothelial Nitric Oxide Synthase OGlCNacylation
Alisa Clyne¹ and Sarah Basehore³
¹Drexel University, Philadelphia, PA

5:00 pm
Short-Duration Overpressure Induces Acute Structural Reactivity in Glia
Nora Hlavac¹ and Pamela VandeVord¹,²
¹Virginia Tech, Blacksburg, VA, ²Salem Veterans Affairs Medical Center, Salem, VA

5:15 pm
in Vivo Diametric Regulation of Single Axons in Drosophila
Anthony Fan¹, Alireza Tofangchi¹, Mikhail Kandel¹, Gabriel Popescu¹, and Taher Saif¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

OP–Fri–3–2  
Auditorium 2

Tracks: Cancer Technologies, Nano and Micro Technologies
Heterogenous Cell-Cell Interactions in Cancer

Chairs: Mathumai Kanapathipillai, Daniel Gallego-Perez

4:00 pm
Effect of Resident Macrophages on Extravasation of Breast Cancer Epithelial Cells
Marie-Elena Brett¹, Geneva Doak¹, and David Wood¹
¹University of Minnesota, Minneapolis, MN

4:15 pm
Microengineered Tumor-Stroma Platform Investigating the Biochemical Influence of Stromal Fibroblasts on Breast Cancer Invasion
Danh Truong², Eric Barrientos², Julieann Puleo³, Ghassam Mouneimne⁴, and Mehdi Nikkhah²
²Arizona State University, Tempe, AZ, ³University of Arizona, Tucson, AZ, ⁴University of Arizona, Tucson, AZ

4:30 pm
Single-Cell Functional Analysis of Immune Cell-Mediated Cytotoxicity Against Myeloma in Microfluidic Droplets
Saheli Sarkar¹, Pooja Sabhachandani¹, and Tania Konry¹
¹Northeastern University, Boston, MA

4:45 pm
Single Cell Analysis of Contact Inhibition in Micro-Patterned Culture
Khadija Zaidi¹ and Nitin Agrawal¹
¹George Mason University, Fairfax, VA

5:00 pm
3D Tumor Model to Investigate Natural Killer Cell-Cancer Cell Interactions
Isaac Adjei¹, Glendon Plumton¹, Julie Djeu¹, and Blanka Sharma¹
¹University of Florida, Gainesville, FL, ²Moffitt Cancer Center, Tampa, FL

5:15 pm
Pediatric Glioblastoma Cells Modulate Human Neural Progenitor Cell Phenotype and Migration within Cocultures
Kurt Farrell¹, Moo-Yeal Lee¹, and Chandra Kothapalli¹
¹Cleveland State University, Cleveland, OH
Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3

**OP–Fri–3–3**

**Auditorium 3**

**Track: Biomechanics**

**Biomechanics of Biomaterials**

*Chairs: Muralidhar Padala, Jessica Isaacs*

4:00 pm

**Zonal Articular Cartilage Exhibits Poroelastic Behavior**

Joseph Wahlquist¹, Aaron Aziz¹, Mark Randolph², Stephanie Bryant¹, Corey Neu¹, and Virginia Ferguson¹

¹University of Colorado, Boulder, Boulder, CO, ²Harvard Medical School, Boston, MA

4:15 pm

**Measurement of Displacement Fields of Native Extracellular Matrix Fibrils Loaded In Situ**

Andrea Acuna¹, Michael Drakopoulos¹, Benjamin Sather¹, Craig Goergen¹, and Sarah Calve¹

¹Purdue University, West Lafayette, IN

4:30 pm

**Detection of Mechanical Damage at the Molecular Level Using Collagen Hybridizing Peptides**

Jared Zitnay¹, Yang Li¹, Zhao Qin¹, Markus Buehler², S. Michael Yu¹, and Jeffrey Weiss¹

¹University of Utah, Salt Lake City, UT, ²Massachusetts Institute of Technology, Cambridge, MA

4:45 pm

**Mechanical Properties of Baboon Tympanic Membrane Measured with DMA System**

Warren Engles¹, Rong Gan¹, Don Nakmali¹, and Kyle Smith¹

¹The University of Oklahoma, Norman, OK

5:00 pm

**Creep Properties of Pelvic Floor Supportive Ligaments**

Adwoa Baah-Dwomoh¹, Ting Tan¹, and Raffaella De Vita¹

¹Virginia Tech, Blacksburg, VA

5:15 pm

**Sensitivity to Axial Rotation and Region-of-Interest Selection in Bone Mineral Density at the Lateral Distal Femur**

Jodie Gomez¹, Rachel Tufaro¹, Ashkan Pourkand², David Grow¹, and Christina Salas¹

¹University of New Mexico, Albuquerque, NM, ²New Mexico Institute of Mining and Technology, Socorro, NM

**OP–Fri–3–4**

**Room 102AB**

**Tracks: Cardiovascular Engineering, Tissue Engineering**

**Cardiovascular Tissue Engineering IV**

*Chairs: Lauren Black III, Megan McCain*

4:00 pm

**Heart-on-a-Plate for Drug Discovery and Disease Modeling—INVITED**

Milica Radisic¹

¹University of Toronto, Toronto, ON, Canada

4:30 pm

**Dissecting The Mechanisms Of Genetic Cardiomyopathy Using In Vitro Engineered Disease Models**

Anant Chopra¹, Mathew Kutys¹, Kehan Zhang¹, William Polacheck¹, J. G. Seidman², Christine Seidman³, John Hinson¹, and Christopher S.Chen¹,²

¹Boston University, Boston, MA, ²Harvard Medical School, Boston, MA, ³University of Connecticut Health Center & The Jackson Laboratory for Genomic Medicine, Farmington, CT, ⁴Harvard University, Boston, MA

4:45 pm

**Construction of Engineered Myocardium by the Cultivation of Induced Pluripotent Stem Cells within Bio-inspired Hydrogel Consisting of Self-assembled Peptides**

Yujian Huang¹, Lei Wang², Tao Yue¹, Leming Sun¹, Hua Zhu³, Yigang Wang², PeterMohler³, and Mingjun Zhang¹

¹The George Washington University, Washington, DC, ²University of California San Francisco, San Francisco, CA

5:00 pm

**Maturation of Human Pluripotent Stem Cell-Derived Cardiomyocytes by Engineering 3D Cardiac Tissues**

Tracy Hookway¹, Nik Mendoza-Camacho¹, and Todd McDevitt¹,²

¹Gladstone Institutes, San Francisco, CA, ²University of California San Francisco, San Francisco, CA

5:15 pm

**Acute and Chronic Stimulation of 1-Adrenergic Receptor have Opposite Effect on Electrical Activity in Human Ventricular Slices**

Chaoyi Kang¹,², Yun Qiao¹,², Gang Li², Stacey Rentschler², and Igor Efimov¹

¹The George Washington University, Washington, DC, ²Washington University in St. Louis, St. Louis, MO
**Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3**

**OP-Fri-3-5**  
**Room 102C**  
**Track: Biomaterials*  
**Biomaterials for Immunoengineering III**

*Chairs: Katie Bratlie, Salman Khetani*

**4:00 pm**  
**Allergen-coated Microneedles as a Novel Approach for Preventive Allergy Immunotherapy**

Akhilesh Kumar Shakya1, Chang Huan Lee1, and Harvinder S Gill1  
1Texas Tech University, Lubbock, TX

**4:15 pm**  
**A Dual-Microparticle System to Modulate Autoimmunity in an Antigen-Specific Context**

Joshua Stewart1, Jamal Lewis2, and Benjamin Keselowsky1  
1University of Florida, Gainesville, FL, 2University of California, Davis, Davis, CA

**4:30 pm**  
**Elucidating the Immunological Mechanism of Non-inflammatory Peptide Nanofiber Vaccines**

Yi Wen1, Youhui Si2, Jianjun Chen2, Rebecca Pompano2, Anita Chong2, and Joel Collier1  
1Duke University, Durham, NC, 2University of Chicago, Chicago, IL

**4:45 pm**  
**Macrophage Responses to Textured Stainless Steel and Cobalt-Chromium Alloy Surfaces**

Jordan Anderson1, Sujan Lamicichane1, and Gopinath Mani1  
1University of South Dakota, Sioux Falls, SD

**5:00 pm**  
**Engineering Nanomaterial Morphology for Targeting Immune Cells in Naive and Atherosclerotic Mice**

Sijia Yi1, Yuyang Liu1, Sean Allen1, Fanfan Du1, Xiaomo Li1, Brian Ouyang1, and Evan Scott1  
1Northeastern University, Boston, MA

**5:15 pm**  
**Fc-functionalized Microparticles to Modulate the Physical Extent of Complement Activity**

Todd Sulchek1 and Brandon Holt1  
1Georgia Tech, Atlanta, GA

* *Biomaterials Track sponsored by ACS Bioengineering*

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**OP-Fri-3-6**  
**Room 101A**  
**Track: Cellular and Molecular Bioengineering**  
**Adhesion to the Vascular Endothelium**

*Chairs: Monica Burdick, Eno Ebong*

**4:00 pm**  
**Stabilization of the Hinge Region in Human E-selectin Enhances Binding Affinity to Ligands Under Force—INVITED**

Thong Cao1, Anne Rocheleau1, and Michael King1  
1Cornell University, Ithaca, NY

**4:15 pm**  
**E-Selectin-Mediated Rolling and Firm Adhesion Of Pancreatic Cancer Cells In Shear Flow**

Daniel Shea1, Yi Wai Li1, and Konstantinos Konstantopoulos1  
1Johns Hopkins University, Baltimore, MD

**4:30 pm**  
**Mechano-signaling Events by Which Cell Rolling on E-selectin Signals Integrin Activation and Arrest of Human Neutrophils**

Vasilios Morikis1, Scott Simon2, and John Magnini3  
1University of California, Davis, Woodland, CA, 2University of California, Davis, Davis, CA, 3Glycomimetics Inc., Rockville, MD

**4:45 pm**  
**Endothelial Glycocalyx Layer Properties and Its Ability to Prevent Neutrophil Adhesion**

Luis Delgadoillo1, Julie Kuebel1, and Richard Waugh2  
1University of Rochester, Rochester, NY, 2University of Rochester, Rochester, NY

**5:00 pm**  
**The Role of Glycocalyx on 4T1 Breast Cancer Cell Attachment to the Endothelium**

Solomon Mensah1, Mark Niedre1, Vladimir Torchilin1, and Eno Ebong1  
1Northeastern University, Boston, MA

**5:15 pm**  
**Development of a Glycocalyx Mimic to Treat Endothelial Cell Dysfunction**

James Wodicka1,2, Andrea Chambers1, Gurneet Sangha1, Craig Goergen1, and Alyssa Panitch1  
1Purdue University, West Lafayette, IN, 2Indiana University School of Medicine, Indianapolis, IN

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**OP-Fri-3-7**  
**Room 101B**  
**Tracks: Cancer Technologies, Biomechanics**  
**Cancer Mechanobiology II**

*Chairs: Amit Pathak, Christopher Lemmon*

**4:00 pm**  
**Glycoprotein-Mediated Tissue Mechanics Regulate Brain Cancer Progression**

Matt Barnes1, Elliot Woods2, Russell Bainer3, Kan Lu1, Jason Tung1, Yekaterina Miroshnikova1, Gabrielle Bergers1, Carolyn Bertozzi2, and Valerie Weaver1  
1UCSF, San Francisco, CA, 2Stanford University, Palo Alto, CA, 3Genentech, South San Francisco, CA

**4:15 pm**  
**Breaking the Tension: Investigating a Link Between Tissue Mechanics and Tumor Immunity in Breast Cancer**

Allison Drain1, Ori Maller1, Luke Cassereau1, Alexander Barrett2, Brian Ruffell3, Jennifer Munson4, Melody Swartz5, Kirk Hansen5, Lisa Coussens5, and Valerie Weaver1  
1University of California, San Francisco, San Francisco, CA, 2University of Colorado Denver, Denver, CO, 3University of South Florida, Tampa, FL, 4University of Virginia, Charlottesville, VA, 5University of Chicago, Chicago, IL, 6Oregon Health and Science University, Portland, OR
Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3

4:30 pm
Mechanical Phenotyping of Inflammatory Breast Cancer Stem Cells
Weiyi Qian¹, Qianbin Wang¹, Xiaoyu Xu¹, and Weiqiang Chen¹
¹New York University, Brooklyn, NY

4:45 pm
A Stiff Microenvironment Induces Multinucleation Downstream of MMP3, Snail, and Cell-Cell Fusion
Allison Simi¹, Tiffany Hsia¹, Derek Radisky², and Celeste Nelson¹
¹Princeton University, Princeton, NJ, ²Mayo Clinic Cancer Center, Jacksonville, FL

5:00 pm
Genomic Variation Across Cancers Scales with Matrix Density and Stiffness
Charlotte Pfeifer¹, Jerome Irianto¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

5:15 pm
Using Optical Manipulation To Determine Mechanical Forces In Normal And Tumor Microenvironments In Vivo—INVITED
Kandice Tanner¹
¹NCI/NIH, Bethesda, MD

OP–Fri–3–8 | Room 101C
Tracks: Biomechanics, Tissue Engineering
Biomechanics in Cell and Tissue Engineering

Chairs: Muralidhar Padala, Andrew Kemper

4:00 pm
Erythrocyte Aggregation by Oxygen Nanobubble Interactions during the Onset of Thermal Burn Injury
Harrison Seidner¹, Samantha WeberFishkin¹, Semih Kuric¹, Geoffry Gunter², and Mary Frame³
¹Stony Brook University, Stony Brook, NY, ²Arete Associates, Los Angeles, CA

4:15 pm
Shear Stress Enhances Human iPSC Differentiation to Brain Endothelial Cells via P21 Signaling
Tongcheng Qian¹, Eric Shusta¹, and Sean Palecek¹
¹UW-Madison, Madison, WI

4:30 pm
Tension Generation and Wound Healing in Human Dermal Equivalents
Ting-Wei Law¹, Lauren Tinnin¹, Melville Vaughan¹, and Gang Xu¹
¹University of Central Oklahoma, Edmond, OK

4:45 pm
Characterizing Physical Properties of Injectable PEG-Fibrinogen Nitric Oxide Releasing Hydrogels
Hannah Fisher¹, Carly Joseph², Breenne Spalding², Leslie Lalonde², Connor McCarthy², and Rupak Rajachar²
¹Michigan Technological University, Mattawan, MI, ²Michigan Technological University, Houghton, MI

5:00 pm
Age and Location-Dependent Variation of Trabecular Length and Trabecular Number per Connection in Human Calcanei
Annalisia De Paolis¹, Sam Tran¹, and Luis Cardoso¹
¹The City College of New York, New York, NY

5:15 pm
Computational Modeling of Collective Cell Migration on a Viscoelastic ECM Fiber Network
Min-Cheol Kim¹, Michaeille Mayalu¹, and H. Harry Asada¹
¹Massachusetts Institute of Technology, Cambridge, MA

OP–Fri–3–9 | Room 101D
Tracks: Tissue Engineering, Nano and Micro Technologies
Organ-on-Chip Models for Study of Disease and Drug Discovery II

Chairs: Guohao Dai, Jason Gleghorn

4:00 pm
Development of Transparent Ultrathin Membranes for Cellular Barrier and Co-Culture Models
Robert Carter¹, Stephanie Casillo¹, Andrea Mazzocchi¹, and Thomas Gaborski¹
¹Rochester Institute of Technology, Rochester, NY

4:15 pm
Human Skin-on-a-Chip: A Microengineered Biomimetic Model for Studies in Skin Mechanobiology
Megan Farrell¹, Thomas Seykora¹, Jeongyun Seo¹, and Dongeun Huh¹
¹University of Pennsylvania, Philadelphia, PA

4:30 pm
A Biomimetic on-Chip Model to Reconstitute Lymphedema
Esak Lee¹², William J. Polacheck¹², Duc-Huy T. Nguyen¹², Stella Alimperti¹², and Christopher S. Chen¹²
¹Boston University, Boston, MA, ²Wyss Institute at Harvard University, Boston, MA

4:45 pm
Comprehensive Investigation of Endothelial Specializations for Physiologically Relevant BBB Models
Candice Hovell¹, Yoshitaka Sei¹, Song Ih Ahn¹, Cole Weiler¹, Jiwon Yom¹, Gilda Barabino², Lakeshia Taite³, and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA, ²City College of New York, New York, NY, ³Texas A&M University, College Station, TX

5:00 pm
A Microtissue System Model of Angiogenesis in the Endometrium
Mahama Traore¹, Jessica Lin¹, Venktesh Shirure¹, Susan Olalekan¹, Julie Kim¹, Teresa Woodruff¹, and Steven George¹
¹Washington University in Saint Louis, Saint Louis, MO, ²Northwestern University, Chicago, IL
5:15 pm
An In Vitro Chondro-Osteo-Vascular Triphasic Model of The Osteochondral Complex
Riccardo Gottardi1,2, Alessandro Pirosa1,3, Peter Alexander1, Paul Manner1, Dario Puppi2, Federica Chiellini5, and Rocky Tuan1
1University of Pittsburgh, Pittsburgh, PA, ²Ri.MED Foundation, Palermo, Italy, ³Università degli Studi di Pisa, Pisa, Italy, ⁵University of Washington, Seattle, WA

5:15 pm
A Conformational Analysis of an Engineered Laminin-mimetic, Elastin-like Fusion Protein Using Molecular Dynamics Simulations
James Tang1, Charles McAnany1, Cameron Mura1, and Kyle Lampe1
1University of Virginia, Charlottesville, VA

* Biomaterials Track sponsored by

OP-Fri-3-10 Room 101E
Track: Biomaterials*
Natural and Bioinspired Materials II
Chairs: Vivek Gupta, Ho-Wook Jun

4:00 pm
Tunable Nitric Oxide Release from SNAP via Catalytic Copper Nanoparticles for Enhanced Antibacterial Properties of Polymeric Biomaterials
Jitendra Pant1, Marcus Goudie1, Elizabeth Brisbois2, Sean Hopkins1, and Hitesh Handa1
1University of Georgia, Athens, GA, ²University of Michigan, Ann Arbor, MI

4:15 pm
Fibronectin Fiber Extrusion Via Silk-inspired Shear Spinning
Matthew Jacobsen1, Shannon Anderson1, Joyce Wong1, and Michael Smith1
1Boston University, Boston, MA

4:30 pm
Deposition Conversion Approach for Selectively Synthesized Apatite Coatings On Biopolymer Hydrogels
Jacqueline Harding1 and Melissa Krebs1
1Colorado School of Mines, Golden, CO

4:45 pm
Collagen-Mimetic Proteins with Tunable Integrin Binding Sites for Vascular Graft Coatings
Juan Felipe Diaz Quiroz1, Patricia Diaz Rodriguez1, Tanzil Islam1, Monty Reichert2, Magnus Höök1, and Mariah S. Hahn1
1Center for Biotechnology and Interdisciplinary Studies, Rensselaer Polytechnic Institute, Troy, NY, ²Department of Biomedical Engineering, Duke University, Durham, NC, ³Institute of Biosciences and Technology, Texas A&M Health Science Center, Houston, TX

5:00 pm
Collagen Methacrylamide For Simple, Free-Form Fabrication Of Customized, Fibrillar Scaffolds
Kathryn Drzewiecki1, Ijaz Ahmed1, and David Shreiber1
1Rutgers, The State University of New Jersey, Piscataway, NJ

5:15 pm
Collagen Methacrylamide For Simple, Free-Form Fabrication Of Customized, Fibrillar Scaffolds
Kathryn Drzewiecki1, Ijaz Ahmed1, and David Shreiber1
1Rutgers, The State University of New Jersey, Piscataway, NJ

5:15 pm
Self-Rolled-Up 3D Microtube Arrays Enhance Alignment of Hippocampal Neurons in Synthetic Circuits
Olivia V. Cangellaris1, Elise A. Corbin1,2, Paul Froeter1, Xiuling Li1, and Martha U. Gillette1
1University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Pennsylvania, Philadelphia, PA
Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3

OP–Fri–3–12 Room 200F
Track: Cellular and Molecular Bioengineering
CMBE Young Innovators II

Chairs: Tejal Desai, Daniel Hammer, Michael King

4:00 pm Predictive Model of Lymphocyte-specific Protein Tyrosine Kinase (LCK) Autoregulation—INVITED
Jennifer Rohrs\textsuperscript{1}, Pin Wang\textsuperscript{1}, and Stacey Finley\textsuperscript{1}
\textsuperscript{1}University of Southern California, Los Angeles, CA

4:15 pm Oncogene Knockdown via Active Loading of Small RNAs into Extracellular Vesicles by Sonication—INVITED
Tek Lamichhane\textsuperscript{1}, Anjana Jeyaram\textsuperscript{1}, Divya Patel\textsuperscript{1}, Babita Paraju\textsuperscript{1}, Natalie Livingstone\textsuperscript{1}, Navein Arumugasaamy\textsuperscript{1}, John Schardt\textsuperscript{1}, and Steven Jay\textsuperscript{1}
\textsuperscript{1}University of Maryland, College Park, MD

4:30 pm Mechanical Properties of The Tumor Stromal Microenvironment Probed Ex Vivo By In Situ Calibrated Optical Trap-Based Active Microrheology—INVITED
Kandice Tanner\textsuperscript{1}
\textsuperscript{1}NCI/NIH, Bethesda, MD

4:45 pm Evolution of Local and Systemic Immunity after Targeted Programming of the Lymph Node Environment—INVITED
Christopher Jewell\textsuperscript{1,2,3}
\textsuperscript{1}University of Maryland, College Park, MD, \textsuperscript{2}University of Maryland Medical School, Baltimore, MD, \textsuperscript{3}Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD

5:00 pm Co-assembly Tags Based on Charge Complementarity (CATCH) for Installing Functional Protein Ligands into Supramolecular Biomaterials—INVITED
Dillon Seroski\textsuperscript{1}, Antonietta Restuccia\textsuperscript{1}, Anthony Sorrentino\textsuperscript{1}, Kevin Knox\textsuperscript{1}, and Gregory Hudalla\textsuperscript{1}
\textsuperscript{1}University of Florida, Gainesville, FL

OP–Fri–3–13 Room 200D
Track: Bioinformatics, Computational and Systems Biology
Omics Data and Analysis

Chairs: Amina Qutub, Jason Papin

4:00 pm Local Metabolic Remodeling by Infection Alters the Antibiotic Susceptibility of Pathogens
Jason Yang\textsuperscript{1,2}, Prerna Bhargava\textsuperscript{1,2}, Douglas McCloskey\textsuperscript{1}, Bernhard Palsson\textsuperscript{1}, and James Collins\textsuperscript{1,2}
\textsuperscript{1}Massachusetts Institute of Technology, Cambridge, MA, \textsuperscript{2}Broad Institute of MIT and Harvard, Cambridge, MA

4:15 pm Meta-Proteomic Analysis for the Clinic: A Guide Towards Personalized Therapy in Leukemia
Chenyue Hu\textsuperscript{1}, Steven Kornblau\textsuperscript{2}, and Amina Qutub\textsuperscript{1}
\textsuperscript{1}Rice University, Houston, TX, \textsuperscript{2}MD Anderson Cancer Center, Houston, TX

4:30 pm Metabolic Interaction Profiling of a Complete Murine Gut Microbiota
Matthew Biggs\textsuperscript{1}, Gregory Medlock\textsuperscript{1}, Thomas Moutinho\textsuperscript{1}, Hannah Lees\textsuperscript{2}, Jonathan Swann\textsuperscript{2}, Glynis Kolling\textsuperscript{1}, and Jason Papin\textsuperscript{1}
\textsuperscript{1}University of Virginia, Charlottesville, VA, \textsuperscript{2}Imperial College, London, United Kingdom

4:45 pm A Sensitive High-throughput Assay Platform for Quantifying Nucleo-cytoplasmic Phosphatase Activity
Millie Shah\textsuperscript{1} and Kevin Janes\textsuperscript{1}
\textsuperscript{1}University of Virginia, Charlottesville, VA

5:00 pm Comparative Mapping of Dengue Virus-Host Interactions Using Systems Biology Approaches
Priya Shah\textsuperscript{1}, Gwendolyn Jang\textsuperscript{1}, Jeffrey Johnson\textsuperscript{1}, John Von Donlen\textsuperscript{1}, Billy Newton\textsuperscript{1}, Laura Satkamp\textsuperscript{1}, Mark Kunitomo\textsuperscript{1}, Federico de Maio\textsuperscript{2}, Ana Fernandez-Sesma\textsuperscript{3}, Andrea Gamarnik\textsuperscript{2}, Raul Andino\textsuperscript{1}, and Nevan Krogan\textsuperscript{1}
\textsuperscript{1}UCSF, San Francisco, CA, \textsuperscript{2}Leibor Institute, Buenos Aires, Argentina, \textsuperscript{3}Mount Sinai School of Medicine, New York, NY

5:15 pm Molecular Network Modeling of Drug-induced Cardiotoxicity in Space of Dose and Time
Huan Wang\textsuperscript{1,2}, Adam Palmer\textsuperscript{3}, Sarah Boswell\textsuperscript{3}, Robert Everley\textsuperscript{3}, and Peter Sorger\textsuperscript{1}
\textsuperscript{1}Harvard Medical School, Boston, MA, \textsuperscript{2}Harvard Institute of Therapeutic science, Boston, MA, \textsuperscript{3}Harvard Institute of Therapeutic science, Boston, MA

OP–Fri–3–14 Room 200G
Track: Stem Cell Engineering
Technologies for Stem Cell Engineering

Chairs: Hossein Tavana, Marsha Rolle

4:00 pm Hierarchical Fabrication of Biomimetic Vascularized Tissue Constructs via Dual 3D Bioprinting and Regional Immobilization—INVITED
Haitao Cui\textsuperscript{1}, Wei Zhu\textsuperscript{1}, Margaret Nowicki\textsuperscript{1}, Xuan Zhou\textsuperscript{1}, Ali Khademhosseini\textsuperscript{2}, and Lijie Grace Zhang\textsuperscript{1}
\textsuperscript{1}The George Washington University, Washington, DC, \textsuperscript{2}Harvard-MIT Division of Health Sciences and Technology, Cambridge, MA
4:30 pm
Hydrogels for Light-Triggered siRNA Release for Guiding hMSC Osteogenesis
Minh Khanh Nguyen1, Cong Truc Huynh1, Mantas Naris1, Gulen Tonga2, Vincent Rotello2, and Eben Alsberg1
1Case Western Reserve University, Cleveland, OH, 2University of Massachusetts, Amherst, MA

4:45 pm
Osteogenic Differentiation of Human Mesenchymal Stem Cell in Response to Biomaterial Properties is Inhibited by Selective Serotonin Reuptake Inhibitors
Nancy Ayad1, Kelly Hotchkiss1, and Rene Olives-Navarrete1
1Virginia Commonwealth University, Richmond, VA

5:00 pm
Engineering Xeno-Free Microcarriers for Human Pluripotent Stem Cell Bioprocessing
Fan Zhang1, Yongjia Fan1, and Emmanuel Tzanakakis1,2
1Tufts University, Medford, MA, 2Tufts Medical Center, Boston, MA

5:15 pm
Fabrication of Injectable Hydrogel Microspheres for Delivery of Encapsulated Equine Endothelial Progenitor Cells
Wen Seeto1, Yuan Tian1, Randolph Winter1, Fred Caldwell1, Anne Wooldridge1, and Elizabeth Lipke1
1University of Pennsylvania, Philadelphia, PA

5:30 pm—5:45 pm
Room 200C
Track: Biomechanics
Biomechanics of Rehabilitation/Injury

4:00 pm
Effect of Exercise Therapy on Supraspinatus Tears During Internal-External Rotation
Gerald Ferrer1, R Matthew Miller1, Jason Zlotnicki1, Scott Tashman1, Volker Musahl1, and Richard E Debski1
1University of Pittsburgh, Pittsburgh, PA

4:15 pm
Ataxic Horses Differ Significantly From Sound Horses In Their Distal Limb Acceleration At A Walk
Megan Aanstoos1, Birgitte Luining2, Jeremiah Easley1, and Yvette Nout-Lomas1
1Colorado State University, Fort Collins, CO, 2Utrecht University, Utrecht, Netherlands

4:30 pm
Severe Unilateral Hip Osteoarthritis Alters Hip and Ankle Power Bilaterally During Walking
Robin Queen1 and Daniel Schmitt2
1Virginia Tech, Blacksburg, VA, 2Duke University, Durham, NC

4:45 pm
H-Taping Method for Prophylactic or Temporary Fixation of A2 Pulley Tears During Rock Climbing
Rachel Tufaro1, Alexander Telis1, Dustin Larson1, Deana Mercer1, and Christina Salas1
1University of New Mexico, Albuquerque, NM

5:00 pm—5:15 pm
Room 200H
Track: Drug Delivery
Delivery Systems for Proteins and Vaccines
Chairs: Amir Farnoud, Isidro Zarraga

4:00 pm
Vaccination with Poly(Mannose)-antigen Conjugates Combined with a Novel TLR7 Agonist Enhances Cellular Immune Response
Scott Wilson1, Sachiko Hirose1, Sven Swart2, and Jeffery Hubbell2
1EPFL, Lausanne, Switzerland, 2University of Chicago, Chicago, IL

4:30 pm
Delivering Nucleic Acid Adjuvants with Nanoparticle Vaccines to Stimulate Pulmonary Immunity
Frances C. Knight1, Pavlo Gilchuk1, Sema Sevimli1, Sebastian Joyce1, and John T. Wilson1
1Vanderbilt University, Nashville, TN

4:45 pm
Controlled Release of Thermostabilized Inactivated Polio Vaccine from PLGA-Based Microparticles
Stephany Tzeng1, Rohiverth Guarecuco1, Kevin McHugh1, Evan Rosenberg1, Yingying Zeng1, Sviatana Rose1, Robert Langer1, and Ana Jaklenec1
1Massachusetts Institute of Technology, Cambridge, MA

5:00 pm
Microneedle-Assisted Microfluidic Platform for Efficient Intracellular Delivery
Weiqian Jiang1, Mingqiang Li1, Yeh-Hsing Lao1, and Kam Leong1
1Columbia University, New York, NY

5:15 pm
Mucoadhesive Polymer Wafers for Preservation and Sublingual Delivery of Vaccines
Samuel Hanson1, Shaibala Singh2, Jagannadha Sastry2, Michael Barry3, and Chun Wang1
1University of Minnesota, Minneapolis, MN, 2MD Anderson Cancer Center, Houston, TX, 3Mayo Clinic, Rochester, MN
OP–Fri–3–17  
**Room 200B**  
**Track: Orthopaedic and Rehabilitation Engineering**  
**Skeletal Muscle, Ligaments and Tendons**  
Chairs: Nelly Andarawis-Puri, Vincent Wang

**4:00 pm**  
**Quantitative Muscle Force Measurement using Intramuscular Pressure—INVITED**  
Kenton Kaufman¹, Shanette Go¹, Shawn O’Connor², Benjamin Wheatley², William Litchy¹, Tammy Haut Donahue², Gregory Odegard¹, Samuel Ward², and Richard Lieber³
  
¹Mayo Clinic, Rochester, MN, ²University of California-San Diego, La Jolla, CA, ³Colorado State University, Fort Collins, CO

**4:30 pm**  
**Gluteus Maximus Activation during Ambulation in Children and Young Adults with Osteogenesis Imperfecta**  
Jessica Fritz¹, Peter Smith², and Gerald Harris¹
  
¹Marquette University/Medical College of Wisconsin, Milwaukee, WI, ²Shriners Hospitals for Children, Chicago, IL

**4:45 pm**  
**Effect of Sarcolemma Water Permeability on Muscle DTI Measures Following Exercise**  
Noel Naughton¹ and John Georgiadis¹,²
  
¹University of Illinois at Urbana Champaign, Urbana, IL, ²Illinois Institute of Technology, Chicago, IL

**5:00 pm**  
**Brown and Beige Fat Promote Rotator Cuff Muscle Regeneration through Paracrine Signaling**  
Anna Bryniarski¹ and Gretchen Meyer¹
  
¹Washington University in St. Louis, St. Louis, MO

**5:15 pm**  
**Knockout of Hyaluronan Synthases Differentially Alters Viscoelastic Properties of Mouse Achilles and FDL Tendons**  
Kristen Renner¹, Katie Trelfa², John Sandy², Anna Plaa², and Vincent Wang¹
  
¹Virginia Tech, Blacksburg, VA, ²Rush University Medical Center, Chicago, IL

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**OP–Fri–3–18  
**Room 200I**  
**Track: Biomaterials*  
**Drug Delivering Biomaterials II**

Chairs: Young-sup Yoon, Tara Deans

**4:00 pm**  
**Nitric Oxide Releasing Nanomatrix to Enhance Dialysis Fistula Maturation**  
Patrick Hwang¹, Grant Alexander¹, Maheshika Somarathna², Maggie Collier², Brigitta Brott¹,², Jennifer Pollock², Timmy Lee², and Ho-Wook Jun¹,²
  
¹Endomimetics, LLC, Birmingham, AL, ²University of Alabama at Birmingham, Birmingham, AL

**4:15 pm**  
**Simple Chemical Modification Reduces Acute Systemic Toxicity and Improves Tissue Penetration of Polysaccharide Nanoparticles**  
Randall Toy¹, Pallab Pradhan¹, Nelson Di Paolo², Vijayeeatha Ramesh¹, Yoshitaka Sei¹, YongTae Kim¹, Dmitry Shayakhmetov², and Krishnendu Roy²
  
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA

**4:30 pm**  
**Linking Micelle Properties of PEO-PPO-PEO Block Copolymers with Preventing Protein Aggregation**  
Michael Poellmann¹, Colin Mcfaul¹, and Raphael Lee¹
  
¹University of Chicago, Chicago, IL

**4:45 pm**  
**Engineering Polymeric Biomaterials for Controlled Release: Therapeutic Contact Lenses for Glaucoma Treatment**  
Liana Wuchte¹, Kacie Carlin¹, Freha Tahir¹, Robert Mosley¹, and Mark Byrne¹
  
¹Rowan University, Glassboro, NJ

**5:00 pm**  
**Development of Stable, Multivalent Protein-Conjugated GNPs as Viral Entry Inhibitors**  
Allison Siehrl¹, Bin Xu¹, Ronald Siegel¹, and Wei Shen¹
  
¹University of Minnesota, Minneapolis, MN

**5:15 pm**  
**Macro-porous Phantom for Improved In Vitro-In Vivo Correlation for Mock Drug Release Kinetics for In Situ Forming Polymer Implants**  
Selva Jeganathan¹, Christopher Hernandez¹, Natalia Gawlik¹, and Agata Exner¹
  
¹Case Western Reserve University, Cleveland, OH

* Biomaterials Track sponsored by [ACS Biomaterials Science & Engineering](http://www.acsbio.org)
**Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3**

**OP–Fri–3–19**

**Room 200J**

**Track: Cardiovascular Engineering**

**Heart Valve Structure, Function and Disease II**

**Chairs:** Lakshmi Dasi, Kristen Billiar

**4:00 pm**

**Patient-Specific CFD of Clinical Mitral Regurgitation as a Novel Method to Quantify Regurgitation Severity**

Muhammad Jamil1, Omar Ahmad2, Kian Keong Poh3, and Choon Hwai Yap1

1National University of Singapore, Singapore, Singapore, Singapore, 2Comsats Institute of Information Technology Islamabad, Pakistan, Islamabad, Pakistan, 3Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

**4:15 pm**

**Effect of Averaging the Extracellular Matrix Fiber Structural Network on the Mechanical Responses of the Tricuspid Valve Leaflets**

Vineet S. Thomas1, Anup D. Pant1, Keyvan Amini-Khoiy1, and Rouzbeh Amini1

1The University of Akron, Akron, OH

**4:30 pm**

**Physiologically Relevant Effects of Fluid Pulsatility On Engineered Valve Tissue Growth**

Alex Williams1, Manuel Perez1, Arash Moshkforoush1, Manuel Salinas1, Omkar Mankame1, Nikolaos Tsoukias1, and Sharan Ramaswamy1

1Florida International University, Miami, FL

**4:45 pm**

**Linking Cell Deformation to Biosynthetic Response: Implications for Mitral Valve Repair**

Salma Ayoub1, Chung-Hao Lee1, Kathryn Driesbaugh2, Wanda Anselmo3, Connor Hughes1, Giovanni Ferrari1, and Michael Sacks1

1The University of Texas at Austin, Austin, TX, 2University of Pennsylvania, Philadelphia, PA

**5:00 pm**

**Age-Related Changes in the Extracellular Matrix of Human Aortic Heart Valves**

Heather Hutson1, Taylor Marohl1, Matthew Anderson1, Kevin Eliceiri1, Paul Campagnola1, and Kristyn Masters1

1University of Wisconsin, Madison, WI

**5:15 pm**

**Patient-specific Computational Modeling of Edge-to-Edge Mitral Valve Repair with MitraClip**

Fanwei Kong1, Thuy Pham1, Charles Primiano2, John Elefteriades1, and Wei Sun1

1Georgia Institute of Technology, Atlanta, GA, 2Hartford Hospital, Hartford, CT, 3Yale Hospital, New Haven, CT

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**MEET THE EXPERT**

**4:00 pm–5:30 pm**

**Room 204**

**Collaborations with Industry**

Organized by Dr. Jerry S.H. Lee, Deputy Director for Cancer Research and Technology, White House Cancer Moonshot Task Force

Bringing a scientific idea to societal benefit is a time and resource intensive endeavor that may involve a combination of state, federal, non-profit, and for-profit funding. This panel of experts will provide and share experiences of how they have successfully crossed one or more “valleys of death” or helped investigators do so with respective resources.

**Panel Members:**

- **Peter Kuhn**, Dean’s Professor of Biological Sciences, Professor of Medicine and Engineering, University of Southern California (USC)
- **Sean E. Hanlon**, PhD, Associate Director, Center for Strategic Scientific Initiatives (CSSI), Office of the Director, National Cancer Institute, NIH
- **Lauren C. Leiman**, Senior Director for External Partnerships, White House Cancer Moonshot Task Force
- **Syril D. Pettit**, Executive Director, Health and Environmental Sciences Institute (HESI)

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**SPECIAL SESSION**

**4:00 pm–5:30 pm**

**Room 200A**

**Educational Approaches to Best Prepare Students for Industry**

Chair: Ben Noe

This panel discussion will be informed by data received from the BMES Industry Survey regarding industry’s needs and perceptions of BME students as potential employees. The session will focus on educational approaches to best prepare biomedical engineering students at both the undergraduate and graduate levels.

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**INDUSTRY MIXER**

**7:30 pm–8:30 pm**

**The Local Pub Choir Room**

Chair: Ben Noe
Track: Orthopaedic and Rehabilitation Engineering

Articular Cartilage, Meniscus and Joints

Fri–7
3D Bioprinting Novel Graphene Oxide Scaffold for Improved Human Bone Marrow Mesenchymal Stem Cell Chondrogenic Differentiation
Xuan Zhou1, Se-jun Lee1, Margaret Nowicki1, and Lijie Zhang1
1The George Washington University, Washington, DC

Fri–8
A Needle-Punch Method to Enhance Cellular Infiltration of Adipose Stem Cells in Allograft Menisci
Rachel Nordberg1, Adisri Charoenpanich1, Christopher Vaughn1, Matthew Fisher1, Jacqueline Cole1, Jeffrey Spang1, and Elizabeth Loboa3
1University of North Carolina Chapel Hill & North Carolina State University, Raleigh, NC, 2University of North Carolina Chapel Hill, Chapel Hill, NC, 3University of Missouri, Columbia, MO

Fri–9
Assessment of Articular Surface Damage by Polarized Reflectance Microscopy and Spectroscopy
Ruby Huynh1, Frances Anne Tosto1, and Christopher Raub1
1The Catholic University of America, Washington, DC

Fri–10
Permeability of Articular Cartilage
Ryan McCulloch1 and Peter Mente2
1Gonzaga University, Spokane, WA, 2UNC/NCSU, Raleigh, NC

Fri–11
The Role of Heat Shock Protein 70 in Chondrogenesis of hMSCs
Chenghai Li1 and Sihong Wang1
1City College of New York, New York, NY

Track: Orthopaedic and Rehabilitation Engineering

Back Pain and Joint Pain

Fri–12
Pain Measures in a Rodent Model of Intervertebral Disc Degeneration
Elizabeth M. Leimer1,2,3, Matthew G. Gayoso1, Taylor L. Comte1, Munish C. Gupta1, and Lori A. Setton1
1Washington University in St. Louis, St. Louis, MO, 2Duke University, Durham, NC, 3Albany Medical College, Albany, NY

Fri–13
Surface Roughness of Metal Orthopedic Implants Alters the Biology of Human Mesenchymal Stromal Cells
Eric Lewallen1, Dakota Jones1, Roman Thaler1, Amel Dudaković, Janet Denbeigh1, Christopher Paradise1, Martina Gluscević, Endre Soreide1, Hilal Kremers1, Matthew Abdel1, Robert Cohen2, David Lewallen1, and Andre van Wijnen1
1Mayo Clinic, Rochester, MN, 2Stryker Orthopedics, Mahwah, NJ

Fri–14
Lumbar Bone Mineral Density Measurement and its Clinical Use in Osteopenia Screening and Fracture Prediction
Mona Saffarzadeh1, Ashley Weaver1, Caresse Hightower1, Anna Miller2, Kristen Beaver3, and Joel Stitzel1
1Center for injury Biomechanics, Wake Forest University School of Medicine, Winston Salem, NC, 2Orthopaedic Surgery, Wake Forest University School of Medicine, Winston Salem, NC, 3Health and Exercise Science, Wake Forest University, Winston Salem, NC

Fri–15
Evaluation of Bone Ingrowth into Orthopedic Implant Surfaces Using an Ex Vivo Bioreactor System
Rupak Dua1, Hugh Jones1, and Philip Noble1,2
1Institute of Orthopedic Research & Education, Houston, TX, 2Baylor College of Medicine, Houston, TX

Fri–16
Development of Subject-Specific Proximal Femur and Lumbar Spine Finite Element Models of Obese, Older Adults to Evaluate the Effects of Weight Loss on Bone Strength
Samantha Schoell1, Ashley Weaver1, Joel Stitzel1, and Kristen Beavers1
1Virginia Tech- Wake Forest Center for Injury Biomechanics, Winston-Salem, NC, 2Wake Forest University, Winston-Salem, NC

Tracks: Orthopaedic and Rehabilitation Engineering, Biomechanics

Orthopaedic Mechanobiology and Mechanotransduction

Fri–17
Quantitative Histological Measures of Bone and Synovium Correlate with Behavior in a Rat Model of OA
Heidi Kloefkorn1 and Kyle Allen1
1University of Florida, Gainesville, FL

Tracks: Orthopaedic and Rehabilitation Engineering, Biomechanics

Implant and Prosthetic Biomechanics

Fri–18
An Insole Device for the Measurement of Foot Plantar Pressure Distribution during a Gait
Ahnryul Choi1, Hyun Woo Jung1, Kyungsuk Lee1, Hyeseon Chae2, and Joung Hwan Mun1
1Sungkyunkwan University, Suwon, Korea, Republic of, 2Rural Development Administration, Jeonju, Korea, Republic of

Fri–19
Qualitative Regional Wear Analysis of Novel 3D-Printed Variable-Hardness Foot Orthotics
Breanne Przestrzelski1, Kyle Walker1, Brian Kaluf2, Nicole Hooks2, W. Dan Ballard3, Tim Pruett1, Steve Hoeffner1, and John DesJardins1
1Clemson University, Clemson, SC, 2Ability Prosthetics & Orthotics, Greenville, SC, 3Upstate Pedorthic Services, Greer, SC, 4Hoeffner Consulting, Easley, SC

Fri–20
Biomechanical Comparison of 5th Metatarsal Jones Fracture Fixation Methods
Aaron Stone1, Steve Zambrano2, Neil Dulpantier2, Ronald Mitchell2, Patrick McCulloch3, Joshua Harris1, David Litner1, Kevin Varner2, and Michael Moreno1,2
1Texas A&M University, College Station, TX, 2Orthopedics & Sports Medicine Methodist Research Hospital, Houston, TX
POSTER SESSION—FRIDAY

Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm

Fri–21
New Generation of Dental Implants Coated with Low Cost Biocompatible/Corrosion Resistant Ultrananocrystalline Diamond (UNCD) Coating for Superior Performance
Orlando Aucillio1, Daniel Olmedo2, Maria Gugliemotti2, Bhavani Patel1, Isabella Marques2, Fernanda Alfaro2, Tarik Shokufar2, Carl Takoudis3, Samuel Campbell2, Carl Robertsson2, Mathew Mathew3, Andriana Duran1, and Pablo Garmi1
1 University of Texas at Dallas, Richardson, TX, 2 University of Buenos Aires, Buenos Aires, Argentina, 3 University of Illinois-Chicago, Chicago, IL

Fri–22
FDM 3D Printed Proproprietoector for Prosthetic Joint Angle Detection
Steven Lathers1 and Jeffrey La Balle1
1 Arizona State University, Tempe, AZ

Fri–23
Biomechanical Study of Hybrid Screw Configurations of Locking Plate Humeral Midshaft Fracture Fixation with Incorporation of Kryptonite™ Bone Cement
Hung T. Le1, Ha V. Vu1, and Lawrence X. Webb2
1 Mercer University, Macon, GA, 2 Navicent Health Hospital, Macon, GA

Fri–24
Reproducibility of ZrO2-based Freeze Casting for Biomaterials and Biomedical Implants
Yajur Maker1, Steven Naleway1, Kate Fickas2, Marc Meyers1, and Joanna McKittrick1
1 University of California, San Diego, La Jolla, CA, 2 Oregon State University, Corvallis, OR

Tracks: Orthopaedic and Rehabilitation Engineering, Tissue Engineering, Musculoskeletal Tissue Engineering

Fri–25
Hydrogels with Conditionally Active Reporters for Studying Stem Cell Chondrogenesis
Glendon Flumpton1, Alfonso Martin-Pena1, Glyn Palmer1, and Blanka Sharma1
1 University of Florida, Gainesville, FL

Fri–26
Microscale Mechanics of Human Chondrocyte-Seeded Cartilage Constructs
Jill Middendorf1, Stephen Kennedy2, Sonya Shortkoff2, Caroline Dugopoliski2, Joseph Siemiatkoski2, Lena Bartell1, Itai Cohen1, and Lawrence Bonassar1
1 Cornell University, Ithaca, NY, 2 Histogenics Corporation, Waltham, MA

Fri–27
Epigeneome Editing Protects Human Adipose Derived Mesenchymal Stem Cells from Inflammatory Cytokines While Maintaining their Therapeutic Properties
Nilofar Farhang1, Jonathan Brugner2, Joshua Stover, Pratiksha Thakore2, Charles Gersbach2, Brandon Lawrence2, Farshid Guilak1, Lori Setton3, and Robby Bowles1
1 University of Utah, Salt Lake City, UT, 2 Duke University, Durham, NC, 3 Washington University in St. Louis, St. Louis, MO

Fri–28
Effects of Mild Periodic Heat Shock on Osteogenesis of hMSCs Cultured in PLA-HA Scaffolds
Kristifor Sunderic1, Chenghai Li1, Luis Cardoso1, and Sihong Wang1
1 City College of New York, New York, NY

Fri–29
Bone Tissue Regeneration using 3D Printed Microstructure Incorporated with Hybrid Nano Hydrogel
Dong Nyoung Heo1, Se-Jun Lee1, and Lijie Grace Zhang1
1 The George Washington University, Washington, DC

Fri–30
Satellite Cell Enhancement of Tissue Engineered Muscle Repair Technologies for the Treatment of Volumetric Muscle Loss
Ellen Mintz1, Juliana Passipieri1, Kyle Martin1, Poornam Sharma1, and George Christ1
1 University of Virginia, Charlottesville, VA

Fri–31
Promote Challenged Bone Regeneration by Targeting Endogenous Stem Cells and Signals
Qingqing Yao1, Yangzi Liu1, and Hongli Sun1
1 University of South Dakota, Sioux Falls, SD

Fri–32
Co-Delivery of Infusion Decellularized Skeletal Muscle with Minced Muscle Autografts Improved Recovery from Volumetric Muscle Loss Injury
Benjamin Kasuniskis1, John Kim1, Lemuol Brown1, Tyrone Washington1, and Jeff Wolchok1
1 University of Arkansas, Fayetteville, AR

Fri–33
Juliana Amaral Passipieri1, Jack Diene2, Ellen Mintz2, Jacqueline Biley1, Joseph Frank1, Joshua Glazier1, Andrew Portell1, Kacey Marra1, and George Christ1
1 University of Virginia, Charlottesville, VA, 2 University of Pittsburgh, Pittsburgh, PA

Fri–34
Engineering Rotator Cuff Tendon Grafts using Riboflavin-UVA Crosslinked Human Amniotic Membranes
Julien Arrizabalaga1, Jin Lu1, and Matthias Nollert1
1 University of Oklahoma, Norman, OK

Fri–35
Catechin-Mediated Surface Chemistry for Enhanced Bone Regeneration
Jung Seung Lee1, Jong Seung Lee1, Kisu Kang1, Soohwan An1, Min Suk Lee2, Kyuei Lee3, Haeshin Lee3, Hee Seok Yang3, and Seung-Woo Cho1
1 Yonsei University, Seoul, Korea, Republic of, 2 Dankook University, Cheonan, Korea, Republic of, 3 Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of

Fri–36
Densified Collagen-Fibril Biomaterials for Craniofacial Bone Tissue Engineering
Lauren Watkins1, Russell Main2, Marco Bottino1, and Sherry Voytik-Harbin2
1 Purdue University, West Lafayette, IN, 2 Purdue University School of Veterinary Medicine, West Lafayette, IN, 3 Indiana University School of Dentistry, Indianapolis, IN

Fri–37
Muscle-macrophage Tissues for Improved Regeneration In Vitro and In Vivo
Mark Juhas1, Jean Ye1, Zohaib Shaikh1, Ying Qian1, and Nenad Bursac1
1 Duke University, Durham, NC
**Tracks: Neural Engineering, Tissue Engineering**

**Neural Tissue Engineering**

**Fri–38**
Harnessing Cell Substrate Sensing for Effective Scaffold-based Skeletal Muscle Regeneration
Naagarajan Narayanan¹, Chunhui Jiang¹, Chaow Wang¹, Shihuan Kuang¹, and Meng Deng¹
¹Purdue University, West Lafayette, IN

**Fri–39**
Size Scale Effects in Engineering Skeletal Muscle Tissue Constructs
Onur Aydin¹, Mohamed Elhebeary¹, and Taher Saifi¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Fri–40**
BMP-2 Overexpressing Mesenchymal Stem Cells in CS Hydrogels for Healing of Critical Bone Defects
Seth Andrews², Albert Cheng³, Robin Webb¹, Hazel Stevens³, Robert Guildberg⁴, Lohitash Karumbaiah⁵, and Steven Stice⁴
¹University of Georgia, Athens, GA, ²Georgia Institute of Technology, Atlanta, GA

**Fri–41**
Magnetically Responsive Hydrogels for Optimizing Growth Factor Delivery in Bone Regeneration
Seyedeh Zahra Moafi Madani¹, Anne Reich¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

**Fri–42**
Multifunctional Electroactive Matrices Have the Ability to Promote Muscle Regeneration
Xiaoyan Tang¹, Yusuf Khan¹, and Cato Laurencin¹
¹Institute for Regenerative Engineering, University of Connecticut Health, Farmington, CT

**Fri–43**
Functional 3D Nerve Model Generates Signals from Fascicles Detectable with a Microelectrode Array
Wesley Anderson¹, Dale George¹, Alicia Brown¹, Alexander Bosak¹, Bradley Willenberg²,³, and Stephen Lambert¹
¹University of Central Florida College of Medicine, Orlando, FL, ²University of Florida, Gainesville, FL, ³Saisijin Biotech, LLC, Orlando, FL

**Fri–44**
Combining Electrospun Nanofibers with Cell-encapsulating Hydrogel Fibers for Neural Tissue Engineering
Joseph Corey¹, Che Chan¹, Christina White¹, Arjun Rastogi¹, Allison Grant¹, Ryan Miller¹, and Keith Duncan¹
¹The University of Michigan, Ann Arbor, MI, ²VA Ann Arbor Healthcare Center, Ann Arbor, MI

**Fri–45**
Functionalized Rosette Nanotubes as a Scaffold for Neural Regeneration
Marissa Puzan¹, Belete Legesse¹, Hicham Fenniri¹, and Abigail Koppes¹
¹Northeastern University, Boston, MA

**Fri–46**
3D Bioprinting Nano Scaffold with Multi-walled Carbon Nanotubes for Improved Nerve Regeneration
Se-Jun Lee¹ and Lijie Grace Zhang¹
¹George Washington University, Washington, DC

**Fri–47**
Alginate Hydrogel Based Dynamic Neuronal Pattering Method for Designing Neuronal Networks In Vitro
Sunghoon Joo¹, Seukyoung Song¹, Yoon Sung Nam¹, and Yoonkey Nam¹
¹KAIST, Daejeon, Korea, Republic of

**Fri–48**
In Vitro 3D Human Innervated Intestinal Tissue Model
Eleana Manousiouthakis¹, Ying Chen¹, and David L. Kaplan¹
¹Tufts University, Medford, MA

**Fri–49**
The Development of Neurovascular Tissue Culture Model by Coculturing NSCs and ECs in a Microfluidic Device
Hiroyuki Uwamori¹, Takuya Higuchi¹, and Ryo Sudo¹
¹Keio University, Yokohama, Japan

**Fri–50**
3D Gelatin Conduits for Differentiation of Mesenchymal Stem Cells into Schwann Cell-like Phenotypes
Metin Uz², Melda Buyukoz², Anup Sharma¹, Donald Sakaguchi¹, Sacide Alsoy², and Surya Mallapragada¹
¹Iowa State University, Ames, IA, ²Izmir Institute of Technology, Izmir, Turkey

**Fri–51**
Peripheral Nerve Repair with Uncoated Magnesium Metal Filaments
Ramakrishna Sharma¹, Priyanka Ruparelia², Lifeng Zhang³, Dennis LaJeunesse⁴, and Shyam Aravamudhan¹
¹North Carolina A&T State University, Greensboro, NC, ²University of North Carolina at Greensboro, Greensboro, NC

**Tracks: Neural Engineering, Nano and Micro Technologies**

**Micro/Nano Tools in Neurosciences**

**Fri–53**
Understanding The Functional Role of Eph Receptor Clustering In Neurogenesis
Chun Yang¹ and David Schaffer¹
¹University of California, Berkeley, Berkeley, CA

**Fri–54**
Patterned Optical Stimulation of Cultured Neuronal Networks for Gold-nanorod Based Neural Inhibition Technique
Hyunjung Jung¹ and Yoonkey Nam¹
¹KAIST, Daejeon, Korea, Republic of

**Fri–55**
Projection Printing Shape Memory Polymer-Based Implantable Neural Interface Devices
Jennifer Burns¹, Lucero Ramirez², Aldo Garcia-Sandoval¹, Jonathan Reeder¹, Romil Modi¹, Alexandra Joshi-Irme¹, and Walter E. Voit¹
¹The University of Texas at Dallas, Richardson, TX

**Fri–56**
Flexible 3D Carbon Nanotubes Cuff Electrode for Functional Electrical Stimulation
Wenwen Yi¹, Chaoyan Chen¹, Pan Tian¹, Yang Zhou¹, Jie Hu², John Cavanaugh¹, and Mark Ming-Cheng Cheng¹
¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of

**Fri–57**
Non-Viral Gene Delivery to Peripheral Nerve through a Nanostructured Chip Platform
Natalia Higuita Castro¹, Christopher Wier¹, Jordan Moore¹, Alec Sunyecz¹, Chadan Sen¹, Jose Otero¹, Stephen Kolb¹, and Daniel Gallego-Perez¹
¹The Ohio State University, Columbus, OH
Fri–58 Evaluations of Platinum and CNT-MEA Electrodes on Recording EMG as Peripheral Muscular Interfaces
Pan Tian¹, Chaoyan Chen², Wenwen Yi³, Jie Hu¹, Jin Qi¹, Yang Zhou¹, Yousef Alshahrani², John Cavanaugh², and Mark Ming-Cheng Cheng³
¹Shanghai Jiao Tong University, Shanghai, China, People’s Republic of, ²Wayne State University, Detroit, MI

Fri–59 Smart Nanoparticles for Anti-Oxidant Delivery into The Brain
Michael Furth¹, Julio Rincon¹, Kyung-An Han¹, and Thomas Bolandi
¹University of Texas at El Paso, El Paso, TX

Fri–60 Role of Nanoelectrode Shape and Size on its Ability to Penetrate and Stimulate Single-Cells
Komal Gardel¹, Jun Yan¹, and Shiyam Aravamudhan¹
¹North Carolina A&T State University, Greensboro, NC

Fri–61 Softening Substrate and Encapsulation for Neural Interfaces: Chronic Spinal Cord Stimulators
Aldo Garcia-Sandoval¹, Asht Mishra², Ajay Pal³, Alexandra Joshi-Imre¹, Adriana C Duran-Martinez¹, Sydney E Sherman¹, Jason B Carmel², and Walter Voit¹
¹The University of Texas at Dallas, Richardson, TX, ²Burke Medical Research Institute, White Plains, NY

Fri–62 In Vitro Multichannel Single-unit Recordings of Action Potential from Mouse Sciatic Nerve
Longtu Chen¹ and Bin Feng¹
¹University of Connecticut, Storrs, CT

Fri–63 Electrochemical Performance Single Material Silicon Carbide (SiC) Electrode
Christopher Frewin¹, Felix Deku¹, Evans Bernardino², Richard Everly³, Jawad Ul Hassan4, Erik Janzen4, Joseph Pancrazio¹, and Stephen Saddow³
¹University of Texas at Dallas, Richardson, TX, ²University of South Florida, Tampa, FL, ³Nanotechnology Research and Education Center at U.S.F., Tampa, FL, ⁴Linköping University, Linköping, Sweden

Fri–64 CNT-HA Nanofibrous Composite for Neural Electrical Stimulation
Elisabeth Steel¹ and Harini Sundararaghavan¹
¹Wayne State University, Detroit, MI

Fri–65 The Effect of Potassium Chloride on Aplysia Californica Abdominal Ganglion Activity
fanrui fu¹ and Rosalind Sadleir¹
¹Arizona State University, Tempe, AZ

Fri–66 Development of Epilepsy-on-a-chip System Based on Microfluidic Perfusion of Organotypic Brain Slice Cultures
Jing Liu¹ and Yevgeny Berdichevsky¹
¹Lehigh University, Bethlehem, PA

Fri–67 Inhibition of the Innate Immunity Pathway of CD14 on Blood-Derived Cells Improves Intracortical Microelectrode Performance
John K. Hermann², Hillary W. Bedell², Madhumitha Ravikumar²,³, Dawn M. Taylor², and Jeffrey R. Capadona²
¹Case Western Reserve University, Cleveland, OH, ²Louis Stokes Cleveland VA Medical Center, Cleveland, OH, ³Cleveland Clinic, Cleveland, OH

Fri–68 Simulation of Neuronal Localization Using the Utah Multisite Electrode Array
John Mize¹, Mobashir Shandhi², and David Warren¹
¹University of Utah, Salt Lake City, UT

Fri–69 Functional Remodeling of Subtype-Specific Markers Surrounding Implanted Neuroprostheses
Joseph Salatino¹ and Erin Purcell¹
¹Michigan State University, East Lansing, MI

Fri–70 Effect of Sieve Transparency on Selectivity of Microsieve Electrodes (µSE) in Recruitment of Peripheral Nerve Axons
Juan Pardo¹, Erik Zellmer¹, Leo Li¹, Matthew MacEwan², Wilson Ray³, and Daniel Moran¹
¹Washington University in St. Louis, St. Louis, MO, ²Washington University School of Medicine, St. Louis, MO

Fri–71 Effect of Synchronous and Asynchronous Microelectrode Stimulation in The Rat Hippocampus
Mark Connolly¹, Robert Gross², and Babak Mahmoudi³
¹Emory University, Atlanta, GA

Fri–72 5MHz Ultrasound Activates Inner Ear Vestibular Organs
Marta Iversen¹, Douglas Christensen², Dennis Parker³, Micah Fereck³, Holly Holman¹, and Richard Rabbitt¹
¹University of Utah, Salt Lake City, UT

Fri–73 Characterizing Noise Sources in Flexible, Multiplexed, Capacitive, Active Electrode Arrays
Matthew McCann¹, Jonathan Viventi¹, Michael Trumpis¹, and Ken Chiang¹
¹Duke University, Durham, NC

Fri–74 Tetrathemyl Orthosilicate as a Delivery Vehicle for Anti-inflammatories to Ameliorate the Foreign Body Response Associated with Micro-device Implantation
Matthew McDermott¹, and Kevin Otto²
¹Purdue University, West Lafayette, IN, ²University of Florida, Gainesville, FL

Fri–75 A Self-assembled Bionanomatrix Coating for Intracranial Aneurysm Coils to Enhance Healing
Patrick Hwang¹, Maggie Colliver², Grant Alexander², Brigitta Brott¹,², Robert Hergenrother², Ramanathan Kardivel³, David Kallmes³, and Ho-Wook Jun¹,²
¹Endomimetics, LLC, Birmingham, AL, ²University of Alabama at Birmingham, Birmingham, AL, ³Mayo Clinic, Rochester, MN

Fri–76 Low-cost, Compact Neuro-stimulator for Chronic Stimulation of Rat Retina
Sahar Elahyoodayan¹ and James Weiland¹
¹University of Southern California, Los Angeles, CA

Fri–77 Decoding the Multi-Modal Failures of Microelectrode-Brain Tissue Interface
Takashi Kozi¹
¹University of Pittsburgh, Pittsburgh, PA

Fri–78 Viability of a Novel Micro-Electrocorticography Electrode Array Design for Intracranial Implantation in Macaca Mulatta Primary Somatosensory Cortex
Taylor Hearrn¹, Justin Tanner¹, John Lachapelle¹, John Burns IV³, Julianne Grainger², Jonathan Cheng³, Edward Keeler³, and Stephen Helms Tillery¹
¹Arizona State University, Tempe, AZ, ²Daper Laboratory, Cambridge, MA, ³Nerves Incorporated, Dallas, TX
Fri–83
On-Chip Data Processing for Large-Scale Neural Recording
Tong Wu¹, Teris Tam¹, and Zhi Yang¹
¹University of Minnesota, Minneapolis, MN

Fri–84
Investigation of Online Incremental Feature Extraction Algorithm for On-Chip Spike Sorting
Wenfeng Zhao¹, Tong Wu¹, and Zhi Yang¹
¹University of Minnesota, Minneapolis, MN

Track: Neural Engineering
Neuroprotective Strategies

Fri–85
Towards a Neuroprotective Abiotic Surface: Resveratrol Incorporation via Surface Adsorbed Hydrogel Particles
Emily Morin¹, Shuangcheng Tang¹, and Wei He¹
¹University of Tennessee, Knoxville, TN

Fri–86
In Vitro Modeling of Stroke with Mesenchymal Stem Cells Treatment
Timo Roehrs¹, Rene Schloss¹, and David Shreiber¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Track: Neural Engineering
Noninvasive Neuromodulation

Fri–87
Integration of Transcranial Alternating Current Stimulation and Electroencephalography for the Study of Binocular Rivalry
Abhrajeet Roy¹, Bryan Baxter¹, Chris Cline¹, Sucharit Katyal¹, Steve Engel¹, Sheng He¹, and Bin He¹
¹University of Minnesota, Minneapolis, MN

Fri–88
Finite Element Modeling Predicts Electrophosphene Phenomena in tDGS or tACS Recipients
Aprinda Indahlastari¹, Aditya Kasinadhuni³, Munish Chauhan¹, Kevin Castellano⁰, Malcolm Calvin¹, Gayathri Srinivasan¹, Aditya Penderkar¹, and Rosalind Sadler¹
¹Arizona State University, Tempe, AZ, ²University of Florida, Gainesville, FL

Fri–89
Efficient Implementation of EEG Beamformers for Source Detection on Mobile Platforms
Ian Sturdevant¹, Ruben Garcia¹, and Kwong Ng¹
¹New Mexico State University, Las Cruces, NM

Fri–90
Changes in the EEG Spectrum of a Child with Severe Disabilities in Response to Power Mobility Training
Nadina Zweifel¹, Lisa Kenyon¹, John Farris³, Naomi Aldrich⁰, Paul Stephenson⁰, and Samhita Rhodes¹
¹Grand Valley State University, Grand Rapids, MI, ²Grand Valley State University, Allendale, MI

Fri–91
A Real Time EEG-Based Neurofeedback Platform for Attention Training
Reza Abiri¹, Xiaopeng Zhao¹, and Yang Jiang¹
¹University of Tennessee, Knoxville, TN, ²University of Kentucky Lexington, KY

Tracks: Bioinformatics, Computational and Systems Biology
Analysis of Cell Signaling

Fri–92
Glucose-Dependence of Renin-Angiotensin System in Podocytes Cells During Diabetic Kidney Disease
Minu Pilvankar¹, Michele Higgins¹, and Ashlee N. Ford Versyp⁰
¹Oklahoma State University, Stillwater, OK

Fri–93
Meta-Modeling Reveals that Tyrosine Kinase Receptor Signaling is Primarily Directed by Endocytic Vesicles, Late Endosome, and the Nucleus
Jared Weddel¹ and Princess Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Track: Bioinformatics, Computational and Systems Biology
Computational Approaches in Multicellular Systems

Fri–94
Toward an Individual-Based Model for Bone Remodeling
Estee George¹, Gabrielle Van Scy², Olivia Petrey⁰, Dominic Conte¹, Alicia Prieto-Langarica³, and Marnie Saunders¹
¹The University of Akron, Akron, OH, ²Youngstown State University, Youngstown, OH

Track: Biomaterials
Dynamic and Spatially-Patterned Biomaterials

Fri–95
Modulating Cell Migration and Focal Adhesion Dynamics Using Nanotopography
Elena Liang¹, Emma Mah¹, Albert Yee¹, and Michelle Digman¹
¹University of California, Irvine, Irvine, CA

Fri–96
Actuating Patterned Hydrogel for Intestinal Tissue Engineering
Jun-Goo Kwak¹, Abhinav Sharma¹, and Jungwoo Lee¹, ², ³
¹University of Massachusetts Amherst, Amherst, MA, ²Institute for Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA

Track: Bioinformatics, Computational and Systems Biology
Metabolic Models

Fri–97
Integrative Modeling of Acetone-Butanol-Ethanol (ABE) Fermentation
Chen Liao¹, Seung-Oh Seo¹, Venhar Celik¹, ³, Huahei Liu¹, Wentao Kong¹, Yi Wang¹, Hans Blaschek¹, Yong-Su Jin¹, and Ting Lu¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Firat, Elazig, Turkey

Fri–98
Using Genome-Scale Metabolic Models to Study Uncultivated Organisms from the Oral Microbiome
David Bernstein¹ and Daniel Segre¹
¹Boston University, Boston, MA

Fri–99
Predicting the Dynamics of Metabolic Pathways in Pancreatic Ductal Adenocarcinoma
Mahua Roy¹ and Stacey Finley¹
¹University of Southern California, Los Angeles, CA
Fri–100  
**Mathematical Modeling of the Methylation Cycle In Children With Autism Spectrum Disorder**  
Troy Vargason¹, Daniel Howsmon¹, Stepan Melnyk², S. Jill James², and Juergen Hahn¹  
¹Rensselaer Polytechnic Institute, Troy, NY, ²Arkansas Children’s Hospital Research Institute, Little Rock, AR

Fri–101  
**A Combined Approach for the Real-Time Monitoring of in vitro Bone Tissue Engineered Construct**  
Aaron Simmons¹, Cortes Williams¹, Kylie M. Foster¹, and Vassilios Sikavitsas¹  
¹University of Oklahoma, Norman, OK

**Track: Bioinformatics, Computational and Systems Biology**  
**Multiscale Modeling**

Fri–102  
**A Time-varying Biased Random Walk Model of Growth: Application to Height from Birth to Childhood**  
Bela Suki¹ and Urs Frey²  
¹Boston University, Boston, MA, ²University Children’s Hospital Basel, UKBB, University of Basel, Basel, Switzerland

Fri–103  
**An Image-Based Multiscale Model Predicts Injury-Prone Regions in Cervical Facet Capsular Ligaments**  
Sijia Zhang¹, Vahubz Zarei², Beth Winklestein¹, and Victor Barocas²  
¹University of Pennsylvania, Philadelphia, PA, ²University of Minnesota, Minneapolis, MN

Fri–104  
**New Algorithms to Characterize ET function during Inflammation in Otitis Media Prone Populations**  
Jennifer Malik¹ and Samir Ghadiali¹  
¹The Ohio State University, Columbus, OH

Fri–105  
**Multiscale Mechanobiology of the Nuclear Pore Complex**  
Mohammad Mofrad¹  
¹University of California Berkeley, Berkeley, CA

**Track: Bioinformatics, Computational and Systems Biology**  
**Single-Cell Measurements and Models**

Fri–106  
**Estimating Myofibril Distribution in Adult Cardiomyocytes: A Subcellular Min-Flow Problem**  
Tyler Harvey¹, Brian Dean¹, and Delphine Dean¹  
¹Clemson University, Clemson, SC

Fri–107  
**Single Cell Analysis of Bacterial Transcription Reveals Dynamic Induction Response Kinetics**  
Rebecca Breuer¹, Arpan Bandyopadhyay¹, Sofie O’Brien¹, Aaron Barnes¹, Wei-Shou Hu¹, and Gary Dunny¹  
¹University of Minnesota, Minneapolis, MN

Fri–108  
**Calcium Transfer Between the ER and Mitochondria is Required for Calcium Oscillations in a Model of Sheared Vascular Endothelial Cells**  
Richard Buckalew¹,², Christopher Scheitlin¹, Alex Cetnar¹, Arash Moshkhforoush¹, Nikolaos Tsoukias¹, and B. Rita Alevriadou¹  
¹The Ohio State University, Columbus, OH, ²University of Minnesota Duluth, Duluth, MN, ³Florida International University, Tampa, FL

**Track: Bioinformatics, Computational and Systems Biology**  
**Systems Approaches to Therapy, Therapeutics, and Precision Medicine**

Fri–109  
**Towards Better Quality in Precision Medicine: A Proposed Framework for Improving Clinical Practice Guidelines with Insights from Mathematical Biology and the Corbin-Strauss Model**  
Hisham Sheriff¹  
¹Christiana Hospital, Newark, DE, ²University of Delaware, Newark, DE

Fri–110  
**Systems Modeling of the Contribution of SGLT to Sodium Handling in the Diabetic Kidney**  
Jessica Boss¹ and Melissa Hallow¹  
¹University of Georgia, Athens, GA

Fri–111  
**A Computational Model of Thrombospordin-1 Apoptotic Mechanisms**  
Qianhui Wu¹ and Stacey Finley¹  
¹University of Southern California, Los Angeles, CA

Fri–112  
**Accurate and Predictive Profiling of Humoral Immunity by Immunoglobulin Repertoire Sequencing**  
Sai Reddy¹  
¹ETH Zurich, Basel, Switzerland

Fri–113  
**Predicting Kinase Activities from Phosphoproteomic Measurements**  
Shweta Ravi¹ and Kristen Naegle¹  
¹Washington University in St. Louis, St. Louis, MO

**Tracks: Bioinformatics, Computational and Systems Biology, Cellular and Molecular Bioengineering**  
**Theory and Practice of Synthetic Biology**

Fri–114  
**Site Specificity of Affinity Tags Significantly Impact the Folding & Function of Synthetic Peptide**  
Aby Thyparambil¹,² and Anthony Guiseppi-Elie¹,²  
¹Texas A & M University, Bryan, TX, ²Center for Bioelectronics, Biosensors and Biochips (C³B®), Bryan, TX

Fri–115  
**Reprogramming MHC Specificity by Immunogenomic Cassette Exchange**  
Sai Reddy¹  
¹ETH Zurich, Basel, Switzerland

Fri–116  
**Expanding the Genetic Toolbox in Synthetic Biology**  
Cody MacDonald¹ and Tara Deans¹  
¹University of Utah, Salt Lake City, UT

Fri–117  
**Probing Angiogenesis with Synthetic Biology**  
Heidi Spears¹, Tyler Page¹, and Tara Deans¹  
¹University of Utah, Salt Lake City, UT
Track: Biomaterials

Fri–135
Polyhistidine-Tagged Ligand and Antigen Binding to Cobalt Porphyrin Bilayers
Shuai Shao¹, Jumin Geng¹, Hyun Yi², Shobhit Gogia¹, Amy Jacobs², Sriram Neelamegham¹, and Jonathan Lovell¹
¹University at Buffalo, The State University of New-York, Amherst, NY, ²University at Buffalo, The State University of New-York, Buffalo, NY

Track: Biomaterials

Three-Dimensional Printing and Advanced Biomaterial Manufacturing

Fri–137
3D Bioprinting of Tissue Engineered Aortic Root Scaffolds with Hydrogels
Benjamin Stewart¹, Shahnaz Javani¹, Debra Wilcox¹, Corinne Corinne¹, and Ali Azadani¹
¹University of Denver, Denver, CO

Fri–138
3D Printed Brain Model Resembling Mechanical Properties of Brain Matter for Preoperative Planning and Practice
Miriam Navarro¹, Jorge I Rodriguez Devora¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

Fri–139
Characterization of Stainless Steel and Hydroxyapatite Powders for Additive Manufacturing of Composite Craniofacial Implants
Robert Pack¹, Elizabeth Barker¹, Beth Armstrong², Claudia Rawn¹, and Brett Compton¹
¹The University of Tennessee at Knoxville, Knoxville, TN, ²Oak Ridge National Laboratory, Oak Ridge, TN

Fri–140
Integrating Electrospun Microfibers into 3D Printed Scaffolds for Nerve Regeneration
Se-Jun Lee¹, Wei Zhu¹, and Lijie Grace Zhang¹
¹George Washington University, Washington, DC

Fri–141
Alginate/gelatin Hydrogels as a Tunable Bioprinting Material for 3D Tumor Studies
Tao Jiang¹, Jose Gil Mungua-Lopez², Joel Grant¹, Sanahan Vijayakumar¹, and Joseph Kinsella¹
¹McGill University, Montreal, QC, Canada, ²Instituto Potosino de Investigación Científica y Tecnológica, A.C. (IPICyT), San Luis Potosi, Mexico

Fri–142
A Nitrogen-doped Carbon Nanotube and Alginate Composite Hydrogel as a 3D Bioprinting
Jose Gil Mungua-Lopez², Tao Jiang¹, Emilio Muñoz-Sandoval¹, Antonio De Leon-Rodriguez¹, and Joseph Kinsella¹
¹Instituto Potosino de Investigación Científica y Tecnológica, A.C. (IPICyT), San Luis Potosi, Mexico, ²McGill University, Montreal, QC, Canada

Fri–143
3D Printing of Alginate Microstructures with Tunable Degradation Kinetics.
Thomas Valentin¹, Po-Yen Chen¹, Jaskiranjeet Sodhi¹, Marielena Gamboa-Castro¹, Susan Leggett¹, Hayley McClintock¹, Shivaali Maddali¹, and Ian Wong¹
¹Brown University, Providence, RI

Fri–144
Evaluation of Carbon Based-Thermoplastic Polyurethane Composites for the Production 3D Printed Articular Cartilage Scaffold
Diana Rodriguez¹, Yejin Ji¹, and NamSoo Kim¹
¹The University of Texas at El Paso, El Paso, TX
Track: Biomaterials

**Biomaterial Scaffolds**

**Fri-145**
Growth and Differentiation of Myoblasts on Graphene Foam Bioscaffolds
Angela Nicole Chang¹, Eric Krueger¹,², Dale Brown¹, Josh Eisenberger¹, Rachel Brown¹, Sepideh Rastegari¹, Kurtis D. Cantley¹, and David Estrada¹
¹Boise State University, Boise, ID, ²Lehigh University, Bethlehem, PA

**Fri-146**
Computational and Experimental Evaluation of Gradient Scaffolds for Vascularization
Banan Akar¹,², Sami Somol³,⁴, Chenlin Lu¹, Katerina Stojkova¹, Mustafa Ozturk¹, Elif Bayrak¹, Kenneth Tichauer¹, Ali Cinar¹, and Eric Breym⁵
¹Illinois Institute of Technology, Chicago, IL, ²Department of Biomedical Engineering, Mississippi State University, Mississippi, MS

**Fri-147**
Optimizing Anisotropic Polyurethane Scaffolds to Mechanically Match with the Native Myocardium
Cancan Xu¹,², Yihui Huang¹,³, Jinglei Wu¹,³, Liao Jun¹,³, Liping Tang¹,³, and Yi Hong¹,²
¹University of Texas at Arlington, Arlington, TX, ²University of Texas at Arlington and The University of Texas Southwestern Medical Center at Dallas, Dallas, TX, ³Department of Biomedical Engineering, Mississippi State University, Mississippi, MS

**Fri-148**
A Novel Approach to Prepare Nanofibrous 3D Scaffolds
Chi Ma¹, Xiaohua Liu¹,², and Chi Ma³
¹Texas A&M University Baylor College of Dentistry, Dallas, TX, ²Texas A&M University Baylor College of Dentistry, dallas, TX

**Fri-149**
3D Printed Polymeric Bone Scaffolds Withstand Physiological Loads in the Spine Under Static Loading
Constance Maglaras¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

**Fri-150**
Focal Adhesion Activation State Drives Cell Migration Velocity Dependence on Matrix Mimetic Nanofiber Diameter
Daniel T. Bowers¹, Mary E. McCulloch¹, and Justin L. Brown¹
¹The Pennsylvania State University, University Park, PA

**Fri-151**
Engineering Versatile and Stable Collagen Nanofibers from a Mild Solvent
David Castilla¹ and Jorge Almodovar¹
¹Universidad de Puerto Rico-Mayaguez, Puerto Rico

**Fri-152**
Novel and Simple Method for Fabrication of Multichannel PLCL Nerve Guidance Conduit
DoYeon Park¹ and Sang-Hoon Lee¹,²
¹KU-KIST Graduate School of Converging Science and Technology, Korea University, Seoul, Korea, Republic of, ²School of Biomedical Engineering, College of Health Science, Korea University, Seoul, Korea, Republic of

**Fri-153**
Engineered Cellulose-Based Cell Culture Platforms
Gulden Camci-Unal¹
¹Harvard University, Cambridge, MA

**Fri-154**
Fabrication of the Nano/micro Grooved Scaffold to Mimic the ECM Structure of Nerve Cells for Neural Regeneration
Ji Hong Min¹, Uie Seok Chung¹, Haejeong Pang¹, Hye Jin Hong¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of
Fri–166
3D Printed Scaffold Design for Bone Graft Applications Can Withstand Physiological Loading
Rebecca Chung¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

Fri–167
Regulation of The Inflammatory Response to Biodegradable Zinc-Based Implant Materials By Corrosion
Roger Guillery¹, Patrick Bowen¹, Sean Hopkins¹, Emily Shearier¹, Amarsi Gitele³, Eli Aghton², Martin Bocks³, Jaroslav Drelích¹, and Jeremy Goldman¹
¹Michigan Technological University, Houghton, MI, ²Ben-Gurion University of the Negev, Beer-Sheva, Israel, ³University of Michigan Congenital Heart Center, Division of Pediatric Cardiology, Ann Arbor, MI

Fri–168
Photopolymerization of Microgel Building Blocks into Porous Scaffolds for Tissue Engineering
Shangjing Xin¹, Omar Wyman¹, and Daniel Alge¹
¹Texas A&M University, College Station, TX

Fri–169
In-Vitro and In-Vivo Investigation of Chitosan Based Polyelectrolyte-Complex
Shiv Mistry¹, Karishma Desai¹, Jordan Tutnauer¹, Rene Schloss¹, and Nooshir Langrana¹
¹Rutgers University, Piscataway, NJ

Fri–170
Electrospun Conductive PANI/PVDF Blends for Scaffold Engineering
Samerender Nagam Hanumantharao¹, Nastaran Alinezhad¹, Srinivas Kannan¹, and Smitha Rao¹
¹Michigan Tech, Houghton, MI

Fri–171
Design of Peptide Hydrogel for Tissue Infiltration
Daisuke Nakayama¹, Yusuke Kambe², Tetsuji Yamaoka², Sachiro Kakinoki¹, and Yoshiaki Hirano¹
¹Kansai University, Osaka, Japan, ²National Cerebral and Cardiovascular Center, Osaka, Japan

Fri–172
3-D culture of Fibroblasts in Superfine Aginate Nanofibrous Meshes
Young Ju Son¹, Wei Mao², and Hyuk Sang Yoo¹
¹Kangwon National University, Chuncheon, Korea, Republic of, ²Kangwon National University, Chuncheon, China, People's Republic of

Track: Biomaterials
Mechanics of Biomaterials

Fri–173
Effect of DDR2 ECD on Collagen I Gel Mechanics
David Yeung¹, David Gutschick¹, Peter Anderson¹, Heather Powell¹, Gregory Layatsis¹, and Gunjan Agarwali¹
¹The Ohio State University, Columbus, OH

Fri–174
Tough, Degradable, HEMA-Based Hydrogels for Trachea Replacement
Elizabeth Mansfield¹, Vaughn Greene, Jr¹, and Debra Augustine¹
¹The City College of New York, New York, NY

Fri–175
Time-Dependent Flexural Properties of Human Cortical Bone
Gavriel Feuer¹ and Subrata Saha¹
¹SUNY Downstate, Brooklyn, NY

Fri–176
Analysis of the Effect of Saliva on the Degradation of Absorbable Sutures
Luke Riebingera¹, Jenna Briddelb¹, and Donna Ebenstein¹
aBucknell University, Lewisburg, PA, bGeisinger Medical Center, Danville, PA

Fri–177
Thrommechanical Analysis of Thin Shape Memory Polymer Films for Bioelectronic Medicines
Melanie Eckert¹, Vindhya Danda¹, Joseph Pancrazio¹, and Walter Voit¹
¹The University of Texas at Dallas, Richardson, TX

Fri–178
Rheological Differences Between Buffer Dialyzed and Water Dialyzed Keratose Films
Nils Potter¹ and Mark Van Dyke¹
¹Virginia Tech, Blacksburg, VA

Fri–179
Fatigue Characteristics of 3D Printed Scaffold for Long Term Stability in Segmental Bone Defects
Rebecca Chung¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

Fri–180
Neural Interfaces with Photolithographically-defined, Softening Substrates
Romil Modii¹ and Walter Voit²
¹University of Texas at Dallas, Dallas, TX, ²University of Texas at Dallas, Richardson, TX

Fri–181
Poly-L-Lactide Fiber Mechanical Properties and Degradation for Bioreabsorbable Stents
Trey Welch¹ and Nandika DSouza²
¹UT Southwestern Medical Center of Dallas, Dallas, TX, ²University of North Texas, Denton, TX

Fri–182
The Impact of Sterilization on the Mechanical Properties of Shape Memory Polymers for Bioelectronic Medicines
Vindhya Danda¹, Melanie Eckert¹, Christopher Frewin¹, Andrew Shoffstall¹, Jeffrey Capadona¹, Joseph Pancrazio¹, and Walter Voit¹
¹University of Texas-Dallas, Richardson, TX, ²Case Western Reserve University, Cleveland, OH

Track: Biomaterials
Biomaterials

Fri–183
The Role of Ceria and Selenium Nanoparticles in Alleviating Cellular Stress
Amit Roy¹, Ming Gao², Carmen Wu², Bo Yuan², and Thomas J. Webster³
¹Northeastern University, Shrewsbury, MA, ²Northeastern University, Boston, MA

Fri–184
Silicone Functionalized with Atomic Layer Deposition: A Novel Material For Antimicrobial Facial Prosthesis
Arghya Kamal Bishal¹, Cortino Sukotjo¹, and Christos G Takoudis¹
¹University of Illinois at Chicago, Chicago, IL

Fri–185
Stability and Protein Resistance of Silicones Modified with PEO-Silane Amphiphiles
Bryan Khai Ngo¹, Marc Rufin¹, Shane Stafslie¹, and Melissa Grunlan¹
¹Texas A&M University, College Station, TX, ²North Dakota State University, Fargo, ND

Fri–186
Mesenchymal Transition Of Endothelial And Epithelial Cells On Segmental Polyurethane Elastomers
Calvin Cheah¹, Yusuf Sevencan¹, Yuan Yuan¹, and Debanjan Sarkar¹
¹University at Buffalo, Buffalo, NY

Fri–187
Cell Propagation on Solvent-Casted Thermoresponsive Film
Kevin Ortiz-Rivera¹, Yonsil Park¹, Wei-Shou Hu¹, and Chun Wang¹
¹University of Minnesota-Twin Cities, Minneapolis, MN
Fri–188
Shrishi Singh¹, Ankario Kalluri¹, Osama Alturkistani¹, Isaac Macwan¹, Prabir Patra¹, and Ashish Aaphale²
¹University of Bridgeport, Bridgeport, CT, ²University of Connecticut, Storrs, CT

Fri–189
Dynamic Corrosion Behavior of Three Biodegradable Metals (Zn, Fe and Mg) in Phosphate Buffered Saline (PBS)
Yinqi Chen¹,², Weitai Zhang¹, Manfred F. Maizt¹,², Mielyn Chen¹, Heng Zhang¹, Jinlong Mao¹, Yuancong Zhao¹, Nan Huang¹, and Guojian Wan¹
¹Key Laboratory of Advanced Technologies of Materials, Southwest Jiaotong University, Chengdu, SC, China, People’s Republic of, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA.

Fri–190
Biomechanical Effects of the Variation of BMI on Joint Loading during Motorized Disinfection
Tae Soo Bae¹, Sang Hyun Lee¹, Jae Woong Han², and Kyung Hoon Kim³
¹Jungwon University, Changbuk, Korea, Republic of, ²Korea University, Seoul, Korea, Republic of, ³Hanlim Medical Equipment Co., Ltd., Gyeonggi-do, Korea, Republic of

Fri–191
Flow Dynamics in an Obstructed and Stented Ureter
Dar Weiss¹, Miki Haifler², Harry Winkler³, Nir Kleinnmann³, and Shmuel Einav¹,³
¹Tel Aviv University, Tel Aviv, Israel, ²Chaim Sheba Medical Center, Tel Aviv, Israel, ³Stony Brook University, Stony Brook, NY

Fri–192
Longitudinal Comparison of Aortic Flow Variables and Mechanical Stresses in Turner Syndrome
Dhananjay Radhakrishnan Subramaniam¹, Ephraim J. Gutmark¹, Goutham Mylaavarapu¹, Christian Trolle¹, Steffen Ringgaard², Claus H. Gravholt³, Philippe F. Backeland⁴, and Iris Gutmark-Little³
¹University of Cincinnati, Cincinnati, OH, ²Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, ³Aarhus University Hospital, Aarhus, Denmark

Fri–193
Patient-Specific Computational Modeling of Aortic Blood Flow in Turner Syndrome
Dhananjay Radhakrishnan Subramaniam¹, Ephraim J. Gutmark¹, Christian Trolle¹, Steffen Ringgaard², Claus H. Gravholt³, Philippe F. Backeland⁴, and Iris Gutmark-Little³
¹University of Cincinnati, Cincinnati, OH, ²Aarhus University Hospital, Aarhus, Denmark, ³Cincinnati Children’s Hospital Medical Center, Cincinnati, OH

Fri–194
Transapical Coaptation Plate for Functional Mitral Regurgitation: An In-vitro Study
kailiang zhang¹ and Zhoming He³
¹Texas Tech University, Lubbock, TX

Fri–195
Modeling Multi-scale Blood Rheology in a Straight Microvessel
Zelin Xu¹ and Clement Kleinstreuer¹,²
¹North Carolina State University, Raleigh, NC, ²NC State University/UNC Chapel Hill, Raleigh, NC

Fri–196
Effects of Bioengineering Scaffolds Releasing Neurotrophins and Body Weight Supported Treadmill Training on Neuropathic Pain after Spinal Cord Injury
Sarah Townsend¹, Patrick Sheehan², Anita Singh³, Shania Shaji⁴, and Andrea Vernengo⁵
¹Widener University, Collegeville, PA, ²Widener University, Bellmawr, NJ, ³Widener University, Media, PA, ⁴Widener University, Chester, PA, ⁵Rowan University, Glassboro, NJ

Track: Biomechanics
Biomechanics in Tissue Engineering and Regenerative Medicine
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Evaluation of the Mechanical Properties of the Brain Tissue Using Indentation Technique
Aref Samadi-Dooki¹, George Voyiadjis², and Rhett Stout¹
¹Louisiana State University, Baton Rouge, LA

Fri–198
Development of a Decellularized Osteochondral Xenograft Using EGCG as a Chemical Crosslinker
John Clune¹ and Steven Elder²
¹Mississippi State University, Starkville, MS

Fri–199
Measurements of Hysteretic Strain-stress Curves of Porcine Liver Tissue at Different Loading Rates
Ling Li¹, Ahmad Abiri¹, Ashkan Maccabi¹, Warren Grundfest¹, and Robert Candler¹
¹University of California, Los Angeles, Los Angeles, CA

Track: Biomechanics
Biomechanics of Rehabilitation
Fri–200
Longitudinal Effect of Nerve Block on Gait Mechanics following Anterior Cruciate Ligament Reconstruction: A Prospective Randomized Control Study
Christopher Nagelli¹,², Stephanie Di Stasi¹, Nathan Schilaty¹, Albert Chen¹, James Cook¹, and Timothy Hewett¹
¹Mayo Clinic, Rochester, MN, ²The Ohio State University, Columbus, OH, ³University of Missouri, Columbia, MO

Fri–201
Activity Recognition and Step Counting Using Wrist-worn Inertial Measurement Units
Heesu Park¹, In Won Jung², Min Hye Chang³, and Inchan Youn²
¹Korea University of Science and Technology, Daejeon, Korea, Republic of, ²Korea Institute of Science and Technology, Seoul, Korea, Republic of

Track: Biomechanics
Biomechanics of the Female Pelvic Floor
Fri–202
Planar Biaxial Mechanical Properties of Swine Vaginal Tissue
Jeffrey McGuire¹ and Rafaela De Vita¹
¹Virginia Tech, Blacksburg, VA
Tracks: Cellular and Molecular Bioengineering, Biomechanics

Cellular and Molecular Biomechanics: Mechanobiology

Fri–203
Mechanical Force Across A-Cadherin Coordinates Proliferation in Epithelial Cell
Abhinav Mohan¹
¹Virginia Commonwealth University, Richmond, VA

Fri–204
Multicellular Regulation of Tensional Homeostasis
Alicia Zollinger¹, Elizabeth Canovic², Michael Smith¹, and Dimitrije Stamenovic³
¹Boston University, Boston, MA, ²Massachusetts Institute of Technology, Cambridge, MA

Fri–205
The Effect of Cell Cortex on OMTC Measurements
Amir Vahabikashi¹, Chan Young Park², Jeffrey Fredberg², and Mark Johnson¹
¹Northwestern University, Evanston, IL, ²Harvard University, Boston, MA

Fri–206
Cytoplasmic Stiffness in Migrating Cells at the Interface of a Chemical/Mechanical Gradient
Andrew Ford¹ and Padma Rajagopalan¹
¹Virginia Tech, Blacksburg, VA

Fri–207
Origin of Axonal Tension through the Study of Single Axon Contraction in vivo
Anthony Fan¹, Alireza Tofangchi¹, and Taher Sait²
¹University of Illinois at Urbana-Champaign, Urbana, IL

Fri–208
Predicting Elastic and Shear Moduli of Regions of the Lens from Lens Fiber Cell Morphology
Bharat Kumar¹ and Matthew Reilly¹
¹Ohio State University, Columbus, OH

Fri–209
Mechanically Coupled Cell-Matrix Interactions Predicted with a 2.5-D Computational Model
Maziar Aghvami¹ and Edward Sander¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–210
Interaction of Alcohol Level and Stretch Pattern on Mitochondrial Function in Vascular Smooth Muscle Cells Using Live Imaging
Elizabeth Bartolak-Suki¹
¹Boston University, Boston, MA

Fri–211
Oscillations in Microglial Cells are Regulated by Actomyosin Contractility
Eunyoung Park¹, Young Bin Cho¹, Unghyun Ko¹, Jin-Sung Park¹, Sukyung Park¹, and Jennifer H. Shin¹
¹Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of

Fri–212
Effect of Membrane Cholesterol on Vascular Smooth Muscle Cell Stiffness and N-Cadherin Adhesion.
Hanna Sanyour¹, Mariah Hoffman¹, Daniel Engebretson¹, and Zhongkui Hong¹
¹University of South Dakota, Sioux Falls, SD

Fri–213
The Effects of Membrane Cholesterol on the Adhesion of Vascular Smooth Muscle Cells to Fibronectin
Josh Childs¹ and Zhongkui Hong¹
¹University of South Dakota, Sioux Falls, SD
Fri–225  Effect Mechanical Stimulation on the Immune Response in HaCaT Keratinocytes
Seunghooe Oh¹, Hyewon Chung¹, Soohoo Chang¹, Seung Hyeok Seok¹, and Hyunguk Lee¹
¹Yonsei University, Seoul, Korea, Republic of, ²Samsung Electronics Co., Ltd., Suwon, Korea, Republic of, ³Seoul National University, Seoul, Korea, Republic of

Fri–226  Role of Progesterone in Modulating the Mechanobiology of Cervical Fibroblasts
Vasudha Chilukuri¹, Victoria Barnhouse¹, Jennifer Leight¹, Douglas Kniss², and Samir Ghadiali³
¹The Ohio State University, Columbus, OH, ²The Ohio State University Wexner Medical Center, Columbus, OH

Fri–227  Biomechanical Properties of Murine Mesenchymal Stem Cells Probed By Mitochondria-Tracking Microscopy
Wenlong Xu¹, Elaheh Alizadeh¹, Jordan Castle¹, and Ashok Prasad¹
¹Colorado State University, Fort Collins, CO

Fri–228  Stress Fiber Contractile Behaviors in Aortic Valve Interstitial Cells
Yusuke Sakamoto¹, Rachel Buchanan¹, Joanna Adams², Farshid Gulak³, and Michael Sacks¹,⁴
¹The University of Texas at Austin, Austin, TX, ²Duke University, Durham, NC, ³Washington University, St. Louis, MO, ⁴Biomedical Engineering, Austin, TX

Fri–229  Strain-rate Dependent Mechanical Responses of the Aortic Valve Interstitial Cells
Yusuke Sakamoto¹, Rachel Buchanan¹, Joanna Adams², Farshid Gulak³, and Michael Sacks¹,⁴
¹The University of Texas at Austin, Austin, TX, ²Duke University, Durham, NC, ³Washington University, St. Louis, MO, ⁴Biomedical Engineering, Austin, TX

Fri–230  The Force Generation of Sarcomere Shortening: Contractile Analysis of iPSC-Cardiomyocytes
Alexandre Ribeiro¹,²,³, Olivier Schwab¹, Yen-Sin Ang¹, Deepak Srivastava¹,⁴, and Beth Pruitt²,³
¹Stanford University, Stanford, CA, ²Stanford Cardiovascular Institute, Stanford, CA, ³Gladstone Institute of Cardiovascular Disease, San Francisco, CA, ⁴University of California San Francisco, San Francisco, CA

Fri–231  Rational Design of FRET-Based Tension Sensors
Andrew LaCroix¹, Andrew Lynch¹, and Brenton Hoffman¹
¹Duke University, Durham, NC

Fri–232  Age-related Changes in Matrix Proteoglycans Affect the In Situ Toughness of Human Bone
Ann Y. Huang¹, Abu Saleh Alsain¹, Sumin Gu², Natalie Fan¹, Haoran Xu¹, Trent Hejazi¹, Jean X. Jiang², and Xiaodui Wang¹
¹University of Texas at San Antonio, San Antonio, TX, ²University of Texas Health Science Center at San Antonio, San Antonio, TX

Fri–233  Determining The Role of Stem Cells in Emery-Dreifuss Muscular Dystrophy Caused by Lamin Mutations
Ashley Kaminski¹, Suzanne Eisenberger¹, Ninad Kanetkar¹, Rebecca Mount¹, Jean Kwon¹, Tyler Kirby¹, and Jan Lamerding¹
¹Cornell University, Ithaca, NY

Fri–234  Endothelial Mitochondria Regulate the Intracellular Ca2+ Response to Fluid Shear Stress
Christopher G. Schettlin¹, Justin A. Julian¹, Santhanam Shannughaapriya², Muniswamy Madesh², Nikolao M. Tsoukias³, and B. Rita Alevriadou¹
¹The Ohio State University, Columbus, OH, ²Temple University, Philadelphia, PA, ³Florida International University, Miami, FL

Fri–235  High Throughput Image Analysis Reveals Three Dimensional Morphological Changes in Hypertrophically Stimulated Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes
Cassady Rupert¹, Heidi Chang¹, and Kareen Coulombe¹
¹Brown University, Providence, RI

Fri–236  Cell Mechanical Determinants of Endothelial Permeability are Global and Not Local
Corey Hardin¹, Jovity Chattoraj¹, Emanuelu Del Gado², and Ramaswamy Krishnan³
¹Massachusetts General Hospital, Boston, MA, ²Georgetown, Washington, DC, ³Beth Israel Deaconess Medical Center, Boston, MA

Fri–237  Activation of Intracellular Ca2+ Oscillation by High-frequency Ultrasound Stimulation in HITT-715 Pancreatic Beta Cell line
Chi Woo Yoon¹, Changhan Yoon², Nan Sook Lee¹, Kyo Suk Goo¹, Hayong Jung¹, and K. Kirk Shung¹
¹University of Southern California, Los Angeles, CA, ²Georgia Institute of Technology, Atlanta, GA

Fri–238  Microchip-Based Examination of Mechanical Interplay of Cadherin- and Integrin-based Adhesions
Erdem Tabdanovic¹, Arja Ray¹, Marjorie Carlson¹, and Paolo Provenzano¹
¹University of Minnesota, Minneapolis, MN

Fri–239  The Effect of Interleukin-1&[beta] On Osteoblastic Bone Formation
Estee George¹ and Marnie Saunders¹
¹The University of Akron, Akron, OH

Marnie Saunders¹, Estee George¹, Sharon Truesdell¹, Dustin Hayes¹, and Robert Thoerner¹
¹The University of Akron, Akron, OH

Fri–241  Biophysical Regulation of Epigenetic Reprogramming during TGF 1-Induced Epithelial-Mesenchymal Transition
Joseph O’Connor¹, Paul Blanchard¹, and Esther Gomez¹
¹Pennsylvania State University, University Park, PA

Fri–242  Effect of Fluid Shear Stress on Endothelial Cell Tensional Homeostasis
Han Xu¹, Dimitrije Stamenovic¹, and Michael Smith¹
¹Boston University, Boston, MA

Fri–243  Mechanosensitive MicroRNA-181b Impairs Anti-inflammatory Signaling at the Aortic Valve Fibrosa Endothelium
Jack Heath¹, Joan Fernandez Esmerats¹, Rachel Simmons¹, Sandeep Kumar¹, and Hanjoong Jo¹
¹Emory University and Georgia Institute of Technology, Atlanta, GA

Fri–244  Aortic Valve Inflammation Is Mediated by Shear-Sensitive miRNA-1237-3p
Joan Fernandez¹, Jack Heath², Sandeep Kumar², and Hanjoong Jo¹,²
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA
Fri–245  
Mechano-sensitivity of Nuclear Lamin Proteins in Endothelial Cells  
Yizhi Jiang¹ and Julie Ji  
¹Indiana University Purdue University Indianapolis, Indianapolis, IN

Fri–246  
Stretch Control of Beta-catenin Nuclear Translocation in MSCs and Its Mediation by N-cadherin  
Jeong Soon Lee¹, Ligyoeom Ha¹, and Jung Yul Lim¹  
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–247  
Somatodendritic Distribution and Nanoclustering of SK Channels Is Under The Control Of PKA  
Kritthika Abiraman¹, Randall Walikonis¹, Anastasios Tzingounis¹, and George Lykotrafitis¹  
¹University of Connecticut, Storrs, CT

Fri–248  
Effect of Temperature and Dosage of Chemotherapeutic Drugs on Cellular Metabolism  
Likitha Somasekhar¹  
¹Florida Institute of Technology, Melbourne, FL

Fri–249  
An Integrated Microfluidic Platform for High-throughput, Single-cell Physical and Biochemical Phenotyping  
Lillian Peng¹, Jonathan Lin¹, and Dino Di Carlo¹  
¹University of California Los Angeles, Los Angeles, CA

Fri–250  
Low-Intensity Vibration Mitigates Diabetes-Induced Inflammation in Adipocyte: An In Vitro Study  
Maggie Haviland¹, Karen Wong¹, Quynh Nhu Le¹, Vihtaben Patel¹, Clinton Rubin¹, and Mei Lin Chan¹  
¹State University of New York at Stony Brook, Stony Brook, NY

Fri–251  
The Role of miR-744 in Endothelial Inflammation and Atherosclerosis  
Rachel Simmons¹, Salim Thabet¹, and Hanjoong Jo¹  
¹Georgia Institute of Technology, Atlanta, GA

Fri–252  
A Large-Scale, Functional Screening of Mammalian Mechanosensitive Genes Using Drosophila RNAi Library- Smarc3/Bap60 Is a Mechanosensitive Pro-Inflammatory Gene  
Sandeep Kumar¹, In Hwan Jang¹, Chanwoo Kim¹, Dong Won Kang¹, Won Jae Lee¹, and Hanjoong Jo¹  
¹Emory University, Atlanta, GA, ²National Creative Research Initiative Center for Hologenomics, Seoul National University, Seoul, Korea, Republic of, ³Georgia Institute of Technology and Emory University, Atlanta, GA

Fri–253  
Progerin and Lamin-A are Equally Phosphorylated in iPSC-derived Mesenchymal Stem Cells: Quantitation by Fine-excision & Alignment Mass Spectrometry (FEA-MS)  
Sangkyun Cho¹, Amal Abbas¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA

Fri–254  
Molecular Determinants of Cadherin Ideal Bond Formation: Conformation Dependent Unbinding On A Multidimensional Landscape  
Kristine Manibog¹, Kannan Sankar¹, Sunae Kim¹, Yunxiang Zhang³, Robert Jernigan¹, and Sanjeevi Sivasankar¹  
¹Iowa State University, Ames, IA, ²Stanford University, Stanford, CA

Fri–255  
Microgravity Compromises Actin Cytoskeleton Resulting in Increased Nuclear Height in MSCs  
Soll Kim¹, Kaushik Puranam¹, Aditi Senthilnathan¹, Janet Rubin¹, and Gunes Uzer¹  
¹University of North Carolina at Chapel Hill, Chapel Hill, NC

Fri–256  
Endogenous Sheet Tension within an Epithelial Cell Colony is Anisotropic  
Venkat Maruthamuthu¹ and Sandeep Dumbali¹  
¹Old Dominion University, Norfolk, VA

Fri–257  
Nuclear Volume Expansion Induced by Cell Shape Changes During Migration  
Vincent Tocco¹, Varun Aggarwal¹, Sandra Baker-Groberg³, Owen McCarty², Richard Dickinson³, and Tanmay Lele¹  
¹University of Florida, Gainesville, FL, ²Oregon Health & Science University, Portland, OR

Track: Biomechanics  
Neuromuscular Biomechanics

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The Effect of Visual Distortion on Human Gait Parameters  
Gabrielle Maestas¹, Pranath Chandurudu¹, Seung-jae Kim², and Hyunglae Lee¹  
¹Arizona State University, Tempe, AZ, ²California Baptist University, Riverside, CA

Tracks: Biomechanics, Orthopaedic and Rehabilitation Engineering  
Orthopedic Mechanobiology and Mechanotransduction

Fri–259  
Intermittent Vibrations Reduce Inflammation, Apoptotic Signaling and Oxidative Damage in Prolongedly Compressed Muscle Tissues: A Senescence-Accelerated Mouse Model  
Brian C. H. Cheung¹, T. K. Pang¹, S. W. Wong¹, and Arthur F. T. Mak¹  
¹The Chinese University of Hong Kong, Shatin, Hong Kong

Fri–260  
Bone-on-Chip to Study Osteocyte Mechano-Transduction and ECM Production  
Elisa Budyń¹,², Morad Bensidhoum³, Samantha Sanders¹, Eric Schmidt¹, Patrick Tauč¹, Eric Deprez¹, and Herve Petite³  
¹Ecole Normale Superieure de Cachan, Cachan, France, ²University of Illinois at Chicago, Chicago, IL, ³University Paris 7, Paris, France

Fri–261  
Mechanical Loading Attenuates Radiation-induced Bone Loss  
Henry Donahue¹, Peter Govey¹, and Yue Zhang¹  
¹Virginia Commonwealth University, Richmond, VA, ²Penn State, Hershey, PA

Fri–262  
Mechanical Properties of Incudostapedial Joint at High Strain Rate Measured by SHTB  
Shangyuan Jiang¹, Huiyang Luo², Hongbing Lu², and Rong Z. Gan¹  
¹University of Oklahoma, Norman, OK, ²University of Texas at Dallas, Richardson, TX

Tracks: Orthopaedic and Rehabilitation Engineering, Biomedical Imaging and Optics  
Imaging Techniques for Musculoskeletal System

Fri–263  
Ultrasound Elastography Probe Design for Rotator Cuff Diagnosis  
Chris Bocklet¹, Emily Kowal¹, Glenn Heffter¹, Mari Marlow¹, Mia Warner¹, Will Harley¹, Delphine Dean¹, and David Kwartowitz¹  
¹Clemson University, Clemson, SC
Fri–264
3D Analysis Method of Angular Rotation Between Ideal and Actual Femur Positions in Anterior-posterior X-ray Images
Eunjuem Shin1, Sehyung Park1, Youngjun Kim1, and Byung Hoon Lee2
1Korea Institute of Science and Technology, Seoul, Korea, Republic of
2Hallym University Medical Center, Seoul, Korea, Republic of
Fri–265
Skeletal Muscle Blood Flow Measured by Diffuse Correlation Spectroscopy and Fluorescent Microspheres
Ashley Proctor1, Gabriel Ramirez2, Tracy Bubel1, Songfeng Han1, and Regene Choe1
1University of Rochester, Rochester, NY
Fri–266
Computer-Aided Detection for Plastic Deformation Fractures in Pediatric Forearm
Yuwei ZHOU1, Uygar Teomete1, and Weizhao Zhao1
1University of Miami, Coral Gables, FL
Fri–267
Multi-channel Light Sheet Microscopy for Intact Mouse Eyeball
Jianguo Ma1, Liwei Zhang2, Yichen Ding1, Parinaz Abiri1, Guangyu Li1, Lu Chen2, and Tsung Hsiai1
1University of California, Los Angeles, Los Angeles, CA, 2University of California at Berkeley, Berkeley, CA
Fri–268
The Effects of Collagen Density and Pore Aize on In Vitro Cancer Cell Migration
Van Lam1, Tyler Zimmerman1, Byung Min Chung1, and Christopher Raub1
1The Catholic University of America, Washington, DC
Fri–269
Wide-field Mapping of Collagen Fiber Orientation and Orientation Distribution in Soft Tissues
Will Goth1, Michael Sacks1, and James Tunnell1
1The University of Texas at Austin, Austin, TX
Fri–270
Effect of Nonlinear Inversion Parameters on MR Elastography of Human Brain
Aaron Anderson1, Curtis Johnson2, Matthew McGarry1, Keith Paulsen1, Bradley Sutton1, Elijah Van Houten1, and John Georgiadis6
1University of Illinois at Urbana-Champaign, Urbana, IL, 2University of Delaware, Newark, DE, 3Dartmouth College, Hanover, NH, 4Dartmouth-Hitchcock Medical Center, Lebanon, NH, 5University of British Columbia, Vancouver, BC, Canada, 6Illinois Institute of Technology, Chicago, IL
Fri–271
Reconstructing Blood Velocity Profiles from Noisy 4D-PCMR Data using Ensemble Kalman Filtering
Ali Bakhshinejad1, Vitaliy Rayz1, and Roshan M. D’Souza1
1University of Wisconsin-Milwaukee, Milwaukee, WI, 2Medical College of Wisconsin, Milwaukee, WI
Fri–272
Exploring the Accuracy of Micro-CT Guided Finite Element Analysis
Ashley Jackson1
1North Carolina A&T State University, Greensboro, NC
Fri–273
Diffusion Tensor Imaging and MR Elastography of the Mini-Pig Brain In Vivo
Charlotte Guertler1, Ruth Okamoto1, Alex Cerjanic2, Curtis Johnson3, and Philip Bayl1
1Washington University in St. Louis, St. Louis, MO, 2University of Illinois at Urbana-Champaign, Urbana, IL, 3University of Delaware, Newark, DE
Fri–274
Volumetric and Structural Analysis of Intervertebral Disc in Open Upright MRI in Humans During Standing
Christian Weber1 and Simon Tang1
1Washington University in St. Louis, St. Louis, MO
Fri–275
Supraspinatus Tendon Degeneration is Correlated with Quantitative Ultrasound Measures
Gerald Ferrer1, R Matthew Miller1, Masahito Yoshida1, Amir A Rahmeh-Azari1, Volker Musahl1, and Richard E Debski1
1University of Pittsburgh, Pittsburgh, PA
Fri–276
Mechanical Anisotropy of Ex Vivo Bovine Intervertebral Disc From Magnetic Resonance Elastography
John Schmidt1, Pierre-François Beauchemin2, Ruth Okamoto1, Joel Garbow1, Delphine Pérè1,4, and Phil Bayl1
1Washington University, St. Louis, MO, 2Rheolution Inc., Montréal, QC, Canada, 3École Polytechnique de Montréal, Montréal, QC, Canada, 4Centre hospitalier universitaire Sainte-Justine, Montréal, QC, Canada
Fri–277
Visualizing the Nonlinear Mechanics of Collagen in Eye Tissue
Ning-Juan Jan1, Michael Iasella1, Mason Lester1, Danielle Hu1, Kira Lathrop1, Huong Tran1, Andrew Voorhees1, Gadi Wollstein1, Joel Schuman2, and Ian A. Sigal1
1University of Pittsburgh, Pittsburgh, PA, 2New York University, New York, NY
Fri–278
Constitutive Modeling of Fibrotic Liver Tissues: A Systems Biology Approach
Yu Wang1 and Jingfeng Jiang1
1Michigan Technological University, Houghton, MI

Tracks: Biomechanics, Biomedical Imaging and Optics

Imaging Techniques in Biomechanics

Fri–264
3D Analysis Method of Angular Rotation Between Ideal and Actual Femur Positions in Anterior-posterior X-ray Images
Eunjuem Shin1, Sehyung Park1, Youngjun Kim1, and Byung Hoon Lee2
1Korea Institute of Science and Technology, Seoul, Korea, Republic of
2Hallym University Medical Center, Seoul, Korea, Republic of
Fri–265
Skeletal Muscle Blood Flow Measured by Diffuse Correlation Spectroscopy and Fluorescent Microspheres
Ashley Proctor1, Gabriel Ramirez2, Tracy Bubel1, Songfeng Han1, and Regene Choe1
1University of Rochester, Rochester, NY
Fri–266
Computer-Aided Detection for Plastic Deformation Fractures in Pediatric Forearm
Yuwei ZHOU1, Uygar Teomete1, and Weizhao Zhao1
1University of Miami, Coral Gables, FL
Fri–267
Multi-channel Light Sheet Microscopy for Intact Mouse Eyeball
Jianguo Ma1, Liwei Zhang2, Yichen Ding1, Parinaz Abiri1, Guangyu Li1, Lu Chen2, and Tsung Hsiai1
1University of California, Los Angeles, Los Angeles, CA, 2University of California at Berkeley, Berkeley, CA
Fri–268
The Effects of Collagen Density and Pore Aize on In Vitro Cancer Cell Migration
Van Lam1, Tyler Zimmerman1, Byung Min Chung1, and Christopher Raub1
1The Catholic University of America, Washington, DC
Fri–269
Wide-field Mapping of Collagen Fiber Orientation and Orientation Distribution in Soft Tissues
Will Goth1, Michael Sacks1, and James Tunnell1
1The University of Texas at Austin, Austin, TX
Fri–270
Effect of Nonlinear Inversion Parameters on MR Elastography of Human Brain
Aaron Anderson1, Curtis Johnson2, Matthew McGarry1, Keith Paulsen1, Bradley Sutton1, Elijah Van Houten1, and John Georgiadis6
1University of Illinois at Urbana-Champaign, Urbana, IL, 2University of Delaware, Newark, DE, 3Dartmouth College, Hanover, NH, 4Dartmouth-Hitchcock Medical Center, Lebanon, NH, 5University of British Columbia, Vancouver, BC, Canada, 6Illinois Institute of Technology, Chicago, IL
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Reconstructing Blood Velocity Profiles from Noisy 4D-PCMR Data using Ensemble Kalman Filtering
Ali Bakhshinejad1, Vitaliy Rayz1, and Roshan M. D’Souza1
1University of Wisconsin-Milwaukee, Milwaukee, WI, 2Medical College of Wisconsin, Milwaukee, WI
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Exploring the Accuracy of Micro-CT Guided Finite Element Analysis
Ashley Jackson1
1North Carolina A&T State University, Greensboro, NC
Fri–273
Diffusion Tensor Imaging and MR Elastography of the Mini-Pig Brain In Vivo
Charlotte Guertler1, Ruth Okamoto1, Alex Cerjanic2, Curtis Johnson3, and Philip Bayl1
1Washington University in St. Louis, St. Louis, MO, 2University of Illinois at Urbana-Champaign, Urbana, IL, 3University of Delaware, Newark, DE
Fri–274
Volumetric and Structural Analysis of Intervertebral Disc in Open Upright MRI in Humans During Standing
Christian Weber1 and Simon Tang1
1Washington University in St. Louis, St. Louis, MO
Fri–275
Supraspinatus Tendon Degeneration is Correlated with Quantitative Ultrasound Measures
Gerald Ferrer1, R Matthew Miller1, Masahito Yoshida1, Amir A Rahmeh-Azari1, Volker Musahl1, and Richard E Debski1
1University of Pittsburgh, Pittsburgh, PA
Fri–276
Mechanical Anisotropy of Ex Vivo Bovine Intervertebral Disc From Magnetic Resonance Elastography
John Schmidt1, Pierre-François Beauchemin2, Ruth Okamoto1, Joel Garbow1, Delphine Pérè1,4, and Phil Bayl1
1Washington University, St. Louis, MO, 2Rheolution Inc., Montréal, QC, Canada, 3École Polytechnique de Montréal, Montréal, QC, Canada, 4Centre hospitalier universitaire Sainte-Justine, Montréal, QC, Canada
Fri–277
Visualizing the Nonlinear Mechanics of Collagen in Eye Tissue
Ning-Juan Jan1, Michael Iasella1, Mason Lester1, Danielle Hu1, Kira Lathrop1, Huong Tran1, Andrew Voorhees1, Gadi Wollstein1, Joel Schuman2, and Ian A. Sigal1
1University of Pittsburgh, Pittsburgh, PA, 2New York University, New York, NY
Fri–278
Constitutive Modeling of Fibrotic Liver Tissues: A Systems Biology Approach
Yu Wang1 and Jingfeng Jiang1
1Michigan Technological University, Houghton, MI

Tracks: Biomedical Imaging and Optics, Tissue Engineering

Imaging Techniques in Tissue Engineering

Fri–279
Differential Z Scanning: A New, Automated Algorithm for Large FOV Acquisition Across a Signal Gradient Using Traditional Confocal and Multiphoton Microscopy Platforms
Kyle Cowdrick1, Harsh Patolia1, George chirist2, and frank Marini1
1Wake Forest Institute of Regenerative Medicine, Winston-Salem, NC, 2University of Virginia, Charlottesville, Charlottesville, VA
Fri–281
Development of a Novel Molecular Probe to Track Viable Mesenchymal Stem Cells
Kabir Dhada¹ and Laura Suggs¹
¹University of Texas at Austin, Austin, TX

Tracks: Biomedical Imaging and Optics, Translational Biomedical Engineering
Imaging Technologies in Clinical Translation

Fri–282
Ultrasound Characterization of Interface Oscillation as a Proxy for Ventriculoperitoneal Shunt Function
April Joy Aralar¹, Matthew Bird¹, Robert Graham¹, Beomseoo Koo¹, Mahesh Shenai², Parag Chitnis¹, and Siddhartha Sikdar¹
George Mason University, Fairfax, VA, ¹Inova Neuroscience and Spine Institute, Fairfax, VA

Fri–283
Line Scan Microscope for a Leukocyte Differential Based On Colorimetric Ratio
Courtney Hunter¹, Joshua A. Hutcheson¹, Amy J. Powless¹, and Timothy J. Muldoon¹
University of Arkansas, White Hall, AR

Fri–284
Measurement of Tissue Phantom Optical Properties at Near-Infrared Wavelengths Using Visible Light Spatial Frequency Domain Imaging
Chun Yeung Yim¹, Raef Istfan², Darren Roblyer², and Mark Pierce³
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Boston University, Boston, MA

Fri–285
Segmentation of Breast Tissue for Infrared Image Analysis
Abia Khan¹ and Murray Loew¹
George Washington University, Washington, DC

Fri–286
Physiological Assessment of Wound Healing using a Near-infrared Optical Scanner
Anuradha Godavarty¹, Arash Dadkhah¹, Xing Pang¹, Jiali Lei¹, Rebecca Kwaskinski¹, Ruogu Fang¹, and Francisco Perez-Clavijo²
¹Florida International University, Miami, FL, ²Podiatry Care Partners, Doral, FL

Fri–287
Objective Measurement of Intraocular Inflammation with Optical Coherence Tomography
Elliot Crane¹, Alexander B. Crane¹, Ronald Rescigno¹, Ben Szirth¹, and David S. Chui²
¹Rutgers New Jersey Medical School, Newark, NJ, ²Metropolitan Eye Research and Surgery Institute, Palisades Park, NJ

Fri–288
Application of Hierarchical Temporal Memory in Anomaly Detection
Jianghao Shen¹ and Murray Loew¹
George Washington University, Washington, DC

Fri–289
Targeted Theranostic Gold Nanoparticles for Imaging and Therapy of Triple Negative Breast Cancer
Nagwa El-Baz¹, Danial Malik¹, Rajat Chauhan², Kurtis James¹, Mingming Zhu¹, Junling Li¹, Ayman El-Baz², Donald Miller³, Robert Keynton¹, Chir Ng¹, Paula Bates¹, Mohammad Malik¹, and Martin O’Toole¹
University of Louisville, Louisville, KY

Track: Biomedical Imaging and Optics
Nanotheranostics

Fri–290
Raman Microspectroscopy of Single Cell during Rapid Freezing
Guanglin Yu¹, Yan Rou Yap¹, Katie Pollock¹, and Allison Hubel¹
University of Minnesota, Minneapolis, MN

Fri–291
Measurement-based and Model-based Scatter Correction in Multi-source Interior Computed Tomography
Hao Gong¹ and Guohua Cao¹
Virginia Polytechnic Institute and State University, Blacksburg, VA

Fri–292
Development of a Mobile Phone-Based Malaria Diagnostic Device
Kokou Dogbevi¹, Cody Lewis¹, Richard Horner¹, and Gerard Cote¹
Texas A&M University, College Station, TX

Fri–293
Improved Spatial Resolution in Optical Projection Imaging with Enhanced Early Photon Detection
Lagnojita Sinha¹, Wei Zhou¹, Jovan Brankov², and Kenneth Tichauer³
Illinois Institute of Technology, Chicago, IL, ²Texas A&M University, College Station, TX, ³Texas A&M Health Science Center, Bryan, TX

Fri–294
Simulating Intravital Imaging of Murine Lung for Enhanced Detection of Bacterial Infection
Madeleine Durkee¹, Fatemeh Nooshabadi¹, Patrick Griffin¹, Jeffrey Cirillo², and Kristen Maitland¹
Texas A&M University, College Station, TX, Texas A&M Health Science Center, Bryan, TX

Fri–295
Comparing Feature-Based Salience Detection Algorithms in Mammograms
Kristina Landino¹ and Murray Loew¹
George Washington University, Washington, DC

Fri–296
Generalized 2D SVD Reconstruction for Interior Tomography
Rui Liu¹,²,³ and Hengyong Yu²
Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²University of Massachusetts Lowell, Lowell, MA, ³Wake Forest University Health Sciences, Winston-Salem, NC

Fri–297
A Kinetic Model to Estimate Retinal Vascular Permeability from Fluorescein Videoangiography Data
Shaoxian Hu¹, Kenneth Tichauer¹, Jennifer Kang-Mieler¹, Wenqiang Liu¹, and Emily Dosmar¹
Illinois Institute of Technology, Chicago, IL
Fri–298
Volumetric Structured Illumination with Non-Mechanical Focal Scanning
Taylor Hinsdale¹
University of Akron, Akron, OH

Fri–299
Real-time Monitoring of Thermal Tissue Damage in Ex Vivo Porcine Kidney using Diffuse Reflectance Spectroscopy
Vivek Krishna Nagarajan¹ and Bing Yu¹
University of Akron, Akron, OH

Tracks: Drug Delivery, Cancer Technologies
Cancer Drug Delivery

Fri–300
Combinatorial Therapy using Multifunctional Gold Nanoparticles for Cancer Treatment
Binita Shrestha¹ and Liang Tang¹
University of Texas at San Antonio, San Antonio, TX

Fri–301
The Therapeutic Effect of Epigenetic Drug-encapsulating-lipid Nanoeulsion for Triple Negative Breast Cancer Cells
Bumjun Kim¹ and Debra Augustine¹
The City College of New York, New York City, NY

Fri–302
Development of Paclitaxel-loaded Polymeric Depots as Drug Delivery System for Cancer Chemotherapy
Chitnart Thedrattanawong¹, Pinunta Nittayacharn¹, and Norased Nasongkla¹
Mahidol University, Nakhon Pathom, Thailand

Fri–303
Development of Novel Glutathione-Sensitive Nanoparticles For Lung Cancer Treatment
Daria Zhukova¹, Roshni Iyer¹, Cancan Xu¹, Kytai Nguyen¹,², and Yi Hong¹³
University of Texas at Arlington, Arlington, TX, Joint graduate program in biomedical engineering-University of Texas at Arlington and University of Texas Southwestern Medical Center, Arlington, TX

Fri–304
KE108-Conjugated Unimolecular Micelles Loaded with a Novel HDAC Inhibitor Thailandepsin-A for Targeted Neuroendocrine Cancer Therapy
Guojun Chen¹, Renata Jaskula-Sztul², April Harrison³, Ajitha Dhammalapati¹, Wenjin Xu¹, Yiqiang Cheng¹, Herbert Chen², and Shaqin Gong¹
University of Texas at San Antonio, San Antonio, TX, University of Alabama at Birmingham, Birmingham, AL, University of Wisconsin-Madison, Madison, WI, University of North Texas Health Science Center, San Antonio-Division, TX

Fri–305
HIFU-mediated Extracellular Matrix Remodeling for Enhancing Drug Delivery
Hyounkoo Han¹,², Jin Hee Na¹, Sangmin Lee¹, Kwangmeyung Kim², and Hyeoncheol Kim¹³
Department of Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea, Republic of, Biomedical Research Center, Korea Institute of Science and Technology, Seoul, Korea, Republic of, Interdisciplinary program of Integrated Biotechnology, Seoul, Korea, Republic of

Fri–306
Tunable Release of Anti-Cancer Agents from Silk-Coated Drug Reservoirs
Jeanine M. Coburn¹,², Rachel Cunningham¹, Akari Miki¹, Bill Chiu³, and David L. Kaplan¹
Tufts University, Medford, MA, Worcester Polytechnic Institute, Worcester, MA, University of Illinois at Chicago, Chicago, IL

Fri–307
Combinatorial miRNA Delivery via Bioreducible Nanoparticles as a Treatment for Human Glioblastoma
Kristen Kozieleski¹, Hernando Lopez-Berton¹, Bachchu Lal¹, Hannah Vaughan¹, John Laterra¹, and Jordan Green¹
Johns Hopkins University, Baltimore, MD

Fri–308
The Cellular Response of Gold Nanorods in SKBR3 and Hep2 Cells
Lijun Wang¹ and Liang Tang¹
University of Texas at San Antonio, San Antonio, TX

Fri–309
Efficacy of 5-aminolevulinic Acid (5-ALA)-mediated Photodynamic Therapy (PDT) using Cold Atmospheric Plasma (CAP) as a Light Source for Anti-tumor Applications
Mian Wang¹, Benjamin Galich¹, Amit Roy¹, Michael Keidar², and Thomas Webster¹³
Northeastern University, Boston, MA, Northeastern University, Washington, DC, Wenzhou Medical University, Wenzhou, China, People’s Republic of

Fri–310
Screening of Lipid-PLGA Hybrid Nanoparticles for Pulmonary Drug Delivery in Lung Cancer Therapy
Serkan Yaman¹,², Kubra Cetiner¹,³, Roshni Iyer¹, and Kytai T. Nguyen¹³
University of Texas at Arlington, Arlington, TX, University of Texas Southwestern Medical Center at Dallas, Dallas, TX

Fri–311
Astrocystic Differentiation of Human Malignant Glioblastoma U87MG Cells Induced by Porous Poly(1,8-octanediol-cocitrate) Wafers Loaded with All-trans Retinoic Acid
Tarielle Sanders¹ and Antonio Webb¹
University of Florida, Gainesville, FL

Fri–312
Fabrication of Dendrimer Porphyrin-Decorated Gold Nanoshells for Combined Phototherapies of Cancer
Ui Seok Chung¹, Ji Hong Min¹, Byoung Ju Yoon¹, Byoung Yong Yoo¹, Eunhyung Kim¹, Woo-Dong Jang¹, and Won-Gun Koh¹
Yonsei University, Seoul, Korea, Republic of

Fri–313
Drug Delivery Treatment for Canine Osteosarcoma
Vina Nguyen¹, Annie Kovach¹, Jennifer Gambino¹, Lakiesha Williams¹, Jun Liao¹, and Rajkumar Prabhu¹
Mississippi State University, Mississippi State, MS

Fri–314
Cationic PLGA Nanoparticles for Improved Therapeutics in Non-Small Cell Lung Cancer
Vivek Gupta¹ and Bhuvaneshwar Vaidya¹
Keck Graduate Institute, Claremont, CA

Fri–315
Using Nanodiamond for Drug Delivery in Liver Cancer Treatment by Adsorbing Epirubicin
Xin Wang¹, Casaurine Low¹, Weixin Hou¹, Lissa Abdullah¹, and Edward Chow¹
National University of Singapore, Singapore, Singapore

Fri–316
Encapsulation of an Antiproliferative Metal Chelator, Dp44mT, in Polymeric Nanoparticles
You Jung Kang¹, A.B. Madhankumar², James R. Connor², and Sheereen Majd³
Pennsylvania State University, University Park, PA, Penn State Hershey Medical Center, Hershey, PA, University of Houston, Houston, TX
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<td>Tumor-targeted Nanoparticles Deliver a Vitamin D-based Drug Payload for Treatment of EGFR Tyrosine Kinase Inhibitor-Resistant Lung Cancer</td>
<td>Chang Liu¹, Suzanne Shoemaker², Tatiana Shaurova³, Qixin Wang¹, Martin Petkovich³, Pamela Hershberger², and Yun Wu¹</td>
<td>¹State University of New York at Buffalo, Buffalo, NY, ²Roswell Park Cancer Institute, Buffalo, NY, ³Queen's University, Kingston, ON, Canada</td>
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<td>Drug Delivery to a 3D Cancer Spheroid Microarray</td>
<td>Ben Brooks¹,², Fatenah Karandish¹, David Schuette¹, Nikki Davidoff², Sanku Mallik², and Amanda Brooks¹</td>
<td>¹North Dakota State University, Fargo, ND, ²Wasatch Microfluidics, Salt Lake City, UT</td>
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<td>Stimuli-responsive Polymeric Micelles for Targeting both Cancer Cells and Cancer Stem Cells</td>
<td>Kayla Duval¹, Xing Guo¹, Lin Wang¹, Jing Fan², Shaobing Zhou², and Zi Chen¹</td>
<td>¹Dartmouth College, Hanover, NH, ²City College of New York, New York, NY, ³Southwest Jiaotong University, Chengdu, China, People's Republic of</td>
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<td>Patrick McKernan¹ and Roger Harrison¹</td>
<td>¹University of Oklahoma, Norman, OK</td>
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<td>Kasturi Banerjee¹, Prakash Kshirsagar¹, Sushil Kumar¹, Mohd Wasim Nasser¹, Shailendra Gautam¹, Kathleen Ross³, Michael Wannemuehler², Surinder Batra³, Balaji Narasimhan³, and Maneesh Jain¹</td>
<td>¹University of Nebraska Medical Center, Omaha, NE, ²Iowa State University, Ames, IA</td>
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<td>Melanoma Growth Control via Ultrasound Depends on the Adaptive Immune System and Surpasses anti-PD-1.</td>
<td>Kelsie Timbie¹, Lena Badd¹, Benjamin Campbell¹, John McMichael¹, Andrew Buckner¹, Jessica Prince¹, Aaron Stevens¹, Timothy Bullock¹, and Richard Price¹</td>
<td>¹University of Virginia, Charlottesville, VA</td>
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<td>Zhou Yuan¹, Nathan Rohner¹, Prithviraj Jothikumar¹, Susan Thomas¹, and Cheng Zhu¹</td>
<td>¹Georgia Institute of Technology, Atlanta, GA</td>
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<td>Heterogeneity in Cell-Matrix Adhesion as an Indicator of Tumor Cell Metastatic State</td>
<td>Alexander Fuhrmann¹, Afsheen Basirad¹, Thea Tlsty², and Adam Engler¹</td>
<td>¹University of California San Diego, La Jolla, CA, ²University of California San Francisco, San Francisco, CA</td>
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<td>Pancreatic Cancer Microtissues to Investigate the Mechanical Microenvironment of Tumors</td>
<td>Andres Rubiano¹, Dan Delitto¹, Song Han¹, Steven Hughes¹, and Chelsey Simmons¹</td>
<td>¹University of Florida, Gainesville, FL</td>
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<td>Making Strong and Stable Plasma-stimulated Medium (PSM) by Multi-approaches</td>
<td>Dayun Yan¹, Annie Talbot¹, Nik Nourmohammadi¹, Jonathan Sherman¹, and Michael Keidar¹</td>
<td>¹The George Washington University, Washington, DC</td>
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<td>Diffuse Correlation Spectroscopy Detects Chemo Induced Blood Flow Change in Breast Cancer Xenografts</td>
<td>Gabriel Ramirez¹, Ashley Proctor¹, Tong Tong Wu¹, Songfeng Han¹, Kelley Madden¹, Edward Brown¹, Thomas Foster¹, Turgut Durduran¹, and Regine Choe¹</td>
<td>¹University of Rochester, Rochester, NY, ²Institute of Photonic Sciences, Barcelona, Spain</td>
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<td>Adhesion Potential of Cancer Cells Ablated with Ethanol and HIFU</td>
<td>Gray Halliburton¹, Hakm Murad¹, and Damir Khismatullin¹</td>
<td>¹Tulane University, New Orleans, LA</td>
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<td>Enhancing Preferential Glioma Ablation Using Pulsed Electric Fields and Molecular Targeting</td>
<td>Jill Ivey¹, Eduardo Latouche¹, Glenn Lesser², Waldemar Debinski², Rafael Davalos³, and Scott Verbridge¹</td>
<td>¹Virginia Tech-Wake Forest University, Blacksburg, VA, ²Wake Forest Baptist Medical Center, Winston-Salem, NC</td>
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<td>Investigation of Non-thermal Atmospheric Pressure Plasma Treatment Effects on Lung Cancer Cells in 3D Collagen Model</td>
<td>Surya karki¹ and Halim Ayan¹</td>
<td>¹University of Toledo, Toledo, OH</td>
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<td>Sarah Pickus¹, Jason Zara¹, Nader Sadeghi², Dayun Yan¹, and Michael Keidar¹</td>
<td>¹George Washington University, Washington, DC, ²The GW Medical Faculty Associates, Washington, DC</td>
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<td>Direct, Multiplexed Molecular Profiling Using Fluorescence Lifetime Imaging</td>
<td>Maha Rahim¹, Rajesh Kota¹, Enrico Gratton¹, and Jered Haun¹</td>
<td>¹University of California Irvine, Irvine, CA</td>
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Precision Medicine and Biomarkers in Cancer

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Hybrid Soluble/Cellular Target Selection Schemes Improve Discovery of Translatable Ligands
Lawrence Stern¹, Daniel Woldring¹, and Benjamin Hackel¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–334
Applications of The Cancer Genome Atlas for the Identification of RNA-Based Prognostic Biomarkers and Signatures
Nathan Wong¹, Weijun Liu¹, and Xiaowei Wang¹
¹Washington University in St. Louis, Saint Louis, MO

Fri–335
Detecting MicroRNA in Dried Blood for Real-time Monitoring of Treatment Response in Prostate Cancer
Yang Liu¹, Lucas Smith¹, Manish Kohli², and Andrew Smith¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Mayo Clinic, Rochester, MN

Track: Cancer Technologies

Cancer Technologies

Fri–336
The Effect of Very Low Dose X-Ray Radiation on the Proliferation of MCF7 Breast Cancer Cells
Bryana Baginski¹, Joseph Wilson¹, Matthew Rusin¹, Endre Takacs¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

Fri–337
The Effects of Low Dose Radiation on Articular Cartilage
Hannah Cash¹, Jeffrey Wiley¹, and Delphine Dean¹
¹Clemson University, Clemson, SC, ²Wake Forest University, Winston-Salem, NC

Fri–338
Identifying Shape Changes of Invasive Cancer Cells
Elaheh Alizadeh¹, Samantha Lyons¹, Katherine Schaumberg¹, Joshua Mannheimer¹, Jordan Castle¹, Zachary Bodmer¹, and Ashok Prasad¹
¹Colorado State University, Fort Collins, CO

Fri–339
Multi-analytical Processing of Bronchoalveolar Lavage Samples Using an Automated Exclusion-Based Sample Preparation Platform
Jacob Tokar¹
¹University of Wisconsin-Madison, Madison, WI

Fri–340
Individual Contributions Combined with Public Data in Community Assessments
Jon Moon¹, Imad Jafir¹, Phyllis Brown¹, Kelly Kalvelage², Michael Dorneich³, Christopher Seeger³, Gregory Welk³, and Paul Iaizzo¹
¹University of Virginia, Charlottesville, VA, ²Virginia Tech, Blacksburg, VA, ³Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany

Fri–341
Invasion of GL261 Cancer Cells In Vivo is Regulated by Interstitial Flow and Depends on CXCR4 Signaling
Robert Cornelson¹ and Jennifer Munson¹
¹University of Minnesota, Minneapolis, MN

Fri–342
Cancer Trap for Capturing Metastatic Prostate Cancer
Yihui Huang¹, Amirhossein Hakamivala¹, Ashwin Nair¹, Jer-Tsong Hsieh¹, and Liping Tang¹
¹the University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center, Dallas, TX

Track: Cardiovascular Engineering

Cardiac Electrophysiology

Fri–343
Co-Occurrence of Depolarization and Repolarization Alternans In ECGs
David Waseemiller¹, Siqi Wang¹, Paul Anaya¹, and Abhijit Patwardhan¹
¹University of Kentucky, Lexington, KY

Fri–344
Assessing the Effects of Stretch-Activated Channel Blockers in Isolated Swine Hearts
Hanyu Zhang¹, Gregory Walcott¹, and Jack Rogers¹
¹University of Alabama at Birmingham, Birmingham, AL

Fri–345
Optogenetic-Mediated Parasympathetic Reduction of Heart Rate in a Transgenic Mouse Model Using Micro LED Illumination.
Jaclyn Brennan¹, Kendal Endicott², Angel Moreno¹, Gregory Trachiotis³, Igor Efimov¹, and Matthew Kay¹
¹The George Washington University, Washington, DC, ²George Washington University Medical Center, Washington, DC

Fri–346
Phrenic Nerve Response to Irreversible Electroporation Therapies
Lars Mattison¹, Sydney Newton¹, Nana Mitsuishi¹, and Paul Iaizzo¹
¹University of Minnesota, Minneapolis, MN

Fri–347
Extracellular Calcium Modulates the Conduction Velocity-Extracellular Potassium Relationship
Michael Entz II¹,² and Steven Poelzing¹,²
¹Virginia Polytechnic Institute and State University, Roanoke, VA, ²Virginia Tech, Blacksburg, VA

Fri–348
The Forces Required to Acutely Perforate Human and Swine Left Ventricular Epicardium
Alexander Mattson¹, Justinus Hartoyo¹, Vladimir Grubac², Michael Eggen³, and Paul Iaizzo¹
¹University of Minnesota, Minneapolis, MN, ²Medtronic PLC, Mounds View, MN

Fri–349
Design and Analysis of a Cavopulmonary Assist Device for Right Ventricular Dysfunction
Ssu-Ying Chien¹, Jakin Jagani¹, Alexandrina Untaroiu¹, and Mihai Bleiziffer²
¹Virginia Tech, Blacksburg, VA, ²Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany

Fri–350
Bioresorbable Material Characterization for Use in Self-Expanding Stents
Jared Park¹, Debora Porter¹, Jason Porter¹, and Anton Bowden¹
¹Brigham Young University, Provo, UT
Fri–351 Mis-sizing of Stent Promotes Intimal Hyperplasia: Impact of Endothelial Shear and Intramural Stress
Henry Chen¹, Brian Bigelow¹, Deepak Bhatt¹, and Ghassan Kassab¹
¹California Medical Innovations Institute, San Diego, CA, ²St. Vincent Hospital, Indianapolis, IN, ³B Brigham and Women’s Hospital, and Harvard Medical School, Boston, MA

Fri–352 Biomechanical Comparison between Mono-, Bi-, and Tri-cuspid Valve Architectures
Henry Chen¹, Sean Chambers², Fedor Lurie¹, and Ghassan Kassab¹
¹California Medical Innovations Institute, San Diego, CA

Fri–353 Examination of Erythrocyte Microparticle Formation in a Microfluidic High Shear Environment
James Buerck¹, Trevor Snyder¹, Dimitrios Papavassiliou¹, David Schmidtke³, and Edgar O’Rea³
¹University of Oklahoma, NORMAN, OK, ²Vadovations, Oklahoma City, OK, ³The University of Texas at Dallas, Richardson, TX

Kang-Ju Lee¹, Seul Gee Lee¹, Seung Hyun Park¹, Il Ho Seo¹, Duk Hwan Ahn¹, Min Kwon Lee¹, Ink Won Jung³, Jung Sun Kim³, and Won Hyo-Young Ryu¹
¹Yonsei University, Seoul, Korea, Republic of, ²Yonsei University College of Medicine, Seoul, Korea, Republic of, ³Genoss Inc., Suwon, Korea, Republic of

Edward Dauer¹, Brad Bradshaw¹, Andrew Brook⁴, Ari Spiró⁴, David Altschul³, Richard Zampolin³, Todd Miller³, and Allan Brook³
¹University of Miami (Florida), Coral Gables, FL, ²University of Chicago, Chicago, IL, ³Montefiore Medical Center, New York, NY

Fri–356 Stent Strut Geometry and Hemodynamics Affect Endothelial Cell Migration and Mitosis
Duy Nguyen¹, Blayne Sarazin¹, Alexander Smith¹, Ali Abdelhamid¹, and Juan Jimenez¹
¹University of Massachusetts, Amherst, MA

Fri–357 Comparison of Systolic And Diastolic Time Intervals from Digital Stethoscope with Tissue Doppler Imaging
Shuang Leng¹, Chow Hung Soh¹, Feiqiong Huang¹,², Jianmin Zhang¹, Chao Wang¹, Kevin Chaia³, Liang Zhong¹,³, and Ru San Tan¹,³
¹National Heart Centre Singapore, Singapore, Singapore, Singapore, ²Duke-NUS Medical School, Singapore, Singapore, ³Nanyang Technological University, Singapore, Singapore, ⁴Institute of Microelectronics, A*STAR, Singapore, Singapore

Fri–358 In Vitro Assessment of a Keratose-Paclitaxel Drug Coated Balloon
Emily Turner¹, Marzieh Atigh¹, Luke Burnett², and Saami Yazdani¹
¹University of South Alabama, Mobile, AL, ²Keranetics, Winston-Salem, NC

Tracks: Cardiovascular Engineering, Tissue Engineering

Fri–359 3D In-Vivo-like Neonatal-cardiomyocyte Culture on Wrinkled PDMS
Zhonghai Wang¹, Alin Wei¹, Xiaoqiang Yang¹, Siyu Ma¹, Thomas Borg¹, and Bruce Gao¹
¹Clemson University, Clemson, SC

Fri–360 Nanoscaffolds Using Photoluminescent-Poly lactones to Prevent Restenosis After PCI
Aneeta Kuriakose¹,², Priyesh Rajanikanth¹,², Upasana Mali¹,², Zack Xie¹, Leping Tang¹,², Subhash Banarjee¹, Jian Yang¹, and Kytai Nguyen¹
¹University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center at Dallas, Dallas, TX, ³Pennsylvania State University, University Park, PA, ⁴VA North Texas Health Care System, Dallas, TX

Fri–361 A hiPSC-Derived 3-D Myocardium-On-A-Chip for the Study of Cardiovascular Disease
Bradley Ellis¹, Aylin Acm¹, and Pinar Zorlutuna¹
¹University of Notre Dame, South Bend, IN

Fri–362 Cardiomyogenesis Stimulation by Stretch for P19 Embryonic Carcinoma Cells
Akanksha Shradhanjali¹, Jeong Soon Lee¹, Ligyoom Ha¹, and Jung Yul Lim¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–363 Oligonucleotides Target the SERCA/PLN Complex in Cardiomyocytes
Kailie Sollier¹, Jing Yang¹, Raffello Verardi¹, Gianluigi Veglia¹, and Michael Bowser¹
¹University of Minnesota, Minneapolis, MN

Fri–364 Using 3D Printing to Customize Engineered Blood Vessel Size
Mai Lam¹, Cameron Pinnock¹, Elizabeth Meier¹, and Bin Wu¹
¹Wayne State University, Detroit, MI

Fri–365 Fibroblast Architecture in Patients with Heart Disease Due to LMNA Mutation
Mehrsa Mehrabi¹
¹University of California, Irvine, Irvine, CA

Fri–366 Engineering Cardiac Tissues on Matrices with Independent Biochemical and Mechanical Properties
Nethika R. Arisinghe¹, Caitlin H. Reck¹, Andrew P. Petersen¹, Mai L. Lyra-Leite¹, Nathan Cho¹, and Megan L. McCain¹
¹University of Southern California, Los Angeles, CA

Fri–367 Polymer Microfiber Meshes Facilitate Human Cardiac Stem Cell Proliferation and Differentiation
Lijuan Kan¹, Patrick Thayer¹, Ben Ledford¹, Miao Chen¹, Aaron Goldstein¹, and Jia-Qiang He¹
¹Virginia Tech, Blacksburg, VA

Fri–368 Cytoskeletal Reorganization of Marrow Stem Cells in Response to Flow
Sana Nasimi¹, Denise Medina¹, Glenda Castellanos¹, Sasmita Rath¹, and Sharan Ramaswamy⁴
¹Florida International University, Miami, FL

Fri–369 Liver-Mediated Prevention of Ischemic Cardiomyocyte Calcification
Shu Liu¹, Sahil Shah¹, and Yu Wu¹
¹Northwestern University, Evanston, IL

Fri–370 A Novel Biphasic Vascular Graft for Engineering Small Diameter Blood Vessels
Vidhya Ramaswamy¹, Allison Goins¹, and Josephine Allen¹
¹University of Florida, Gainesville, FL
Fri–371 Organotypic Culture System for Cardiac Tissue
Yun Qiao¹, Quan Dong¹, Chaoyang Kang², Baichen Li¹, Zhenyu Li¹, and Igor Efimov¹
¹George Washington University, Washington, DC
²Washington University in St. Louis, St. Louis, MO

Fri–372 Tissue Engineered Tunica Adventitia Graft
Bijal Patel¹, Cameron Pinnock², and Mai Lam²
¹Wayne State University, Canton, MI, ²Wayne State University, Detroit, MI

Fri–373 Engineering a Living Mitral Valve Using a Stabilized Collagen and Elastin-Based Scaffold
Christopher deBorde¹, Dan Simionescu¹, Leslie Sierad³, Jun Liao³, Christopher Wright³, and Agneta Simionescu¹
¹Clemson University, Clemson, SC, ²Aptus Bioreactors, Clemson, SC, ³Mississippi State University, Mississippi State, MS, 4Greenville Hospital System, Greenville, SC

Fri–374 Electrospray Polyurethane and Hydrogel Composite Scaffolds to Study Valve Cell Fibrotic Response
Daniel Puperi¹, Alysha Kishan¹, Zoe Punske¹, Elizabeth Cosgriff-Hernandez², Jennifer West¹, and Jane Grande-Allen¹
¹Rice University, Houston, TX, ²Texas A&M, Houston, TX, ³Duke University, Durham, NC

Fri–375 Surface-modified Poly(vinyl alcohol) Vascular Grafts Improve Endothelialization without Increasing Thrombosis
Deirdre Anderson¹, Marie Cutugno², Pascale Chevallier², Diego Mantovani², Evangelina Yim³, and Monica Hinds³
¹Oregon Health & Science University, Portland, OR, ²National University of Singapore, Singapore, Singapore, ³Laval University, Quebec, Canada, ⁴University of Waterloo, Waterloo, Ontario, Canada

Fri–376 Fabrication of an Elastomeric Scaffold with Cell-Derived ECM for Cardiovascular Tissue Engineering
Harleigh Warner¹,², William D. Wagner¹,³
¹Wake Forest- Virginia Tech, Winston Salem, NC, ²Wake Forest University School of Medicine, Winston Salem, NC, ³Wake Forest School of Medicine, Winston Salem, NC

Fri–377 Engineering Human Stem Cell-Derived Cardiac Tissues for Heart-on-a-Chip
Joycelyn Yip¹, Nathan Cho¹, and Megan McCain¹
¹University of Southern California, Los Angeles, CA

Fri–378 Stable Engineered Vascular Networks from Human iPSC-Derived Endothelial Cells in Synthetic Hydrogels
Matthew Zanotti¹, Hamisha Ardalani², Eric Nguyen², Angela Xie², Michael Schwartz², and William Murphy²
¹Cornell University, Ithaca, NY, ²University of Wisconsin-Madison, Madison, WI

Fri–379 Nanoengineered Hydrogel Topographies for the Development of Organized Cardiac Tissues
Ali Navaei¹, Nathan Moore¹, Ryan Sullivan³, Raymond Migrino³, and Mehdi N Nikkhah³
¹Arizona State University, Tempe, AZ, ²Arizona State University, Tempe, AZ, ³Phoenix Veterans Affairs Health Care System, Phoenix, AZ

Fri–380 Vascular Differentiation of Adipose Derived Stem Cells on Porcine Decellularized Cardiac Slices In Vitro
Mickey Shah¹, Pawan KC², Keyvan Amini Khoiy¹, Rouzbeh Amini¹, and Ge Zhang¹
¹University of Akron, Akron, OH

Fri–381 Stiffness Impacts Tissue Formation and Syncytium Development in Engineered Human Myocardium
Nicholas Kaiser¹ and Kareen Coulombe¹
¹Brown University, Providence, RI

Fri–382 Recellularization Strategies to Promote Pre-Vascularization of Decellularized Cardiac Tissue
Pawan KC¹, Mickey Shah², and Ge Zhang²
¹The University of Akron, Ridgewood, NY, ²The University of Akron, Akron, OH

Fri–383 Dynamically Stiffening Hydrogels for Cardiac Tissue Engineering
Rachel Besser¹, Diana Velluto², and Ashutosh Agarwal²
¹University of Miami, Boca Raton, FL, ²University of Miami, Miami, FL

Fri–384 Autologous Decellularized Graft for Vascular Tissue Engineering
Xuefeng Qiu¹,², Beniamin Lee¹, and Song Li¹
¹University of California, Los Angeles, Los Angeles, CA, ²University of California, Berkeley, Berkeley, CA, ³Union Hospital, Tongji Medical School, Huazhong University of Science and Technology, Wuhan, China, People's Republic of

Fri–385 "Off-the-Shelf" Tissue-Engineered Aortic Valve with Surgical and Transcatheter Design
Zeeshan Syedain¹, Brandon Tefft², Melissa Young³, Amir Lerman², and Robert Tranquillo¹
¹University of Minnesota, Minneapolis, MN, ²Mayo Clinic, Rochester, MN

Track: Cardiovascular Engineering

Fri–386 Slice-by-Slice Evaluation of Wall Shear Stress in Stented Coronary Arteries Reconstructed Using Optical Coherence and Computed Tomography: Uncovering the Stimuli for Restenosis and Resorption
Ali Aleiou¹, Amirhossein Arzan¹, Shawn Shadden², Mehdi Maadooliat³, Hiromasa Otake³, and John LaDisa³,⁴
¹Marquette University, Milwaukee, WI, ²University of California, Berkeley, Berkeley, CA, ³Kobe University Graduate School of Medicine, Kobe, Japan, ⁴Medical College of Wisconsin, Milwaukee, WI

Fri–387 Pulsatile Flow Studies of a Bovine Pericardial Heart Valve Bioprosthesis in Low, Normal, and High Cardiac Outputs: PIV Measurements
Mohammad Barakat¹, Koohyar Vahidkhh¹, Mostafa Abbasi¹, and Ali Azadani¹
¹University of Denver, Denver, CO

Fri–388 Elucidating the Mechanisms of Irreversible Vascular Changes after Treatment for Aortic Coarctation
Brandon Wegter¹, Thomas Eddinger¹, Aoy Tomita-Mitchell³, Karl Stamm³, Donna Mahnke³, Mary Goetsch³, Michael Mitchell³, Ronald Woods³, and John LaDisa³
¹Marquette University, Milwaukee, WI, ²Medical College of Wisconsin, Milwaukee, WI

Fri–389 Small-Scale Ex Vivo Perfusion Mock Circulation Model to Simulate Mechanical Circulatory Support
Kevin Soucy¹, Mitchell Buller¹, Guruprasad Giridharan¹, Michael Sobieski¹, and Mark Slaughter¹
¹University of Louisville, Louisville, KY
Fri–390
Ultrasound Indicator Dilution Quantifies Renal Blood Flow Distribution in Rat Models of Hypertension
John Bukowy1, Louise Evans1, Allen Cowley2, and Daniel Beard2
1Medical College of Wisconsin, Milwaukee, WI, 2University of Michigan, Ann Arbor, MI

Fri–391
Effect of Pulmonary Vasodilators on Lung Diffusing Capacity during Exercise in Young Healthy Individuals: Preliminary Results
Kirsten Coffman1, Timothy Curry2, Niki Dietz1, and Bruce Johnson1
1Mayo Clinic, Rochester, MN

Fri–392
Volumetric PIV Investigation of Hemodynamics and Pressure in a Cerebral Aneurysm
Melissa Brindise1, Benjamin Dickerhoff2, David Saloner3, Vitaliy Rayz4, and Pavlos Vlachos5
1Purdue University, West Lafayette, IN, 2Marquette University, Milwaukee, WI, 3University of California, San Francisco, San Francisco, CA, 4University of Wisconsin-Milwaukee, Milwaukee, WI, 5University of Nebraska, Lincoln, NE

Fri–393
Porcine Small Intestinal Submucosal Mitral Valve Hydromyodynamics: Preliminary Assessment
Omkar Mankame1, Ricardo Hausz2, Lilliam Valdes-Cruz3, Steven Bibeck4, Frank Scholl5, Sarah Bell6, Ivan Basz7, and Sharat Ramaswamy1
1Florida International University, Miami, FL, 2Memorial Regional Hospital, Hollywood, FL

Fri–394
Effects of Geometric Variations on Idealized Bifurcation Aneurysm Hemodynamics Treated with Pipeline Embolization Device
Priya Nair1, Brian Chong2, Matthew Mortensen1,3, and David Frakes1
1Arizona State University, Tempe, AZ, 2Mayo Clinic Hospital, Phoenix, AZ, 3EndoVantage, LLC, Scottsdale, AZ

Fri–395
Effect of Core Temperature on the Venous System
A. Colleen Crouch1, Olivia Palmer1, and Joan Greve1
1University of Michigan, Ann Arbor, MI

Fri–396
A Perfusion Apparatus to Image Semilunar Valve Anatomies in Perfusion-Fixed Human Hearts
Evan Johnson1, Lars Mattsson1, Alex Mattson1, and Paul A. Iaizzo1
1University of Minnesota, Minneapolis, MN

Fri–397
Modified Cerebrovascular Reactivity Parameter Results in Less Variability in Measurements
Madison Burger1, Mohammed Alwatban1, Benjamin Hage1, Edward Truemper2, and Greg Bashford3
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

Fri–398
Analysis of Breath-Holding Index as an Assessment of Cerebrovascular Reactivity
Allison Porter1, Mohammed Alwatban1, Edward Truemper2, and Greg Bashford3
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

Fri–399
Development of a Murine Model to Study the Prevention of Deep Vein Thrombosis
Andrea Chambers1, James Wodicka2, Gurneet Sangha3, Alyssa Panitch4, and Craig Goergen1
1Purdue University, West Lafayette, IN

Fri–400
Deconvolution of Multispectral Confocal Microscopic Images Using Measured Point Spread Functions
Azmi Ahmad1, Jordan Johnson1, Gustavo Lenis2, Chris Hunter1, and Frank Sachse1
1University of Utah, Salt Lake City, UT, 2Karlsruhe Institute of Technology, Karlsruhe, Germany

Fri–401
Interactions Between Collagen and Myofibrils in the Heart Revealed by Polarization-Resolved SHG
Zhonghai Wang1, Cai Yuan1, Yonghong Shao2, Thomas K. Borg3, and Bruce Z Gao1
1Clemson University, Clemson, SC, 2Shenzhen University, Shenzhen, China, 3People’s Republic of, 4Medical University of South Carolina, Charleston, SC

Fri–402
Construction of Magnetic Contrast Agent for Intra-vascular Applications
Candice Gurbatri1, Trejon Turner1, James Grace1, Saparja Nag1, Yuexin Lue1, Paul Van Tassel2, David Holmes III2, and David Holmes Jr2
1Yale University, New Haven, CT, 2Mayo Clinic, Rochester, MN

Fri–403
(Author Cancellation)

Fri–404
In Vivo Vibrational Photoacoustic Tomography of Murine Perivascular Fat
Gurneet Sangha1, Evan Phillips1, and Craig Goergen1
1Purdue University, West Lafayette, IN

Fri–405
Improving Iodine Contrast Agent Sensitivity in Spectral Computed Tomography via Rho-Z Mapping
Olga Pen1 and Guohua Cao1
1Virginia Polytechnic Institute and State University, Blacksburg, VA

Fri–406
An Automated Method for Quantifying Intermembrane Distances using Image Dilation and Spatial Gradients
Tristan Raisch1 and Steven Poelzing1
1Virginia Tech, Roanoke, VA

Fri–407
Fabrication, Characterization and Performance Improvement of a Single Element Forward-Viewing Opto-Acoustic Imaging Device
Supriya Thathachary1 and Shai Ashkenazi1
1University of Minnesota, Minneapolis, MN

Fri–408
Large-Scale LSFM for 3-D Localization and Tracking of Progenitor Cells and Ionic Channels in the Murine Hearts
Yichen Ding1, Jianguo Ma1, Juhyun Lee1, Kevin Sung1, Tomohiro Yokota1, Neha Singh1, Mojdeh Dooraghi2, Parinaz Abiri1, Yiben Wang1, Rajan Kulkarni1, Atsushi Nakano1, Thao Nguyen1, Peng Fei1, and Tzung Hsiao1
1University of California, Los Angeles, Los Angeles, CA, 2Huazhong University of Science and Technology, Wuhan, China, People’s Republic of
Track: Cardiovascular Engineering
Lymphatic System

Fri–409
Analysis of Mechanical Contractility of Lymphatic Vessels Under Varying Flow Conditions
Anish Mukherjee¹, Joshua Hooks¹, Zhanna Nepiyushchikh¹, and James Dixon¹
¹Georgia Institute of Technology, Atlanta, GA

Fri–410
Mapping Lymphatic Vessels in the Rat Mesentery to Improve Multiscale Lymphatic Flow Models
Caleb Davis¹, Irina Nizamutdinova², Michael Moreno³, and David Zawieja²
¹Texas A&M University, College Station, TX, ²Texas A&M Health Science Center, Temple, TX

Fri–411
Characterization of Lymphatic Flow in vivo in Wild-type Mice
Akshay Pujari¹, Daniel Sweet², Mark Kahn³, and Juan Jimenez²
¹University of Massachusetts, Amherst, MA, ²University of Pennsylvania, Philadelphia, PA

Track: Cardiovascular Engineering
Microcirculation

Fri–412
Nitrite-mediated Vasodilation Quantified from In Vivo Studies in Rat Mesentery
Donald Buerk¹, Kelly A. Zaccheo¹, Kenneth A. Barbee¹, and Dov Jaron¹
¹Drexel University, Philadelphia, PA

Fri–413
Development of an Ex Vivo Intact Microvascular Network Model: Evaluation Of Smooth Muscle Cell Constriction
Jessica Motherwell¹, Mohammad Azimi², Prasad Katakam³, and Walter Murfee³
¹Tulane University, New Orleans, LA

Fri–414
A Cell Culture Device with Continuous Oxygen Gradient for Microcirculation Research in vitro
Kanae Kadokura¹, Asako Sato¹, Brice Boudehent¹, and Kosuke Tsukada¹
¹Keio University, Yokohama, Japan

Fri–415
Systems Framework for Multi-dimensional Redox System Regulations in Vascular Dysfunction
Sheetal Joshi¹, Hemang Patel², and Mahendra Kavdia¹
¹Wayne State University, Detroit, MI

Fri–416
Shear Stress and Cyclic Stretch Regulate Blood Brain Barrier Integrity
Paul Partyka¹ and Peter Galie¹
¹Rowan University, Glassboro, NJ

Fri–417
Influence of Red Blood Cell Aggregation on Perfusion of an Artificial Microvascular Network
Nathaniel Piety¹, Walter Reinhart², and Sergey Shevkoplyas³
¹University of Houston, Houston, TX, ²Kantonsspital Graubünden, Chur, Switzerland

Track: Cardiovascular Engineering
Thrombosis and Hemostasis

Fri–418
Platelet GpIb Binding to VWF-A1 is More Prominently Regulated by the Proximal D’D3- Rather than A2-Domain
Changjie Zhang¹, Kelkar Anju¹, Nasirikenari Mehrab², Joseph T Lau³, and Sriram Neelamegham¹
¹SUNY at Buffalo, Buffalo, NY, ²Molecular and Cellular Biology, Roswell Park Cancer Institute, Buffalo, NY

Fri–419
The Development of an Assay to Assess the Priming of Platelets by Multiple Surface Bound Agonists
Colin Eichinger¹ and Vladimir Hlady¹
¹University of Utah, Salt Lake City, UT

Fri–420
Targeted Xa Inhibition for the Treatment of Venous Thrombosis
Donny Hanjaya-Putra¹,²
¹Harvard Medical School, Boston, MA, ²Wyss Institute for Biologically Inspired Engineering, Boston, MA

Fri–421
The Influence of Hematocrit on Thrombus Propagation in an In Vitro Model of Venous Thrombosis
Marcus Lehmann¹ and Keith Neeves¹
¹Colorado School of Mines, Golden, CO

Fri–422
Do Quadrupeds Develop Edema Post Venous Thrombosis?
Olivia Palmer¹, Jose Antonio Diaz¹, and Joan Greve¹
¹University of Michigan, Ann Arbor, MI

Track: Cellular and Molecular Bioengineering
Advanced Single Cell Probes

Fri–423
Fetuin-A Supplementation as an Effective Therapy in Regulating Phenotypic Differentiation of Smooth Muscle Cells in Vascular Calcification
Justin B. McMahan¹, Amber M. Kay¹, James A. Stewart Jr¹, and C. LaShan Simpson¹
¹Mississippi State University, Starkville, MS

Fri–424
Dispersion in Flowing Blood: A Theoretical Structure for Experimental First Passage Studies
Eugene Eckstein¹, Vinay Bhall¹, Mark Leggas¹, JoDe Lavine¹, Baoshun Ma², and Jerome Goldstein¹
¹University of Memphis, Memphis, TN

Track: Cellular and Molecular Bioengineering
Cardiovascular Engineering

Fri–425
Rapid Uptake and Ubiquitination of Fluorescent Peptides into Mammalian Cells Using a β-Hairpin Sequence Motif
Nora Safabakhsh¹, Jeffrey Anderson¹, Manirathu Vaithyanathan¹, Jacob pettiqrew¹, Gavin Pappas¹, Ted Gauthier¹, and Adam Melvin¹
¹Louisiana State University, Baton Rouge, LA

Fri–426
Single Cell Patterning in Stiffness-Tunable Hydrogels for High Throughput Studies
Xiangyu Gong¹ and Kristen Mills¹
¹Rensselaer Polytechnic Institute, Troy, NY
Tracks: Cellular and Molecular Bioengineering, Nano and Micro Technologies

**Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)**

**Fri–427**
Towards a Cell-Level Personalization of Nanomedicine: Pathology Dependent In Situ Reduction of Gold Nanoparticles by Action of Mammalian Cells.
Aaron Schwartz-Duval¹, Enrique Daza¹, Santosh Misra¹, Elyse Johnson², Prabuddha Mukherjee², Rohit Bhargava², and Dipanjan Pan²
¹University of Illinois Urbana Champaign, Urbana, IL, ²Cytoviva Inc., Auburn, AL

**Fri–428**
Visualization of Protein Myristoylation During Cellular Differentiation
Andrew Witten¹, Meghan A. Traore¹, Sarah Calve¹, and Tamara Kinzer-Ursem¹
¹Purdue University, West Lafayette, IN

**Fri–429**
Proteomic Analysis of Exosomes Derived from Neuronal Cells to Determine Factors Promoting Neuronal Differentiation
Doyeon Koo¹, Xuwei Zhao², Yuji S. Takeda³, and Qiaoqing Xu³
¹Tufts University, Cambridge, MA, ²Tufts University, Medford, MA

**Fri–430**
In Vivo Incorporation of Non-Canonical Amino Acids to Determine Protein Turnover During Tissue Assembly
Alexander Ocken¹, Sawyer Kieffer¹, Tamara Kinzer-Ursem¹, and Sarah Calve¹
¹Purdue University, West Lafayette, IN

**Fri–431**
Hairpin DNA Cascade Amplifier for Detection of microRNA in Living Cells
Shan Chen¹, Qiaoxia Hu¹, Lok Ting Chu¹, and Ting-Hsuan Chen¹
¹City University of Hong Kong, Hong Kong, Hong Kong

**Fri–432**
One-pot Isothermal DNA Extraction and Amplification for the Detection of Enterohemorrhagic E. coli
Shereena Cheung¹, Matthew Yee¹, Nguyen Le¹, Benjamin Wu¹, and Daniel Kamei¹
¹University of California Los Angeles, Los Angeles, CA

**Track: Cellular and Molecular Bioengineering**

**Molecular Bioengineering**

**Fri–433**
PAH Afflicted Pulmonary Arteries on-a-Chip to Screen Drugs and Study PAH Pathophysiology
Ahasanul Hasan¹, Ziyi Dong², Wei Li³, Amanda Flockton³, Kurt Stenmark³, and Fahzrul Ahsan³
¹Texas Tech University Health Sciences Center, Amarillo, TX, ²Texas Tech University, Lubbock, TX, ³University of Colorado, Aurora, CO

**Fri–434**
Genome Editing Enabled Generation of Human iPSC Cells for Treating Sickle Cell Disease
Ang Li¹, Ciaran Lee¹, So Hyun Park¹, and Gang Bao¹
¹Rice University, Houston, TX

**Fri–435**
Amperometric Detection of Ultrasound-Induced Secretory Events In Potential Treatment Of Type 2 Diabetes
Bogdan Balteanu¹, Singh Tania¹, Ivan Suarez Castellanos¹, Vesna Zderic¹, and Aleksandar Jeremic¹
¹The George Washington University, Washington, DC

**Fri–436**
Engineering the Next Generation of Lumitoxins
David Nedrud¹ and Daniel Schmidt¹
¹University of Minnesota, Minneapolis, MN

**Fri–437**
Highly Specific and Modular Affinity Labeling of Epigenetic Modifications
Fanny Wang¹, Osama Zahid¹, and Adam Hall¹,²
¹Virginia Tech-Wake Forest School of Biomedical Engineering, Winston-Salem, NC, ²Wake Forest School of Medicine, Winston-Salem, NC

**Fri–438**
Sortagging as A Bioconjugation Strategy For In Vitro Compartmentalization Applications
Fredrik W. Sadler¹, Igor Dodevski¹, and Casim A. Sarkar¹
¹University of Minnesota, Minneapolis, MN

**Fri–439**
Radioactivity and Mathematical Modeling to Quantify Important Parameters in the Lateral-Flow Immunoassay
Garrett Mosley¹, Phuong Nguyen¹, Benjamin Wu¹, and Daniel Kamei¹
¹University of California Los Angeles, Los Angeles, CA

**Fri–440**
Mutual Information to Inform Protein Library Design
George Markou¹ and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

**Fri–441**
De Novo Engineering of Site-Specific Protein Binders by Tethering-RD
Igor Dodevski¹, Irena Cich¹, and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

**Fri–442**
Geometry and Expression Enhance Enrichment of Functional Yeast-Displayed Ligands via Cell Panning
Lawrence Stern¹, Ian Schrack¹, Sadie Johnson¹, Aakash Deshpande¹, Nathaniel Bennett¹, Lauren Harasymiw¹, Melissa Gardner¹, and Benjamin Hackel¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

**Fri–443**
An shRNA-Extruding Nanofactory within DNA Origami Nanocapsule
Leo Chou¹, Jaeseung Hahn¹, Rasmus Soresen¹, and William Shih¹
¹Wyss Institute, Harvard Medical School, Boston, MA

**Fri–444**
An Atomic Force Microscopy Study of Ebola Virus Host Cell Interaction
Matthew Dragovich¹, Yan Xu¹, Krista Schutt¹, Michelle Sanabria¹, and X. Frank Zhang¹
¹Lehigh University, Bethlehem, PA

**Fri–445**
Optimization of CRISPR/Cas9 Systems for Treating Cystic Fibrosis with Gene Correction
Mithil Chokshi¹, Ciaran Lee¹, and Gang Bao¹
¹Rice University, Houston, TX

**Fri–446**
Impacts of Hydrodynamic Conditions on the Initial Phases of Staphylococcus aureus Biofilms and Their Resistance to Antimicrobial Agents
Patrick Ymele-Leki¹
¹Howard University, Washington, DC
Fri–447 Enhancing Homology-Directed Genome Editing with Orthogonal CRISPR-Cas9 Systems
So Hyun Park¹, Ciaran Lee¹, Harshavardhan Deshmukh¹, and Gang Bao¹
¹Rice University, Houston, TX

Fri–448 In-silico Prediction of CRISPR/Cas9 Cutting Efficiency
Yidan Pan¹, Ciaran Lee¹, Timothy Davis¹, Harshavardhan Deshmukh¹, and Gang Bao¹
¹Rice University, Houston, TX

Fri–449 Determine Protein Interaction Affinity without Protein Purification by Quantitative FRET (qFRET) Technology
Zhehao Xiong¹, Ling Jiang¹, Raphael Kung¹, Yang Song¹, Yan Liu¹, Amanda Saareedra¹, Songgin Pan¹, and Jiayu Liao¹
¹University of California, Riverside, Riverside, CA

Track: Device Technologies and Biomedical Robotics
Implantable Devices and Implantable Electronics

Fri–450 A Parylene-based Peripheral Nerve Cuff Electrode
Angelica Cobo¹, Kee Scholten ¹, Victor Pikov², and Ellis Meng¹
¹University of Southern California, Los Angeles, CA, ²GlaxoSmithKline, London, United Kingdom

Fri–451 Wireless Power and Data Transfer System for Mandibular Distraction Osteogenesis Implants
Deepak Dileepkumar¹, Brent Nowak¹, and Jeffrey Ward¹
¹Grand Valley State University, Grand Rapids, MI

Fri–452 Simple Implantable Wireless Sensor for Monitoring Intracompartmental Pressures
Eric Ledet¹, John Drazan¹, Michael Wassick¹, Khalil Drayton¹, Reena Dahle², Amanda Saareedra¹, Songgin Pan¹, and Nathaniel Cady²
¹University of California, Riverside, Riverside, CA

Fri–453 Mechanical Response of Liquid Crystal Polymer Based Magnetic Microactuators for Glaucoma Drainage Device
Hyunsu Park¹, Simon John², and Hyowon Lee¹
¹Purdue University, West Lafayette, IN, ²Howard Hughes Medical Institute, Bar Harbor, ME

Fri–454 Mechanical Responses of Flexible Magnetic Microactuators for Biofouling Removal
Qi Yang¹, Hyowon Lee¹, and Jeffrey Rhoads¹
¹Purdue University, West Lafayette, IN

Fri–455 Bacteria Removal Capabilities of Polyimide-Based Magnetic Microactuators
Tran Nguyen¹,²,³, Jacqueline Linnes¹, and Hyowon Lee¹,²,³
¹Purdue University, West Lafayette, IN, ²Irck Nanotechnology Center, West Lafayette, IN, ³Center for Implantable Devices, West Lafayette, IN

Track: Wearable Sensors and Devices

Fri–456 Wearable Biosensors to Detect Stress Indicators in College Students: A Pilot Study
John La¹, Shirley Cheng¹, Kaikai Liu², and Alessandro Bellofiore¹
¹San Jose State University, San Jose, CA

Fri–457 Preliminary Development of PalmSight: Letting the Visually Impaired See using a Hand-Held Device
Alexandra Delazio¹, Zhixuan Yu¹, Samantha Horvath², Jihang Wang³, John Galeotti³, Roberta Klatzky³, and George Stetten³
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

Fri–458 Multiple Sclerosis (MS) Sensory Feedback Device to Improve Pinch Grip
Anastasia Ostrowski¹, Nicole Bettè¹, Megan White¹, Evan Chen¹, Joshua Cockrum¹, John Gosbee¹, and Rachael Schmedien¹
¹University of Michigan, Ann Arbor, MI

Fri–459 Use of Electroencephalographic Technology to Predict Blood Glucose Levels Through Brain Activity
Bryce Cranwell¹ and Ricky Castles²
¹East Carolina University, Holly Springs, NC, ²East Carolina University, Greenville, NC

Fri–460 Fabrication of Highly Conductive Hydrogel-patterned Nanofiber for Bioelectronics Device Applications
Dongnyoung Heo¹, Junghoon Kim¹, and Lijie Grace Zhang¹
¹The George Washington University, Washington, DC

Fri–461 The Development of a Novel, Flexible, Low Profile, Configurable, Single Point Pressure Sensor
Erika Vandersteen¹, Jane Saviers-Steiger¹, Tomasz Petelenz¹, and Robert Hitchcock¹
¹University of Utah, Salt Lake City, UT

Fri–462 Assessment of Dehydration in the Mouth via Bioimpedance Spectroscopy
Arik Fenstermacher¹ and Gene Fridman²
¹Stevenson University, Baltimore, MD, ²Johns Hopkins University, Baltimore, MD

Fri–463 Battle of the Minds: Entertainment as Proof of Concept Using Affordable EEG and Processing Systems
Alexander Bashqawi¹, James Steele¹, Samuel Dreyer⁴, and Hananeh Esmailbeigi¹
¹University of Illinois at Chicago, Chicago, IL

Fri–464 Electromagnetic Resonant Bone Health Sensor Skin Patch for the Detection Of Osteoporosis and Bone Density Changes
Jessica Aldrich¹, Mariam Yassine¹, Nithin Muntimadugu¹, Jeremy Patterson¹, Anil Mahapatro¹, and Kim Cluff¹
¹Wichita State University, Wichita, KS

Fri–465 Tongue-Computer Interface: Assistive Technology for Patients with Paralysis or Limited Hand Function
Richard Hickey¹, Kevin Kerr¹, Vincent Nguyen¹, Ricardo Aranda¹, and Hananeh Esmailbeigi¹
¹University of Illinois at Chicago, Chicago, IL
Fri–466  
Towards a Continuous Blood Pressure Monitoring System for Training Scenarios  
Devon Griggs¹, Arian Naghibi¹, Manuja Sharma¹, Karinne Barbosa¹, and Hung Cao¹  
¹University of Washington, Bothell, WA

Fri–467  
Design of a Wearable Electrochemical Sensor for the Detection of Cocaine in Sweat  
Orlando Hoilet¹ and Jacqueline Linnes¹  
¹Purdue University, West Lafayette, IN

Fri–468  
Smartphone Based Fall Risk Assessment Using Dynamic Stability in Healthy Individuals  
Seong Moon¹, Rahul Soangra², Saba Rezvanian¹, Victoria Smith¹, Christopher Frames¹, Markey Olson¹, and Thurmon Lockhart²  
¹Arizona State University, tempe, AZ, ²Arizona State University, Mesa, AZ

Fri–469  
Can Inertial Sensors Measure Movement Variability in Young and Older Subjects  
Rahul Soangra² and Thurmon Lockhart¹  
¹Arizona State University, Mesa, AZ, ²Arizona State University, Tempe, AZ

Fri–470  
Consumer Wearable Devices for Health Surveillance and Disease Monitoring  
Jessilyn Dunn¹, Xiao Li¹, Denis Salins¹, and Michael Snyder¹  
¹Stanford University, Palo Alto, CA

Track: Device Technologies and Biomedical Robotics  
Device Technologies and Biomedical Robotics

Fri–471  
Sensitivity Analysis for Designing Head Alignment Device for Dental Patients during Cone Beam Computer Tomography (CBCT)  
Cem Yaba¹, Sinan Onal¹, Sohyung Cho¹, Cyril Pandarakalam², Nathalia Garcia³, and Mohamed Omran³  
¹Southern Illinois University Edwardsville, Edwardsville, IL, ²Southern Illinois University, School of Dental Medicine, Alton, IL

Fri–472  
Fast Response Cart Validation with Traceable Gas Blenders  
Jon Moon¹, Christopher Bock², Erica Wohlers¹, Eric Ruud¹, and Yi Liu²  
¹MEI Research, Edina, MN, ²Florida Hospital, Orlando, FL

Fri–473  
Development of a Scaled Bipedal Robot Using Human Kinematics  
Jonathan Mueller¹ and Jaydip Desai¹  
¹Indiana Institute of Technology, Fort Wayne, IN

Fri–474  
Smart Needle for Epidermal Administration  
Michael Oreminger¹, Anastasia Zink², Brian Krohn³, and Amit Goyal³  
¹University of Minnesota Duluth, Duluth, MN, ²University of Minnesota, Minneapolis, MN

Fri–475  
Dynamically Controlled PCR Based on Direct Monitoring of Primer and Target Hybridization States  
Nicholas Adams¹, William Gabella¹, Austin Hardcastle¹, and Frederick Haselton¹  
¹Vanderbilt University, Nashville, TN

Fri–476  
Assessing and Reducing the Toxicity of 3D-printed Parts  
Shirin Mesbah Osuk¹, Graciél Diamante¹, Chunyang Liao¹, Wei Shi¹, Jay Gan¹, Daniel Schlenk¹, and William H. Grover¹  
¹University of California, Riverside, Riverside, CA, ²Nanjing University, Nanjing, China, People’s Republic of

Fri–477  
Demonstration of Proof-of-Concept to Enable Microfluidic Density Gradient Separation of PBMCs from Whole Blood  
Yuxi Sun¹ and Palaniappan Sethi¹  
¹University of Alabama, Birmingham, Birmingham, AL

Track: Biomaterials  
Drug Delivering, Therapeutic, and Theranostic Biomaterials

Fri–478  
Bending and Collapse of Pure DPPC and Survanta Monolayers on Microbubbles  
Alec Thomas¹, Eduard Benet¹, Franck Vernerey², and Mark Borden¹  
¹University of Colorado at Boulder, Boulder, CO

Fri–479  
Piezoelectric Polymer Nano Matrix for Gene Delivery  
Carcia Carson¹, Hak-Joon Sung¹, and Richard Mu²  
¹Vanderbilt University, Nashville, TN, ²Fisk University, Nashville, TN

Fri–480  
Poly(diol citrate) Modified Bare Metal Stents for Drug Delivery  
Darcy Lichlyter¹ and Antonio Webb¹  
¹University of Florida, Gainesville, FL

Fri–481  
GNP-Eluting Hollow Brachytherapy Spacer for Biological In Situ Dose Painting for Image-Guided Radiation Therapy  
Francis Boateng¹ and Wilfred Ngwa³  
¹University of Massachusetts Lowell, Lowell, MA, ²University of Massachusetts Lowell, Lowell, MD, ³Brigham and Women’s Hospital, Boston, MA

Fri–482  
Affinity-Mediated Retention and Delivery of High Isoelectric Point Exhibiting Therapeutic Proteins from Molecularly Imprinted Microparticles  
John Clegg¹, Joann Gu¹, and Nicholas Peppas¹  
¹University of Texas at Austin, Austin, TX

Fri–483  
Tethered Microparticles for BMP-2 Delivery from Collagen Coated Hydroxyapatite Scaffolds  
Laura Gaviria¹, Teja Guda¹, and Joo L. Ong¹  
¹The University of Texas at San Antonio, San Antonio, TX

Fri–484  
Tannic Acid Crosslinked Collagen Type I for Prevention Of Breast Cancer Recurrence  
Lauren Jordan¹, Christopher Moody², Kendyl Williams¹, and Brian Booth¹,²  
¹Clemson University, Clemson, SC, ²Institute for Biological Interfaces of Engineering, Clemson, SC

Fri–485  
Aligned Nanofibrillar Scaffolds for Controlled Delivery of Modified mRNA  
Ngan Huang¹, Luqia Hou¹, Zachary Strassberg³, Michael Hopkins¹, Tatiana Zaitseva³, Eduard Yakubov³, and Michael Paukshto³  
¹Stanford University, Stanford, CA, ²Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, ³PhaRNA, Houston, TX
Fri–486
Titanium-Containing Bioactive Glasses for Clinical Applications: Structural Analysis
Omar Rodriguez Perez¹, Declan Curran¹, Marcello Papini¹, Lana Placek², Anthony Wren³, Emil Schemitsch⁴, Paul Zalzal⁴, and Mark Towler¹,²,³
¹Ryerson University, Toronto, ON, Canada, ²St. Michael’s Hospital, Toronto, ON, Canada, ³Alfred University, Alfred, NY, ⁴Oakville Trafalgar Memorial Hospital, Oakville, ON, Canada, ⁵University of Malaya, Kuala Lumpur, Malaysia

Fri–487
Effect on Oligosaccharide Grafting on the Conformation and Protonation State of Polyethylenimine
Saswati Basu¹, Danielle Miller¹, Stacy Apugo¹, and Preethi Chandran¹
¹Howard University, Washington, DC

Fri–488
Theranostic Nanoprobes
Tugba Ozel¹, Gabriela Herrera¹, and Tania Betancourt¹
¹Texas State University, San Marcos, TX

Fri–489
Antibiofilm activity of Quaternized Chitosan against Mature Dental Biofilms
Wei Lv¹, Yuyu Sun², and Ying Deng³
¹University of South Dakota, Sioux Falls, SD, ²University of Massachusetts Lowell, Lowell, MA

Fri–490
Clicked Gold Nanoclusters for High Drug Payload and Tumor Targeting through EPR Effect
Wei Mao¹ and Hyuk Sang Yoo¹
¹Kangwon National University, Chuncheon, Korea, Republic of

Track: Drug Delivery
Multifunctional or Hybrid Systems

Fri–491
High-Throughput Screening of Clinically Approved Drugs That Prime PEI Transfection Reveals Modulation of Mitochondrial Dysfunction Response Improves Gene Transfer Efficiencies
Albert Nguyen¹, Jared Beyersdorf¹, Jean-Jack Riethoven¹, and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–492
Size and Surface Characteristics of Silica Nanoparticles Impact CHO Cell Uptake and Viability
Alexander Kelly¹, Kyle Paul¹, Robert Arnold¹, and Allan David¹
¹Auburn University, Auburn, AL

Fri–493
Selective Customization of Preformed Multicomponent Nanoparticles Using Microvortices
Candice Howell¹, Michael Toth¹, and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

Track: Drug Delivery
Nano to Micro Devices in Delivery

Fri–494
Polyanhydride Nanoparticle Mediates Efficient Killing of Filarial Parasites
Andrea Binnebose¹, Adam Mullis¹, Shannon Haughney¹, Balaji Narasimhan¹, and Bryan Belloire¹
¹Iowa State University, Ames, IA

Fri–495
Gelatin Nanoparticle Encapsulation of Anti-Parasitic Compound and Characterization for Treatment of Leishmaniasis Disease
Carlos Serna¹, Alfredo Ormeleas¹, Eva Iniguez¹, Katja Michael¹, Rosa Maldonado¹, and Thomas Boland¹
¹The University of Texas at El Paso, El Paso, TX

Fri–496
Synthesis of Structured Microparticles for Tunable, Delayed Protein Release
Dipankar Dutta¹, Chase Fauer¹, Mariama Salifu¹, and Sarah Stabenfeldt¹
¹Arizona State University, Tempe, AZ

Fri–497
Anomalous Drug Transport Through Nanochannels at the Ultra-Nanoscale
Giacomo Bruno¹, Robert, Lyle Hood², and Alessandro Grattoni¹
¹Houston Methodist Research Institute, Houston, TX, ²Politecnico di Torino, Turin, Italy, ³The University of Texas at San Antonio, San Antonio, TX

Fri–498
A New Method to Produce Nano-Structured, High Strength, Drug-Eluting Sutures
Kunal Parikh¹, Rezvom Matzade¹, Aditya Josyula¹, Richard Shi¹, Abdul Elahi Al-Towerk³, Yousef Yazdi², Peter McDonnell³, Laura Ensing³, and Justin Hanes¹
¹Johns Hopkins University, Baltimore, MD, ²King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Fri–499
Interrogation of Cellular Innate Immunity by Diamond-nanoneedle-assisted Intracellular Molecular Fishing
Zixun Wang¹ and Peng Shi¹
¹City University of Hong Kong, Kowloon, Hong Kong

Fri–500
Nanochannel Drug Delivery System for Intratumoral Delivery of Immunotherapeutics
Priya Jain¹, R. Lyle Hood¹, Giacomo Bruno¹, Corrine Ying Xuan Chua¹, and Alessandro Grattoni¹
¹Houston Methodist Research Institute, Houston, TX, ²Politecnico de Turino, Turin, Italy

Fri–501
Establishing Design Criteria for Targeted Nanoparticle Delivery in the Joint
Shannon Brown¹ and Blanka Sharma¹
¹University of Florida, Gainesville, FL

Fri–502
Rapid Synthesis, Purification, and Concentration of Unilamellar Liposomes
Steven Roberts¹, Adriana Pacheco-Figuero¹, Ryan Blower¹, and Nitin Agrawal¹
¹George Mason University, Fairfax, VA

Fri–503
Microneedles Integrated with Pancreatic Cells for Smart Insulin Delivery
Yanqi Ye¹, Jicheng Yu¹, Chao Wang¹, Nhu-Y Nguye¹, John Buse², and Zhen Gu¹,²
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC, ²University of North Carolina at Chapel Hill, Chapel Hill, NC
Track: Drug Delivery

**Drug Delivery**

**Fri–504** Ultrasound-enhanced Drug Delivery for Treatment of Onychomycosis
Alina Kline-Schoder¹, Vesna Zderic¹, and Zung Li¹
¹The George Washington University, Washington, DC

**Fri–505** Design and Development for Transdermal Diabetes Drug Delivery System
Michaela Rizzo¹, Daniel Griffin¹, Sarah Colón¹, Deshawn Gray², Brenden Overton¹, and Bin Wang¹
¹Widener University, Chester, PA

**Fri–506** Enhanced Therapeutic Loading and Delivery Via Protonation of Extracellular Vesicles
Tak Lamichhane¹, Eshan Dahal¹, Babita Parajuli¹, Natalie Livingston¹, and Steven Jay¹
¹University of Maryland, College Park, MD

**Fri–507** Sustained Release of Dasatinib as Therapeutic for Prevention of Proliferative Vitreoretinopathy
Rayanne Balgemann¹, Rajat Chauhan¹, Hidetaka Noma¹, Kevin MacDonald¹, Henry Kaplan¹, Tamiya Shigeo¹, and Martin O’Toole¹
¹University of Louisville, Louisville, KY

Track: Nano and Micro Technologies

**Micro/Nano Fluidic Engineering**

**Fri–508** Streamline Based Design Guideline for Deterministic Microfluidic Hydrodynamic Single Cell Trap
Allan Guan¹, Aditi Sheny¹, Richard Smith¹, and Zhenyu Li¹
¹George Washington University, Washington, DC

**Fri–509** Design Rules for 3D-Printed Autonomous Capillaric Circuits
Ayokunle Olanrewaju¹ and David Juncker¹
¹McGill University, Montreal, QC, Canada

**Fri–510** Modeling and Validation of Mass Transport in a Microfluidic Vascular Model with On-chip Biosensing
Jeremy Wong¹, Edmond Young¹, and Craig Simmons¹
¹University of Toronto, Toronto, ON, Canada

**Fri–511** Development of an Integrated Microfluidic Platform for Automated Proteomic Assay Predictive of Radiotherapy Outcomes
Jerome Lacombe¹, Jerome Solasso²,³, Alain Mange³, Matthew Barrett¹, Alan Nordquist¹, David Azria¹,³, and Frederic Zenhausern¹
¹University of Arizona, Chandler, AZ, ²CHU Montpellier, Montpellier, France, ³INSERM U1196, Montpellier, France, ⁴ICM Val d’Aurelle, Montpellier, France

**Fri–512** Low Cost Stamping Method for Patterning Multi-Analyte and Ladder-Bar Immunoassays
Jessalyn Imdieka¹ and Elain Fu¹
¹Oregon State University, Corvallis, OR

**Fri–513** Capillary Pressure-Driven Micro-Viscometer to Quantify a Living Zebrafish Fluidic System
Juhyun Lee¹, Dongyang Kang², Nelson Jen¹, Dino Di Carlo¹, Yu-Chong Tai², and Tszung Hsiail¹
¹University of California, Los Angeles, Los Angeles, CA, ²California Institute of Technology, Pasadena, CA

**Fri–514** A Self-Contained and Self-Powered Microfluidic Device for Point-of-Care Diagnostics
Tae-Hoon Kim¹ and Jungkyu (Jay) Kim¹
¹Texas Tech University, Lubbock, TX

**Fri–515** High-Throughput Inertial Focusing of Micron and Submicron Particles: from Bacteria to Subcellular Organelles
Lei Wang¹ and David Dandy¹
¹Colorado State University, Fort Collins, CO

**Fri–516** Smartphone-Fluidics Based Microscopy and Flow Cytometry for Islet Quantification
ManWai Chan³, Yuan Xing¹, Mohammad Nourmohammadzadeh¹, Joshua Mendoza Elias¹, James McGarrigle¹, Jade Yeh¹, Jose Oberholzer¹, and Yong Wang¹
¹University of Illinois at Chicago, CHICAGO, IL

**Fri–517** Generation and Detection of An Oxygen Gradient From a Single Source Inside A Microfluidic Platform
Md. Daud Khan¹, John Cressman¹, Paige Eppler¹, and Nitin Agrawal¹
¹George Mason University, Fairfax, VA

Garrett Benedict¹, Sarah Fowler¹, Sarah Wells¹, Jordan Backer¹, Paul Carlquist¹, Scott Evans¹, Sam Ginsburg¹, Kathleen Seeley¹, Evan VanBelle¹, and Melanie Watson¹
¹Trine University, Angola, IN

**Fri–519** Affinity-Based Systems for Efficient Cell Separation and Release in Microfluidic Channels
Mengen Zhang¹, Bin Xu¹, and Wei Shen¹
¹University of Minnesota, Minneapolis, MN

**Fri–520** Orientation-based Control of Microfluidics
Nazila Norouzi¹, Heran Bhakta¹, and William. H Grover¹
¹University of California, Riverside, Riverside, CA

**Fri–521** Bi-directional Frequency-tuned Microfluidic Valve
Rahil Jain¹ and Barry Lutz¹
¹University of Washington, Seattle, WA

**Fri–522** Improved Mixing Efficiency Using Convex Grooves In Passive Micro-mixer With Low Reynolds Number Scheme
Taekyoun Kwak¹, Young Gyu Nam¹, Maria Alejandra Najera³, Sang Woo Lee¹, J. Rudi Strickler¹, and Woo-Jin Chang¹
¹Mechanical Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI, ²Industrial Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI, ³Department of Biomedical Engineering, Yonsei University, Wonju, Korea, Republic of,"Great Lakes Water Institute, University of Wisconsin-Milwaukee, Milwaukee, WI

**Fri–523** Propagating Microvortices to Engineer Drug Loaded High-Density Lipoprotein Mimetic Nanomaterials
Yoshitaka Sei¹ and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

**Fri–524** A Pumpless Microfluidic Device Driven by Surface Tension for Pancreatic Islet
Yuan Xing¹, Mohammad Nourmohammadzadeh¹, Joshua Mendoza-Elias¹, Zequn Chen¹, James McGarrigle¹, Jose Oberholzer¹, and Yong Wang¹
¹University of Illinois at Chicago, Chicago, IL
Track: Drug Delivery

Fri–525
Voltage-Controlled Molecular Release from Nanoporous Gold Electrodes in Microfluidic Channel
Zidong Li¹, Ling Wang¹, Özge Polat¹, and Erkin Seker¹
¹University of California Davis, Davis, CA

Fri–526
Polycation Gene Delivery: Investigation of Opposing Trends in mRNA and Plasmid DNA Transfection
Albert Yen¹, Yilong Cheng¹, Sanyogitta Puri², Katie Barker², and Suzie Pun²
¹University of Washington, Seattle, WA, ²AstraZeneca UK Ltd., Macclesfield, United Kingdom

Fri–527
Dual Peptide-Mediated Targeted Delivery of SiRNAs for the Treatment of Oral Cancer
Angela Alexander-Bryant¹,², Haiven Zhang³, Christopher Attaway³, William Pugh³, Laurence Eggart³, Lu Dinh⁴, Robert Sansevere⁴, Lourdes Andino⁴, and Andrew Jakymiw⁴
¹Clemson University, Clemson, SC, ²Medical University of South Carolina, Charleston, SC

Fri–528
Cytocompatible Catalyst-free Hydrogel for UV-triggered RNA Release to Induce hMSC Osteogenesis
Cong Truc Huynh¹, Minh Khanh Nguyen¹, Zijie Zheng¹, Alexandra McMillan¹, Gulan Y. Tonga², Vincent M. Rotello², and Eben Alsberg¹
¹Case Western Reserve University, Cleveland, OH, ²University of Massachusetts, Amherst, MA

Fri–529
Delivery of DNA Probes for Competitive Transcription Factor Antagonism in Pulmonary Fibrosis
Dwight Chambers¹ and Thomas Barker²
¹Georgia Institute of Technology and Emory University, Atlanta, GA, ²University of Virginia, Charlottesville, VA

Fri–530
Chitosan-Zein Nano-in-Microparticles for Oral Gene Delivery
Eric Farris¹, Amanda Ramer-Tait¹, Deborah Brown¹, and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–531
A Novel Rac1-dependent Endocytic Route for Gene Uptake in Electrotransfection
Mao Mao¹, Liangli Wang¹, Chun-Chi Chang¹, Jianyong Huang², and Fan Yuan¹
¹Duke University, Durham, NC

Fri–532
Using Spherical DNA Aptamer-Conjugated Nanoparticles for Personalized Treatment of Small Cell Lung Carcinoma
Ricky Whittenert¹, Padma Sundaram¹, Katherine Windham¹, Jacek Wowert¹, and Mark Byrne¹
¹Auburn University, Auburn University, AL, ²Rowan University, Glassboro, NJ

Fri–533
Cationic Amphiphilic Copolymer for pTK and GCV Delivery in Spinal Cord Tumor
So-Jung Gwak¹, Justin Nice¹, Christian Macks¹, and Jeoung Soo Lee¹
¹Clemson University, Clemson, SC

Track: Drug Delivery

Fri–534
Accurate Models of Cell Membranes for In Vitro Screening of Membrane Interactions
Graham Taylor¹ and Stephen Sarles¹
¹University of Tennessee, Knoxville, Knoxville, TN

Fri–535
Integrating Multiple Types of Inorganic Nanoparticles into Biodegradable Polymersomes
Murali Ramamoorthi¹, Sanaz Ebrahimi Samani¹, Simon Tran¹, and Joseph Kinsella¹
¹McGill University, Montreal, QC, Canada

Fri–536
Supramolecular Assemblies of Alkane Functionalized Poly Ethylene Glycol Copolymer for Drug Delivery
Lida Zhu¹ and Katie Bratlie¹
¹Iowa State University, Ames, IA

Fri–537
Optically Clear, In-Situ Forming Self-Assembled Nanogels for the Delivery of Ocular Pharmaceuticals
Laura Osorno¹, Mark Byrne¹, and Mindy George-Weinstein²
¹Rowan University, Glassboro, NJ, ²Copper Medical School of Rowan University, Camden, NJ

Fri–538
Feasibility of Liposomal Encapsulation Of Complex Black Raspberry Phytochemical Fractions
Lauren Cosby¹, Thomas Knobloch¹, Christopher Weghorst¹, and Robert Lee¹
¹The Ohio State University, Columbus, OH

Fri–539
Stretch Activated Formation of Artificial Model Cell Membranes
Reza Razavi¹ and Stephen Sarles¹
¹University of Tennessee Knoxville, Knoxville, TN

Track: Nano and Micro Technologies

Fri–540
An Impedance-Based Thermal Flow Sensor for Physiological Fluids
Alex Baldwin¹ and Ellis Meng¹
¹University of Southern California, Los Angeles, CA

Fri–541
Enhancing Performance of Enzyme-based Amperometric Biosensors Through Interfacial Engineering
Christian Kotanen¹,² and Anthony Giuseppi-Elie¹,²,³
¹Texas A&M University, College Station, TX, ²Center for Bioelectronics, Biosensors and Biochips (C³B), College Station, TX, ³ABTECH Scientific, Inc., Richmond, VA

Fri–542
Single Cell Analysis Based on Magnetic Beads Assay
Fan Liu¹, Pawan KC¹, Ge Zhang¹, and Jiang Zhe¹
¹The University of Akron, Akron, OH

Fri–543
Molecular Characterization of Hyaluronic Acid (HA) With Solid-State Nanopores
Felipe Rivas¹, Osama Zahid¹, Courtney Smith¹, Elaheh Rahbar¹, and Adam Hall¹
¹Virginia Tech-Wake Forest School of Biomedical Engineering, Winston-Salem, NC
Fri-544 Nanomes: Next Generation of Artificial Enzymes
Hui Wei
1Nanjing University, Nanjing, China, People’s Republic of

Fri-545 Synthesis and Characterization of Polymer-Coupled Gold Nanorods
Katherine Carrizales1, Gilbert Bustamante1, and Jing Yong Ye1
1University of Texas at San Antonio, San Antonio, TX

Fri-546 Encapsulated Arrays of Asymmetric Synthetic Lipid Bilayers with in situ Electrical Measurements for Membrane Based Studies
Mary-Anne Nguyen1 and Stephen Sarles1
1University of Tennessee, Knoxville, TN

Fri-547 Integrating Cell-Free Synthetic Biology with Mobile Microfluidics-Based Fluorescent Microscopy to Detect Clinically Relevant Analytes
Mary Joe Rice1, John Lake1, and Warren Ruder1
1Virginia Tech, Blacksburg, VA

Fri-548 Hydrogel Microarray: A New System for A Metal Enhanced Fluorescence-Based Protein Assay
Minsu Kim1, Sang Won Han1, Haejeong Pang1, Hye Jin Hong1, and Won-Gun Koh1
1Yonsei University, Seoul, Korea, Republic of

Fri-549 Interference of KCl on Cobalt Nanoparticle-based Electrochemical Low-cost Disposable Phosphate Sensor
Misong Ryu1 and Woo-Jin Chang1
1Mechanical Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI

Fri-550 In Vivo Biosensing Via Single Walled Carbon Nanotubes
Nicole Iverson1, Paul Barone2, Mia Shandell2, Laura Trudel2, Selda Sen2, Fatih Sen2, Vsevolod Ivanov2, Esha Atolia2, Edgardo Farias2, Thomas McNicholas2, Nigel Reuel2, Nicola Parry2, Gerald Wogan2, and Michael Strano2
1University of Nebraska Lincoln, Lincoln, NE, 2Massachusetts Institute of Technology, Cambridge, MA

Fri-551 Integration of Flexible Wearable Sensors with Wireless Communication Systems for Health Monitoring
Qiwei Wang1, Ji Young Lee1, Teddrick Schaffer1, Sung Y. Shin1, and Hyeun Joong Yoon1
1South Dakota State University, Brookings, SD

Fri-552 Measuring Extracellular Amino Acid Dynamics from 3T3-L1 Adipocytes Using Online Microdialysis-Capillary Electrophoresis
Rachel Harstad1 and Michael Bowser1
1University of Minnesota, Minneapolis, MN

Fri-553 Hydrogel-framed Nanofiber Matrix Integrated with a Microfluidic based Assay Chip for Fluorescence Detection of Matrix Metalloproteinases-9
Sang Won Han1, Minsu Kim1, Kanghee Cho1, Sung Ho Cha1, and Won-Gun Koh1
1Yonsei University, Seoul, Korea, Republic of

Fri-554 Super-Capacitive Conductive Nanocomposites for Biosensing
Shrishti Singh1, Maitri Jariwala1, Osama Alturkistani1, Ankarao Kalluri1, Prabir Patra1, Isaac Macwan1, and Ashish Aaphale1
1University of Bridgeport, Bridgeport, CT, 2University of Connecticut, Storrs, CT

Fri-555 Electrochemical Detection of Volatile Organic Compounds (VOCs) associated with Colorectal Cancer via Nickel Functionalized Titania Nanotube Arrays (TNAs)
Anurag Tripathy1, Dhiman Bhattacharyya1, Mano Misra1, and Swomita Mohanty1
1University of Utah, Salt Lake City, UT

Fri-556 Immobilization of Protein-G on Assembled Gold Nanorods for Label-free Detection of Human IgG
Victor Aguero Villarreal1 and Liang Tang1
1The University of Texas at San Antonio, San Antonio, TX

Fri-557 Three-dimensional Mapping and Regulation of Action Potential Propagation
Xiaochuan Dai1, Wei Zhou1, and Charles Lieber1
1Harvard University, Cambridge, MA, 2Virginia Tech, Blacksburg, VA

Track: Nano and Micro Technologies

Nano and Micro Technologies

Fri-558 Investigation of Glass Formation Characteristics in Trehalose-water Binary System using Raman Microspectroscopy
Mian Wang1 and Nilay Chakraborty1
1University of Michigan Dearborn, Dearborn, MI

Fri-559 A High-throughput Microfluidic Device for 1000-fold Leukocyte Reduction of Platelet Rich Plasma
Hui Xie1, Briony Strachan1, Sean Gifford1, and Sergey Shevkopylas1
1University of Houston, Houston, TX, 2Halcyon Biomedical Incorporated, Friendswood, TX

Fri-560 Monitoring the Activity of P-glycoprotein Reconstituted in Giant Liposomes
SooHyun Park1 and Sheereen Majd1,2
1Penn State University, University Park, PA, 2University of Houston, Houston, TX

Fri-561 A Simple Culture System for Long Term Imaging of Individual C. Elegans
Will Pittman1 and Zachary Pincus1
1Washington University in St Louis, St. Louis, MO

Track: Stem Cell Engineering

Advanced Biomanufacturing: Nano, Cell and Tissue-Based Therapeutic Agents Manufacturing Science and Engineering

Fri-562 Direct Production of Human Cardiac Tissues by Pluripotent Stem Cell Encapsulation in PEG-Fibrinogen Microspheres
Petra Kerscher1, Wen Seeto1, and Elizabeth Lipke1
1Auburn University, Auburn, AL

Fri-563 A Regenerative Bio-minipump Created by Cardiac Stem Cells Encapsulated in Thermo-sensitive Microgel
Junnan Tang1,2, Xiaolin Cui1, Michael Hensley1,2, Adam Vandegriff3, Jhon Cores1, Tyler Allen1, Phuong-Uyen Dinh1, Jinying Zhang2, Hu Zhang2, and Ke Cheng1,3
1University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC, 2First Affiliated Hospital of Zhengzhou University, Zhengzhou, China, People’s Republic of, 3North Carolina State University, Raleigh, NC, 4University of Adelaide, Adelaide, Australia
Track: Stem Cell Engineering
Directing Stem Cell Differentiation

Fri–564
A Computational Model of Hematopoietic Stem Cell Differentiation in Culture
Bhushan Mahadik¹, Bruce Hannon², and Brendan Harley¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Illinois at Urbana-Champaign, Urbana, IL

Fri–565
Arterial Differentiation of Pluripotent Stem Cells Via Modulating Early VE-cad+/Nrp1+ Endothelial Progenitors
Diana Kim¹ and Guohao Dai¹
¹Rensselaer Polytechnic Institute, Troy, NY

Fri–566
A Customizable Assay to Investigate Parallel & Competing Roles of Microenvironmental Factors on Stem Cell Fate and Behavior
Jayant Saksera¹, Liana Boraas¹, Samuel Charles Sklare¹, Lowry Curley¹, Ben Vinson³, Tabassum Ahsan¹, and Douglas Chrisey¹
¹Tulane University, New Orleans, LA

Fri–567
Utilizing Genetic Circuits for Enhancing Cell Fate Outcomes
Michael Fitzgerald¹ and Tara Deans¹
¹University of Texas at Austin, Austin, TX

Fri–568
Designing a Synthetic Bone Marrow Microenvironment to Drive Adaptive Immunity
Nisarg Shah¹, Angelo Mao¹, Ting-Yu Shih¹, David Mooney¹, and David Scadden¹
¹Harvard University, Cambridge, MA

Fri–569
Role of Dynamic Stiffening on hMSC Differentiation towards Osteogenic or Adipogenic Lineage
Shane Allen¹, Alexis Atequera¹, and Laura Suggs¹
¹The University of Texas at Austin, Austin, TX

Fri–570
MicroRNA-191 Regulates Mesenchymal Stem Cells Differentiation through ZO-1/ZONAB Pathway
Xiao-Fei Zhang¹ and Xiaofeng Cui¹,²
¹Wuhan University of Technology, Wuhan, China, People’s Republic of, ²Stemorgan Therapeutics, Albany, NY, ³Rensselaer Polytechnic Institute, Troy, NY

Fri–571
Patterned Porous Silicon Photonics for Integrated Biosensing and Spatial Control of Neural Stem Cell Differentiation
Ya Pei¹, Tiffany Huang¹, Douglas Zhang¹, Yanfen Li¹, and Kristopher Kilian¹
¹University of Illinois, Urbana, IL

Track: Stem Cell Engineering
Engineering in Developmental Biology

Fri–572
Understanding the Role of Tissue-Level Forces in Mesoderm Specification of Human Embryonic Stem Cells
Jonathon Muncie¹, Larynyne Przybyla², Johnathon Lakins³, Raimon Sunyer⁴, Xavier Trepatt⁴, and Valerie Weaver²
¹Joint Graduate Group in Bioengineering, UCSF and UC Berkeley, San Francisco, CA, ²University of California San Francisco, San Francisco, CA, ³Institute for Bioengineering of Catalonia, Barcelona, Spain, ⁴Universitat de Barcelona and Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

Fri–573
Engineering Novel Thermoreversible Hydrogels for Large Scale Expansion of Stem Cells
Barbara Ekerdt¹, Christina Fuentes¹, Yuqiu Lei², Rachel Segalman³, and David Schaffer¹
¹University of California Berkeley, Berkeley, CA, ²University of Nebraska, Lincoln, NE, ³University of California Santa Barbara, Santa Barbara, CA

Fri–574
Alignment of hPSC-derived Myogenic Cells in Response to Nanotopographical Cues and Biochemical Ligands
Bin Xu¹, Alessandro Malì³, Yoska Anugrah Liu¹, Steven Koester¹, Rita Perlingeiro¹, and Wei Shen¹
¹University of Minnesota, Twin Cities, Minneapolis, MN

Fri–575
Mesenchymal Stem Cell Response to Static Tension, Cyclic Tension, and Vibration
Brooke McClaren¹, Ayesha Aijaz¹, Sneha Mehta¹, and Ronke Olabisi¹
¹Rutgers University, Piscataway, NJ

Fri–576
Engineering the Microenvironment Niche of Human BM derived MSC Spheroids for Enhanced Cardiomyogenesis
Jyotsna Joshi¹, Vincent Beachley², and Chandra Kothapalli¹
¹Cleveland State University, Cleveland, OH, ²Rowan University, Glassboro, NJ

Fri–577
Tunable Surface Repellency maintains Stemness and Redox Capacity of Human Mesenchymal Stem Cells
Daniel Balkov¹, Spencer Crowder¹, Tim Boire¹, Jung Bok Lee¹, Mukesh Gupta¹, and Hak-Joon Sung¹
¹Vanderbilt University, Nashville, TN

Fri–578
Alginate Encapsulated Mesenchymal Stromal Cells for Osteoarthritis Treatment
Ileana Marrero-Berrios¹, Rene Schloss¹, and Martin Yarmush¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Fri–579
Investigating the Role of Glycosaminoglycans (GAGs) in Neural Stem Cells (NSCs) Differentiation
Jie Shi Chua¹, Anna Sung¹, and Kubieran Balagurunathan¹
¹University of Utah, Salt Lake City, UT

Fri–580
Algorithm Optimization of Non-DMSO Cryopreservation Protocols Results in Improved Mesenchymal Stem Cell Functionality
Kathryn Pollock¹, Joseph Budenske¹, Elizabeth Moy¹, David H. McKenna², Peter Dosa¹, and Allison Hubel¹
¹University of Minnesota, Minneapolis, MN, ²University of Minnesota, St Paul, MN

Fri–581
Elucidating the Effect of the Enteric Nervous System on Intestinal Health and Permeability
Marissa Fuzan¹ and Abigail Koppes¹
¹Northeastern University, Boston, MA
Fri–583
Formulation of Defined Conditions for Human Hematopoietic Progenitor Expansion Based on a High-Throughput, Evolutionary Algorithm-Directed Closed Loop System
Michelle Kim¹ and Julie Audet¹
¹University of Toronto, Toronto, ON, Canada

Fri–584
Molecular Regulation of Colony Size-Dependent Neural Differentiation of Embryonic Stem Cells in a Heterocellular Niche
Ramila Joshi¹, James Buchanan¹, Nathan Morris², and Hossein Tavana¹
¹University of Akron, Akron, OH, ²Case Western Reserve University, Cleveland, OH

Track: Stem Cell Engineering
Scaling Up Stem Cell Production/Stem Cell Derived Progenitors

Fri–585
Expandable and Rapidly Differentiating Human Induced Neural Stem Cell Lines For Multiple Tissue Engineering Applications
Dana Cairns¹, Karolina Chwalek¹, Yvonne Moore², Matt Kelley³, Rosalyn Abbott⁴, Stephen Moss⁵, and David Kaplan¹
¹Tufts University, Medford, MA, ²Tufts University, Boston, MA

Fri–586
Shear Susceptibility of Primary Human Mesenchymal Stem Cells (hMSCs) Increases with Generation Number
Peter Amaya¹, Eric Plencner¹, Peter Rapiejko², and Jeffrey Chalmers¹
¹Ohio State University, Columbus, OH, ²EMD Millipore Corporation, Bedford, MA

Tracks: Stem Cell Engineering, Cellular and Molecular Bioengineering
Stem Cell Programming

Fri–587
Enhancing Nonviral Gene Delivery to Human Mesenchymal Stem Cells Using Glucocorticoid Pathways
Andrew Hamann¹ and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–588
Neutrophil Phenotype Analyzed from Expanded CD34+ Human Umbilical Cord Blood Hematopoietic Stem Cells
Leif Anderson¹, Vasilios Morikis¹, and Scott Simon¹
¹UC Davis, Davis, CA

Fri–589
Physical and Chemical Conditions to Promote Differentiation of Human iPSCs to Nucleus Pulposus-like Cells
Ruhang Tang¹, Lufang Jing¹, Vincent Willard², Farshid Guilak¹, Lori Setton³, and Jun Chen⁴
¹Washington University in St Louis, St. Louis, MO, ²Duke University, Durham, NC

Fri–590
High-Throughput Screening of Neurotoxicity on Neural Stem Cell Microarrays
Kyeong-Nam Yu¹, Pranav Joshi¹, Seok-Joon Kwon¹, Chandrasekhar Kothapalli¹, and Moo-Yeal Lee¹
¹Cleveland State University, cleveland, OH, ²Rensselaer Polytechnic Institute, Troy, NY

Track: Tissue Engineering
Inflammation and Immunomodulation

Fri–591
The Effects of Scaffold Rigidity on Retinal Pigment Epithelial Inflammation and Microglial Activation
Corina White¹ and Ronke Olabisi²
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Rutgers University, Piscataway, NJ

Fri–592
Isolation and 3D Culture of Lymph Node Fibroblastic Reticular Cells to Restore Self-tolerance
Freddy Gonzalez Badillo¹, Maria Abreu¹, Vita Manzoli², Diana Velluto¹, and Alice Tomei³
¹Diabetes Research Institute-University of Miami-Miller School of Medicine, Miami, FL, ²Department of Biomedical Engineering-University of Miami, Coral Gables, FL, ³Department of Electronics, Information and Bioengineering-Politecnico di Milano, Milano, Italy

Fri–593
Dual-Affinity Heparin Hydrogels Achieve Localized Immunomodulation and Enhance Microvascular Remodeling
Molly Ogle¹, Jack Krieger¹, Jennifer McFalone-Figueroa¹, Johnna Temenoff¹, and Edward Botchwey¹
¹Georgia Institute of Technology, Atlanta, GA

Fri–594
Development of a Hemoglobin-Based Treatment to Promote M2 Macrophage Polarization in Inflammation
Paulina Krzyszczyk¹, Kristopher Richardson², Martin Yarmush¹, Andre Palmer³, and Francois Berthiaume¹
¹Ohio State University, Columbus, OH, ²Tufts University, Medford, MA

Fri–595
Endothelial Dysfunction Caused By Polarized Macrophages In Atherosclerosis
Radhika Josi¹ and Damir Khismatullin¹
¹Tulane University, New Orleans, LA

Fri–596
Engineered PGE2 for Bone Regeneration By Modulating Both Inflammation and Osteogenesis
Yangxi Liu¹, Qingqing Yao¹, and Hongli Sun¹
¹University of South Dakota, Sioux Falls, SD

Track: Tissue Engineering
Integration of Developmental Biology and Morphogenesis in Tissue Engineering

Fri–597
A Microphysiological Approach to Elucidate Gene-Environment Interactions in Orofacial Clefting
Brian Johnson¹, Angela Xie¹, Dustin Fink¹, Ross Vitek¹, William Murphy¹, David Bebe¹, and Robert Lipinski¹
¹UW-Madison, Madison, WI

Fri–598
Liver-on-a-chip for in vitro Alcoholic Liver Fibrosis Model
JaeSeo Lee¹ and Sang-Hoon Lee¹
¹Korea University, Seoul, Korea, Republic of

Fri–599
In-vitro Multi-tissue Interface Model Provides Mechanistic Insight for Vascularizing Tissues
Kevin Buno¹, Xuemei Chen¹, Justin Weibel¹, Stephanie Thiede¹, Suresh Garimella¹, Mervin Yoder¹,², and Sherry Voytik-Harbin¹
¹Purdue University, West Lafayette, IN, ²Indiana University School of Medicine, Indianapolis, IN
Track: Tissue Engineering
Printing and Patterning in Tissue Engineering

Fri–600
Tuned Fibroblast Cell Alignment on Polyelectrolyte Nano-wrinkles
Ariel Ash-Shakoor¹, Eric Finkelstein¹, James Henderson¹, and Patrick Mather¹
¹Syracuse University, Syracuse, NY

Fri–601
Design and Engineering of Complex Biological Structures through Micro Extrusion
Geoffrey Navarro¹, Inti Garcia¹, Paul Sundaram¹, and Nanette Diffool¹
¹University of Puerto Rico, Mayaguez, PR

Fri–602
Multiscale 3D Vascular Network Hydrogel Formed by 3D Printing with Sacrificial Fibers
Jung Bok Lee¹, Brian O’Grady¹, Shannon Foley¹, Hak-Joon Sung¹, and Leon Bellan¹
¹Vanderbilt University, Nashville, TN

Fri–603
The Water Soluble Matrix of Nacre Exerts Microspatial Control of Osteogenic Mineralization
Kristopher White¹ and Ronke Olabisi¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Fri–604
Evaluation of Printed Cell Viability, Proliferation, and Insulin Production on Various Alginate-Gelatin Hydrogels
Luis Solis¹, Julio Rincon¹, Armando Varela-Ramirez¹, Renato Aguilera¹, and Thomas Boland¹
¹University of Texas at El Paso, El Paso, TX

Fri–605
Feasibility of 3-D Printing for the Replication of Tri-Leaflet Heart Valve Shape
Mohammad Shaver¹, Arvind Agarwal¹, Sara Rengifo¹, and Sharar Ramaswamy¹
¹Florida International University, Miami, FL

Fri–606
Development of Cell-laden Graphene Oxide/ Gelatin Based Bioinks for 3D Bioprinting of Regenerative Tissues
Shayan Shafiee¹ and Tolou Shokuhfar¹
¹Purdue University, West Lafayette, IN

Fri–607
4D Printing Smart Biomedical Scaffolds with Novel Soybean Oil Epoxidized Acrylate
Shida Miao¹, Wei Zhu¹, Nhan, J Castro¹, Haitao Cui¹, Xuan Zhou¹, John P. Fisher², and Lijie Zhang¹
¹The George Washington University, Washington, DC, ²University of Maryland, College Park, MD

Fri–608
3D Bio-Printed Vascularized Skin Tissue
Vivian Lee¹, Seung-Schik Yoo¹, Pankaj Karande¹, and Guohao Dai¹,³
¹Rensselaer Polytechnic Institute, Troy, NY, ²Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, ³Rensselaer Polytechnic Institute, Troy, NY

Fri–609
Rapid Multi-Material Bioprinting
Yu Shrike Zhang¹, Wanjun Liu¹, Marcel Heinrich¹, Fabio De Ferrari¹, Mehmet Dokmeci¹, and Ali Khademhosseini¹
¹Harvard Medical School, Cambridge, MA

Track: Stem Cell Engineering
Stem Cell Technologies for Drug Development

Fri–610
Microengineered Stem Cell-Derived Human Liver Platform for Infectious Disease Applications
Christine Lin¹,² and Salman Khetani²
¹Colorado State University, Chicago, IL, ²University of Illinois at Chicago, Chicago, IL

Fri–611
Fluid Flow Induction of Genes in Human Dermal Fibroblasts &ndash; Engineering a Patient-Specific Drug Screening Platform
Nikita Zabinyakov¹, Deborah Studer¹, Robert Shepherd¹, and Kristina Rinker¹,³
¹University of Calgary, Calgary, AB, Canada, ²Libin Cardiovascular Institute, Calgary, AB, Canada

Fri–612
Recapitulating Stem Cell Therapy for Idiopathic Pulmonary Fibrosis Within Microfluidic Platforms
Matthew Ishahak¹ and Ashutosh Agarwal¹
¹University of Miami, Coral Gables, FL

Fri–613
The Role of Baz and aPKC in Asymmetric Cyst Stem Cell Divisions
Zhinan Wang¹, Wei Shen¹, and Jun Cheng¹
¹University of Illinois at Chicago, Chicago, IL

Track: Translational Biomedical Engineering
Bio-Nanomedicine in Healthcare

Fri–614
Self-Assembled Collagen-mimetic Triple Helices with Antimicrobial Peptide Amphiphiles as Novel Antibacterial Agents
Kanny (Run) Chang¹, Linlin Sun¹,², and Thomas Webster¹
¹Northeastern University, Boston, MA, ²Wenzhou Institute of Biomaterials and Engineering, Wenzhou, China, People's Republic of

Fri–615
A BCS Class Ib Drug Dabigatran Etxilate Self-nanoemulsifying System to Treat Cardiovascular Disease
Fujuan Chai¹, Linlin Sun² ³, Yafei Ding¹, Yajie Zhang¹, and Thomas J. Webster² ³
¹China Pharmaceutical University, Nanjing, China, People’s Republic of, ²Wenzhou Institute of Biomaterials and Engineering, Wenzhou, China, People's Republic of, ³Northeastern University, Boston, MA, ⁴King Abdulaziz University, Jeddah, Saudi Arabia

Track: Translational Biomedical Engineering
Translational Approaches for Biomedical Products and Devices

Fri–616
Effects of Gamma Irradiation on the Mechanical and Surface Properties of PTFE
Corayma Duarte¹, Naushadh Wazit¹, and Gun Selvaduray¹
¹San Jose State University, San Jose, CA, ²San Jose State University, Fremont, CA
Fri–617
Aqueous Two-Phase Systems Enhance the Detection of Streptococcus mutans via the Lateral-Flow Immunoassay
David Pereira¹, Alison Thach¹, Christina Pearce¹, Benjamin Wu¹, and Daniel Kamei¹
¹UCLA, Los Angeles, CA

Fri–618
Non-Thermal Plasma Treatment Safely and Rapidly Disinfects MRSA Infected Wounds
Kerry A. Morrison¹, Rachel Akintayo¹, Julia Jin¹, Ross Weinreb¹, Omer Kaymakcalan¹, Xue Dong¹, Sarah Karinja¹, Andrew Abadeer¹, Lars F. Westblade², Czeslaw Golkowski³, and Jason A. Spector¹
¹Laboratory of Bioregenerative Medicine and Surgery, Division of Plastic Surgery, Weill Cornell Medical College, New York, NY, ²Department of Pathology and Laboratory Medicine, Weill Cornell Medical College, New York, NY, ³Steri Free Med, Inc., Cornell University, Ithaca, NY

Fri–619
Biomimetic Nanotechnology for Improved Capture of Circulating Tumor Cells
Seungpyo Hong¹,², Andrew Wang³, Ja Hye Myung¹, Michael Eblan³, and Sin-jung Park¹
¹University of Illinois, Chicago, IL, ²Yonsei University, Seoul, Korea, Republic of, ³University of North Carolina, Chapel Hill, NC

Fri–620
Magnetic Levitation Platform for Rapid, On-Site Disease Diagnostics
Stephanie Knowlton¹, Bekir Yenilmez¹, Chu Hsiang Yu¹, Matthew Heeney², Farzana Pashankar³, and Savas Tasoglu¹
¹University of Connecticut, Storrs, CT, ²Harvard Medical School, Boston, MA, ³Yale University School of Medicine, New Haven, CT

Track: Translational Biomedical Engineering

Translational Approaches for Regenerative Medicine

Fri–621
Clinical Grade Expansion of Human Intestinal Smooth Muscle Cells using Human Platelet Lysate as a Substitute for Fetal Bovine Serum
Elie Zakhem¹, Mohammad Z Albanna²,³, and Khalil N Bitar¹,⁴
¹Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, ²Pinnacle Transplant Technologies, Phoenix, AZ, ³Wake Forest School of Medicine, Winston Salem, NC, ⁴Virginia Tech-Wake Forest University, Winston Salem, NC

Fri–622
Development of a Quantitative Histology Scale for Capsular Contracture Severity
Katherine Degen¹, Kurtis Moyer¹,², and Robert Gourdie¹,²
¹Virginia Tech, Roanoke, VA, ²Carilion Clinic, Roanoke, VA, ³Virginia Tech Carilion Research Institute, Roanoke, VA
## SATURDAY’S HIGHLIGHTS

### Platform Sessions–Sat–1

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tr>
<td>8:00 am–9:30 am</td>
<td>Convention Center</td>
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**Meet the Expert:** Meet the Experts on Data Sharing

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<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:00 am–9:30 am</td>
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**Exhibit Hall Open**

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<tr>
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**Poster Session**

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<td>9:30 am–1:00 pm</td>
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**Poster Viewing with Authors & Refreshment Break**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>9:30 am–10:15 am</td>
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**Plenary Session**

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<th>Event</th>
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<tbody>
<tr>
<td>10:30 am–11:30 am</td>
<td>Auditorium</td>
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**Rita Schaffer Young Investigator Lecture**

Jennifer Munson, PhD

**BMES Diversity Lecture Award**

Srinivas Sridhar, PhD

### Platform Sessions–Sat–2

<table>
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### Platform Sessions–Sat–3

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### OP-Sat-1-1

**Auditorium 1**

**Track:** Cellular and Molecular Bioengineering

**Mechanobiology of Cell Adhesion I**

** Chairs:** Ashley Brown, Matthew Paszek

**8:00 am**

**Cells Feel the Force, Then They Don’t: Implications in Wound Repair and Fibrosis —INVITED**

Thomas Barker¹

¹University of Virginia, Charlottesville, VA

**8:15 am**

**Physical Determinants of the Subcellular Distribution of Vinculin Tension**

Andrew LaCroix¹ and Brenton Hoffman¹

¹Duke University, Durham, NC

**8:30 am**

**Provisional Matrix Citrullination Contributes to aberrant Wound Healing**

Victoria Stefanelli¹, Kelly Pesson¹, and Thomas Barker²

¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA

**8:45 am**

**Anisotropic Traction Forces from Spatially Constrained Focal Adhesions Drive Contact-guided Cell Migration**

Arja Ray¹, Oscar Lee¹, Zaw Win¹, Rachel Edwards¹, Patrick Alford¹, Deok-Ho Kim², and Paolo Provenzano¹

¹University of Minnesota, Twin Cities, Minneapolis, MN, ²University of Washington, Seattle, Seattle, WA

**9:00 am**

**Obesity-associated ECM Remodeling Promotes Proangiogenic Endothelial Cell Behavior**

Lu Ling¹, Bo Ri Seo¹, Andrew J Dannenberg³, and Claudia Fischbach-Teschl¹

¹Cornell University, Ithaca, NY, ²Weill Cornell Medical College, New York City, NY

**9:15 am**

**Contractile Fibroblasts Activate an Extracellular Integrin "Switch" Implicated in Fibrotic Progression**

John Nicosia¹, Lizhi Cao³, Jacqueline Larouche¹, and Thomas Barker¹

¹Georgia Institute of Technology, Atlanta, GA, ²Biogen Idec, Cambridge, MA, ³University of Virginia, Charlottesville, VA
### OP-Sat-1-2  
**Auditorium 2**

**Track: Cancer Technologies**

**Cancer Drug Delivery**

*Chairs: Michael King, Walter Murfee*

8:00 am  
**Chitosan/Poly(lactide) Drug-loaded Nanoparticles for Breast Cancer Therapy**  
Rupali Hire¹ and Cheryl Gomillion¹  
¹University of Georgia, Athens, GA

8:15 am  
**Halofuginone as a Stroma-targeted Therapy Agent in Pancreatic Ductal Adenocarcinoma**  
Kianna Elahi Gedwillo¹, Marjorie Carlson¹, and Paolo Provenzano¹  
¹University of Minnesota, Minneapolis, MN

8:30 am  
**PolyDots for Glioblastoma: Drug Delivery, Release, and Distribution**  
Mark Calhoun¹, Gauri Nabari², Jihong Xu², Alessandra Welker², Vinay Puduwalli², and Jessica Winter²  
¹The Ohio State University, Columbus, OH, ²OSU, Columbus, OH

8:45 am  
**A Bi-directional, Light-based Combination Therapy For Pancreatic Cancer**  
Huang-Chiao Huang¹, Imran Rizvi², Joyce Liu¹, Ashish Kalra², Helen Lee², Jaeyeon Kim², Jonathan Fitzgerald², and Tayyaba Hasan¹  
¹Massachusetts General Hospital and Harvard Medical School, Boston, MA, ²Merrimack Pharmaceuticals, Inc., Cambridge, MA

9:00 am  
**Irridation of Bladder Cancer via Targeted Carbon Nanotubes for Photothermal Therapy**  
Needa Virani¹, Carole Davis², Paul Hauser¹, Robert Hurst², Joel Slaton², and Roger Harrison¹  
¹University of Oklahoma, Norman, OK, ²University of Oklahoma Health Sciences Center, Oklahoma City, OK

9:15 am  
**Filomicelles Self-assembled From Degradable Di-block Copolymers Deliver Retinoids and Chemotherapeutics in Durable Control of Carcinoma Cell Fate**  
Praful Nair¹ and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA

### OP-Sat-1-3  
**Auditorium 3**

**Track: Translational Biomedical Engineering**

**Clinical Translation of Engineered Tissues**

*Chairs: Pinar Zorlutuna, Milica Radisic*

8:00 am  
**Clinical Translation of Engineered Tissues: Bedside to Bench and Back—INVITED**  
Michael Yaszemski¹  
¹Mayo Clinic, Rochester, MN

8:30 am  
**“Off-the-Shelf” Tissue-Engineered Vascular Graft with Growth Potential for Pediatric Application**  
Zeeshan Syedain¹, Jay Reimer¹, Mathew Lahti¹, James Berry¹, and Robert Tranquillo¹  
¹University of Minnesota, Minneapolis, MN

8:45 am  
**Enhancing Regulatory Review of Computational and Mathematical Modeling and Simulation for Regenerative Medicine Products**  
Ryan Ortega¹, Tina Morrison¹, Brian Pullin¹, and Alex Bailey¹  
¹Food and Drug Administration, Silver Spring, MD

9:00 am  
**FGF-8 and TGF-2 Effects on Ligamentous Formation for Bioengineered ACL Matrices**  
Paulos Mengsteab¹,², Lakshmi Nair¹,²,³, and Cato Laurencin¹,²,³  
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health, Farmington, CT, ³University of Connecticut, Farmington, CT

9:15 am  
**New Retina Reattachment Procedure Based on Magnetic Field Force on Biocompatible Superparamagnetic Nanoparticles Injected in the Eye**  
Orlando Auciello¹, Maria Saravia², Pablo Gurman¹, Roberto Zysler³, and Alejandro Berra³  
¹University of Texas at Dallas, Richardson, TX, ²Hospital Austral, Buenos Aires, Argentina, ³CONICET, Bariloche, Argentina

### OP-Sat-1-4  
**Room 102AB**

**Track: Biomaterials**

**Biomaterials for Immunoengineering IV**

*Chairs: Chandra Kothapalli, Daniel Alge*

8:00 am  
**Hydrophilicity Provides Translatable Regulation of Immune Response to Biomaterials**  
Kelly Hotchkiss¹, Victor Garcia-Perez¹, and Rene Olivares-Navarrete¹  
¹Virginia Commonwealth University, Richmond, VA
8:15 am
Effects of Extracellular Matrix and Cytokine Microenvironment on Macrophage Migration
Tim Smith¹, Jessica Hsieh¹, and Wendy Liu¹
¹University of California, Irvine, Irvine, CA

8:30 am
Localised Control of T Cell Activation Using Biodegradable Artificial Antigen Presenting Cells
Derfogail Delcassian¹,², Omar Qutachi¹, and Kevin Shakesheff¹
¹University of Nottingham, Nottingham, United Kingdom, ²MIT, Cambridge, MA

8:45 am
Interaction of Macrophages with Different Topographies of Polytetrafluoroethylene
Sujan Lamichhane¹, Jordan Anderson¹, Tyler Remund², Hongli Sun¹, Mark Larson³, Patrick Kelly⁴, and Gopinath Mani¹
¹The University of South Dakota, Sioux Falls, SD, ²Sanford Research, Sioux Falls, SD, ³Augustana University, Sioux Falls, SD, ⁴Sanford Health, Sioux Falls, SD

9:00 am
Nanomaterials-based Vaccines against Cocaine Addiction
Joshua Snook¹, Ye Ding¹, Harshini Neelakantan¹, Haiying Chen¹, Jia Zhou¹, Kathryn Cunningham¹, and Jai Rudra¹
¹University of Texas Medical Branch, Galveston, TX

9:15 am
Engineering Antioxidant Nanoscale Layer-by-Layer Coatings for Islet Transplantation
Nicolas Abuid¹, Kerim Gattas-Asfura¹, Ethan Yang², Mike Valdes², and Cherie Stabler¹
¹University of Florida, Gainesville, FL, ²University of Miami, Miami, FL

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

OP-Sat-1–5
Room 102C

Track: Cardiovascular Engineering

Cardiac Electrophysiology

Chairs: Daniel Conway, Karen May-Newman

8:00 am
Probing the Effects of MYBPC3 Truncating Mutations Using Computational Models and Engineered Human Myocardium—INVITED
Jonas Schwan¹, Yongming Ren¹, Yibing Qyang¹, and Stuart Campbell¹
¹Yale University, New Haven, CT

8:15 am
Ion Channel Expression and Distribution are Modulated by Phosphorylation of Focal Adhesion Kinase
Swarnali Bjergaard¹, Brenton Hoffman¹, and Nenad Bursac¹
¹Duke University, Durham, NC

8:30 am
Improved Cardiac Function by Chronic Activation of Hypothalamic Oxytocin Neurons in a Rat Model of Heart Failure
Kara Garrott¹, Edmund Cauley¹, Sarah Kuzmiak-Blancy¹, Xin Wang¹, David Mendelowitz¹, and Matthew Kay¹
¹The George Washington University, Washington, DC

8:45 am
Extracellular Matrix Regulation of Conduction Velocity In Engineered Cardiac Tissues
Andrew Petersen¹, Davi Lyra-Leite¹, Nethika Aiyasimghe¹, Nathan Cho¹, Joon Young Kimº, and Megan McCain¹
¹University of Southern California, Los Angeles, CA

9:00 am
Intercalated Disk Localization of the Inward Rectifier Current (IK1) Modulates Cardiac Conduction
Seth Weinberg¹, Swarnali Bjergaard², and Nenad Bursac²
¹Old Dominion University, Suffolk, VA, ²Duke University, Durham, NC

9:15 am
Novel Multiscale Entropy Approach for Rotor Pivot Point Identification
Shivaram Poigai Arunachalam¹, Elizabeth Annoni¹, and Elena Tolkacheva¹
¹University of Minnesota, Minneapolis, MN

OP-Sat-1–6
Room 101A

Track: Cellular and Molecular Bioengineering

Cancer Cell Motility and Migration

Chairs: Kristen Mills, Jennifer Munson

8:00 am
The Hypoxic Tumor Microenvironment Alters CXCR4 Expression and Collective Cell Migration of Breast Tumor Cells
Priscilla Hwang¹ and Steven George¹
¹Washington University in St Louis, St Louis, MO

8:15 am
Podocalyxin Promotes Migration of Pancreatic Cancer Cells by Altering Cytoskeletal Dynamics
Bin Sheng Wong¹, Daniel Shea¹, Robert Law¹, and Konstantinos Konstantopoulos¹
¹Johns Hopkins University, Baltimore, MD

8:30 am
Metastatic Migration in Microtracks is Mediated by Cell Polarization through Girdin
Aniqua Rahman¹, Shuo Shan¹, and Cynthia Reinhart-King¹
¹Cornell University, Ithaca, NY
8:45 am  
**Characterization of Cancer Cell Confined Migration in Embryonic Zebrafish and Microchannels**  
Colin Paul¹, Alexus Devine¹, and Kandice Tanner¹  
¹National Cancer Institute, Bethesda, MD

9:00 am  
**Migration Against the Direction of Shear Flow is LFA-1 Dependent in Human Hematopoietic Stem Cells**  
Alexander Buffone, Jr.¹, Nicholas Anderson¹, and Daniel Hammer¹  
¹University of Pennsylvania, Philadelphia, PA

9:15 am  
**Metabolic Signaling Crosstalk Promotes Brain Cancer Progression**  
Sanjana Ranganathan¹, Ka Wai Lin¹, Angela Liao¹, and Amina Qutub¹  
¹Rice, Houston, TX

**OP-Sat–1–7 Room 101B**

**Track: Cardiovascular Engineering**

**Computational Modeling in Cardiovascular Systems I**  
**Chairs:** Ranjan Dash, Sharan Ramaswamy

8:00 am  
**Quantitative + Computational Biology: Towards Directed Control of Neovascularization—INVITED**  
Princess Imoukhuede¹  
¹University of Illinois Urbana Champaign, Urbana, IL

8:30 am  
**In Silico Organ-Level Modeling of Infarcted Myocardium and Cardiac Function Impairment**  
Joao S. Soares¹, David S. Li¹, Samarth Raut¹, Joseph H. Gorman III², Robert C. Gorman², and Michael S. Sacks¹  
¹University of Texas at Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

8:45 am  
**Assessment of Organ-Scale Left Ventricular Mechanics and Physiology using a Cellular-Based Active Contraction Model**  
Sheikh Mohammad Shavik¹, Joakim Sundnes², Samuel Wall³, Daniel Burkhoff¹, and Lik Chuan Lee¹  
¹Michigan State University, East Lansing, MI, ²Simula Research Laboratory, Oslo, Norway, ³Columbia University, New York, NY

9:00 am  
**Fluid Dynamics Effect of Peristalsis-like Right Ventricular Wall motion in 20 Weeks Old Human Fetuses**  
Hadi Wiputra¹, Khong Chun Chua¹, Nivetha Raju¹, Hwa Liang Leo¹, and Choon Hwai Yap¹  
¹National University of Singapore, Singapore, Singapore

9:15 am  
**Using Graph Theory to Predict Ablation Targets in Patient Specific Models of Left Atrial Flutter**  
Erica Schwarz¹, Sohail Zahid¹, Kaitlyn Whyte¹, Patrick Boyle¹, Jonathan Chrispin², Robert Blake³, Adityo Prakosa³, Esra Ipek³, Henry Halperin³, Hugh Calkins³, Ronald Berger³, Saman Nazari³, and Natalia Trayanova¹  
¹Johns Hopkins University, Baltimore, MD, ²Johns Hopkins Hospital, Baltimore, MD, ³CardioSolv Ablation Technologies, Baltimore, MD

**OP–Sat–1–8 Room 101C**

**Track: Tissue Engineering**

**Integration of Developmental Biology and Morphogenesis in Tissue Engineering**  
**Chairs:** Lauren Black III, Kelly Stevens

8:00 am  
**Engineering CNS Tissue Morphogenesis In Vitro—INVITED**  
Gavin Knight¹,², Carlos Marti-Figueroa¹,², Jason McNulty¹,², Jake Tokar¹,², Ethan Lippmann¹,², David Beebe¹,², Lih-Sheng Turner², and Randolph Ashton¹,²  
¹University of Wisconsin Madison, Madison, WI, ²Wisconsin Institute for Discovery, Madison, WI, ³Wisconsin Institutes for Medical Research, Madison, WI

8:30 am  
**Architectural Cues Mediate Engineered Human Liver Tissue Expansion In Vivo**  
Kelly Stevens¹, Chelsea Fortin¹, Margaret Scull², Vyasa Ramanan², Christopher Chen², Charles Rice², and Sangeeta Bhatia³  
¹University of Washington, Seattle, WA, ²Rockefeller University, New York, NY, ³Massachusetts Institute of Technology, Cambridge, MA, ⁴Boston University, Boston, MA

8:45 am  
**FGF8-mediated Tensional Gradients Drive Collective Cell Movements During Early Endoderm Morphogenesis**  
Nandan Nerurkar¹, L Mahadevan², and Cliff Tabin¹  
¹Harvard Medical School, Boston, MA, ²Harvard University, Cambridge, MA

9:00 am  
**Directed Folding of Synthetic Biological Tissues Via Programmed Cellular Contractility**  
Alex Hughes¹, Max Coyle¹, Jesse Zhang¹, and Zev Gartner¹  
¹University of California, San Francisco, San Francisco, CA

9:15 am  
**A Method to Characterize Extracellular Matrix Composition and 3D Structure During Embryonic Development**  
Michael Drakopoulos¹ and Sarah Calve¹  
¹Purdue University, West Lafayette, IN
OP-Sat-1-10  Room 101E
Track: Biomaterials*

Hydrogel Biomaterials I

Chairs: Jamal Lewis, Janet Zoldan

8:00 am
Temporally Controlled Release of Platelet-Rich Plasma from Biodegradable PEG Microgels
Era Jain1, Saahil Sheth1, Scott Sell1, and Silviya Zustiak1
1Saint Louis University, Saint Louis, MO

8:15 am
PPS-based, Thermoresponsive Hydrogels Protect Primary Human Pancreatic Islets from Cytotoxic ROS
Bryan Dollinger1, Mukesh Gupta1, John Martin1, Nicolas Vierra1, David Jacobson1, and Craig Duvall1
1Vanderbilt University, Nashville, TN

8:30 am
MMP-Triggered Activation of Mammalian Genetic Circuits in Recombinant Protein Hydrogels
Mitchell Weisenberger1, Martin Jensen1, Hamid Ghahremai1, and Tara Deans1
1University of Utah, Salt Lake City, UT

9:00 am
A Biodegradable, Thermally Responsive Injectable Hydrogel with Reactive Oxygen Species Scavenging Effect
Yang Zhu1,2, Murugesan Velayutham1, Yasumoto Matsumura1, and William Wagner1,2,3,4
1McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, 2Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, 3Department of Surgery, University of Pittsburgh, Pittsburgh, PA, 4Department of Chemical Engineering, University of Pittsburgh, Pittsburgh, PA

9:15 am
Development of Smart Responsive Hydrogel Vehicles for Controlled Delivery of Analgesics
Liangju Kuang1, Nurul Sulima1, Mario Cano-Vage1, Jeff Ko1, Gert Breur1, and Meng Deng1
1Purdue University, West Lafayette, IN

* Biomaterials Track sponsored by

ACS Biomaterials

OP-Sat-1-11  Room 200E
Track: Nano and Micro Technologies

Applications of Nanopores and Nanoparticles

Chairs: Adam Hall, Alptekin Aksan

8:00 am
Biofouling-Resilient Nanoporous Gold Electrodes for Electrochemical DNA Detection
Pallavi Daggumati1, Zimple Matharu1, Ling Wang1, and Erkin Seker1
1University of California Davis, Davis, CA

8:15 am
Selective Detection of miRNAs and Other Sequence Biomarkers with Solid-State Nanopores
Osama K. Zahid1, Fanny Wang1, and Adam R. Hall1,2
1Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, 2Comprehensive Cancer Center of Wake Forest University, Winston-Salem, NC

8:30 am
Nanowarming of Tissues
Zhe Gao1, Navid Manuchehrabad1, Jinjin Zhang1, Hattie Ring1, Qi Shao1, Feng Liu1, Michael McDermott1, Kelvin Brockbank2,3, Michael Garwood1, Christy Haynes1, and John Bischof1
1University of Minnesota, Minneapolis, MN, 2Tissue Testing Technologies LLC, North Charleston, SC, 3Clemson University, Clemson, SC

8:45 am
Chitosan-coated Selenium Nanoparticles for the Selective Inhibition Bacteria Growth
Michelle Stolzoff1, Nicholas de la Torre1, and Thomas J. Webster1
1Northeastern University, Boston, MA

9:00 am
Accurate Detection of Serum Biomarkers Using Iron Oxide Nanoparticle-linked Immunosorbent Assay
Linlin Zhang1, Sheng Tong1, and Gang Bao1
1Rice University, Houston, TX

9:15 am
Electrically-Guided DNA Printing and Multiplexed DNA Detection with Nanoporous Gold Electrodes in Microfluidic Device
Zidong Li1, Pallavi Daggumati1, Ling Wang1, and Erkin Seker1
1University of California Davis, Davis, CA
**Applications of MRI and Focused Ultrasound**

**Chairs:** Wilson Miller, Richard Price

**8:00 am**

**Non-Invasive Ultrasound Liver Ablation using Histotripsy: Chronic Study in an In Vivo Rodent Model**

Eli Vlaisavljevich1, Joan Greve1, Xu Cheng1, Kimberly Ives1, Jiaqi Shi1, Tim Hall1, Theodore Welling1, Gabe Owens1, William Roberts1, and Zhen Xu1

1University of Michigan, Ann Arbor, MI

**8:15 am**

**MR Image-Guided Delivery of Non-Viral miRNA-34a Gene Vectors via Focused Ultrasound Inhibits Tumor Growth in a Mouse Glioma Model**

Colleen Curley1, Ying Zhang1, Karina Negron2, G. Wilson Miller1, Alexander Klibanov1, Roger Abounader1, Jung Soo Suk2, Justin Hanes2, and Richard Price1

1University of Virginia, Charlottesville, VA, 2Johns Hopkins University, Baltimore, MD

**8:30 am**

**Characterization of Uterine Fibroid Tissue Properties for MRgFUS Thermal Therapies**

Christopher Dillon1, Margit Janát-Amsbury1, and Allison Payne1

1University of Utah, Salt Lake City, UT

**8:45 am**

**High Sensitivity Magnetic Resonance Thermometry of Focused Ultrasound Heating—INVITED**

Wilson Miller1 and Yuan Zheng1

1University of Virginia, Charlottesville, VA

**9:00 am**

**Focused Ultrasound Blood Brain Barrier Disruption Enables Non-invasive Delivery of Contrast Agents for Multiscale Imaging of the Brain**

Robin Hartman1,2, Flor Medina1, R. Andrew Fowler1, Kristina Hallam1, S. M. Shams Kazmi1, Stanislav Emelianov1,2,3, and Andrew Dunn1

1University of Texas at Austin, Austin, TX, 2Georgia Institute of Technology, Atlanta, GA, 3Georgia Institute of Technology and Emory University School of Medicine, Atlanta, GA

**9:15 am**

**MR-guided High Intensity Contact Ultrasound using CMUTs for Thermal Lesions in Brain—In Vivo**

Christopher Bawiec1, W. Apoutou N’Djin1, Loïc Daunizeau1, Jérémy Vion1, Guillaume Bouchoux1,2,3, Nicolas Sénégué1, Alexandre Carpentier1, and Jean-Yves Chapelon1

1Inserm, U1071, LabTAU, Lyon, France, 2Univ Lyon, Université Lyon 1, Lyon, France, 3CarThera Research Team, Brain and Spine Institute, Paris, France, 4Vermont SA, Tours, France

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**Optical Imaging & Microscopy**

**Chairs:** Nozomi Nishimura, Miguel Moreira

**8:00 am**

**Wide-field Synovial Fluid Analysis Using Lens-free Polarized Microscopy for Gout Diagnosis**

Yibo Zhang1, Seung Yoon Celine Lee1, Yun Zhang1, Daniel Furst1, John Fitzgerald1, and Aydogan Ozcan1

1University of California Los Angeles, Los Angeles, CA

**8:15 am**

**Lattice Light Sheet Microscopy: Imaging Molecules, Cells, and Embryos at High Spatiotemporal Resolution**

Wesley Legant1, Eric Betzig1, and Luke Lavis1

1HHMI Janelia Research Campus, Ashburn, VA

**8:30 am**

**Rapid Rearrangement Restores Patterning of Lgr5+ Stem Cells in Intestinal Crypt after Femtosecond Laser Ablation in Mouse**

Jiahn Choi1, Daniel Joe1, Poornima Gadamsetty1, Nikolai Rakhlina1, Steven Lipkin2, Xiling Shen3, and Nozomi Nishimura1

1Cornell University, Ithaca, NY, 2Weill Cornell College of Medicine, New York, NY, 3Duke University, Durham, NC

**8:45 am**

**Monte Carlo Simulation of Laser Speckle Contrast Imaging of Perfusion in the Skin**

Caitlin Regan1, Carole Hayakawa1, Vasan Venugopal1, and Bernard Choi1

1University of California, Irvine, Irvine, CA

**9:00 am**

**Optical Imaging of Membrane Potential in the In Situ Stomach**

Hanyu Zhang1, Joshua Hughes2, Jack Price1, Niranchan Paskaranandanavadiel1, Gregory Walcott1, Greg O’Grady1, Leo Cheng1, and Jack Rogers1

1University of Alabama at Birmingham, Birmingham, AL, 2Johns Hopkins University, Baltimore, MD, 3University of Auckland, Auckland, New Zealand

**9:15 am**

**Automation of Collagen Birefringence Imaging at Multiple Polarization Angles**

Jade Montgomery1,2 and Robert Gourdie1,2

1Virginia Tech, Blackburg, VA, 2Virginia Tech Carilion Research Institute, Roanoke, VA

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**Pluripotent Stem Cell Engineering**

**Chairs:** Gulden Camci-Unal, Hossein Tavana

**8:00 am**

**Mechanical Modulation of Mesodermal Differentiation—INVITED**

Taby Ahsan1

1Tulane University, New Orleans, LA
**Saturday, October 8 | 8:00 am—9:30 am | Platform Session 1**

**8:30 am**
Matrix Tension Directs Tissue-level Organization to Prime Embryonic Stem Cells for Differentiation
Laralynne Przybyla1, Johnathon Lakins1, Jonathon Muncie1,2, and Valerie Weaver1
1University of California San Francisco, San Francisco, CA, 2University of California Berkeley, Berkeley, CA

**8:45 am**
Mechano-modulation of E-cadherin Clustering Regulates Early-Stage Differentiation of Human Pluripotent Stem Cells
Maricela Maldonado1, Gerardo Ico1, Rebecca Luu1, and Jin Nam1
1University of California, Riverside, CA

**9:00 am**
NANOG Restores the Effects of Senescence on Extracellular Matrix Deposition
Na Rong1, Panagiotis Mistriotis2, Xiaoyan Wang1, Georgios Tseropoulos1, and Stelios Andreadis1
1University of New York at Buffalo, Buffalo, NY

**9:15 am**
Directing the Cancer Stem Cell State through Interface Engineering
Junmin Lee1 and Kristopher Kilian1
1University of Illinois at Urbana-Champaign, Urbana, IL

**OP-Sat-1-15  Room 200C**

**Track: Drug Delivery**
**Nano to Micro Devices in Drug Delivery**

**8:00 am**
Microscale Devices Sealed with Nanostraw Membranes for Oral Drug Delivery
Cade Fox1, Yuhong Cao2, Cameron Nemeth1, Harisharasudhan Chirra1, Rachel Chevalier1, Alexander Xu2, Nicholas Melosh2, and Tejal Desai1
1University of California, San Francisco, San Francisco, CA, 2Stanford University, Stanford, CA

**8:15 am**
Injectable Microfabricated Particles with Pulsatile Release Kinetics
Kevin McHugh1, Thanh Nguyen1, Allison Linehan1, David Yang1, Stephany Tzeng1, Adam Behrens1, Jennifer Lu1, Zachary Tochka1, Svatlana Rose1, Austin Wang1, Robert Langer2, and Ana Jaklenec1
1Massachusetts Institute of Technology, Cambridge, MA

**8:30 am**
IL4 Conjugated Gold Nanoparticles Direct Macrophage Polarization <i>In Vivo</i>
Theresa Raimondo1 and David Mooney1
1Harvard University, Cambridge, MA

**8:45 am**
Non-covalent Functionalization of Single Wall Carbon Nanotubes with Engineered Proteins for Targeted Subcellular Delivery
Kris Dahl1 and Mohammad Islam1
2Carnegie Mellon University, Pittsburgh, PA

**9:00 am**
Optimizing Nanoparticle Platforms to Penetrate Colorectal Mucosa for Rectal Pre-Exposure Prophylaxis (PrEP) for HIV
Antoinette Nelson1, Dan Myers1, Jennifer Holloway1, Xiaoping Zhang2, Zoltan Szekely1, and Patrick Sinko1
1Rutgers University, Piscataway, NJ

**9:15 am**
Controlled Delivery of Lentivectors via Micropatterned Hydrogels
Justin Madrigal1, Roberta Stilhano2, Christian Siltanen1, Kimberly Tanaka1, Alexander Revzin1, Sang Won Han1, and Eduard Silva1
1University of California Davis, Davis, CA, 2Federal University of Sao Paulo, Sao Paulo, Brazil

**OP-Sat-1-16  Room 200H**

**Track: Neural Engineering**
**Noninvasive Neuromodulation**

**8:00 am**
Ultrasound Stimulation of the Brain, Nerves and Whatever Else for Achieving Activation—INVITED
Mark Hamilton1, Hongsun Guo1, Sarah Offutt2, Yohan Kim2, Cory Gloeckner1, Jamu Alford2, and Hubert Lim1
1University of Minnesota, Minneapolis, MN, 2Medtronic, Minneapolis, MN

**8:15 am**
Transcranial Current Stimulation Alters Brain Computer Interface Task Performance
Bryan Baxter1, Bradley Edelman1, Nicholas Nesbitt1, and Bin He1,2
1University of Minnesota, Minneapolis, MN, 2Institute for Engineering in Medicine, Minneapolis, MN

**8:30 am**
Stimulation of Deep Layers But Not Surface Of Auditory Cortex Induces Strong Suppression Of Activity: Implications For Tinnitus Treatment
Mark Hamilton1 and Hubert Lim1
1University of Minnesota, Minneapolis, MN

**8:45 am**
Effect of Intermittent Theta Burst Stimulation on Cortical and Corticospinal Excitability in Healthy Subjects: A TMS-EEG-EMG Study
Tamara Gedankien1, Peter J. Fried1, Alvaro Pascual-Leone1, and Mouhsin Shafi1
1Beth Israel Deaconess Medical Center, Boston, MA
9:00 am
Can Ultrasound Activate Nerves In Vivo?
Hongsun Guo1, Mark Hamilton1, Sarah Offutt2, Yohan Kim2, Cory Gloeckner1, Jamu Alford2, and Hubert Lim1
1University of Minnesota, Minneapolis, MN,
2Medtronic, Minneapolis, MN

9:15 am
Transcranial Direct Current Stimulation Transiently Increases the Blood-Brain Barrier Solute Permeability In Vivo
Da Wi Shin1, Niranjan Khadka1, Jie Fan1, Marom Bikson1, and Bingmei Fu1
1The City College of the City University of New York, New York, NY

OP-Sat-1-17
Room 200I
Track: Neural Engineering
Neural Progenitor and Stem Cell Engineering

Chairs: Randolph Ashton, Shelly Sakiyama-Elbert

8:00 am
Acutely-activated Microglia Differentially Regulates Neural Stem Cell Phenotype and Genotype
Kurt Farrell1 and Chandra Kothapalli1
1Cleveland State University, Cleveland, OH

8:15 am
Optimizing Label-free Human Neural Stem Cell Sorting Using 3D Dielectrophoresis
Tayloria Adams1, Clarissa Ro1, Nicolo Mendoza1, Stephen Flynn1, Jamison Nourse1, and Lisa Flanagan1
1University of California Irvine, Irvine, CA

8:30 am
The Social Networks of Neural Progenitor Cells
Arun Mahadevan1, Jacob Robinson1, and Amina Qutub1
1Rice University, Houston, TX

8:45 am
The Effect of Peptide Affinity in Neural Progenitor Cell Mechano sensing
Jessica Stukel1 and Rebecca Willits1
1University of Akron, Akron, OH

9:00 am
Engineering Organotypic Spinal Cord Slice Cultures from Human Pluripotent Stem Cells
Gavin Knight1,2 and Randolph Ashton1,2
1University of Wisconsin-Madison, Madison, WI,
2Wisconsin Institute for Discovery, Madison, WI

9:15 am
Characterization of Spontaneous and Light-evoked Activity of Mouse Embryonic Stem Cell Derived Motor Neurons using Optogenetic Stimulation and Multi-electrode Electrophysiology
Gelson Pagan-Diaz1, Caroline Cvetkovic1, Rashid Bashir1, and Farjat Sengupta1
1University of Illinois at Urbana-Champaign, Champaign, IL

OP-Sat-1-18
Room 200J
Track: Cardiovascular Engineering
Angiogenesis

Chairs: Ho-Wook Jun, Eduardo Silva

8:00 am
Vascularization of Engineered Tissues—INVITED
Eric Brey1
1Illinois Institute of Technology, Chicago, IL

8:30 am
Isolation of a Highly Angiogenic Subpopulation of CD31+ Cells
Brandon Johnson1,2, Young-Doug Sohn2, Ji Han2, Ho-Wook Jun3, and Young-Sup Yoon2
1Georgia Institute of Technology, Atlanta, GA,
2Emory University, Atlanta, GA,
3University of Alabama at Birmingham, Birmingham, AL

8:45 am
PI3K and PLC Pathways Regulate VEGF-A-VEGFR1-Mediated Cell Migration
Jared Weddell1 and Princess Imoukhuede1
1University of Illinois at Urbana-Champaign, Urbana, IL

9:00 am
Topographical Guidance of Tumor Angiogenesis at an Interface of Collagen Densities
Matthew Zanotelli1, Francois Bordeleau1, and Cynthia Reinhart-King1
1Cornell University, Ithaca, NY

9:15 am
Microvessel Elicitation in Ischemic Myocardium by Dual Growth Factor Delivery
Alexander Xu1, Kayle Shapero1, Jared Geibig1, Daniel Pitts1, Elaine Hillis2, Matthew Firpo2, and Robert Peattie1
1Tufts Medical Center, Boston, MA, 2University of Utah, Salt Lake City, UT
**9:03 am**

**Catch the Wave: Using Prior Knowledge of Action Potentials to Identify Neurons in Chronic Recordings**

Shruti Vempati¹, Adam Snyder¹,², and Matthew Smith¹
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

**9:12 am**

**Transcriptional and Metabolic Characterization of Antimalarial Resistant and Sensitive Malaria Parasites**

Ana Untaroiu¹, Maureen Carey¹, Jason Papin¹, Jennifer Guler¹
¹University of Virginia, Charlottesville VA

**9:21 am**

**Integrating Gene Expression Data into a Computational Model to Ascertain the Role of Genetic Background in Cardiomyocyte Hypertrophy**

Kathryn Bridges¹
¹University of Virginia, Charlottesville, VA

**MEET THE EXPERT**

**8:00 am—9:30 am**

**Room 204**

Meet the Experts on Data-Sharing
Organized by Dr Pep Pàmies, Chief Editor, Nature Biomedical Engineering

Scientific research flourishes when data are preserved and made accessible. The Human Genome Project has become one prominent example of how making data broadly available prior to publication can be profoundly valuable to scientists, industry and the public. Panelists will discuss current bottlenecks to, and ways to promote, a culture of data sharing in biomedical engineering. The session will feature 10-min presentations from each of the panel members and a round-table discussion.

Panel Members:

- **Prof Kevin Peterson**, Department of Family Medicine and Community Health, University of Minnesota
- **Dr Andrew A. Quong**, Director, Partnership Development Office, Frederick National Laboratory for Cancer Research and Leidos Biomedical Research, Inc.
- **Dr Michelle A. Berny-Lang**, Program Director, Center for Strategic Scientific Initiatives, National Cancer Institute, National Institutes of Health
- **Connie Lee**, Big Data Scientist Training Enhancement Program (BD-STEP) Director, Veterans Health Administration
**OP-Sat-2-1**

**Auditorium 1**

**Track: Cellular and Molecular Bioengineering**

**Mechanobiology of Cell Adhesion II**

**Chairs:** Amit Pathak, Aaron Baker

1:30 pm

**Mechanosensitivity of Integrins and Adhesions are Modulated by Lipid Order**

Seoyoung Son1, George Moroney1, and Peter Butler1

1The Pennsylvania State University, State College, PA

1:45 pm

**Conformational Switch, Activation and Clustering in Transmembrane Signaling and Mechano-transduction**

Mohammad Mofrad1

1UC Berkeley, Berkeley, CA

2:00 pm

**Optical Trapping to Determine Mechanical Forces in Living Zebrafish**

Jack Staunton1, Ben Blehm1, Alexus Devine1, and Kandice Tanner1

1National Cancer Institute (NIH), Bethesda, MD

2:15 pm

**Nanotopography-Induced Structural Anisotropy and Sarcomere Development in Human Cardiomyocytes Derived from Induced Pluripotent Stem Cells**

Daniel Carson1, Marketa Hnilova1, Xiulan Yang1, Cameron Nemeth1, Jonathan Tsui1, Alec Smith1, Alex Jiao1, Michael Regnier1, Charles Murry1, Candan Tamerler2, and Deok-Ho Kim1

1University of Washington, Seattle, WA, ²University of Kansas, Lawrence, KS

2:30 pm

**Novel Role of Cadherin 11 in Extracellular Matrix Synthesis and Muscular Physiology**

Yayu Liu1, Seldleen Kenneth1,2, Sindhu Row1, Troen Bruce1, Sandeep Agarwal1, and Andreadis Stelios1

1University at Buffalo, Buffalo, NY, ²Veterans Affairs Western NY Healthcare System, Buffalo, NY, ³Baylor College of Medicine, Houston, TX

2:45 pm

**Force Activated Protein Dynamics in Focal Adhesion Stability**

Katheryn Rothenberg1 and Brenton Hoffman1

1Duke University, Durham, NC

**OP-Sat-2-2**

**Auditorium 2**

**Track: Cancer Technologies**

**Engineered Models of Cancer Metastasis and Treatment Response**

**Chairs:** Thomas Zangle, Pamela Kreeger

1:30 pm

**Targeting Flow-induced Heterogeneity in Ovarian Cancer with Engineered 3D Models**

Imran Rizvi1, Huang-Chiao Huang1, Yuiiro Tsujita1, Sriram Anbil1,2,3, William Hanna1, Jonathan Celli1, Utkan Demirci1, and Tayyaba Hasan1

1Massachusetts General Hospital, Harvard Medical School, Boston, MA, 2Howard Hughes Medical Institute, Chevy Chase, MD, 3University of Texas Health Science Center at San Antonio, San Antonio, TX, 4University of Massachusetts Boston, Boston, MA, 5Stanford University School of Medicine, Palo Alto, CA

1:45 pm

**3D Micro-scale Model of Cortical Inclusion Cysts in Early Ovarian Cancer**

Andrew Fleszar1, Peyton Uhl1, and Pamela Kreeger1

1University at Buffalo, Buffalo, NY, ²Veterans Affairs Western NY Healthcare System, Buffalo, NY, ³Baylor College of Medicine, Houston, TX

2:00 pm

**A 3D Bioprinting Biomimetic Cell-laden Bone Matrix for Breast Cancer Metastasis Study**

Xuan Zhou1, Wei Zhu1, Benjamin Holmes1, Shida Miao1, Haitao Cui1, and Lijie Zhang1

1The George Washington University, Washington, DC

2:15 pm

**The Role of the Blood Microenvironment in Cancer Metastasis**

Joanna Sylman1, Annachiara Mitrugno1, Sandra Baker-Groberg1, Garth Tormoen1, Rosalie Sears1, Xiaolin Nan1, Travis Walker2, Paul Newton3, Peter Kuhn1, Pallavi Dhadag1, and Owen McCarty2

1Oregon Health Science University, Portland, OR, 2Oregon State University, Corvallis, OR, ³University of Southern California, Los Angeles, CA

2:30 pm

**Pro-Survival Integrin Signaling and Tissue Stiffness in Engineered Tumor Microenvironment Regulate B Cell Receptor Activity in Aggressive Human B Cell Lymphomas**

FNU Apoorva1, Ye Tian1, Leandro Cerchietti2, Ari Melnick2, and Ankur Singh1

1Cornell University, Ithaca, NY, ²Weill Cornell Medical College, New York, NY

2:45 pm

**A 3D Acoustofluidic Tumor Model for Localized Drug Release and Response to Chemotherapy**

Ioannis Zervantonakis1 and Costas Arvanitis2

1Harvard Medical School, Boston, MA, ²Brigham and Women’s Hospital, Boston, MA
**OP-Sat-2-3**  
*Auditorium 3*

**Track: Biomechanics**

**Advances in Biomechanical Testing of Medical Devices**

*Chairs: Ruth Ochia, Muralidhar Padala*

1:30 pm  
**Mechanical Surrogates of Brain Tissue**  
Daniel Stewart¹, Andrés Rubiano¹, and Chelsey Simmons¹  
¹University of Florida, Gainesville, FL

1:45 pm  
**Biomechanical Effects of Strap Tension on the Corrective Force Capacity of a Scoliosis Brace**  
Chloe Chung¹, Derek Kelly², Jack Steele³, Terrell Tate³, Cody Bateman¹, and Denis DiAngelo¹  
¹UTHSC, Memphis, TN, ²Campbell Clinic Orthopaedics and Le Bonheur Children’s Hospital, Collierville, TN, ³The Center for Orthotics and Prosthetics, Inc., Memphis, TN

2:00 pm  
**Feasibility of Inertial Measurement Units for Biomechanical Testing and Ergonomic Evaluation of Neck Posture During Surgical Instrument Operation**  
Bethany Lowndes¹, Melissa Morrow¹, Emma Fortune¹, and Susan Hallbec¹  
¹Mayo Clinic, Rochester, MN

2:15 pm  
**Modeling and Simulating Fatigue in Bioprosthetic Heart Valves: Permanent Set as a First Step**  
Will Zhang¹ and Michael Sacks¹  
¹The University of Texas at Austin, Austin, TX

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**Sat-2-4**  
*Room 102AB*

**Track: Biomaterials***

**Dynamic Biomaterials**

*Chairs: Yan Li, Rebecca Willits*

1:30 pm  
**Biodegradable and Conductive Polyurethane Elastomers**  
Xinzhu Gu¹, Zhongwei Mao¹², Souvik Roy¹, and William Wagner¹  
¹University of Pittsburgh, Pittsburgh, PA, ²Tsinghua University, Beijing, China, People’s Republic of

1:45 pm  
**Integrating Chemical and Optical Responsive Cells and Flexible Materials for a Biosensing Soft Robot**  
Kyle Justus¹, Daniel Lewis², Carmel Majidi¹, Philip LeDuc¹, and Cheemeng Tan²  
¹Carnegie Mellon University, Pittsburgh, PA, ²University of California, Davis, Davis, CA

2:00 pm  
**Development of a Combinatorial Hydrogel Platform for Screening 3D Cell-Biomaterial Interactions**  
Sebastian Vega¹, Kwang Hoon Song¹, and Jason Burdick¹  
¹University of Pennsylvania, Philadelphia, PA

**OP-Sat-2-5**  
*Room 102C*

**Tracks: Biomedical Imaging and Optics, Cardiovascular Engineering**

**Imaging in Cardiovascular Systems I**

*Chairs: Joan Greve, Craig Goergen*

1:30 pm  
**New Generation CMOS Panoramic Imaging System for Cardiac Electrophysiology**  
Christopher Gloschat¹, Matthew Kay¹, and Igor Efimov¹  
¹The George Washington University, Washington, DC

1:45 pm  
**Development of a High Frame Rate Ultrasound Tissue Doppler Imaging Method to Assess Intrinsic Wave Propagation through the Myocardium**  
Aaron Engel¹ and Greg Bashford¹  
¹University of Nebraska, Lincoln, NE

2:00 pm  
**Multiphoton Microscopy Platform Enables Visualization of In Vivo Cellular Dynamics within the Beating Mouse Heart**  
Jason Jones¹, David Small¹, and Nozomi Nishimura¹  
¹Cornell University, Ithaca, NY

2:15 pm  
**Noise Amplitude and Reduced Leads Increase Uncertainty in Electrocardiographic Imaging**  
Jessie France¹ and Chris Johnson¹  
¹Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT
**2:30 pm**
**Real-time MRI Motion Tracking of the Cardiac Cycle in Breath-Held, Normal and Heavy Breathing**
F. Scott Gayzik\(^1\), Craig Hamilton\(^1\), and Ashley Weaver\(^1\)
\(^1\)Wake Forest University School of Medicine, Winston-Salem, NC

**2:45 pm**
**Investigating Mechanisms and Prevention of Alcohol-induced Congenital Heart Defects using OCT Imaging**
Andrew Rollins\(^1\), Pei Ma\(^1\), Shi Gu\(^1\), Ganga Karunamuni\(^1\), Lindsay Peterson\(^1\), Megan Sheehan\(^1\), Cameron Pedersen\(^1\), Michael Jenkins\(^1\), and Michiko Watanabe\(^1\)
\(^1\)Case Western Reserve University, Cleveland, OH

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**OP-Sat-2-7**
**Track: Cardiovascular Engineering**

**Computational Modeling in Cardiovascular Systems II**

Chairs: Amanda Randles, Wei Sun

**1:30 pm**
**Investigation of Pericyte Dynamics using In Vivo Imaging and Computational Modeling—INVITED**
Shayn Peirce\(^1\)
\(^1\)University of Virginia, Charlottesville, VA

**2:00 pm**
**SimVascular: An Open Source Pipeline for Image-Based Cardiovascular Simulation**
Hongzi Lan\(^1\), Adam Updegrove\(^2\), Nathan Wilson\(^3\), Shawn Shadden\(^2\), and Alison Marsden\(^1\)
\(^1\)Stanford University, Stanford, CA, \(^2\)University of California-Berkeley, Berkeley, CA, \(^3\)Open Source Medical Software Corporation, Santa Monica, CA

**2:15 pm**
**Simulation of Coronary Artery Motion and Blood Flow Using a Fluid Structure Interaction Model**
Daphne Meza\(^1\), David A. Rubenstein\(^1\), and Wei Yin\(^1\)
\(^1\)Stony Brook University, Stony Brook, NY

**2:30 pm**
**Inward Rectifying Potassium Channels and Spreading Vasodilation in the Cerebral Vasculature**
Arash Moshkforoush\(^1\) and Nikolaos Tsoukas\(^1\)
\(^1\)Florida international University, Miami, FL

**2:45 pm**
**Anatomically-Driven Multiscale Model of Ascending Thoracic Aorta, with Application to Multidirectional Experiments**
Rohit Dhume\(^1\), Christopher Korenczuk\(^1\), and Victor Barocas\(^1\)
\(^1\)University of Minnesota, Minneapolis, MN

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**SOP-Sat-2-8**
**Track: Tissue Engineering**

**Stem Cells in Tissue Engineering**

Chairs: Kristopher Kilian, Kelly Stevens

**1:30 pm**
**Bioinspired Materials Systems to Study and Regulate Stem Cell Biology—INVITED**
Kevin Healy\(^1\)
\(^1\)University of California, Berkeley, CA

**2:00 pm**
**Biomimetic Self-assembled Scaffolds Enhance Muscle Stem Cell Transplantation**
Benjamin Cosgrove\(^1,2\), Eduard Sleep\(^1\), Mark McClendon\(^3\), Adam Preslar\(^2\), Russell Haynes\(^2\), Thomas Meade\(^1\), Samuel Stupp\(^3\), and Helen Blau\(^1\)
\(^1\)Cornell University, Ithaca, NY, \(^2\)Stanford University, Stanford, CA, \(^3\)Northwestern University, Chicago, IL

**2:15 pm**
**Breast Cancer Cell-derived Factors Promote Osteogenic Differentiation of Mesenchymal Stem Cells**
Aaron Chioi\(^1\), Maureen Lynch\(^2\), and Claudia Fischbach\(^1\)
\(^1\)Cornell University, Ithaca, NY, \(^2\)University of Massachusetts Amherst, Amherst, MA

**2:30 pm**
**Generation of Functional Skeletal Muscle Tissues from Human Pluripotent Stem Cells (hPSCs)**
Lingjun Rao\(^1\) and Nenad Bursac\(^2\)
\(^1\)Duke University, Durham, NC

**2:45 pm**
**Salivary Gland Engineering via the Combination of Human Stem/Progenitor Cells and Synthetic Matrices**
Padma Pradeepa Srinivasan\(^1\), Tugba Ozdemir\(^2\), Eric Fowler\(^1\), Shuang Liu\(^1\), Daniel Harrington\(^2\), Robert Witt\(^3,4\), Mary C. Farach-Carson\(^1,2\), Xinqiao Jia\(^1\), and Swati Pradhan-Bhatt\(^1,4\)
\(^1\)University of Delaware, Newark, DE, \(^2\)Rice University, Houston, TX, \(^3\)Thomas Jefferson University, Philadelphia, PA, \(^4\)Helen F. Graham Cancer Center & Research Institute, Newark, DE

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**OP-Sat-2-9**
**Track: Device Technologies and Biomedical Robotics**

**Medical Device Development and Computational Models**

Chairs: Ramesh Raghupathy, Ferris Pfeiffer

**1:30 pm**
**Beat-by-beat Control of the Heart: Prevention and Control of Cardiac Alternans**
Kanchan Kulkarni\(^1\), Christopher Johnson\(^1\), and Elena Tolkacheva\(^1\)
\(^1\)University of Minnesota, Minneapolis, MN
1:45 pm
Optimized Programming Algorithm for Cylindrical and Directionally Segmented Deep Brain Stimulation Electrodes
Daria Nesterovich Anderson1, Braxton Osting1, Alan “Chuck” Dorval1, and Christopher Butson1
1University of Utah, Salt Lake City, UT

2:00 pm
Effects of Unilateral Exoskeleton Propulsive Assistance on Cost of Transport
Tracy Giest1, Richard Nuckols1, and Greg Sawicki1
1North Carolina State University, Raleigh, NC

2:15 pm
Integration of Music, Thermal, and Mechanical Stimulation for Management of Alzheimer’s Disease
Xinghua Jia1, Dong Wang1, Kathryn Kaltenmark1, Byron Carper1, Douglas Scharre2, Scott Galster2, and Mingjun Zhang1
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH

2:30 pm
Development of a Novel Device for Tube Thoracostomy in Trauma Patients
Shannen Kizilski1,2, Xiang Zhang2, Nigel Kojimoto2, Kristi Oki1, Sheng Jiang2, Tyler Wortman2, and Nevan Hanumara1
1University of Minnesota, Minneapolis, MN, 2Massachusetts Institute of Technology, Cambridge, MA

2:45 pm
Handheld Microfluidic Immunoassay System for Point-of-Care Diagnostics
Baichen Li1 and Zhenyu Li1
1The George Washington University, Washington, DC

OP-Sat-2-10
Track: Biomaterials*
Hydrogel Biomaterials II
Chair: Yujian Huang

1:30 pm
Nanoparticle Enhanced Adhesion of Mussel Inspired Hydrogels for Tissue Interfacing
Nikhil Pandey1, Amirhossein Hakamivala1, Prashant Hariharan1, Boris Rodionov1, Zhong Huang1, Philippe Zimmern2, Kytae Nguyen1, Liping Tang1, and Yi Hong1
1University of Texas at Arlington, Arlington, TX, 2UT Southwestern, Dallas, TX

1:45 pm
Supramolecular Peptide Hydrogels Adjuvant Protective Antibody Responses against West Nile Virus
Brian Friedrich1, Joshua Snook1, David Beasley1, and Jai Rudra1
1University of Texas Medical Branch, Galveston, TX

2:00 pm
Cell-Cell Communication in PEG Hydrogel Microenvironment for Improved Beta Cell Function
Seda Kizilel1, Tugba Bal1, and Erdal Karaoz1
1Koc University, Istanbul, Turkey, 2Liv Hospital, Istanbul, Turkey

2:15 pm
Fabricating Anti-Fas Conjugated Hyaluronic Acid Microsphere Gels for Neural Stem Cell Transplantation
Dalia Shendi1, Dirk Albrecht1, and Anjana Jain1
1Worcester Polytechnic Institute, Worcester, MA

2:30 pm
Ultra-Strong, Thermoresponsive Double Network Membranes for Implanted Glucose Biosensors
Anna Kristen Means1, Ruochong Fei1, Alexander Abraham1, Andrea Locke1, Gerard Cote1, and Melissa Grunlan1
1Texas A&M University, College Station, TX

2:45 pm
Fiber Textile Technology for Musculoskeletal Tissue Engineering Applications
Iman Yazdi1, Afsoon Fallahi1, Raquel Costa-Almeida1, Huseyin Avci1, Ali Tamayo1, and Ali Khademhosseini1
1Brigham and Women’s Hospital, Cambridge, MA

* Biomaterials Track sponsored by

OP-Sat-2-11
Room 200E
Track: Nano and Micro Technologies
Advances in Pathogen Detection

1:30 pm
A New Approach to Rapid Pathogen Isolation using Molecular Buoys
Shannon Weigum1, Lichen Xiang1, Erica Osta1, Linying Li2, and Gabriel Lopez1,2
1Texas State University, San Marcos, TX, 2Duke University, Durham, NC

1:45 pm
RNA Extraction from a Mycobacterium under Ultrahigh Electric Field Intensity in a Microfluidic Device
Sai Ma1, Bryan Bryson2, Chen Sun1, Sarah Fortune2, and Chang Lu1
1Virginia Tech, Blacksburg, VA, 2Harvard School of Public Health, Boston, MA

2:00 pm
Single-Step Paper Diagnostic that Improves the Limit of Detection of Chlamydia through Thermodynamic Target Concentration
Garrett Mosley1, Yue Han1, Benjamin Wu1, and Daniel Kamei1
1University of California Los Angeles, Los Angeles, CA
Saturday, October 8 | 1:30 pm–3:00 pm | Platform Session 2

2:15 pm
Vertical Gold Nanorod Array Based DNA Sensing with Improved Performance
Zhong Mei1 and Liang Tang1
1University of Texas at San Antonio, San Antonio, TX

2:30 pm
Building an Open-source Simulation Platform of Acoustic Radiation Force-based Breast Elastography
Yu Wang1, Bo Peng1, David Rosen1, and Jingfeng Jiang1
1Michigan Technological University, Houghton, MI

2:45 pm
The Vibro Acoustography System Characterization Using Different rf’s
Nikan Namiri1, Ashkan Maccabi2, Maie St. John3, George Saddik2, Zachary Taylor2, and Warren Grundfest1
1Department of Bioengineering, University of California, Los Angeles, Los Angeles, CA, 2Department of Electrical Engineering, University of California, Los Angeles, Los Angeles, CA, 3Department of Head and Neck Surgery, University of California, Los Angeles, Los Angeles, CA

OP–Sat–2–12 Room 200F
Track: Biomedical Imaging and Optics
Ultrasound Imaging

Chair: Brooks Lindsey, Greg Bashford

1:30 pm
GPU-accelerated Speckle Tracking Toward High Quality Volumetric Strain Elastography
Bo Peng1 and Jingfeng Jiang1
1Michigan Technological University, Houghton, MI

1:45 pm
Molecular Acoustic Angiography: Assessing Sensitivity and Tortuosity in Combined High Resolution Ultrasound Molecular and Microvascular Imaging
Brooks Lindsey1, Sarah Shelton1, F. Stuart Foster2, and Paul Dayton1
1University of North Carolina, Chapel Hill, NC, 2Sunnybrook Health Sciences Centre, Toronto, ON, Canada

2:00 pm
Functional Pulsatility Index as a New Measure to Assess Arterial Stiffness
Mohammed Alwatban1, Benjamin Hage1, Jessie Patterson1, Alaina Bassett1, Edward Truemper1,2, Julie Honaker1, and Greg Bashford1,3
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

2:15 pm
Assessment of the Nonlinear Shear Modulus using Compression of Ex Vivo Kidneys and Shear Wave Elastography
Sara Aristizabal1, Carolina Amador1, James F. Greenleaf1, and Matthew W. Urban1
1Mayo Clinic College of Medicine, Rochester, MN

2:30 pm
Genetically Encodable Acoustomagnetic Reporters for Background-Free Molecular and Cellular MRI
George Lu1, Arash Farhadi1, Jerzy Szablowski2, Samuel Barnes3, Anupama Lakshmanan1, Raymond Bourdeau1, and Mikhail Shapiro1
1California Institute of Technology, Pasadena, CA, 2Loma Linda University, Loma Linda, CA
2:45 pm
Multiple Overlapping Thin Slice Acquisition (MOTSA) for Applications in Studying Preclinical Models of Cardiovascular Disease
Amos Cao¹ and Joan Greve¹
¹University of Michigan, Ann Arbor, MI

OP-Sat–2–14 Room 200G
Track: Drug Delivery
Cancer Drug Delivery I
Chairs: Bingmei Fu, Vivek Gupta

1:30 pm
Theranostic Delivery to Canine Intracranial Gliomas via Convection-Enhanced Delivery
Michael Caplan¹, Simon Platt¹, Hope Jehng¹, Courtenay Freeman², Alexandros Bouras³, and Costas Hadjipanayis¹
¹Arizona State University, Tempe, AZ, ²University of Georgia, Athens, GA, ³Mount Sinai Beth Israel, New York, NY

1:45 pm
Multifunctional Unimolecular Micelles Loaded with the Anti-Cancer Drug Aminoflavone for Triple-Negative Breast Cancer Therapy
Guojun Chen¹, Ashley Brinkman¹, Yidan Wang¹, Curtis Hedman¹, Thomas Havighurst¹, Nathan Sherer¹, Wei Xu¹, and Shaoqin Gong¹
¹University of Wisconsin-Madison, Madison, WI

2:00 pm
Bis(indolyl)methane Based Retinoid X Receptor Agonist for Efficient Nanotherapy in Onco-Pigs via In-Silico-to-In Vivo Approach
Santosh Misra¹, Mao Ye¹, Arun De¹, Laurie Rund¹, Lawrence Schook¹, and Dipanjan Pan¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

2:15 pm
A Multi-functional Drug Delivery System for the Treatment of Drug-resistant Breast Cancers
Song Lou¹, Michal Dezort¹, Taylor Lohneis¹, Zongmin Zhao¹, and Chenming Zhang¹
¹Virginia Tech, Blacksburg, VA

2:30 pm
Elevated AQP3 Expression Enhances H2O2 Permeability: Implications for Improving Ascorbate Therapy
Dieanira Erudaitius¹, Andrew Huang¹, Sarah Kazmi¹, Garry Buettner², and Victor Rodgers¹
¹University of California Riverside, Riverside, CA, ²University of Iowa, Iowa City, IA

2:45 pm
Mechanistic Studies on the Self-Assembly of PLGA Patchy Particles and their Biomedical Applications
Carolina Salvador-Morales¹,², Valeria Márquez-Miranda³, Ingrid Araya-Duran³, Jonathan Canan⁴, Fernando Gonzalez-Nilo³, Cristian Viños⁵, Juan Cebral⁶, Fernando Mut⁷, Rainald Lohner⁷, Brian Leong⁷, Gobalakrishnan Sundaresan⁷, and Jamal Zweid⁷
¹George Mason University, Bioengineering Department, Fairfax, VA, ²George Mason University, Krashnow Institute, Fairfax, VA, ³Universidad Andres Bello, Santiago, Chile, ⁴Fundación Fraunhofer Chile Research, Santiago, Chile, ⁵Universidad Andres Bello, Center for Integrative Medicine and Innovative Science, Faculty of Medicine, Santiago, Chile, ⁶George Mason University, Center for Computational Fluid Dynamics, College of Sciences, Fairfax, VA, ⁷Virginia Commonwealth University, Richmond, VA

OP-Sat–2–15 Room 200C
Track: Drug Delivery
Targeted or Responsive Delivery Systems I
Chairs: Michael Lawrence, Katie Bratlie

1:30 pm
Antioxidant Porous Polymersomes to Treat Neuropathic Pain
Sonia Karha¹, Christine Weisshaar¹, Andrew Tsourkas¹, Beth Winkelstein¹, and Zhiliang Cheng¹
¹University of Pennsylvania, Philadelphia, PA

1:45 pm
A Nanoscale Magnetically-Activated, Spatially-Targeted Drug Delivery Device
Jessica Liu¹, Anrew Tsourkas¹, and David Issadore¹
¹University of Pennsylvania, Philadelphia, PA

2:00 pm
Improving Distribution of Agents Released from PLGA Implants Using Therapeutic Ultrasound
Chawan Manspon¹, Christopher Hernandez², Norased Nasonkla¹, and Agata Exner²
¹Mahidol University, Salaya, Thailand, ²Case Western Reserve University, Cleveland, OH

2:15 pm
The Evolution of Targeted Multivalent Nano–particle Adhesion
Mingqiu Wang¹, Shreyas Ravindranath¹, Maha Rahim¹, Elliot Botvinick¹, and Jered Haun¹
¹University of California, Irvine, Irvine, CA

2:30 pm
Multilayer Polymeric Films Exhibiting Controlled -Lactamase-Triggered Antibiotic Release
Dahlia Alkekhia¹ and Anita Shukla¹
¹Brown University, Providence, RI

2:45 pm
Doxorubicin Encapsulated in Stealth Liposomes Conferred with Light-triggered Drug Release
Dandan Luo¹, Kevin Carter¹, Adia Razi¹, Jumin Geng¹, Shuai Shao¹, Daniel Giraldo¹, Ulas Sunar³, Joaquin Ortega², and Jonathan Lovell⁷
¹University at Buffalo, State University of New York, Buffalo, NY, ²McMaster University, Hamilton, ON, Canada ³Wright State University, Dayton, OH
Saturday, October 8  |  1:30 pm–3:00 pm  |  Platform Session 2

**OP-Sat-2-16**  
**Room 200H**  
**Track: Neural Engineering**  
**NeuroDevices/Neuromodulation**

*Chairs: Ryan Koppes, Zhi Yang*

**1:30 pm**
Investigating Simultaneous microECOg Recordings and In Vivo Vascular Imaging with Concomitant MRI in a Chronic Photothrombotic Stroke Model—**INVITED**
Kyle Swanson¹, Sarah Brodnick¹, Jared Ness¹, Joseph Novello¹, Aaron Dingle¹, Wendell Lake¹, David Niemann¹, and Justin Williams¹  
¹University of Wisconsin, Madison, WI

**1:45 pm**
Controlling Plasticity in Sensory Cortical Regions Using Multisensory Neuromodulation
Cory Gloeckner¹, Jio Nocon¹, and Hubert Lim¹  
¹University of Minnesota, Minneapolis, MN

**2:00 pm**
Quadruple Labelled Mouse to Study Tissue Response to Brain Implanted Devices
Janak Gaire¹, Heui Chang Lee¹,², Seth Currlin¹, and Kevin J. Otto¹  
¹University of Florida, Gainesville, FL, ²Purdue University, West Lafayette, IN

**2:15 pm**
Evaluation of Novel Amorphous Silicon Carbide Ultramicroelectrodes for Neural Interfaceing
Felix Duku¹, Yarden Cohan¹, Ben Pearre², Alexandra Joshi-Imre¹, Atefeh Ghazavi¹, Winthrop Gillis², Timothy Gardner², and Stuart Cogan¹  
¹University of Texas at Dallas, Richardson, TX, ²Boston University, Boston, MA

**2:30 pm**
Simultaneous Optical and Electrical *In Vivo* Analysis of the Enteric Nervous System
Nikolai Rakhlin¹, Bradley Barth², Jiahn Choi¹, Nozomi Nishimura¹, and Xiling Shen²  
¹Cornell University, Ithaca, NY, ²Duke University, Durham, NC

**2:45 pm**
Integrated Electroencephalography & Transcranial Direct Current Stimulation Device
L. Savannah Dewberry¹, Matthew N. Gray¹, and Aaron R. Sears¹  
¹University of Alabama at Birmingham, Birmingham, AL

**OP-Sat-2-17**  
**Room 200I**  
**Track: Neural Engineering**  
**Glial Cell Engineering**

*Chairs: Maribel Vazquez, Pam VanderVord*

**1:30 pm**
PEG-based Hydrogels Support Oligodendrocyte Survival, Proliferation, and Maturation as a Function of 3D Hydrogel Mechanics
Kyle Lampê and Lauren Russell¹  
¹University of Virginia, Charlottesville, VA

**1:45 pm**
Synthetic Nanoparticles to Regulate Synuclein Trafficking and Reduce Microglial Activation
Neal Bennett¹, Rebecca Chmielowski¹, Nicola Francis¹, Jean Baum¹, Kathryn Uhrich¹, and Prabhak Moghe¹  
¹Rutgers University, Piscataway, NJ

**2:00 pm**
3D Neural Culture Platform as a Physiological Model of Peripheral Myelin.
Ashwin Sivakumar¹, Reed Gioe¹, Parastoo Khoshakhlagh², and Michael Moore¹  
¹Tulane University, New Orleans, LA, ²Harvard University, Massachusetts, MA

**2:15 pm**
Enhancing Schwann Cell Proliferation Via Light Stimulation Using Visible Light: A Prelude To Peripheral Nerve Regeneration Using Optogenetics
David Diaz Vera¹, Coleman Clifford¹, Erin Cram¹, Ryan Koppes¹, and Abigail Koppes¹  
¹Northeastern University, Boston, MA

**2:30 pm**
Growth Factor Mediated Migration of Neonatal Schwann Cells (nnSC)
Tanya Singh¹ and Maribel Vazquez¹  
¹City College of New York, New York, NY

**2:45 pm**
Ability of Astrocyte Extracellular Matrix To Support Axon Growth Depends on Astrocyte Phenotype
Russell Thompson¹ and Shelly Sakiyama-Elbert¹  
¹Washington University in St Louis, St Louis, MO

**OP-Sat-2-18**  
**Room 200B**  
**Track: Undergraduate Research, Design & Leadership**  
**Undergraduate Research, Design & Leadership II: Biomaterials and Tissue Engineering**

*Chairs: Sherry Harbin, Renee Cottle*

**1:30 pm**
Enhancing Chitosan Nanoparticle Delivery to Lung Epithelial Cells
Blake Lash¹, Joscelyn Mejias¹, and Krishnendu Roy¹  
¹Georgia Institute of Technology, Atlanta, GA

**1:39 pm**
Development of bFGF-Eluting Biodegradable Elastomeric Inks for Three-Dimensionally Printed Tympanic Membrane Perforation Patches
Sabrina Liu¹, Nicole Black¹, Elliott Kozin², Aaron Remenschneider³, and Jennifer Lewis¹  
¹Harvard University, Cambridge, MA, ²Massachusetts Eye and Ear Infirmary, Boston, MA
1:48 pm
The Role of Mechanical Loading In ECM Bioscaffold Mediated Skeletal Muscle Remodeling
Riddhi Gandhi¹, Jenna Dziki¹, Ross Giglio¹, Brian Sicari¹, Derek Wang¹, Ricardo Louisdon¹, and Christopher Dearth³
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ³Walter Reed National Military Medical Center, Bethesda, MD

1:57 pm
TSG-6 Modulation of Neutrophil Migration Patterns in Excisional Skin Wound Repair
Kathryn Hardin¹,², Sajina Shakya¹,³, Judith Mack¹, and Edward Maytin¹
¹Cleveland Clinic, Cleveland, OH, ²Boston University, Boston, MA, ³Cleveland State University, Cleveland, OH

2:06 pm
dECM Endothelialization to Create a Non-Thrombogenic Interface of an Engineered Vascular Structure
Hamsini Sriraman¹, Christopher Broda¹, Eric Chau¹, Rachel Van Duren¹, Luiz Sampaio³, Andrea Gobin³, and Doris Taylor³
¹Rice University, Houston, TX, ²Baylor College of Medicine, Houston, TX, ³Texas Heart Institute, Houston, TX

2:15 pm
The Effect of Environmental Aging on the Material Properties of Soft-Polymer Materials for 3D-Printed Custom Foot Orthotics
Shannon Hall¹, Lauren Jackson¹, Breanne Przestrzelski¹, John DesJardins¹, Brian Kaluf², Nikki Hooks², Walter D. Ballard II³, Timothy Pruett³, and Steven Cooper³
¹Clemson University, Clemson, SC, ²University of Mississippi, Oxford, MS, ³Texas A&M University, College Station, TX

2:24 pm
Culture with Trimethylamine N-oxide After Transient Chondroitinase ABC-Treatment as a Strategy for Functional Tissue Engineering of Cartilage Derived from Adult Chondrocytes
William Yu¹, Andrea Tan¹, James Cook¹, Gerard Ateshian¹, and Clark Hung¹
¹Columbia University, New York, NY, ²University of Missouri, Columbia, MO

2:33 pm
Continuous Cocaine Administration Results In Significant Trabecular Bone Deterioration
Amna Haider¹, Brandon Zhuang¹, Hyunsu Shin¹, Kevin Clare¹, Craig Allen¹, Gabriel Pagnotti¹, Congwu Du¹, Clinton Rubin¹, and M. Ete Chan¹
¹Stony Brook University, Stony Brook, NY

2:42 pm
Novel PEDOT Coating Functionalization Methods for Bio-interfacing Applications
Bingchen Wu¹, Bin Cao¹, and Xinyan Cui¹
¹University of Pittsburgh, Pittsburgh, PA

2:51 pm
A Microfluidic Device Based Angiogenesis Assay to Study the Effects of Interstitial Flow
Arnold Tao¹, Venktesh S. Shirure¹, and Steven C. George¹
¹Washington University in Saint Louis, St. Louis, MO
3:30 pm

Single Cell Tracking of the Epithelial-Mesenchymal Transition in 3D Tumor Organoids

Susan Leggett¹, Thomas Valentín¹, Marielena Gamboa Castro¹, and Ian Wong¹
¹Brown University, Providence, RI

4:00 pm

Bacterial Quorum-Sensing Signals in the Breast Tumor Microenvironment: Implications on Breast Cancer Survival and Proliferation

Brittany Balhouse¹ and Scott Verbridge¹
¹Virginia Tech, Blacksburg, VA

4:15 pm

3D Hydrogel Microwell Arrays with Encapsulated Adipocytes as a Tumor Microenvironment Model for Studying Breast Cancer

Xiaoshan Yuel, John Casey¹, Trung Dung Nguyen¹, Victoria Zellmer¹, Siyuan Zhang¹, andFINar Zorlutuna¹
¹University of Notre Dame, Notre Dame, IN

4:30 pm

In Situ Oxygen Generation within Immunoisolating Device Improves Efficacy in Diabetic Rodent Model

Maria Coronel¹ and Cherie Stabler²
¹University of Florida, Gainesville, FL, ²University of Florida, Gainesville, FL

* Biomaterials Track sponsored by

OP–Sat–3–3

Auditorium 3

Track: Biomaterials*

Integration of Biomaterials with Chips and Devices

Chairs: Ryan Koppes, Blanka Sharma

3:15 pm

Non-swelling Microchanneled Hydrogels Reveal that Matrix Degradability Controls Cell Invasion Mode

Brendon Baker¹, Britta Trappmann¹, Jason Burdick², and Christopher Chen¹
¹Boston University, Boston, MA, ²University of Pennsylvania, Philadelphia, PA

3:30 pm

Sprayable Thermoresponsive Polymeric Coatings for Intestinal Tissue Regeneration

Meryem Pehlivaner¹ and Adam Ekenseair¹
¹Northeastern University, Boston, MA

3:45 pm

Precision-engineered Porous Material with Tunable Mechanical Property for Vascular Graft Application

Le Zhen¹ and Buddy Ratner¹
¹University of Washington, Seattle, WA
4:00 pm
Effect of Capsule Size, Material, and Geometry on the Insulin Release Profile of Encapsulated Islets
Peter Buchwald1, Alejandro Tamayo-Garcia1, Alice Tomei1, and Cherie Stabler2
1University of Miami, Miami, FL, 2University of Florida, Gainesville, FL

4:15 pm
Extrahaepatic Islet Transplantation with a Citrate-based Thermoresponsive Hydrogel
Yunxiao Zhu1, Xiaomin Zhang2, Xunrong Luo2, and Guillermo Ameer1
1Northwestern University, Evanston, IL, 2Northwestern University, Chicago, IL

4:30 pm
Biomimetic Microgels with “Switchable” Deformability to Promote Wound Repair
Erin Sproul1 and Ashley Brown1
1North Carolina State University and The University of North Carolina at Chapel Hill, Raleigh, NC

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

OP-Sat-3-7
Room 101B

Track: Cardiovascular Engineering

Thrombosis/Hemostasis

Chairs: Anjelica Gonzalez, Danny Bluestein

3:15 pm
Neutrophil-Platelet Aggregation Enabled Vaso-occlusion in Sickle Cell Disease
Maritza Jimenez1 and Prithu Sundd1
1University of Pittsburgh, Pittsburgh, PA

3:30 pm
Flow-Induced Damage to Blood Cells in Aortic Valve Stenosis: A Multiscale Analysis
Koohyar Vahidkhah1, Dan Cordasco2, Mostafa Abbasi1, Liang Ge3, Elaine Tseng3, Prosenjit Bagchi2, and Ali Azadani1
1University of Denver, Denver, CO, 2Rutgers University, Piscataway, NJ, 3University of California at San Francisco, San Francisco, CA

3:45 pm
The Effect of Factor XI on Clot Structure and Mechanical Strength
Joanna Sylman1, Xiaolin Nan1, Jevgenia Rudenko1, Cristina Puy2, Erik Tucker2, Uranbileg Daalkhaijav1, Travis Walker4, Andras Gruber1,2, and Owen McCarty1
1Oregon Health Science University, Portland, OR, 2Aronora, Inc., Portland, OR, 3Oregon State University, Corvallis, OR

4:00 pm
Synthetic Platelet (SynthoPlate®) Nanotechnology in Prophylactic and Emergent Treatment of Bleeding
DaShawn A. Hickman1, Christa L. Pawlowski1, Meenal Shukla2, Mitchell Dyer3, Ann Kim1, Andrew Shevitz4, Keith R. McCrae2, Matthew D. Neal3, Vikram Kashyap1, and Anirban Sen Gupta1
1Case Western Reserve University, Cleveland, OH, 2Cleveland Clinic Foundation, Cleveland, OH, 3University of Pittsburgh Medical Center, Pittsburgh, PA, 4University Hospitals Case Medical Center, Cleveland, OH
**Saturday, October 8 | 3:15 pm–4:45 pm | Platform Session 3**

### 4:15 pm
**Efficacy of Antiplatelet Drugs on Shear-Mediated Platelet Activation in Ventricular Assist Devices**
Jawaad Sheriff¹, Phat L. Tran², Lorenzo Valerio³, Marcus Hutchinson², William Brengle², Marvin J. Slepian², and Danny Bluestein¹
¹Stony Brook University, Stony Brook, NY, ²University of Arizona, Tucson, AZ, ³Politecnico di Milano, Milan, Italy

### 4:30 pm
**In Situ Regeneration of Bioactive Coatings Enabled by an Evolved Staphylococcus aureus Sortase A**
Hyun Ok Ham¹, Zheng Qu¹, Carolyn Haller¹, Brent Dorr², Erbin Dai¹, Woohyun Kim¹, David Liu², and Elliot Chaikof¹
¹Beth Israel Deaconess Medical Center/ Harvard Medical School, Boston, MA, ²Howard Hughes Medical Institute/ Harvard University, Cambridge, MA

### OP-Sat-3-8
**Room 101C**
**Track: Tissue Engineering**
**Inflammation and Immune-Modulation**

**Chairs:** Rene Olivares-Navarrete, Haipeng Liu

#### 3:15 pm
**Dendritic Cell-Targeted Immunomodulation for Tolerance—INVITED**
Benjamin Keselowsky¹
¹University of Florida, Gainesville, FL

#### 3:45 pm
**GPMB Regulates the Crosstalk between Macrophages and MSCs towards Diabetic Wound Repair**
Bing Yu¹, Talib Alboslemy¹, Layla Almutairi¹, and Min-Ho Kim¹
¹Kent State University, Kent, OH

#### 4:00 pm
**Understanding the Therapeutic Potential of Human Mesenchymal Stem Cells for Osteoarthritis Treatment**
Patricia Diaz-Rodriguez¹, Satyavrata Samavedi¹, and Mariah Hahn¹
¹Rensselaer Polytechnic Institute, Troy, NY

#### 4:15 pm
**Localizing Pro-Regenerative Inflammation Promotes Skeletal Muscle Repair**
Cheryl Lau¹, Claire Segar¹, and Edward Botchwey¹
¹Georgia Institute of Technology, Atlanta, GA

#### 4:30 pm
**Spatiotemporal Regulation of Inflammation using Engineered Hydrogels**
Claire Segar¹, Jose Garcia¹, Andres Garcia¹, and Edward Botchwey¹
¹Georgia Institute of Technology and Emory University, Atlanta, GA, ²Georgia Institute of Technology, Atlanta, GA

### OP-Sat-3-9
**Room 101D**
**Track: Biomedical Engineering Education (BME)**
**Biomedical Curriculum**

**Chairs:** Brittany Zick, Donald Gaver

#### 3:15 pm
**Utilizing Cell Phones, Plasma, and Imaging Software to Introduce Surface Engineering to Freshman**
Samuel Bechara¹, Jay Goldberg¹, Miguel Sotelo¹, and Scott Beardsley¹
¹Marquette University, Milwaukee, WI

#### 3:30 pm
**Ten Years of Interdisciplinary Undergraduate Student Research: Outcomes and Lessons Learned**
Attiyya Houston¹, Carin McBee¹, Jabari Knight¹, Kendra Oliver¹, Jonathan Ehrman¹, Stacy Sherrod¹, John Wikswo¹, and Christina Marasco¹
¹Vanderbilt University, Nashville, TN

#### 3:45 pm
**Systematic Design and HRV Analysis of a Portable ECG System for Biomedical Engineering Education and Curriculum**
Mehdi Shokoueinejad¹, Samual Lines¹, Fa Wang¹, Amit J. Nimunkar¹, and John G. Webster¹
¹UW-Madison, Madison, WI

#### 4:00 pm
**Duke-Makerere BME Partnership**
William Reichert¹, Ashutosh Chilkoti¹, Charles Ibingira², and Robert Ssekitoleko²
¹Duke University, Durham, NC, NC, ²Makerere University, Kampala, Uganda

#### 4:15 pm
**A Peer-Learning Nursing-Engineering Pedagogy for Senior Design Projects.**
Colin Drummond¹
¹Case Western Reserve University, Cleveland, OH

#### 4:30 pm
**Effectiveness of Summer Undergraduate Research Experiences in Biomedical Engineering at Carnegie Mellon University**
Conrad Zapanta¹ and Keith Cook¹
¹Carnegie Mellon University, Pittsburgh, PA

### OP-Sat-3-10
**Room 101E**
**Track: Biomaterials**
**Hydrogel Biomaterials III**

**Chairs:** Jeannine Coburn, Rhima Coleman

#### 3:15 pm
**Self-assembly of Hepatic Spheroids Inside Core-shell Poly(ethylene glycol) Microcapsules**
Christian Siltanen¹, Michaela Diakatou¹, Jeremy Lowen¹, Amranul Haque¹, and Alexander Revzin¹
¹UC Davis, Davis, CA
3:30 pm Rupture Force of Cell Adhesion Ligand Tethers Modulates Biological Activities of a Cell-laden Hydrogel
Min Kyung Lee1, Jooyeon Park1, Xuefeng Wang1, Mehdi Roein-Peikar2, Eunkyung Ko1, Ellen Qin1, Jonghwi Lee3, Taekjip Ha1, and Hyunjoon Kong1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Chung-Ang University, Seoul, Korea, Republic of

3:45 pm Bioorthogonal Conjugation of Bioactive Proteins to Thiol-Ene Click Microparticles
Faraz Jivan1 and Daniel Alge1
1Texas A&M University, College Station, TX

4:00 pm Zwitterionic Hydrogels Resist Foreign-body Response in a Stiffness Dependent Manner
Lauren E Jansen1, Luke D Amer2, Thuy V Nguyen1, Raghu Thyagarajan1, Dave Ford1, Stephanie J Bryant2, and Shelly R Peyton1
1University of Massachusetts Amherst, Amherst, MA, 2University of Colorado Boulder, Boulder, CO

4:15 pm Particle Scaffolds Using Amino Acid Chirality for Spatial Control of Immune Activation in Wounds
Donald Griffin1, Elias Sideris1, Westbrook Weaver1, Philip Scumpia1, Jaekyung Koh1, Dino Di Carlo1, and Tatiana Segura1
1UC Los Angeles, Los Angeles, CA

4:30 pm Controlling PEG Hydrogel Mechanics through Crosslinking Structure to Promote Microvascularization
Ryan Schweller1, Bruce Klitzman1, and Jennifer West1
1Duke University, Durham, NC

* Biomaterials Track sponsored by

OP-Sat-3-11 Room 200E
Track: Nano and Micro Technologies

Advances in Micro/Nano Manufacturing
Chairs: Vinay Abhyankar, Xiaolong Luo

3:15 pm Pre-aligned Microfiber for Engineering Linear Tissues
Chunxiao Cui1, Mingkun Wang1, and Li-Hsin Han1
1Drexel University, Philadelphia, PA

3:30 pm Leaf-inspired Artificial Microvascular Networks (LIAmN) for Three-dimensional Cell Culture
Rong Fan1, Yihang Sun1, and Jiandi Wan1
1Rochester Institute of Technology, Rochester, NY

3:45 pm Magnetic NiFe Electroformed Trap (MagNET): Fabrication Strategy for >100mL/hr Immunomagnetic Sorting
Venkata Yelleswarapu1, Jina Ko1, Anup Singh1, Nishal Shah1, and David Issadore1
1University of Pennsylvania, Philadelphia, PA

4:00 pm Parallelized Microfluidics for Large-scale Synthesis of Multicomponent Nanoparticles
Michael Toth1 and YongTae Kim1
1Georgia Institute of Technology, Atlanta, GA

4:15 pm A Reversibly Sealed Easy Access Modular (SEAm) Microfluidic Architecture to Establish In Vitro Tissue Interfaces
Vinay Abhyankar1, Chung-Yan Koh2, Meiye Wu2, and Anson Hatch2
1UT Arlington Research Institute, Fort Worth, TX, 2Sanda National Labs, Livermore, CA

4:30 pm Robotic Control of Magnetic Particles and Biological Cells Using Magnetic Microwheels
Tonguc Tasci1, Tao Yang1, Kuldeep Singh Rana1, Keith Nevees1, and David Marr2
1Colorado School of Mines, Golden, CO, 2Colorado School Of Mines, Golden, CO

OP-Sat-3-12 Room 200F
Track: Biomedical Imaging and Optics

Nanotheranostics
Chairs: Santosh Aryal, Paolo Decuzzi

3:15 pm Array-Based Identification of Triple-Negative Breast Cancer Cells Using Fluorescent Nanodot-Graphene Oxide Complexes
Yu Tao1 and Debra Auguste1
1City College of New York, New York, NY

3:30 pm Magnetomotive Displacement of the Tympanic Membrane for Sound Perception
Pin-Chieh Huang1, Eric Chaney1, Ryan Shelton1, and Stephen Boppart1
1University of Illinois at Urbana-Champaign, Urbana, IL

3:45 pm Dual Energy CT Imaging of the Vascular Effects of Gold Nanoparticles in Radiation Therapy
Jeffrey Ashton1, Jocelyn Hoye1, Katherine Deland2, David Kirsch1, Jennifer West2, and Cristian Badea3
1Duke University, Durham, NC, 2Duke University Medical Center, Durham, NC

4:00 pm Fluorescent Nanoplatelets for Cellular Imaging and Delivery: Flat Nanoprobes with Rapid Cellular Entry
Sung Jun Lim1, Minjee Kang1, Daniel R. McDougle1, Mohammed U. Zahid1, Liang Ma1, Cecilia Leal1, Aditi Das1, and Andrew M. Smith1
1University of Illinois at Urbana-Champaign, Urbana, IL
4:15 pm
RGD Guided Near-infrared Fluorescent Peptide Nanoparticles For Non-invasive Esophageal Cancer Prognosis Imaging
Zhen Fan1,2, Chaochu Cui3,4, Leming Sun1,2, Zui Pan4, and Mingjun Zhang5,6
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH, Sun Yat-sen University Cancer Center; State Key Laboratory of Oncology in South China; Collaborative Innovation Center for Cancer Medicine, Guangzhou, China, People's Republic of, 3Department of Surgery—Thoracic Surgery, The Ohio State University, Columbus, OH, 4Interdisciplinary Biophysics Graduate Program, The Ohio State University, Columbus, OH

4:30 pm
Biocompatible and Photostable Fluorescent Peptide Nanoparticles For In Vivo Imaging
Zhen Fan1,2, Leming Sun1,2, Mark Ruegsegger1, Derek Hansford1, Chaochu Cui3,4, Zui Pan4, Scott Galster1, Peter Mohler2, and Mingjun Zhang5,6
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH, Sun Yat-sen University Cancer Center; State Key Laboratory of Oncology in South China; Collaborative Innovation Center for Cancer Medicine, Guangzhou, China, People's Republic of, 3Department of Surgery—Thoracic Surgery, The Ohio State University, Columbus, OH, 4Interdisciplinary Biophysics Graduate Program, The Ohio State University, Columbus, OH

OP–Sat–3–13
Room 200D
Track: Biomedical Imaging and Optics
MRI II

Chairs: Miguel Moreira

3:15 pm
Diffusion Altering Reporter Genes for Magnetic Resonance Imaging
Arnab Mukherjee1, Di Wu1, Hunter Davis1, and Mikhail Shapiro1
1California Institute of Technology, Pasadena, CA

3:30 pm
Bio-Orthogonal MRI Imaging-A Novel Method Proposed for Metastatic Cancer Detection
Tanner Ravsten1, William Pitt1, and Neal Bangerter1
1Brigham Young University, Provo, UT

3:45 pm
Preclinical MRI and FDOPA-PET/CT for Monitoring Therapeutic Response in a Syngeneic Mouse Model of Multiple Myeloma
Deep Hathi1, Alexander Bollerman-Nowlis1, Wadha Alyami2, John Engelbach1, Walter Akers1, Joel Garbow1, Jonathan McConathy6, and Monica Shokeen1
1Washington University in St. Louis, St. Louis, MO, 2King Saud University, Riyadh, Saudi Arabia, 3University of Alabama Birmingham, Birmingham, AL

4:00 pm
Magnetic Resonance Glowing Red Blood Cells—INVITED
Santosh Aryal1
1Kansas State University, Manhattan, KS

4:15 pm
Methods for Whole-brain Probabilistic Tractography in Acute and Chronic Stroke Survivors
Miguel Sotelo1 and Brian Schmit2
1Marquette University, Greenfield, WI, 2Marquette University, Milwaukee, WI

4:30 pm
Significance of Electrode Orientation in Magnetic Resonance Electrical Impedance Tomography (MREIT)
Neeta Ashok Kumar1, Munish Chauhan1, and Rosalind J. Sadleir1
1Arizona State University, Tempe, AZ

OP-Sat–3–14
Room 200G
Track: Drug Delivery
Cancer Drug Delivery II

Chairs: Bingmei Fu, Teja Guda

3:15 pm
Improving Selective Targeting to Macrophage Subpopulations Through Modifying Liposomes with Arginine based Materials
Katie Bratlie1
1Iowa State University, Ames, IA

3:30 pm
The Preparation and Characterization of Long-Circulating Thermosensitive Liposomes for Oxaliplatin
Yan Shen1, Yanan Li2, Linlin Sun1, and Thomas Webster3
1Northeastern University, Boston, MA, 2China Pharmaceutical University, Nanjing, China, People’s Republic of, 3Northeastern University, Boston, Afghanistan

3:45 pm
Efficacy of E-selectin/TRAIL Liposomes to Treat Patient Circulating Tumor Cells in Flowing Whole Blood
Jocelyn Marshall1, Zeinab Mohamed1, Edward Messing2, Deepak Sahasrabudhe2, and Michael King1
1Cornell University, Ithaca, NY, 2University of Rochester, Rochester, NY

4:00 pm
Shear Resistance of Circulating Tumor Cells with Cancer-associated Fibroblasts
Jocelyn Marshall1, Andrea Clinch1, and Michael King1
1Cornell University, Ithaca, NY

4:15 pm
A Unique Enzyme Conjugation Strategy for Enhanced Nanoparticle Tumor Penetration and Highly Efficient Antitumor Efficacy
Hao Zhou1, Zhiyuan Fan1, Junjie Deng1, Pelin Lemon, Dimitrios Arhontoulis1, Wilbur Bone1, and Hao Cheng1
1Drexel University, Philadelphia, PA
4:30 pm
Bioreponsive Polymer Coating on Targeted Drug Nanorods
Sutapa Barua1
1Missouri University of Science and Technology, Rolla, MO

OP–Sat–3–15 Room 200C
Track: Drug Delivery
Targeted or Responsive Delivery Systems II
Chairs: Craig Duvall, Michael Lawrence

3:15 pm
Translational Nanomaterials for Efficient Targeting of Adipose Tissue Macrophages in Obesity
Liang Ma1, Tzu-wen Liu1, Kelly Swanson1, and Andrew Smith1
1University of Illinois at Urbana-Champaign, Urbana, IL

3:30 pm
A Nitro-furan Antibiotic Turns Oncolytic to Selectively Reduce Breast Cancer Stem Cell and Tumor Growth via STAT-3 Modulation
Santosh Misra1, Zhe Wu1, Mao Ye1, Klaus Schulten1, and Dipanjan Pan1
1University of Illinois at Urbana-Champaign, Urbana, IL

3:45 pm
Reversal of Arterial Calcification in A Rat Model Of Chronic Kidney Disease By Targeted Chelation Therapy With EDTA Loaded BSA Nanoparticles
Saketh Karamched1, Nasim Nosoudi1, Hannah Moreland1, and Nandara Vyawahare1
1Clemson University, Clemson, SC

4:00 pm
Recovering Antibiotic Utility with Silica-Lipid Nanoparticle Composites
Brandon Slaughter1, Christopher Lino1, Amber McBride1, Patrick Fleig1, Marissa Conroy1, Claire Melo1, Terry Wu2, Natalie Adolph2, Scott Reed1, Carol Ashley1, Jeff Brinker1,2, Eric Carnes1, and Carlee Ashley1
1Sandia National Laboratories, Albuquerque, NM, 2The University of New Mexico, Albuquerque, NM

4:15 pm
Hydrogel Microspheres for Spatiotemporally Controlled Delivery of siRNA
Alexandra McMillan1, Minh K. Nguyen1, Samantha Sarett2, Craig Duvall2, and Eben Alsberg1,3
1Case Western Reserve University, Cleveland, OH, 2Vanderbilt, Nashville, TN, 3Case Western Reserve University, Cleveland, OH

3:30 pm
Perivascular Flow of Cerebrospinal Fluid in The Brain
Vinod Suresh1 and James Grotberg2
1University of Auckland, Auckland, New Zealand, 2University of Michigan, Ann Arbor, MI

3:45 pm
Effect of the Perilymph Hydrodynamic Behavior on the Traveling Wave Motion of the Basilar Membrane in the Cochlea
A. De Paolis1, M. Bikson1, J.T. Nelson2, M. Packer2, and L. Cardoso1
1The City College of New York, Department of Biomedical Engineering, New York, NY, 2Department of Defense, Hearing Center of Excellence, Lackland, AFB, TX

4:00 pm
Using In-Vivo 4D PC-MRI to Obtain Boundary Conditions for CFD Simulations of Flow in Cerebral Aneurysms
Alireza Vali1, Benjamin Dickerhoff2, Farshid Faraji3, David Saloner3, and Vitaliy Rayz4
1Medical College of Wisconsin, Milwaukee, WI, 2Marquette University, Milwaukee, WI, 3University of California at San Francisco, San Francisco, CA, 4University of Wisconsin-Milwaukee, Milwaukee, WI

4:15 pm
In Vivo Characterization of Wall Shear Stress Environment in Fetus Umbilical Arteries and Veins
Shier Nee Saw1, Dawn Chia2, Citra Nurfarah Zaini Mattar2, Arijit Biswas2, and Choon Hwai Yap1
1National University of Singapore, Singapore, Singapore, 2National University of Health Sciences, Singapore, Singapore

4:30 pm
Simulations and Experiments of Airflow in Models of Damaged Human Trachea for Surgical Planning
Grant Armstrong1
1University of Central Oklahoma, Edmond, OK

OP–Sat–3–17 Room 200I
Track: Neural Engineering
Neural Invasive Devices/Interfaces: Compatibility, Stimulation, Recording and Modeling
Chairs: Teresa Murray, Matthew Johnson

3:15 pm
Close-Packed Microelectrodes for Awake Headfixed 1020-Channel Neural Recording
Jorg Scholvin1, Brian Allen1, Jacob Bernstein1, Chris Chronopoulos2, Justin Kinney1, Charlie Lamantia2, Caroline Moore-Kochlacs3, Nancy Kopell3, Clifton Fonstad1, and Edward Boyden1
1Massachusetts Institute of Technology, Cambridge, MA, 2LeafLabs, Cambridge, MA, 3Boston University, Boston, MA

3:30 pm
Electrocorticographic Features of Therapeutic Deep Brain Stimulation in Tourette Syndrome
Jonathan Shute1, Enrico Opri1, Rene Molina1, Justin Rossi1, Kelly Foote1, Michael Okun1, and Aysegul Gunduz1
1University of Florida, Gainesville, FL
3:45 pm  Computational Modeling of STN-DBS for Predicting Neuronal Activation Around Directional DBS Arrays
Benjamin Hoenes¹, Simeng Zhang¹, and Matthew Johnson¹
¹University of Minnesota, Minneapolis, MN

3:51 pm  Comparative Deformability and Microfluidic Perfusion of Human and Nonhuman Red Blood Cells
Pranav Murugan¹, Kian Torabian¹, Nathaniel Piety¹, and Sergey Shevkoplyas¹
¹University of Houston, Houston, TX

4:00 pm  Multicolor Genetically-Encoded Calcium-Sensitive Bioluminescent Reporters of Neural Activity for Brain-Machine Interfaces
Mitchell Pender¹, Karen Lin¹, Eva Ding¹, Amanda Bares¹, Michael Kaplitt², Chris Schaffer¹, and Nozomi Nishimura¹
¹Nancy E. and Peter C. Meinig School of Biomedical Engineering, Cornell University, Ithaca, NY, ²Brain and Spine Center, Weill Cornell Medical College, New York, NY

4:09 pm  In Vitro Cardiac Organoid Induction: Advancing a 3D “Organ in a Dish” Model for Biomechanical Studies of Early Cardiac Development
Micah Feeney¹
¹University of Pittsburgh, Pittsburgh, PA

4:33 pm  Development of the Fabrication Process and Design of 3D-Folding Shrinky Dinks
Christian Danielson¹ and Kidong Park¹
¹Louisiana State University, Baton Rouge, LA

4:42 pm  Evaluation of Adipose-derived Mesenchymal Stem Cell Therapy on Neovascularization in Diabetic Mice
Hannah Bouvin¹, Jamila Hedhli¹, Iwona Dobrucka¹, and Lawrence W. Dobrucki¹
¹University of Illinois at Urbana-Champaign, Champaign, IL, ²Iowa State University, Ames, IA

OP-Sat-3-18  Room 200B
Track: Undergraduate Research, Design & Leadership

Undergraduate Research, Design & Leadership III: Nano/Micro Technology and Bioimaging

Chairs: Delphine Dean, Fang Huang

3:15 pm  Point-of-Care Microfluidic Biochip to Quantify Inflammatory Response by Measuring IL6 from Whole Blood
Michael Rappleeye¹, Jackson Winter¹, Manish Patel¹, Paula Duerte Guevara¹, Emilee Flaugher¹, Umer Hassan¹, Bobby Reddy¹, and Tor Jensen²
¹University of Illinois at Urbana-Champaign, Champaign, IL, ²Carle Foundation Hospital, Urbana, IL

3:24 pm  Quantitative Bacterial Chemotaxis Study In Membrane-Enabled Static Gradient Device
Kathleen O’Brien¹, David Quan², Gary W. Rubloff², Herman O. Sintim¹, William E. Bentley¹, and Xiaolong Luo¹
¹The Catholic University of America, Washington, DC, ²Purdue University, West Lafayette, IN

3:27 pm  Automated Analysis of Cell Migration and Nuclear Envelope Rupture in Confined Environments
Joshua Elacqua¹, Alexandra McGregor¹, and Jan Lammerding¹
¹Cornell University, Ithaca, NY

3:33 pm  In Vivo Intravascular Ultrasound Comparison of 3D Printed Versus 3D Printed Superficial Femoral Artery
Hannah Cebull¹, W. Michael Park², and Paul Bishop¹,²
¹University of Akron, Akron, OH, ²Cleveland Clinic, Cleveland, OH

3:36 pm  A Novel Algorithm to Automate Segmentation and Analysis of Trabecular Bone in Rodents
Gregory Dadourian¹, Ronald Wood², and Hani Awad²
¹University of Rochester, Rochester, NY, ²University of Rochester, Rochester, NY
Bioinformatics, Computational and Systems Biology—Undergraduate

**Sat-41**
Graphical GAIN: User-Friendly Automated Neural Cell Image Processor
Hanyang Li¹, Byron Long¹, Tien Tang¹, Nicholas Grandel³,², Kylie Balotin¹, Arun Mahadevan¹, and Amina Gubbi¹
¹Rice University, Houston, TX, ²Stanford University, Stanford, CA

**Sat-42**
Using Machine Learning Models to Identify Disease-Causing Single Nucleotide Variants
Andrianna Aytios¹, Zhuo Liu¹, and Rui Jiang²
¹University of Southern California, Los Angeles, CA, ²Tsinghua University, Beijing, China, People’s Republic of

**Sat-43**
The Protein Data Bank Japan (PDBj): Uncovering Hidden Trends in Macromolecular Structure Data
Michelle Ragsac¹, Akira Kinjo⁰, and Haruki Nakamura²
¹University of California, San Diego, La Jolla, CA, ²Osaka University, Suita, Osaka, Japan

**Sat-44**
Correlation Revealed in Simultaneously Recorded Multichannel EGG and Antro-Duodenal Manometry
Alex Beltran¹, Armen Gharibans¹, Hayat Moussa¹, and Todd Coleman¹
¹University of California, San Diego, La Jolla, CA

**Sat-45**
Stochastic Parameterization of the Proliferation-Diffusion Model of Brain Cancer in Mice
Barrett Andries¹, Eric Kostelich¹, Erica Rutter¹, Tracy Stephien², and David Frakes¹
¹Arizona State University, Tempe, AZ, ²University of Arizona, Tucson, AZ

**Sat-46**
A New Assay for Profiling Endogenous Phosphatase Activity
Megan Burton¹, Lindsey Szymczak¹, Maria Cabezas¹, and Milan Mrksich¹
¹Northwestern University, Evanston, IL

**Sat-47**
Inference of a Cardiac Differentiation Network From Mass Cytometry
Catherine Weathered¹, Laura Woo¹, Eli Zunder¹, and Jeffrey Saucerman¹
¹University of Virginia, Charlottesville, VA

**Sat-48**
A Deep Network for Predicting the Epoxidation of Drug-like Molecules Generalizes to an External Test Set
Ayush Kumar¹
¹Washington University in St Louis, St. Louis, MO

**Sat-49**
High Oxidant Concentration as an Agent of Cell Death
Priyank Madria¹, Hailee Scelsi¹, and Cassie Mitchell¹
¹Georgia Institute of Technology, Atlanta, GA

**Sat-50**
Creating a 3-D Hydrogel Model of the Human Endometrium and its Interactions with Immunological Factors
Deborah Plana¹, Abby Hill¹, Christi Cook¹, Linda Griffith¹, and Douglas Laufenburger¹
¹Massachusetts Institute of Technology, Cambridge, MA

**Sat-51**
Discovery of IncRNA-Encoded Peptidome in Mouse Kidney Inner Medulla
Cameron Flower¹, Chin-Rang Yang¹, and Mark Knepper²
¹University of Connecticut, Burlington, CT, ²National Institutes of Health, Bethesda, MD

**Sat-52**
Molecular Dynamics Simulation of Nanoscale Membrane Organization to Examine Influenza Virus Binding
Cara Broshkevitch¹ and Peter Kasson¹
¹University of Virginia, Charlottesville, VA

**Sat-53**
Understanding the Structure and Energetics of Phosphate-Protein Recognition
Sydney Hutton¹, Rui Qi², and Pengyu Ren²
¹Stanford University, Austin, TX, ²The University of Texas at Austin, Austin, TX

**Sat-54**
Detection of Pancreatic Ductal Adenocarcinoma by Evaluating the Biophysical Properties of Extracellular Vesicles in Human Peripheral Blood Using Particle-Tracking Analysis
Zilu Tang³,², Francis San Lucas¹, Gabrielle Davis¹, Dong Kim¹, Jonathan Castillio¹, Peter Gascoyne¹,², Donghui Li¹, Hector Alvarez¹, and Anirban Maity¹
¹The University of Texas MD Anderson Cancer Center, Houston, TX, ²Rice University, Houston, TX, ³ContinuumDx, Inc, Austin, TX

**Sat-55**
Design of Multianalyte Biosensor Hardware
Rafael Viana¹, John Aggas², Ankita Bhat³, and Anthony Guiseppi-Elie³
¹Texas A&M, college station, TX, ²Texas A&M, College Station, TX, ³Texas A&M, College station, TX

**Sat-56**
Automated Cardiomyocyte Segmentation to Identify Novel Regulators of Hypertrophy
Matthew Van de Graaf¹, Philip Tan¹, Jop van Berlo², and Jeffrey Saucerman¹
¹University of Virginia, Charlottesville, VA, ²University of Minnesota, Minneapolis, MN

**Sat-57**
Classification of Rett Syndrome Behavior Using Machine Learning
Laryssa Gavala¹, F. Quentin Hickam², Sarah Mbiki³, Jared Wells¹, Neelasaranay Avudaiappan⁴, and Brian C. Dean⁵
¹Stanford University, Austin, TX, ²The University of Texas at Austin, ³ContinuumDx, Inc, Austin, TX

**Sat-58**
Quantiﬁcation of Angiogenic Receptor Levels and Heterogeneity on Co-cultured HUVECs and HDFs
Kareem Al-Qadi¹, Brendan Mathias¹, Si Chen¹, and Princess Imoukhuede¹
¹University of Illinois at Urbana Champaign, Champaign, IL

**Sat-59**
Design of Stereoscopic Visualization of Mastectomy Specimens for Augmented Reality Glasses
Emilio Loera¹, Krista Nicklaus², Mary Bordes¹, Juhun Lee⁴, Audrey Cheong⁵, Michelle Fingeret⁶, Fatima Merchant⁷, Gregory Reece⁶, and Mia Markey³
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX, ³University of Texas MD Anderson, Houston, TX, ⁴University of Pittsburgh, Pittsburgh, PA, ⁵University of Houston, Houston, TX

**Sat-60**
Interactions Between the Immune System and Healthy Aging
Samuel Krause¹
¹University of North Carolina at Chapel Hill, Chapel Hill, NC
### Biomaterials - Undergraduate

#### Sat-221
**Engineering Collagen Fibril Microstructure and Tuning ECM Stiffness to Study Migration Strategies Of Cancer Cells In 3-D Microenvironments**
Jiranuwat Sapudom¹, Raymond Chin²,², Steve Martin¹, Liv Kalbitzer¹, and Tilo Pompe¹
¹Universität Leipzig, Leipzig, Germany, ²University of Rochester, New York, NY

#### Sat-222
**Calcium Phosphate Nanoparticle-Assisted Dissolving Microneedles for Transdermal DNA Delivery**
Abigail Magee³, Min-Hua Chen¹,², and Nobutaka Hanagata²
¹University of Central Oklahoma, Edmond, OK, ²National Institute of Materials Science, Tsukuba, Japan

#### Sat-223
**Varying Levels of Degradation in Synthetic Polymers In Vivo**
Rachel Slappy¹
¹University of Tennessee at Knoxville, Knoxville, TN

#### Sat-224
**Relative Effects of Substrate Stiffness on Neuronal Phenotype Modulation in 2D and 3D Microenvironments**
Rachel Tchen¹, Rodrigo Zurita¹, Zach Nickle⁴, Andrea Jimenez Vergara¹,², and Dany Munoz Pinto¹
¹Trinity University, San Antonio, TX, ²McGill University, Montreal, QC, Canada

#### Sat-225
**Myoblast Response to Tissue Specific Extracellular Matrix Environments**
Nicole Friend¹, Jessica Ungerleider¹, and Karen Christman¹
¹University of California, San Diego, La Jolla, CA

#### Sat-226
**Characterizing the ECM Composition and Mechanical Properties of Ovarian Tissue-Derived Hydrogels**
Ziyu Xian¹,², Michael Buckenmeyer², and Bryan Brown²
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

#### Sat-227
**A Personalized 3D Medpor Conformal Process Feasibility Study**
Jason Yang¹ and Amanda Nguyen¹
¹Arizona State University, Tempe, AZ

#### Sat-228
**Retention and Release of Model Drugs from Hydrogels Impregnated with Magneto-Liposomes**
Mickey Colombo¹, Ryan Lynn¹, Geoffrey Bothun¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

#### Sat-229
**The Properties of Hyaluronic Acid For Double Network Hydrogels**
Anna Hrbac¹, Alexander Jannini¹, and Julie Hasenwinke⁸
¹University of Rochester, Manlius, NY, ²Syracuse Biomaterials Institute, Syracuse, NY

#### Sat-230
**Novel Poly[(1,8-octanediol)-co-(citric acid)-co-(suberic acid)] Scaffolds for Vascular Tissue Engineering**
Jacob Irwin², Gloria Kim²,³, and Jian Yang²
¹Arizona State University, Tempe, AZ, ²Pennsylvania State University, State College, PA

#### Sat-231
**Design and Synthesis of Functionalized Polymers for 3D Printing Tissue Engineering Scaffolds**
Rachel Fan¹, Caroline Kaufman¹, Patricia Morales¹, Divya Patel¹, and Lesley Chew¹
¹Lehigh University, Bethlehem, PA

#### Sat-232
**The Effects of Different Shoe Inserts On Force Applied to the Foot**
Janki Patel¹, Caroline Merz¹, Amy Lloyd¹, and Ha Van Vo¹
¹Mercer University, Macon, GA

#### Sat-233
**Shear Stress in Stromal-Like Conditions is a Metric for Metastatic Potential**
Mackenzie Coston¹, Afsheen Banisadr²,³, Pranjali Beri²,³, and Adam Engler²
¹University of Washington, Seattle, WA, ²University of California, San Diego, La Jolla, CA

#### Sat-234
** Highly Stretchable, Tough, and Thermo-responsive Hydrogels**
Serena Blacklow¹, Jianyu Liu¹,², and David Mooney¹,³
¹School of Engineering and Applied Sciences at Harvard University, Cambridge, MA, ²Wyss Institute for Biologically Inspired Engineering at Harvard University, Boston, MA

#### Sat-235
**Live Cell Tracking of U87MG-EGFP Glioma Cells Encapsulated in 3D Brain-mimetic Hydrogel Scaffolds**
Kylie Balotin¹, Meghan Logun², and Lohitash Karumbaiah²
¹Rice University, Houston, TX, ²University of Georgia, Athens, GA

#### Sat-236
**“Self-Fitting” Shape Memory Polymer, Semi-iPN Scaffolds for Cranial Defect Repair**
Vanessa Page¹, Melissa Grunlan¹, Lindsay Woodard¹, and Kevin Knetz¹
¹Texas A&M University, College Station, TX

#### Sat-237
**Biomimetic Substrates for Mechanobiology Investigations of Pancreatic Cancer**
Wisam Fares¹, Abigail De La Pena¹, Andrés Rubiano¹, Codi Elliott¹,², and Chelsey Simmons¹
¹University of Florida, Gainesville, FL, ²Sarasota High School, Sarasota, FL

#### Sat-238
**Characterizing The Release of Therapeutic Agents from Thin Fibrin Membranes**
Alexandra Burr¹, Megan Chrobak¹, Meagan Carnes¹, George Pins¹, and Alexandra Burr¹
¹Worcester Polytechnic Institute, Worcester, MA

#### Sat-239
**Magnetic Freeze Casting with Surface Magnetized Hydroxyapatite for Bioinspired Bone Implants**
Cindy Ayala¹, Michael Frank³, Louis Guibert³, Sze-Hei Siu¹, Olivia A. Graeve¹, Joanna M. McKittrick¹, Keyur Karandikar¹, and Chin-Hung Liu¹
¹University of California, San Diego, La Jolla, CA, ²University of California, San Diego, La Jolla, CA, ³Department of Materials Sciences, École Polytechnique de l’Université de Nantes, France, Nantes, France

#### Sat-240
**3D Printed Haversian Scaffolds for Critical Bone Trauma**
Brian Ruliffson¹
¹UTSA, San Antonio, TX

#### Sat-241
**Synthesis and Electrical Characterization of PAN-PAAmPSA Nanofibers in PolyHEMA Hydrogels**
Blake Smith¹, John Aggas¹, Anthony Guiseppi-Elie¹, and Jodie Lukenhaus¹
¹Texas A&M University, College Station, TX
**Poster Session - Saturday**

**Saturday, October 7 | 9:30 am–1:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am**

### Sat-242
**3D-Printed Dielectric Elastomer Actuators for Artificial Muscles and Soft Robotics**
Julia Khoury¹ and Yigit Menguc¹
¹Oregon State University, Corvallis, OR

### Sat-243
**Digitizing Biological Signals Using a Biocompatible Sample and Hold Circuit**
Earl Hughes III¹, John Aggas², and Anthony Guiseppi-Elie³
¹Hampton University, College Station, TX, ²Texas A & M, College Station, TX

### Sat-244
**Induced Metastatic Breast Cancer Hyperthermia Using Composite Scaffolds**
Heather Fong¹, Francisco Pelayo¹, Navid Manuchehrabadi², John Bischof¹, and Samira Azarin¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

### Sat-245
**Neuropeptides Conjugated with DNA Structures Improve Diabetic Wound Healing**
Richard Walsh¹
¹Beth Israel Deaconess Medical Center, Boston, MA

### Sat-246
**Demineralized Bone Matrix Fibers Support Adipose Mesenchymal Stem Cells and Mineralization In Vitro**
Jacob DeRoo¹
¹Colorado State University, Fort Collins, CO

### Sat-247
**Change in The Binding Ability In Different 3D Printed Polyurethane Gels**
Josue Campos¹, Pengrui Wang¹, and Shaochen Chen¹
¹University of California San Diego, San Diego, CA

### Sat-248
**Engineering Heparin-Binding Culture Substrates for Spatiotemporal Control of Human Embryonic Stem Cell-derived Neural Tissue Morphology**
Brady Lundin¹, Gavin Knight¹, and Randolph Ashton¹
¹University of Wisconsin-Madison, Madison, WI

### Sat-251
**The Effect of Substrate Stiffness and ECM Protein Coating on Macrophage Activation**
Emily Burtch¹, Jefferson Overlin¹, Kelly Hotchkiss¹, and Rene Olivares-Navarrete¹
¹Virginia Commonwealth University, Richmond, VA

### Sat-252
**Design of Biocompatible Chemical Crosslinkers for Tuning the Degradation in Polyethylene Hydrogels**
Stephanie Kroger¹, Aaron Stock¹, Lindsay Hill¹, Era Jain¹, and Silviya Zustria³
¹Saint Louis University, St Louis, MO

### Biomechanics - Undergraduate

### Sat-253
**Biomechanics Changes Following An Exercise Intervention In Females With Ehlers-Danlos Syndrome-Hypermobility Type Stratified By Age And Experience**
Jennifer Mathews¹, Micah Garcia², Stephanie Sabo³, Matthew Kanetzke¹, and Jason Long²
¹Saint Louis University, Saint Louis, MO, ²Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, ³University of Cincinnati, Cincinnati, OH

### Sat-254
**Characterization Of Glucagon Via Electrochemical Impedence Spectroscopy In Complex Solution**
Connor Beck¹, Aldin Malkoç¹, David Probst¹, Mukund Khanwalker¹, Chi lin³, and Jeffrey LaBelie¹
¹Arizona State University, Tempe, AZ

### Sat-255
**Cadaveric Modeling of Odontoid Fractures with Common Associated Ligamentous Injuries**
Rahul Ramanathan¹, Nicholas Vaudreuil¹, Robert Fisherman¹, Rob Hartman¹, Joon Lee¹, and Kevin Bell¹
¹Ferguson Laboratory for Spine Research, Pittsburgh, PA, ²Swanson School of Engineering, Pittsburgh, PA

### Sat-256
**Physical Modeling of the Effects of Human Dural Membranes on Brain Biomechanics**
Ramona Durham¹, Andrew Badachhape¹, Ruth Okamoto¹, Curtis Johnson², Dzung Pham², and Philip Bayly³
¹Washington University in St. Louis, St. Louis, MO, ²University of Delaware, Newark, DE, ³The Henry M. Jackson Foundation for the Advancement of Medical Medicine, Bethesda, MD

### Sat-257
**Changes in Sided-to-side Symmetry During a 2 Mile Run**
Mackenzie Wennick¹ and Robin Queen¹
¹Virginia Tech, Blacksburg, VA

### Sat-258
**Regional Differences In Viscoelastic Heating Of Tendon Due To Cyclic Compression**
Harrah Newman¹, Stephanie Kamau¹, and Amanda Tian¹
¹University of Rochester, Rochester, NY

### Sat-259
**Frequency-dependent Viscoelastic Heating In Cyclically Compressed Tendons**
Stephanie Kamau¹, Harrah Newman¹, and Amanda Tian¹
¹University of Rochester, Rochester, NY

### Sat-260
**Influence of Posture on Thoracoabdominal Organs among 5th, 50th and 95th Percentile Male Subjects**
Katelyn Greene¹, James Gaeckly³, F. Scott Gayzik², and Ashley Weaver³
¹UC Berkeley, Berkeley, CA, ²Wake Forest University, Winston-Salem, NC

### Sat-261
**Relating Collagen Fiber Structure and Mechanical Properties in Healing Myocardial Scar Tissue**
Abigail Teitgen¹ and Jeffrey Holmes¹
¹University of Virginia, Charlottesville, VA

### Sat-262
**Interaction between CT-based BMAT and Total Body Fat during Intentional Weight Loss in Older Adults**
Elizabeth Lopez¹, Samantha Schoeff², Carrese Hightower², Jack Rejeski³, Michael Walkup³, Ashley Weaver², and Kristen Beavers²
¹Arizona State University, Prescott Valley, AZ, ²Virginia Tech–Wake Forest University, Winston Salem, NC, ³Wake Forest University, Winston Salem, NC

### Sat-263
**The Role of Hyaluronic Acid in Liver Cirrhosis and Hepatocellular Carcinoma**
Abigail Loneker¹, LiKang Chin¹, and Rebecca Wells¹
¹University of Pennsylvania, Philadelphia, PA

### Sat-264
**Quantification of Lymphatic Permeability via Near-Infrared Imaging**
Mindy Ross¹, Tyler Nelson¹, and J. Brandon Dixon¹
¹Georgia Institute of Technology, Atlanta, GA
Sat-265
Recognition of Human Dynamic And Static Activity During Independent Time Periods Using Wearable Sensor
Austin Tielke¹, Gabrielle Milì², Christopher Farns², Saba Rezvanián³, and Thurmon Lockhart²
¹Arizona State University, Tempe, AZ, ²Arizona State University, Tempe, AZ

Sat-266
Hemodynamic Quantification of Magnetohydrodynamic Voltages through a Flow Phantom
Morgan DaSilva¹, Kevin Wu², Stan Gregory³, Jonathan Murrow⁴, and Zion Tse⁵
¹University of Connecticut, Storrs, CT, ²University of Georgia, Athens, GA, ³Athens Regional Medical Center, Athens, GA

Sat-267
Effects of Inflammatory Bowel Disease on Bone Strength and Density during Early Life
Malik Snowden¹, Cory Lindeman², and Iwona Jasik³
¹University of Pittsburgh, Gambirills, MD, ²University of Illinois at Urbana-Champaign, Urbana, IL

Sat-268
Development of Kinematically Accurate Cervical Spine Model for Biomechanical Testing Optimization
Casey Weinstein¹,² and Philip Brown²
¹Arizona State University, Tempe, AZ, ²Wake Forest University, Winston-Salem, NC

Sat-269
Determining Static and Dynamic Movement Between Human Gender with Inertial Measurement Unit
Ryan Bridges¹, Sydney Connor¹, Seong Hyun Moon¹, Victoria Smith¹, Rahul Soangra¹, and Thurmon Lockhart¹
¹Arizona State University, Tempe, AZ

Sat-270
Bacterial Adhesive Dynamic Simulation of FimA Mutant With Low Uncoiling Force
Natacha Comandante ¹L¹, Saugat Poudel¹, Maia Schumacher², Juan Vizcarr¹, and Wendy Thomas²
¹University of Washington, Seattle, WA, ²Seattle University, Seattle, WA

Sat-271
Biomechanical Evaluation of Football Practice Drills in Youth Athletes
Alexander Lord¹, Mireille Kelley¹, Joel Sitzel¹, and Jillian Urban¹
¹Virginia Tech - Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC

Sat-272
Investigation of the Reliability Of AFM Nanoindentation-Derived Measurements of Cell Mechanics
Matthew Dragovich¹, Jared Feindt¹, Daniel Altman¹, Cassandra Christman¹, Nathan DeRaymond¹, Ibrahim Hashmi¹, Adama Shaw¹, Katie Wu¹, Serge Aynou¹, Felipe Torres¹, X. Frank Zhang¹, and Hannah Dailey¹
¹Lehigh University, Bethlehem, PA

Sat-273
Bone Microarchitecture and Strength Diminished in Mice with Chronic Kidney Disease and Aging
Danielle Howe¹, Chelsea Heveran², Eric Livingston², Ted Bateman³, Karen King⁴, Moshe Levi⁴, Virginia Fergusson¹,⁵, and Anthony Lau¹
¹The College of New Jersey, Ewing, NJ, ²University of Colorado, Boulder, CO, ³University of North Carolina, Chapel Hill, NC, ⁴University of Colorado School of Medicine, Aurora, CO

Sat-274
Effect of Sliding-Induced Tribological Rehydration on Chondrocyte Viability in Cartilage Explants
David Sun¹, Michael Lan¹, Brian Graham², Axel Moore², David Burris³, and Christopher Price⁴
¹Washington University in St. Louis, St Louis, MO, ²University of Delaware, Newark, DE

Sat-275
Contracture Wave Propagation in an Excitable Epithelial Tissue
David Denberg¹, Jonathan Rubin², and Lance Davidson¹
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh, Pittsburgh, PA

Sat-276
Effects of Mechanical Preconditioning on the Material Properties of Murine Cartilage
Chandler Wool¹, Alexander Kotelsky¹, and Mark R. Buckley¹
¹University of Rochester, Rochester, NY

Sat-277
Developing an in vivo, X-Ray Detectable Strain Sensing Device for Use in Dynamic Hip Screws
Bryce Kunkle¹, Nathan Carrington¹, Jeffrey Anker¹, John DesJardins¹, Thomas Pace², and Caleb Behrend³
¹Clemson University, Clemson, SC, ²Greenville Health System, Greenville, SC, ³Virginia Tech Carilion School of Medicine and Research Institute, Roanoke, VA

Sat-278
Analysis of Bone Strength Losses Due To Space Radiation
Alexander Borg¹, Dale Johnson¹, Summer Lawrence², Eric Livingston², Robert Hienz³, Catherine Davis³, and Anthony Lau¹
¹The College of New Jersey, Ewing, NJ, ²University of North Carolina, Chapel Hill, Chapel Hill, NC, ³Johns Hopkins University, Baltimore, MD

Sat-279
Assessment of Strain in the Achilles Tendon Insertion During Exercise Using Ultrasound Elastography
Rachel E. Olsen¹, Grace E. Weyand², Mary A. Bucklin², Ruth L. Chimenti³, Michael S. Richards¹, and Mark R. Buckley¹
¹University of Rochester, Rochester, NY, ²North Western University, Manlius, NY, ³University of Iowa, Iowa City, IA

Sat-280
Case Study: Investigating Ideal Helmet Properties to Prevent Facial Fracture in Bicycle Accident
Brett Salazar¹, Mehmet Kurt¹, Michael Fanton¹, and David Camarillo¹
¹Stanford University, Stanford, CA

Sat-281
Development of Subject-Specific Musculoskeletal Models to Predict Quadriceps Strength
Brett Whorley¹,², Anthony Kulas¹, and Zachary Domire¹
¹East Carolina University, Greenville, NC, ²University of Nebraska-Lincoln, Lincoln, NE

Sat-282
Amputee Gait During Load Carriage with An Energetically Passive And Powered Knee
Charles Humphries¹,², Andrea Brandt³, and He (Helen) Huang³
¹North Carolina State University, Raleigh, NC, ²University of North Carolina Chapel Hill, Chapel Hill, NC

Sat-283
Effects of Cyclic Mechanical Strain on Human Breast Adenocarcinoma Behavior
Daniel Chavarria¹, Adrienne Spencer², Jason Lee³, Tamer Kaoud³, Kevin Dalby³, and Aaron Baker³
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX

Sat-284
Polyethylene Bearing Conformity Impacts Articular Constraint in Total Knee Replacements
Sean Flannery¹, Matthew Trowbridge¹, Kyle Snethen¹, and Melinda Harman¹
¹Clemson University, Clemson, SC

Sat-285
Gait and Limb Length Analysis using MatScan by Tekscan Software
Megan McKinney¹, Alexis Tillery¹, and Ha Van Vo²
¹Mercer University, Cuhutta, GA, ²Mercer University, Macon, GA
Sat–286
Increased Biofidelity of Simplified Human Body Models Through Compliant Element Implementation
Woojae Koh1, Berkan Guleyupoglu2, Bharath Koya3, and Francis Gayzik2
1University of Maryland, College Park, MD, 2Wake Forest University School of Medicine, Winston Salem, NC

Sat–287
Robust Method for Mechanical Testing of Rat Vertebrae to Determine Compressive Bone Properties
Jason M. Chang1, Shannon R. Emerzian1, Megan M. Pendleton1, Tony M. Keaveny1, and Grace D. O’Connell1
1University of Texas at Dallas, Richardson, TX, 2University of California - Berkeley, Berkeley, CA

Sat–288
Comparative Gait Rehabilitation with Virtual Reality Headset
Kristin Ladia1, Josiah Keime1, Briana Corlew1, and Derek Lura1
1Florida Gulf Coast University, Fort Myers, FL

Sat–289
Investigating the Impact of Biophysical Factors on Cell Adhesion and Fibroblast-to-Neuron Reprogramming
Giang Ha1, Douglas Kelkoff1, Jennifer Soto1, Sze Yue Wong1, and Song Li2
1University of California, Berkeley, Berkeley, CA, 2University of California, Los Angeles, Los Angeles, CA

Sat–290
Development and Mechanical Characterization of Gelatin-based Synthetic Blood Vessel Phantoms
Nicholas DeMaio1
1Rutgers University, Holmdel, NJ

Sat–291
Calculating Forces on the Femoral Head During Bridging Exercise Using OpenSim
Kyle Berkow1, Navit Roth2, and Orit Braun-Benyamin2
1University of Pittsburgh, Pittsburgh, PA, 2ORT Braude College of Engineering, Karmiel, Israel

Sat–292
Comparative Analysis of Photogrammetry to Laser-Based Methods of Measuring the Physical Dimensions of Soft Tissues
Iman Benbourenane1, Deanna Easley1, Maurice Kotz1, and Steven Abramowitch1
1University of Pittsburgh, Pittsburgh, PA

Sat–293
Katelyn Axman1
1University of Pittsburgh, Pittsburgh, PA

Sat–294
The Role of Substrate Stiffness in Epithelial to Mesenchymal Transition of Premalignant and Malignant Breast Epithelial Cells
Nadiah Hassan1, Lauren Griggs1, and Christopher Lemmon1
1Virginia Commonwealth University, Richmond, VA

Sat–295
Accurate Model of Moment Arms of the Elbow Flexors Using a Multiple Polynomial Equation Approach
Alexandra Deghand1 and Zachary Domire2
1Wichita State University, De Soto, KS, 2East Carolina University, Greenville, NC

Biomedical Engineering Education (BME) –Undergraduate

Sat–31
A Student-Taught Skills-Based Course to bring Research to the Introductory Biomedical Curriculum
Daniel Naveed Tavakol1, Cara Broshkevitch1, William H. Guilford1, and Shayan M. Peirce1
1University of Virginia, Charlottesville, VA

Sat–32
Effect of GFP Expression and DiR labeling on DiR Fluorescence and Cytotoxicity of INSCs In Vitro
Courtney McClure1,2
1Delaware State University, Dover, DE, 2University of Georgia, Athens, GA

Sat–33
CT Perfusion Image Super-Resolution Using a Deep Convolutional Network
Paul Naghshineh1, Peng Liu2, and Ruogu Fang3
1The George Washington University, Washington, DC, 2Florida International University, Miami, FL

Sat–34
Characterization of a Nanoparticle-hydrogel Ocular Drug Delivery System
Geeya Patel1, Priyanka Ghosh1, Emily Dosmar1, and Jennifer Kang-Mieler1
1Illinois Institute of Technology, Chicago, IL

Sat–35
Development and Validation of a Brain Phantom for Therapeutic Cooling
Megan Fritz1,2, Ryan Packett1, Philip Brown1,2, Guatam Popli3, and F. Scott Gayzik2,3
1University of Illinois at Urbana-Champaign, Champaign, IL, 2Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, 3Wake Forest University School of Medicine, Winston-Salem, NC

Sat–36
Degradable Ceramic- Hydrogel Composite Scaffolds for Bone Tissue Engineering
Abigail Avila1, Banu Akar1, and Eric M. Brey1
1Illinois Institute of Technology, Chicago, IL

Sat–37
Optimization of Fibronectin Micro-contact Printing Protocol for Potential Nanoparticle Uptake Study
Laura McGimpsey1, Pouria Fattahi1, Justin L. Brown1, and Peter J. Butler1
1Pennsylvania State University, Allentown, PA

Sat–38
GFP-HeLa Cell Viability in Sugar Augmented Alginate Bio Inks
Gabriel Garcia1 and Thomas Boland1
1University of Texas at El Paso, El Paso, TX
Biomedical Imaging and Optics—Undergraduate

Sat–62
Efficient and Automated Neuronal Tracking on Global Brain Imaging with Point Registration.
Yun-Hsuan Lee1,2, Charles Zhao1, Kathleen Bates1, and Hang Lu1
1Georgia Tech, Atlanta, GA, 2Emory University, Atlanta, GA

Sat–63
Quantifying Quantum Dot Nanosensor Binding Affinities to Angiogenic Receptors via SPR-Based Assay
Jacob Erstling1,2, Cassandra Jensen2, Samantha Schad2, Mallory Wall3, Spencer Mamer2, Si Chen2, and P.I. Imoukhuede2
1Florida International University, Miami, FL, 2University of Illinois at Urbana-Champaign, Urbana, IL

Sat–64
Dynamic Axial Biometry of the Eye in Accommodation using Extended-depth OCT
Keke Liu1,2, Yu-Cheng Chang1,3, Carolina de Freitas1,2, Alex Pham1,2, Florence Cabot1,2, Siobhain Williams1,2, Ethan Adre1,2, Giovanni Gregori4, Marco Ruggeri1,2, Sonia Yoo1, Arthur Ho1,2, Jean-Marie Parel1,2,3, and Fabrice Manno1,3
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 2Biomedical Optics and Laser Laboratory, Department of Biomedical Engineering, University of Miami College of Engineering, Coral Gables, FL, 3Anne Bates Leach Eye Hospital, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 4Quantitative Imaging Center, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 5Vision Cooperative Research Centre, Sydney, Australia

Sat–65
An Automated Comparison of the Distribution of Extracellular Matrix Molecules in the Brain
Jessie Liu1 and Michel Modo1
1University of Pittsburgh, Pittsburgh, PA

Sat–66
Diffuse Correlation Tomography to Image Temporal and Spatial Changes of Blood Flow in a Mouse Model
Nathaniel Barber1, Songfeng Han1, Ashley Proctor1, Gabriel Ramirez1, Danielle Benoit1, and Regine Choe1
1University of Rochester, Rochester, NY

Sat–67
A Field-Deployable, Automatically-Tracking Microscope Stage for Microfluidic Systems
Vasilios Dounis1, Keith Heyde1, John Lake1, and Warren Ruder1
1Virginia Polytechnic Institute and State University, Blacksburg VA, VA

Sat–68
Resolving Coarse Fluorescence Molecular Tomography Images Using Boundary Conditions
Samveg Shah1, Pradeep Wyss2, Nicola Sebert2, Melika Sarem2, and V. Prasad Shastri2
1Western University, Windsor, ON, Canada, 2University of Freiburg, Freiburg, Germany

Sat–69
Structural Connectivity Analysis Can Predict Poor Walking Performance in Multiple Sclerosis
Jorge Maldonado1,2, Bradley Sutton2, Robert Motl1, and Elizabeth Hubbard3
1Universidad del Este, Carolina, PR, Puerto Rico, 2University of Illinois at Urbana Champaign, Urbana-Champaign, IL, 3University of Illinois at Urbana Champaign, Urbana-Champaign, IL

Sat–70
Towards Non-invasive Vascular Imaging of Murine Allografts with the Diffuse Optical Tomography
Haitong Wang1, Jingxuan Ren1, Ashley R. Proctor1, Songfeng Han1, and Regine Choe1
1University of Rochester, Rochester, NY

Sat–71
Ultrasonic Shear Wave Imaging of Median Nerve
Thammiathida Ketsiri1, Samantha Liptman1, Anna Knight1, Lisa Hobson-Webb2, and Kathryn Nightingale1
1Duke University, Durham, NC, 2Duke University School of Medicine, Durham, NC

Sat–72
Comparison of Novel CAD system and Histopathology for Volumetric Analysis of Prostate Cancer Lesions
Claire Kaiser1, Nathan Lay2, Baris Turkbey2, and Ronald Summers2
1University of Rochester, Rochester, NY, 2National Institutes of Health, Bethesda, MD

Sat–73
Accommodative Changes in the Internal Structure of the Lens Measured with SD-OCT
Ethan Adre1,2, Yu-Cheng Chang1,3, Marco Ruggeri1, Georgios Kontakis1, Sonia Yoo2, Fabrice Manns1,2, and Jean-Marie Parel1,2
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, University of Miami College of Engineering, Coral Gables, FL, 2Bascom Palmer Eye Institute, Miami, FL, 3University of Miami, Coral Gables, FL

Sat–74
Biomech Of The Aging Human Lens Using Optical Coherence Tomography: Thickness And Curvature
Alex Pham1,2, Yu-Cheng Chang1,3, Ethan Adre1,2, Ivan Shestopalov1,2, Keke Liu1,2, Siobhain Williams1,2, Giovanni Gregori4, Marco Ruggeri1,2, Sonia Yoo3, and Jean-Marie Parel1,2
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, University of Miami College of Engineering, Coral Gables, FL, 2University of Miami Miller School of Medicine, Miami, FL, 3Quantitative Imaging Center, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 4Vision Cooperative Research Center, Sydney, Australia

Sat–75
Single-Molecule Analysis of Cytokine-Induced Macrophage Polarization using Quantum Dots
Sophie Xie1, Phuong Le2, and Andrew Smith2
1Vanderbilt University, Nashville, TN, 2University of Illinois at Urbana-Champaign, Urbana, IL

Sat–76
Three-Dimensional Reconstruction of In Vivo Murine Cardiovascular System
Grey Braybrooks1, Olivia Palmer1, and Joan Greve1
1University of Michigan, Ann Arbor, MI

Sat–77
Image Analysis Method for All-Optical Stimulation and Recordings from Neurons in Culture
Denise M. Almora1, Javier I. Suarez2, and Stephen A. Boppart2
1University of Michigan, Ann Arbor, MI, 2University of Rochester, Rochester, NY

Sat–78
Breast Cancer Detection by an Infrared Imager: Evaluating the Thermal Resolution
Nada Kamona1 and Murray Loew1
1The George Washington University, Washington, DC

Sat–79
Imaging Biomechanical Properties of Soft tissue with Artificial Neural Networks
Wendy Reyes1, Cameron Hoerie2, Léo Fabre3, Jamshid Ghaboussi4, and Michael F. Insana1
1The Catholic University of America, Washington, DC, 2University of Illinois Urbana-Champaign, Urbana, IL, 3Ecole Centrale de Lille, Cité Scientifique, France, 4University of Illinois at Urbana-Champaign, Urbana, IL
Sat–80 Investigating Methods of Signal Interpolation in Synthetic Aperture Ultrasound Imaging
Kathleen Larson¹ and Stephen McAleavey²
¹University of Rochester, Rochester, NY

Sat–81 IR Imaging Detects Biochemical Changes in Steatohepatitis Progression in the Liver
Christine Massiel¹, Hari Sreedhar¹, Vishal Varma¹, Grace Guzman¹, Natalia Nieto¹, and Michael Walsh¹
¹University of Illinois at Chicago, Chicago, IL

Sat–82 Skeletal Visualization in Rat Embryos Using Optical Projection Tomography and a Novel Clearing Agent
Alexander Magasam¹ and Mark Pierce²
¹University of Nebraska-Lincoln, Lincoln, NE, ²Rutgers, The State University of New Jersey, Piscataway, NJ

Sat–83 Characterization of Survival And Proliferation In Glioblastoma Mouse Models
Brooke Braman¹, Chao Liu¹, Ghaidan Shamsam¹, Rebecca Klank¹, Stephan McFarren¹, Barbara Tschida¹, Steven Rosenfeld³, David Largaespada¹, and David Odde¹
¹University of Minnesota, Twin Cities, Minneapolis, MN, ²Cleveland Clinic, Cleveland, OH

Sat–84 Computerized Analysis of Breast Cancer Microenvironment Through Fourier Transform Infrared (FT-IR) Spectroscopy and Machine Learning
Matthew Kavanagh¹, Saumya Tiwari², and Rohit Bhargava²
¹University of Kansas, Leawood, KS, ²University of Illinois, Urbana, IL

Sat–85 Real-Time 3D Reconstruction for Biomedical Systems
Jose Botello¹ and Zhen Zhu²
¹East Carolina University, Tarboro, NC, ²East Carolina University, Greenville, NC

Sat–86 Atomic Force Microscopy of Plasmidium falciparum Lipid Rafts and GPI-Anchored Proteins
Alison Long¹,², Albert Jin¹, and David Narum³
¹University of California Berkeley, Berkeley, CA, ²National Institute of Biomedical Imaging and Bioengineering, Bethesda, MD, ³Laboratory of Malaria Immunology and Vaccinology, Rockville, MD

Sat–87 Optical Imaging of Cell Metabolism in Metastatic and Non-metastatic Breast Cancer Cells
Kinan Alhallak¹, Lisa Rebello¹, Timothy Muldoon¹, Kyle Quinn¹, and Narasimhan Rajaram²
¹Arkansas, Fayetteville, AR

Sat–88 Large Field of View Single Pixel Interference Projection Imaging
Robert Stokoe¹, Patrick Stockton¹, Jeffrey Field¹, and Randy Bartels¹
¹Colorado State University, Fort Collins, CO

Sat–89 Luminous Porous Silicon as Single Particle Ratiometric Probes
Mollie Sewell¹, Geoffrey Holltet¹, David Roberts², and Emma Wensley²
¹North Carolina A&T State University, Greensboro, NC, ²University of California San Diego, La Jolla, CA

Sat–90 Automatic Analysis of 3D Engineered Muscle Contractions with Digital Image Processing
Steven Pirvu¹, Hyeonyu Kim², and H. Harry Asada³
¹Louisiana Tech University, Ruston, LA, ²Massachusetts Institute of Technology, Cambridge, MA

Sat–91 Exploring Iron Oxide Response Under Biological Conditions Using Magnetic Particle Spectrometry
Daniel Prestridge¹,², Rohan Dhavalikar¹, Ana Bohorquez¹, Nicolas Garraud¹, Mythreyi Unni¹, Andreina Chiu-Lam¹, David Arnold¹, and Carlos Rinaldi¹
¹University of Florida, Gainesville, FL, ²Santa Fe College, Gainesville, FL

Sat–92 Towards Spectrally-Resolved Super-Resolution Microscopy Using a Spatial Light Modulator
Sravan Munagavala², Bryce Schroeder¹, and Shu Jia¹
¹Stony Brook University, Stony Brook, NY

Sat–93 Development of a 3D-printed Laser Speckle Contrast Imaging System
Dylan Beam², Colin Sullender², Jeremy Arkin², Lisa Richards², and Andrew Dunn²
¹The Ohio State University, Columbus, OH, ²The University of Texas at Austin, Austin, TX

Sat–94 Dynamic Model to Optimize Ultrasound Elasticity Imaging of Tendon for Assessment of Tendinopathies
Hannah Schmitz¹, Liang Gao², Andres Nuncio Zuniga³, Cindy Fastje¹, Miha Taianovic², Daniel Latt¹, and Russell Witte¹
¹University of Arizona, Tucson, AZ, ²University of Washington, Seattle, WA

Sat–95 Quantitative Ultrasound Signals used in the Detection of Fatty Liver
Shaun Meyer¹, Lynn Gerber¹,², Siddhartha Siddar¹, Hussain Allawi³, and Zobair Younossi³
¹George Mason University, Fairfax, VA, ²INOVA, Falls Church, VA, ³Betty and Guy Beatty Center for Integrated Research Inova, Falls Church, VA

Cancer Technologies - Undergraduate

Sat–103 Metabolic Profiling of Macrophages Conditioned in Glioblastoma Stem Cell Environments
Victoria Lee¹, Travis Salzillo¹, and Pratip Bhattacharya¹
¹The University of Texas MD Anderson Cancer Center, Houston, TX

Sat–104 The Effect of Salinomycin On Glioblastoma Cancer Stem Cells
Justin Magrath¹ and Yonghyun Kim¹
¹The University of Alabama, Tuscaloosa, AL

Sat–105 Effects of Tasquinimod, An Inhibitor of S100A9 in Breast Cancer Metastasis
Tiffany-Rae Robinson¹
¹Western New England University, Dalton, MA

Sat–106 Examining the 3D Tumor Microenvironment Via Microbioreactors
Matthew Rogers¹, Tammy Sobolik¹, David Schaffer¹, Philip Samson¹, John Wikswo¹, and Ann Richmond²,³
¹Vanderbilt University, Nashville, TN, ²Vanderbilt University Medical Center, Nashville, TN, ³Tennessee Valley Healthcare System, Nashville, TN

Sat–107 Bioorthogonal Conjugated Probes for Enhancing Tumor Cell Imaging
Jasmin Vanessa Guerrero¹, Irma Fernandez², Maha K. Rahim², and Jereid B. Haun²
¹University of California, Irvine, Santa Barbara, CA, ²University of California, Irvine, Irvine, CA
Sat-108
The Effect of Fluid Shear and Metastatic Potential on Breast Cancer Cell Migration
Jae Hyun Lim¹, Brandon Riehl², Ravi Raghani³, Jeong Soon Lee³, and Jung Yul Lim³
¹Lincoln Southwest High School, Lincoln, NE; ²University of Nebraska-Lincoln, Lincoln, NE

Sat-109
A 3-D Model of Breast Tumor and Endothelial Cell Interactions
Olivia Ngo¹, Swathi Swaminathan¹, and Alisa Morss Clyne¹
¹Drexel University, Philadelphia, PA

Sat-110
Influence of Tumor Microenvironment Mechanics on Myoferlin-Mediated Changes in Breast Cancer Cell Migration
Kelsey Watts¹, Vasudha Shukla¹, and Samir Ghadiali¹
¹The Ohio State University, Columbus, OH

Sat-111
Ionic Driven Embedment of Lipid Nanoparticles in Polymer Films for Local Therapeutic Delivery
Stephen Hayward¹, David Francis², Matthew Sis³, and Srivatsan Kidambi⁴, 5
¹University of Michigan-Ann Arbor, Ann Arbor, NE; ²Georgia Institute of Technology, Atlanta, GA; ³University of Nebraska-Lincoln, Lincoln, NE; ⁴University of Nebraska-Lincoln, Lincoln, NE; ⁵University of Nebraska Medical Center, Omaha, NE

Sat-112
Gut Microbiota Modulates Cisplatin Induced Systemic Toxicity
Miranda Dawson¹, Soumen Roy², Amirjan Dzutsev³, Gianluca Pegoraro³, and Giorgio Trinchieri²
¹University of Illinois at Urbana-Champaign, Urbana, IL; ²National Cancer Institute, National Institutes of Health, Bethesda, MD

Sat-113
Breast Cancer Cell Behavior on Electrospun Fibrous Scaffolds
Alston-Lauren Feggins¹, Alicia Allen², and Janet Zoldan³
¹Florida Institute of Technology, Melbourne, FL; ²University of Texas at Austin, Austin, TX

Sat-114
The Effects of Hemodynamic Shear Stress on Stemness of Acute Myelogenous Leukemia
Andrew Raddatz¹, Ursula Triantafillu¹, and Yonghyun (John) Kim¹
¹The University of Alabama, Tuscaloosa, AL

Sat-115
M1 Macrophage Polarization Decreases with an Increase of Stiffness
Adiel Hernandez¹, Shane Allen¹, and Laura Suggs²
¹University of Miami, Miami, FL; ²The University of Texas at Austin, Austin, TX

Sat-116
Use of EGFR Tracking in Detection of Epithelial-Mesenchymal Transition in Cancer Cells
Hannah Horning¹, Yen-Liang Liu², Chun-Liang Chen², and Hsin-Chih Yeh²
¹University of Maryland, College Park, Derwood, MD; ²The University of Texas at Austin, Austin, TX; ³UT Health Center at San Antonio, San Antonio, TX

Sat-117
The Feasibility and Optimization of a Percutaneous Carbon Dioxide–based Cryoprobe
Bailey Surtees¹, Sarah Lee¹, Ben Lee¹, Sonia Trakru¹, Monica Rex¹, Yechan Kang¹, Nikhil Jois¹, and Alwin Hui¹
¹Johns Hopkins University, Baltimore, MD

Sat-118
PC3 Detachment from Surface-Modified Scaffolds in 3D Perfusion Bioreactors
Gabriel Ratcliff¹, Cortes Williams¹, and Vassilios Sivakutsa¹
¹University of Oklahoma, Norman, OK

Sat-119
Anti-tumor (M1) Macrophages Secrete Cytokines that Prime Breast Cancer Cells for Apoptosis
Maya McKeown¹, Jennifer Guerriero², and Anthony Letai²
¹University of Pittsburgh, Pittsburgh, PA; ²Dana-Farber Cancer Institute, Boston, MA

Sat-120
The Effect of Degraded Collagen upon the Epithelial-Mesenchymal Transition in Cancer Progression
Pierce Hadley¹, ², Mark Gryka³, Saumya Tiwani¹, ², Nicolas Spegazzini¹, ², and Rohit Bhargava¹, ²
¹University of Illinois (Urbana-Champaign), Urbana, IL; ²Beckman Institute for Advanced Science and Technology, Urbana, IL

Cardiovascular Engineering--Undergraduate

Sat-192
The Fluid Mechanics of Aortic Regurgitation- A Simplified Experiment
Samantha Houser¹, Ikekchukwu Okaro¹, Vishrank Raghav¹, and Ajit Yoganathan¹
¹Georgia Institute of Technology, Atlanta, GA

Sat-193
Lumped Parameter Modeling of the Left Ventricle to Study Energy Loss during Aortic Regurgitation
Elizabeth Stayduhar¹, Vishrank Raghav¹, Ikekchukwu Okaro¹, and Ajit Yoganathan¹
¹Georgia Institute of Technology, Atlanta, GA

Sat-194
A Flow Bioreactor Enabling Simultaneous High-Resolution Microscopy of Monolayer Cultures
Zachary Davis¹, Julia Brekke¹, and Rohit Bhargava¹, ²
¹University of Illinois (Urbana-Champaign), Urbana, IL; ²Beckman Institute for Advanced Science and Technology, Urbana, IL

Sat-195
Single Institution Experience in 3D Modeling of Congenital Heart Defects
Alex Demers¹, Robert Hannan², Robert Wesley³, Redmond Burke², ³, and Juan Carlos Muniz², ³
¹Miami University, Oxford, OH; ²Nicklaus Children's Hospital, Miami, FL; ³Florida International University Herbert Wertheim College of Medicine, Miami, FL

Sat-196
Fabrication of Patient-Specific Intracranial Aneurysm Models For Burst Testing
Toby Zhu¹, Joseph Pichamuthu¹, and Juan Carlos Muniz², ³
¹Miami University, Oxford, OH; ²Nicklaus Children's Hospital, Miami, FL; ³Florida International University Herbert Wertheim College of Medicine, Miami, FL

Sat-197
Cardiomyocyte Differentiation on Polyurethane Nanofibers for Cardiac Tissue Engineering
Hannah Shield¹, Akankshya Shradhanjalii, Mohammad Andalib, and Jung Yul Lim²
¹Emporia State University, Emporia, KS; ²University of Nebraska-Lincoln, Lincoln, NE

BMES 2016 | Minneapolis
**Saturday, October 7 | 9:30 am–1:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am**

**Sat-198** Extracellular Matrix Remodeling Due to Hypoxia in Porcine Aortic and Mitral Valve Tissue
Qiaochu Zhang¹, Varun Krishnamurthy¹, Matthew Sapp¹, Dragoslava Velikov¹, and Jane Grande-Allen¹
¹University of Texas, Houston, TX

**Sat-199** Use of Neural Networks to Predict Peripheral Artery Pathology
Andreas Seas¹, Jason MacTaggart², MariJose Castellanos³, and Alexey Kamensky⁴
¹University of Maryland, Baltimore County, Ellicott City, MD, ²University of Nebraska Medical Center, Omaha, NE

**Sat-200** Optogenetics for the Maturation of hiPS-CMs
Christopher Shen¹, Stephen Ma¹, Olaia Vila¹, and Gordana Vunjak-Novakovic¹
¹Columbia University, New York, NY

**Sat-201** Optimization of a Decellularization Technique for the Study of Human Mitral Valve Interstitial Cells
Ethan Kwan¹, Elizabeth Shih¹, Connor Hughes¹, Kayla Walter¹, Salma Ayoub¹, and Michael Sacks¹
¹University of Texas Austin, Austin, TX

**Sat-202** Modeling and in-silico Analysis of Clinically Used Coronary Artery Stents
Jacob Herman¹, and Zhi Ang²
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore

**Sat-204** Investigating Cellular Defects Arising from the LMNA Mutation
Zachery Robinson¹, Jason Core¹, Hamza Atcha¹, Waleed Dahbour¹, and Anna Grosberg²
¹University of California, Irvine, CA, ²University of California, Irvine, Irvine, CA

**Sat-205** Design of a Versatile Physical Model of Multi-Lymphangion Systems
Luke Riexinger¹, James Baish¹, and Lance Munn²
¹Bucknell University, Lewisburg, PA, ²University of Arizona, Tucson, AZ

**Sat-206** CLARITY Optimization of Cardiac Tissue
Devon Guerrelli¹, Aaron Koppel¹, Jaclyn Brennan¹, and Igor Efimov¹
¹The George Washington University, Washington, DC

**Sat-207** Stress Analysis of Pulmonary Autograft in One Year Postoperative Ross Patients
Matthew Zweber¹, Jing Liu¹, Yue Xuan¹, Ismail El-Hamamsy¹, Elaine Tsenq¹, and Liang Ge¹
¹San Francisco VA Medical Center, San Francisco, CA

**Sat-208** Isolation of The Opposing Effects of Fluid Mechanical Forces On Endothelial Sprouting
Griffin Spychalski¹, Ehsan Akbari¹, Kaushik Rangharajan¹, Shaurya Prakash¹, and Jonathan Song¹,²
¹The Ohio State University, Columbus, OH, ²OSU Comprehensive Cancer Center, Columbus, OH

**Sat-209** Characterizing a Magnetic Bead Microrheometry System to Measure the Local Elasticity of Thrombi
Ryan Betzold¹, Peter Butler¹, and Keefe Manning¹,²
¹The Pennsylvania State University, University Park, PA, ²Penn State Hershey Medical Center, Hershey, PA

**Sat-210** Sarcomeric Addition under Uniaxial Stress Loads
Tiffany Yu¹, Zhonghai Wang², and Bruce Gao²
¹Clemson University, Central, SC, ²Clemson University, Clemson, SC

**Sat-211** Influence of Variations in Circle of Willis Anatomy on Cerebral Circulation & Embolus Distribution
Neel Jani¹, Debjanjan Mukherjee¹, and Shawn Shadden¹
¹UC Berkeley, Berkeley, CA

**Sat-212** Trypsin Upregulates Membrane PDGFR Localization
Dipen Kumar¹, Pi Chen¹, and Princess Imokhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Sat-213** Changes in Pulmonary Arterial Hemodynamics Prior To LVAD Implant and The Association with RV Failure
Courtney Vu¹, Timothy Bachman¹, Luigi Lagazzi¹, Robert Kormos¹, and Marc Simon¹
¹University of Pittsburgh, Pittsburgh, PA

**Sat-214** The Virtual Implantation of the Penn State Pediatric Total Artificial Heart
Shyanthony R Synigall¹, Keefe B Manning², and William J Weiss³
¹Louisiana Tech University, Ruston, LA, ²Pennsylvania State University, University Park, PA, ³Pennsylvania State Hershey Medical Center, Hershey, PA

**Sat-215** Effect of DRP Additives on Leukocytes in Microvessels: A Potential Method to Reduce Inflammation
Soumya Vhasure¹,², Daniel Crompton¹,², and Marina Kameneva¹,²
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

**Sat-216** Developing a LabVIEW Virtual Instrument for a Planar Biaxial Bioreactor System
Lindsay Lehman¹, Brenda Rodriguez¹, Annie Mara¹, Ethan Kwan¹, Salma Ayoub¹, and Michael Sacks¹
¹The University of Texas Austin, Austin, TX

**Sat-219** Effect of DRP Additives on Thrombocytes in Microvessels: A Potential Treatment for Thrombosis
Siddharth Balakrishnan¹, Dan Crompton², and Marina Kameneva²
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh, Pittsburgh, PA

**Sat-220** Right Ventricular Function in a Simian Immunodeficiency Virus Model of Early Pulmonary Hypertension
Ian Christman¹, Rebecca Vanderpool¹, Rebecca Tarantelli¹, Karen Norris³, and Marc Simon³
¹University of Pittsburgh, Pittsburgh, PA, ²Pittsburgh Vascular Medicine Institute, Pittsburgh, PA, ³University of Pittsburgh Department of Immunology, Pittsburgh, PA
Cellular and Molecular Bioengineering—Undergraduate

Sat–296
Effect of Extracellular Matrix Strain in Triggering Myofibroblastic Differentiation
Jacqueline Larouche¹, John Nicosia², and Thomas Barker³
¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA

Sat–297
Establishing a Biological Switch for the Inducible Overproduction of Farnsyl Pyrophosphate
Shreya Udani¹, Andrew Younger¹, Andrea Shepard¹ and Joshua Leonard³
¹Northwestern University, Evanston, IL

Sat–298
Tagging Endogenous Genes Using a Universal Nuclease Assisted Vector Integration System
Nikhil Shiva¹, Alexander Brown¹, Wendy Woods¹, and Pablo Perez-Pinera¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Sat–299
Investigating the Role of Vinculin Tension in Cell Spreading and Polarization
Karen Xu¹
¹Duke University, Durham, NC

Sat–300
Construction of Pancreatic Islet-Mimetics by Optimizing Three-Dimensional MIN6 Cell Culture
Connor Verheyen¹, Vita Manzoli²,³, and Alice Tomei¹,²
¹University of Miami, Coral Gables, FL, ²University of Miami - Miller School of Medicine, Miami, FL, ³Politecnico di Milano, Milan, Italy

Sat–301
Molecular Genetic Analysis of an In Vitro Model of Chronic Coksackieviral Infection
Elise Gray-Gaillard¹, Millie Shah¹, Christian Smolko¹, and Kevin Janes¹
¹University of Virginia, Charlottesville, VA

Sat–302
Engineering Macrophages to Eat Solid Tumors by Inhibiting “Self” Signaling
Brandon Hayes¹, Cory Alvey¹, Jake Hsu¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

Sat–303
Precise Quantitation of Single DNA Molecules Bound to Protein
Lauren Pruett¹, Hidetaka Ohnuki², and Giovanna Tosato²
¹Clemson University, Clemson, SC, ²National Institutes of Health, National Cancer Institute, Bethesda, MD

Sat–304
Modulation of Cancer-Associated Fibroblast Contractility Quantified by 3D Image Analysis
Brian Hughes¹, Mary-Kathryn Sewell-Loftin¹, Elizabeth Crist¹, Samantha van Hove¹, Gregory Longmore¹, and Steven George¹
¹Washington University in St. Louis, St. Louis, MO

Sat–305
The Effects of Amyloid Beta and Mechanical Stretch on Astrocyte Activation
Sruti Bheri¹, Julia Raykin¹, John Mulvihill¹, Laura Weinstock¹, Levi Wood¹, and C. Ross Ethier¹
¹Georgia Institute of Technology, Atlanta, GA

Sat–306
High-Throughput Functional Screening for Influenza HA Antigenic Drift Variants using Drop Based Microfluidics
Elina Davi¹,²
¹Harvard University, Cambridge, MA, ²Union College, Schenectady, NY

Sat–307
Ca2+ Response in Endothelial Cells Exposed to Different Flows: Experiments and Mathematical Modeling
Alexander Cetnar¹, Christopher Scheitlin¹, Richard Buckalew¹, and B. Rita Alevriadou¹
¹The Ohio State University, Columbus, OH

Sat–308
Inhibition of an RTX Toxin Using Small, Receptor-Based Peptides
Shannon Hayes¹
¹Lehigh University, Bethlehem, PA

Sat–309
Role of Desmosome and Nuclear LINC Complex Forces in Cardiomyocytes
Nicole Duggan¹, Paul Arsenovic¹, and Daniel Conway¹
¹Virginia Commonwealth University, Richmond, VA

Sat–310
How the Stiffness of the Microenvironment Affects Breast Cancer Cells’ Drug Resistance
Rachel Hegab¹, Marshall Joyce¹, and Amy Brock²
¹Louisiana Tech University, Ruston, LA, ²The University of Texas at Austin, Austin, TX

Sat–311
Point-of-Care Lysis and Amplification Of Neonatal Sepsis Causing Pathogens
Gregory Berglund¹, Elizabeth Phillips¹, and Jacqueline Linnes¹
¹Purdue University, West Lafayette, IN

Sat–312
The Protective Role of Rnd3 in Regard to oxLDL Uptake in Cell Culture Studies and Atherosclerotic Mice Models
Irina Ahn¹, Gerard O’Neil¹, Ashlee Asada¹, Ming Cheng¹, Ning Hua², Ian Harding¹, James Hamilton², and Enno Ebbini¹
¹Northeastern University, Boston, MA, ²Boston University, Boston, MA

Sat–313
Utility of a Low Volume Imaging Assay to Assess the Granular Phenotype and Activity of Neonatal Platelets
Marisa Theriheimer¹, Anh Ngo¹, Sandra Baker-Groberg¹, Ayesha Khader¹, Joseph Aslan¹, Susan Lattimore¹, Michael Recht¹, Kristina Haley¹, and Owen McCarty¹
¹Oregon Health & Science University, Portland, OR

Sat–314
Low-Intensity Mechanical Vibrations Increase Cytoskeleton Structure in Adipocytes
Robert Bruce¹, Renata Bruno², Stefanie Blanco¹, Yusef Saad-Eldin¹, Clinton Rublin¹, and Mei Lin Chan¹
¹State University of New York Stony Brook, Stony Brook, NY, ²Kings Park High School, Kings Park, NY

Sat–315
Adaptive PCR Enables Detection of Nucleic Acid Biomarkers in Urine with No Sample Preparation
Austin Hardcastle¹, Nicholas Adams³, and Rick Haselton¹
¹Vanderbilt University, Nashville, TN

Sat–316
Assessing Scl26a6 & NaDC1 (INDY) Interaction on Calcium Oxalate Crystal Formation in a Drosophila Model of Kidney Stones
Jessica Lin¹,², Jacob Anderson³, Adam Rossano³, Thomas Burghardt², and Michael Romero²
¹Washington University in St. Louis, St. Louis, MO, ²Mayo Clinic College of Medicine, Rochester, MN
### Sat–317
**Biological Response of Superficial Zone Chondrocytes To Combined Compression And Shear**  
Sarina Veale¹, Matt Gong¹, Felix Hsu¹, and Robert Sah¹  
¹University of California San Diego, La Jolla, CA

### Sat–318
**The Soluble Effects of Microgravity-Exposed Osteocytes on Bone Resorption**  
Sharon Truesdell¹, Estee George¹, Soham Mukherjee¹, and Marnie Saunders¹  
¹University of Akron, Akron, OH

### Sat–319
**Bio Logic Gate: AND Gate Constructed in Cyanobacteria**  
Kevin Walsh¹, Aidan Ceney¹, Sharon Lian¹, Sam Mellentine¹,  
¹Colorado State University, Fort Collins, CO

### Sat–321
**Using CRISPR/Cas9 to Assess the Role of Rif1 In DNA End-processing During Non-homologous End Joining In Saccharomyces cerevisiae**  
Stephen Leel¹ and Katherine Friedman²  
¹Searle Systems Biology and Bioengineering Undergraduate Research Program, Vanderbilt University, Nashville, TN, ²Department of Biological Sciences, Vanderbilt University, Nashville, TN

### Sat–322
**Long-term Expression of Cathepsin K Induces Unexpected Proteolytic Feedback to Maintain Proteostasis**  
Marc Shuler¹, Meghan Ferrall-Fairbanks², Maurizio Affer², and Manu Platt²  
¹The Pennsylvania State University, Philadelphia, PA, ²Georgia Institute of Technology, Atlanta, GA

### Sat–323
**HSPG Glypican-1 as a Primary Mechanosensor for NO Production in RFPECs**  
Anne Marie Weber¹, Rick Mathews¹, and John Tarbell¹  
¹The City College of New York, New York, NY

### Sat–324
**Laser Ablation of Epithelial Sheets: Guidance on the Role of Biomechanics from Physical Analogs**  
Aiden Reuter¹,²  
¹University of Pittsburgh, Wexford, PA

### Sat–314
**Effect of an Alternate Pressure Operating Room Table Overlay On Sacral Skin Blood Flow**  
Michael Churilla¹, David Brienza², and Tricia Karg¹  
¹University of Pittsburgh, Pittsburgh, PA

### Sat–315
**The iSurgeon: A Sensor and Expert-Model Based Training System for Laparoscopic Suture Knot Tying**  
Carly Garrow¹,², Karl-Friedrich Kowalewski³, Jonathan Hendrie³, Monia Schmidt³, Thomas Bruckner³, Sai Paul³, Sebastian Bodenstedt³, Hannes Kennngott³, Stefanie Speidel³, Beat Mueller-Stich³, and Felix Nickel²  
¹University of Missouri, Columbia, MO, ²University of Heidelberg, Heidelberg, Germany, ³Karlsruhe Institute of Technology, Karlsruhe, Germany

### Sat–316
**The Development of a Portable Semiautonomous IV Catheter Placement Device for Prehospital Use**  
Nicholas Hirdt¹, Peter Schwarzenberg⁰, Matthew Bilsky¹, and Susan Perry¹  
¹Lehigh University, Bethlehem, PA

### Sat–317
**Wireless Muscle Stimulation Data Transmission for Peripheral Nerve Prosthesis Development**  
Adam Smoulder¹, Sudip Nag², and Shih-Cheng Yan²  
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore

### Sat–318
**Surgical Screwdriver to Optimize Insertional Torque and Energy**  
Andrea Rich¹ and Philip Brown²  
¹University of North Carolina - Chapel Hill, Chapel Hill, NC, ²VT-WFU School of Biomedical Engineering and Sciences, Winston-Salem, NC

### Sat–319
**A Continuous Biosensor for The Rapid Detection of Insulin to Better Manage Diabetes Mellitus**  
Mukund Khanwalker¹, Connor Beck¹, Aldin Malikc¹, Chi Lin¹, Jeffrey Labelle¹, and David Probst¹  
¹Arizona State University, Tempe, AZ

### Sat–320
**Mathematical Modeling of Gastroparesis and Endocrine Dynamics in Type I Diabetics with Continuous Glucose Monitoring and 13C Breath Test Data**  
Nolan Meyer¹, Dushyant Mehra², Gopanandan Parthasarathy³, Adil Bharucha³, Yogish Kudva³, Armando Manduca³, and Zeljko Bajzer³  
¹University of Minnesota, Rochester, MN, ²Mayo Clinic, Rochester, MN

### Sat–321
**Potassium Biosensor for The Pathophysiology of Trauma**  
Alyssa Seunarine¹, John Aggas¹, Christian Kotanen¹, and Anthony Guiseppi-Elie¹  
¹Texas A&M University, College Station, TX

### Sat–322
**Preliminary Development of a Minimally Invasive Transoral Surgical System**  
Michelle Botyrius¹,², Quanquan Liu², and Hongliang Ren²  
¹University of Pittsburgh, West Lafayette, IN, ²Purdue University, West Lafayette, IN

### Sat–323
**Development of the 1DoF Haptic Renderer: Controller-Based Membrane Modeling for Haptic Devices**  
Avin Khera¹, Randy Lee¹, Zhihuan Yu¹, Roberta Klatzky¹, and George Stetten¹  
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

### Sat–324
**Path Oriented Powered Wheelchair Navigation Assistance**  
Jason Dekarske¹  
¹UW-Madison, Sheboygan, WI

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**Device Technologies and Biomedical Robotics - Undergraduate**

### Sat–131
**Preliminary Development of a Flexible Drill for Robotic Minimally Invasive Transoral Surgical System**  
Michelle Botyrius¹,², Quanquan Liu², and Hongliang Ren²  
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore

### Sat–132
**Development of the 1DoF Haptic Renderer: Controller-Based Membrane Modeling for Haptic Devices**  
Avin Khera¹, Randy Lee¹, Zhihuan Yu¹, Roberta Klatzky¹, and George Stetten¹  
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

### Sat–133
**Path Oriented Powered Wheelchair Navigation Assistance**  
Jason Dekarske¹  
¹UW-Madison, Sheboygan, WI
Sat-144
A Potentially Low-Cost, Customized Stroke Rehabilitation Tool: Assist in Small Steps
Mohiuddin Ahmed¹, Peter Cooman², Tim Tang¹, Felix Huang³, and James Patton¹
¹University of Illinois at Chicago, Chicago, IL, ²Rehabilitation Institute of Chicago, Chicago, IL, ³Northwestern University, Evanston, IL

Drug Delivery - Undergraduate

Sat-487
Inhibition of Glioma Tumor Growth Using Hyaluronan Targeting Nanoparticles to Modify Brain Extracellular Matrix
Sayeduzzaman Khan¹, Nitish Yeredla¹, and Mathumai Kanapathipillai¹
¹University of Michigan - Dearborn, Dearborn, MI

Sat-488
Degradable Poly(ethylene glycol) Hydrogels For Temporal Control Of Nanoparticle-mediated siRNA Delivery
Sue Zhang¹, Yuchen Wang¹, and Danielle Benoit¹
¹University of Rochester, Rochester, NY

Sat-489
Novel PEG-OES Nanocarriers for Local Immunomodulation in Pancreatic Islet Grafts
Connor Walsh¹, Diana Velluto², Vita Manzoli²,³, and Alice A. Tomei²
¹University of Miami - Coral Gables, FL, ²University of Miami - Miller School of Medicine, Miami, FL, ³Politecnico di Milano, Milano, Italy

Sat-490
Controlled Release of Immuno-modulatory Small Molecules from Poly(lactide-co-glycolide) Films.
Zachary Brown¹, Mohammad Arifuzzaman², Fan Yuan¹, and Soman Abraham¹
¹Pratt School of Engineering, Durham, NC, ²Duke University, Durham, NC, ³Duke University School of Medicine, Durham, NC

Sat-491
Characterization of Particulate and Vapor Phase Nicotine in Electronic Cigarettes
Mark Daley¹, James Baish¹, Dabrina Dutcher¹, and Timothy Raymond¹
¹Bucknell University, Lewisburg, PA

Sat-492
Magnetic Control of Multiple Drug Deliveries Using Multi-Compartment Ferrogels
Miranda Mitchell¹, Celia Dunn¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Sat-493
Free Radical Scavenging Potential of Acrylated Polyethylene Glycol Polymers for TBI Treatment
Emily DiMartini¹, Christopher Lowe¹, and David Shreiber²
¹The College of New Jersey, Ewing, NJ, ²Rutgers, The State University of New Jersey, Piscataway, NJ

Sat-494
Acoustic Vaporization of Perfluorocarbon Nanoemulsions
Tristan Ford¹, Satya Kothapalli², Eric Lambert³, Lu Liu¹, Jelena Janjic³, and Hong Chen²
¹University of Rochester, Rochester, NY, ²Washington University in St. Louis, St. Louis, MO, ³Duquesne University, Pittsburgh, PA

Sat-495
Addition of Protein Stabilizers to Nanoparticles Derived from Pig Lung Extracellular Matrix
Gabrielle Cotman¹, Patrick Link¹, Robert Pouliot¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

Sat-496
Localized FKS06 Delivery System for Peripheral Nerve Repair
Susan Wojtalewicz¹, Brett Davis¹, Pratima Labroo³, Ching-ween Li³, Jill Shea³, Himanshu Sant³, Bruce Gale³, and Jay Agarwal³
¹University of Utah, Midvale, UT, ²University of Utah, Salt Lake City, UT, ³National Chung Hsing University, Taichung, Taiwan

Sat-497
Novel Micellar Drug Delivery System Using Poly(amino ester)-Poly(ethylene glycol) Copolymer
James Shamul¹, Yechan Kang¹, Jayoung Kim¹, and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD

Sa-498
Characterization of the Antimicrobial Effects of a Silver-Doped Titanium Dioxide-PDMS Hybrid Coating on the Adherence and Proliferation of Multi-Drug Resistant A. baumannii and Vancomycin Resistant E. faecalis on Spinal Implant Rods of Varying Compositions
Anthony Minnah¹, Eric Nguyen¹, Dioscaris Garcia¹,²,³, John Jarrell¹,³, and Christopher Born¹,²,³
¹Brown University, Providence, RI, ²Rhode Island Hospital, Providence, RI, ³BiolIntraface, Inc., North Kingston, RI

Sat-499
Evaluation of Curcumin Loaded Nanoliposomes for the Treatment of Age-Related Macular Degeneration
Somtochukwu Dimobi¹, Kameron Kilchrist¹, Thomas Werfel¹, and Craig Duvall¹
¹Vanderbilt University, Nashville, TN

Sat-500
Validation of a Galectin-8 Reporter as a Measure of Nanocarrier Endosomal Escape and Biologic Drug Intracellular Bioavailability
Sriramya Ayyagari¹, Haris Dar¹, Vivian Morton¹, Kevin Moy¹, Chadni Patel¹, Lalithasri Ramasubramanian¹, Nivetita Ravi¹, Samantha Wood¹, Andrew Zhao¹, Melanie Zheng¹, Kiet Zhou¹, and Jose Helim Aranda Espinoza¹
¹University of Maryland College Park, College Park, MD

Industry—Undergraduate

Sat-501
High Throughput Droplet Sorting using Surface Acoustic Waves
Elna Davé¹
¹Harvard University, Cambridge, MA, ²Union College, Schenectady, NY

Sat-502
How Medical Device Regulation Changes Business Practice
Siyu Chen¹, Ben Johnston¹, and Nicholas Lemme¹
¹Brown University, Providence, RI

Sat-503
Industry Analysis of the Largest Medical Device and Pharmaceutical Companies
Sylvia Brown¹
¹Brown University, Providence, RI
**Saturday, October 7 | 9:30 am–1:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am**

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### Nano and Micro Technologies—Undergraduate

**Sat–504**
Design of Plasmon Rulers for Study of RNA Splicing
Bara Saada1, AbderRahman Sobh1, Progna Banerjee1, Zhaleh Ghias1, Nahil Sobh2, and Prashant Jain1
1University of Illinois at Urbana-Champaign, Urbana, IL

**Sat–505**
Characterization of Model Middle Molecular Weight Solute Sieving in the Bioartificial Kidney
Jeff Hsiao1, Benjamin Feinberg1, William Fissell2, Andrew Zydny3, and Shuvo Roy1
1University of California, San Francisco (UCSF), San Francisco, CA, 2Vanderbilt University, Nashville, TN, 3The Pennsylvania State University, University Park, PA

**Sat–506**
Characterization of Nanoparticle-Membrane Interaction through Cell Membrane Models
Colleen O’Connor1, Michelle Mansour2, Eric Freeman3, and Xianqiao Wang2
1The University of Texas at Austin, Austin, TX, 2University of Georgia, Athens, GA

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### Poster Session—Saturday

**Sat–513**
Single Walled Carbon Nanotube Fluorescence Detection to Quantify In Vitro Nitric Oxide Concentration
Victoria Bart1, Eric Hofferber1, Joseph Stapleton1, Janelle Adams1, and Nicole Iverson1
1University of Nebraska-Lincoln, Lincoln, NE

**Sat–514**
Optimization of Mixed Metal Oxide Magnetic Nanoparticles for Point-of-Care Biosensors
Hannah Smith1, Haley Marks1, and Gerard Cote1
1Texas A&M University, College Station, TX

**Sat–515**
Characterization of a Microfluidics in vitro Model of the Gastrointestinal Human-Microbe Interface
Amanda Nguyen1, Jianing Yang1, Carla Brooks1, and Frederic Zenhausern1
1Translational Genomics Research Institute, Phoenix, AZ, 2University of Arizona, Chandler, AZ

**Sat–516**
A Cost-Effective Micro Milling Platform for Rapid Prototyping of Micro Devices
Daniel Yen1 and Keyue Shen1
1University of Southern California, Rancho Palos Verdes, CA, 2University of Southern California, Los Angeles, CA

**Sat–517**
Assessing Uptake of Magnetite Nanoparticles by Fibroblasts Using Transmission Electron Microscopy
Nardine Ghobrial1, Benjamin Fellows1, Q. Thompson Mefford1, and Delphine Dean1
1Clemson University, Clemson, SC

**Sat–518**
Oral Mucosa-on-a-Chip for Cytotoxicity Testing of Biomaterials on Human Gingival Cells
Dominic Padova1, Christopher Raub1, Diane Bienek2, Gili Kaufman2, and Xiaolong Luo1
1Catholic University of America, Washington, DC, 2ADA Foundation, Gaithersburg, MD

**Sat–519**
Reversible Blood Clotting via pH Controllable Protein Polymers
Jessica Polka1,2, Camilo Ruiz1, Bryan Hsu1, and Pamela Silver1
1Harvard Medical School, Boston, MA, 2Wyss Institute for Biologically Inspired Engineering, Boston, MA

**Sat–520**
Phase Separating Liposomes For In Vitro Fusion to Membrane Targets
Grant Ashby1, Zachary Imam1, and Jeanne Stachowiak1
1Georgia Institute of Technology, Atlanta, GA, 2University of Texas at Austin, Austin, TX

**Sat–521**
Using Computational Modeling for the Design and Optimization of Novel Cancer Theranostics
Binal Brahmhat1, Dora Obodo1, Kaitlyn Scott1, VedaLakshmi Prasad1, Brian Schnoor1, Carolina Salvador-Morales1, Juan Cebral1, Rainald Lohner1, and Fernando Mut1
1George Mason University, Fairfax, VA
**Neural Engineering—Undergraduate**

**Sat–528**  
Targeting CD14 Pathway on Blood-Derived or Resident Brain Immune Cells Improves Neural Recovery  
Shushen Lin¹, Hilary Bedell¹,², Madhumitha Ravikumar¹,³, Ashley Rein¹, Xujia (Jessica) Li¹, and Jeffery Capadona²  
¹Case Western Reserve University, Cleveland, OH, ²Louis Stokes Cleveland VA Medical Center, Cleveland, OH

**Sat–529**  
Direct Current Stimulation of Endothelial Monolayers Induces a Transient and Reversible Increase in Transport Due to Electro-osmotic Effect  
Katherine Arias¹, Limary Cancé¹, Marom Bikson¹, and John Tarbell¹  
¹The City College of New York, New York, NY

**Sat–530**  
Mirror Movements in Chronic Stroke: Origins and Their Influence on Interpretation About Recovery  
Bryana Baginski¹, Nicole Varnerin², David Cunningham², Kelsey Potter-Baker², Jesus Cardenas², Vishwanath Sankarasubramanian², and Ela Plow²  
¹Clemson University, Clemson, SC, ²Cleveland Clinic, Cleveland, OH

**Sat–531**  
Effects of Phase-Delaying Optogenetic Stimulation of the Suprachiasmatic Nucleus On Mood  
Christine Heisler¹, Chelsea Vadnie¹, Ryan Logan¹, and Colleen McClung²  
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh School of Medicine, Department of Psychiatry, Translational Neurosciences Program, Pittsburgh, PA

**Sat–532**  
The Effect of Nanopatterned Surface on Intracortical Microelectrode Biocompatibility  
Cara Smith¹, Seth Meade¹, Keying Chen¹, Jeffrey Capadona¹, and Evon Ereifej¹  
¹Case Western Reserve University, Cleveland, OH

**Sat–533**  
Cortical Cell Network Response to Ultrasound Stimulation  
Sarah Shaykevich¹, Michael Plaksin², Yonatan Weissler², and Shy Shoham²  
¹University of Pittsburgh, Pittsburgh, PA, ²Technion-Israel Institute of Technology, Haifa, Israel

**Sat–534**  
Generation of Ca²⁺ Networks to Study Intercellular Communication of Human Neural Progenitor Cells  
Nicolas Grandel², Arun Mahadevan³, Jacob Robinson³, and Amina Qutub⁴  
²Stanford University, Stanford, CA, ³Rice University, Houston, TX

**Sat–535**  
Modelling of Axonal Block Induced by Extracellular Potassium Accumulation in Hippocampal CA1 Region  
Amulya Veldanda¹, Daniel Tamashiro¹, and Xuefeng Wei¹  
¹The College of New Jersey, Ewing, NJ

**Sat–536**  
Neural Recruitment and Tissue Damage Propensity for Fractal Deep Brain Stimulation Electrodes  
Aakhila Rameez¹ and Xuefeng Wei¹  
¹The College of New Jersey, Ewing, NJ

**Sat–537**  
Neural Networks and Hand Dominance  
Temilade Aladeniyi¹,² and J.C. Mizelle¹  
¹East Carolina University, Greenville, NC, ²North Carolina Central University, Durham, NC

**Sat–538**  
Characterization of Electrodes for High-voltage Nanosecond Pulsed Electric Field Exposure of Adrenal Chromaffin Cells  
Jordanna Payne¹, Josette Zaklit¹, Hao Li², Robert Terhune³, Indira Chatterjee¹, and Gale Craviso¹  
¹University of Nevada, Reno, Reno, NV

**Sat–539**  
Effect on Rat Motor Behavior of Chronic Intracortical Microelectrodes Implanted in the Motor Cortex  
Keith Dona¹, Monika Goss¹, Justin McMahon¹, Andrew Shoffstall¹, Evon Ereifej¹, and Jeffery Capadona¹  
¹Case Western Reserve University, Cleveland, OH

**Sat–540**  
Photostimulation of Microglia Indicates Cytotoxicity  
Yang Lin¹, David Diaz¹, and Abigail Koppes¹  
¹Northeastern University, Boston, MA

**Sat–541**  
A Neural Recording Device for Monitoring Preclinical Deep Brain Stimulation Therapy  
Anupam Kumar¹, James Fallon², Hugh McDermott³, and Joel Villalobos³  
¹Bionics Institute, Melbourne, Australia, ²Bionics Institute, East Melbourne, Australia

**Sat–542**  
EEG Dynamics in Epilepsy: From IED Inverse Solution to Microstates  
Alexandra Rodriguez Rojas¹  
¹Florida International University, Miami, FL

**Sat–543**  
Targeted Effects of FGF-9 Deletion in Scleraxis Lineage Cells  
Emily Hudson¹, Michael Sonnenfeld¹, Anna Klintsova¹, and Megan Killian¹  
¹University of Delaware, Newark, DE

**Orthopaedic and Rehabilitation Engineering—Undergraduate**

**Sat–544**  
Polymer Clip Design Affects Migration Resistance and Pressure in Simulated Surgical Conditions  
Madeline Simon¹, Hao Li¹, Richard Lebens¹, Kevin Loeppke¹, Zhiheng Lu¹, Connor Darrough¹, Blake Darkow¹, and Carly Garrow¹  
¹Nanova Biomaterials, Inc., Columbia, MO

**Sat–545**  
Growth of Mineral Coatings on Inert Materials Using Electric-Field-Induced Surface Charge  
Ian O’Donnell¹, Abdurahman Alsasa¹, and Stephen Kennedy¹  
¹University of Rhode Island, Kingston, RI

**Sat–546**  
Validating an Experimental Dynamic Gait Arena for Measuring Vertical Ground Reaction Forces in Mice  
Samantha Haus¹, Emily Lakes¹, Britany Jacobs¹, and Kyle Allen¹  
¹University of Florida, Gainesville, FL

**Sat–547**  
Characterization of Articular Cartilage By Raman Spectromicroscopy  
Kiara Chan¹, Alexander Boys¹, Lawrence Bonassar¹, and Lara Estroff¹  
¹Cornell University, Ithaca, NY

**Sat–548**  
Effects of Grader Skill Level on Measurement Variability  
Joshua Berko¹, Heidi Kloefkorn¹, and Kyle Allen¹  
¹University of Florida, Gainesville, FL
Sat-549
Development of Cell Seeded Tissue Engineered Meniscal Entheses with Functional Solute Gradients
Leanne Iannucci¹, Mary Clare McCorry¹, Tyler Khilnani¹, and Lawrence Bonassar¹
¹Cornell University, Ithaca, NY

Sat-550
Software Design and Mechanical Verification of An IMU System To Monitor Cervical Spine Movement
Michelle Riffitts¹, Marcus Allen¹, and Kevin Bell¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-551
The Effect of Environmental Aging on Shore Hardness of Additive Manufactured Materials for 3D-Printed Custom Foot Orthotics
Kyle Walker¹, Manav Jain¹, Shannon Hall¹, Lauren Jackson¹, Breanne Przestrelska¹, Brian Kalu², Nikki Hooks², Dan Ballard³, Timothy Pruet¹, Steven Hoeffner¹, and John DesJardins¹
¹Clemson University, Clemson, SC, ²Ability Prosthetics & Orthotics, Greenville, SC, ³Upstate Pedorthic Services, Greer, SC

Sat-552
Gait Analysis of Vietnamese Amputees Wearing Mercer Universal Prosthesis versus Customized Prostheses
Brittany White¹ and Cheyenne Andrew¹
¹Mercer University, Macon, GA

Sat-553
Case Studies of Pediatric Poliomyelitis Patients fit with Lower Extremity Orthotics
Andrew Roy¹
¹Mercer University, Macon, GA

Sat-554
Quantifying the Effect of Varying User Conditions on EMG Features for Upper-limb Pattern Recognition
Caroline Li¹, Dustin Crouch², and He Huang²
¹Wake Forest University, Winston-Salem, NC, ²UNC/NCSU Joint Department of Biomedical Engineering, Raleigh, NC

Sat-555
Treatment of Poliomyelitis Patient Using Ankle-Foot Orthosis (AFO) and Analysis of Gait Improvement
Gabriel Gonzalez Quintero¹
¹Mercer University, School of Engineering, Macon, GA

Sat-556
Establishing System to Mimic Hand Acceleration During Parkinsonian Active Writing Tremors
Sidney Cannon-Bailey¹, Ori Braun Benyamin², and Navit Roth²
¹University of Pittsburgh, Pittsburgh, PA, ²ORT Braude College of Engineering, Karmiel, Israel

Sat-557
Developing a Smart Sock to Assist in the Treatment of Plantar Fasciitis
Jack McGreevey¹, Bryce Kuncle¹, Ryan Gilbert¹, Zachariah Lindower¹, Alex Giron¹, Omar Abdeladl¹, and Vladimir Reukov¹
¹Clemson University, Clemson, SC

Respiratory Bioengineering—Undergraduate

Sat-558
Linking Cellular Membrane Disruption and Blood-Gas Barrier Leak in Ventilator-Induced Lung Injury
Chantel Charlebois¹, Gregory Roy¹, Katharine Hamlington¹, Adele Julianelle¹, Alyx Cleveland¹, Bradford Smith¹, and Jason Bates¹
¹University of Vermont College of Medicine, Burlington, VT

Sat-559
Design and Testing Of An Automated Bioreactor System to Maintain Airway Segments Viable for Extended Durations Under Conditions Mimicking Tidal Breathing
Suzanne Stasiak¹, Daniel Brewster¹, Harikrishnan Parameswaran¹, and Kenneth Lutchen¹
¹Boston University, Boston, MA

Sat-560
Cellular Endoplasmic Reticulum Stress and Cytokine Response in Age-Associated Experimental Ventilator Induced Lung Injury
Franck Kamga Gninze¹, Michael Valentine¹, Joseph Herbert¹, Matthew Schneck¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

Sat-561
Microtubule Dynamics and Exogenen Gene Expression on Polyacrylamide Gels Of Varying Stiffness
Daniel Bordner¹ and Robert Geiger¹
¹Florida Gulf Coast University, Ft Myers, FL

Sat-562
Bilayer Epithelial/Smooth Muscle Constructs as an In Vitro Bronchial Model
Peter Sariano¹, Joshua Morgan¹, and Jason Gleghorn¹
¹University of Delaware, Newark, DE

Sat-563
Assessing the Host Inflammatory Response to Acellular Lung Scaffolds
Joshua Tarantino¹, Clint Skillet¹, and Bryan Brown²
¹University of Pittsburgh, Pittsburgh, Mechaniscburg, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

Sat-564
Pentagalloyl Glucose Treatment to Mitigate Effects of Cigarette Smoke Extract in Vitro
Mario F Garcia Duarte¹, Vaideesh Parasaram², Jorge I Rodriguez-Devora², and Naren Vyavahare²
¹University of Texas at El Paso, El Paso, TX, ²Clemson University, Clemson, SC

Stem Cell Engineering—Undergraduate

Sat-565
Influencing Differentiation of Neural Progenitor Cells with Gene Silencing
Meghan Wyatt¹, William Ong², Wai Hon Chooi², and Sing Yian Chew²
¹University of Pittsburgh, Pittsburgh, PA, ²Nanyang Technological University, Singapore, Singapore

Sat-566
Regulation of Adenosine A2B Receptor Signaling on Osteogenic Differentiation of Mesenchymal Stem Cells
Morgan Cobban¹,², Yuru Shih², Masayuki Iida³, and Shyni Varghese³
¹Arizona State University, Tempe, AZ, ²University of California San Diego, La Jolla, CA

Sat-567
Role for Stiffness in Vascular Fate
Lian Wong¹, Je Chua¹, Drew Glaser², and Kara McCloskey¹
¹University of California, Merced, Merced, CA, ²Washington University in St. Louis, Saint Louis, MO

Sat-568
Differentiation of Mesenchymal Stem Cells into Schwann Cell-like Phenotype by Electrical Stimulus
Matthew Lrenter¹, Metin Uz², Suprem Das², Don Sakaguchi², Surya Mallapragada², and Jonathan Clausen²
¹Iowa State University, Ham Lake, MN, ²Iowa State University, Ames, IA
Sat-569
Development of Immobilized Bioactive Signals for Pluripotent Stem Cell Differentiation
Alexander Grath¹, Taylor Dorsey¹, and Guohao Dai¹
¹Rensselaer Polytechnic Institute, Troy, NY

Tissue Engineering—Undergraduate

Sat-570
An In Vitro Approach to Identify Skin Sensitizers with Classification Tools
Lingting Shi¹, Talia Greenstein¹, Serom Lee¹, Rene Schloss¹, and Martin Yarmush¹
¹Rutgers University, Piscataway, NJ

Sat-571
Optimization of Electroactive Hydrogel Characteristics for a Composite Skeletal Muscle Scaffold
Caroline Wood¹,²
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²The College of New Jersey, Ewing, NJ

Sat-572
Optimizing Osteo-Differentiation Factor Delivery Profiles for Enhanced Bone Regeneration
Anne Reisch¹, Seyedeh Zahra Moafi Madani¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Sat-573
Towards Elimination Of The In Vitro Dynamic Culture Period of SVF Cell-Seeded TEVGs
Kamiel Salehi¹, Darren Haskett¹,², Lauren Kokai²,³, A. Justin Weinbaum¹,³, Antonio D’Amore¹,²,², William Wagner¹,²,³, S. J. Peter Rubin¹,³, and David Vorp¹,²,²,³,⁴,⁵
¹University of Pittsburgh, Department of Bioengineering, Pittsburgh, PA, ²University of Pittsburgh, Department of Surgery, Pittsburgh, PA, ³McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ⁴University of Pittsburgh, Department of Plastic Surgery, Pittsburgh, PA, ⁵Center for Vascular Remodeling and Regeneration, Pittsburgh, PA, ⁶University of Pittsburgh, Department of Cardiothoracic Surgery, Pittsburgh, PA

Sat-574
Utilizing Microfluidics to Recapitulate the Microenvironment of Glioblastoma
Elijah Karvelis¹, Mai Ngo¹, Aidan Gilchrist¹, Roger Kamm², and Brendan Harley²
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Massachusetts Institute of Technology, Cambridge, MA

Sat-575
3D Printed Biodegradable Scaffold Loaded with Anti-Inflammatory Cytokines for Local Immunomodulation and Bone Regeneration
Hae Seong Kim¹
¹Columbia University, New York, NY

Sat-576
Engineering The Bone-Cartilage Interface: An Osteochondral Microphysiological System
Kalon Overholt¹, Riccardo Gottardi¹, Alessandro Pirosa¹, and Rocky Tuan¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-577
Development of A Bioreactor Aimed At Designing Spatial And Temporal Drug Delivery Profiles For Bone Regeneration Protocols
Inderbir Sodhi¹, Derek Nichols¹, Emily Bayer¹, Riccardo Gottardi¹, and Steven Little¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-578
Centrifugation-based Fabrication of Laminar High-density Tissue Aggregates
Uma Balakrishnan¹, Joseph Shawky¹, and Lance Davidson¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-579
Characterization of Breast Cancer Metastasis using a Two-Dimensional and a Three-Dimensional Assay
Awa Bakayoko¹, Brittany Jenkins², Rupali Hire³, Melissa Davis², and Cheryl Gomillion²
¹University of Maryland, Baltimore County, Silver Spring, MD, ²University of Georgia, Athens, GA

Sat-580
Effects of Hormonal Stimulation on Endometrial Vascular Morphogenesis in 3D PEG Hydrogels
Alyssa Mendenhall¹, Alex Brown¹, Christi Cook¹, and Linda Griffith²
¹University of Iowa, Iowa City, IA, ²Massachusetts Institute of Technology, Cambridge, MA

Sat-581
Developing a Hydrogel-Loaded Gradient Microarray
Kunal Shah¹, Lauren Cross¹, and Akhilesh Gaharwar¹
¹Texas A&M University, College Station, TX

Sat-582
Characterization of a Microfluidic Platform to Tissue Engineer Arterioles
Hongyi Li¹
¹Washington University in Saint Louis, St. Louis, MO

Sat-583
Real Time Monitoring of Heart Valve Hydrodynamic in Pulse Duplicator
Thanh Le¹, Zeeshan Syedain¹, and Robert Tranquillo¹
¹University of Minnesota Twin Cities, Minneapolis, MN

Sat-584
Assessment of Schwann Cell Migration In Vitro And In Vivo Following Application of a Peripheral Nerve Specific Hydrogel
Mara Palmer¹, Travis Prest¹, and Bryan Brown¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-585
Chitosan Nanoparticle-Loaded Collagen Gels for a Tissue-Engineered Brain Patch
Sakshi Shah¹ and Sarah Anderson¹
¹Harvey Mudd College, Claremont, CA

Sat-586
Analysis of Vascularization Following Implantation of Prevascularized Fibrin Scaffolds in a Cranial Defect Model
Woojin Pang¹, Brianna Roux²,³, Banu Akar³,³, and Eric Brey²,³
²Illinois Institute of Technology, Chicago, IL, ³Edward Hines Jr. VA Hospital, Hines, IL

Sat-587
Effect of HIF1 Activity on CD44 Variant Expression And Matrix Production During Chondrogenic Differentiation Of Human Mesenchymal Stem Cells
Emily Durisin¹, Rhima Coleman¹, and Biming Wu¹
¹University of Michigan, Ann Arbor, MI

Sat-588
Analysis of Extracellular Matrix in Mice with Muscular Dystrophy and its Effect on Myoblast Function
Felicia Sadikin¹, Ashley Kaminski-Earle¹, and Jan Lammerding¹
¹Cornell University, Ithaca, NY

Sat-589
Electrospinning: Creating 3D Biocompatible Scaffolds
Victoria Myers¹ and Barbara Muller-Borer²
¹East Carolina University, Linden, NC, ²East Carolina University, Greenville, NC
Sat-590  
In Vitro Characterization and In Vivo Survival of Three-Dimensional Vascular Networks in Fibrin Scaffolds  
Beatriz Barrera¹, Brianna Roux², Banu Akar¹, and Eric Brey¹  
¹Illinois Institute Of Technology, Chicago, IL, ²Edward Hines Jr. VA Hospital, Hines, IL

Sat-591  
In Vitro Development of a Vascularized Full Thickness Skin Equivalent Model  
Andrew Ramos¹, Maryna Pavolva¹, Anna Jakimenko¹, and Ganna Bilousova¹  
¹University of Colorado, Anschutz Medical Campus, Aurora, CO, ²Charles, C Gates Center of Regenerative Medicine, Aurora, CO

Sat-592  
Lyophilized Platelet-Rich Plasma Increases Osteoblast Proliferation and Alkaline Phosphatase Activity  
Rachel Rone¹, Scott Sell¹, and Natasha Case¹  
¹Saint Louis University, Saint Louis, MO

Sat-593  
Extracellular Matrix Mediation of Adipose Tissue Differentiation and Function  
Christopher Mayhugh¹, Feipeng Yang¹, Ronald Cohen², and Eric Brey¹  
¹Illinois Institute of Technology, Chicago, IL, ²The University of Chicago, Chicago, IL

Sat-594  
Cellular Response to Spider Silk Scaffolds  
Dallas Montag¹, Katherine Hafner², Marian Kennedy², and Delphine Dean³  
¹Marietta College, Marietta, OH, ²Clemson University, Clemson, SC

Sat-595  
The Development of a Novel PPLG Hydrogel System to Promote the Vascularization of iPS-Derived Endothelial Cells  
Kwasi Amofa¹, Hongkun He², Alex Wang³, Marianna Sofman³, Linda Griffith³, and Paula Hammond²  
¹Western New England University, Springfield, MA, ²Massachusetts Institute of Technology, Boston, MA

Sat-596  
Approaches to Antigen Removal from a Porcine Osteochondral Xenograft  
Ruth Recinos¹, Emily Wright¹, and Steven Elder¹  
¹Mississippi State University, Starkville, MS

Sat-597  
Analysis of Structure and Strength of Tissue Rings Fabricated in Custom Machined Culture Wells  
Kathy Suqui¹, Hannah Strobel¹, Christopher Nycz¹, Gregory Fischer¹, and Rolle Marsha¹  
¹Worcester Polytechnic Institute, Worcester, MA

Sat-598  
Vacuum-assisted Recellularization of Decellularized Porcine Mitral Valve Scaffold  
Brianna Sanchez², Christopher deBorde², Lee Sierad³, Jorge I Rodriguez-Devora³, and Aggie Simionescu²  
¹University of Texas at El Paso, El Paso, TX, ²Clemson University, Clemson, SC

Sat-599  
Additive Manufacturing to Produce Biomechanically Anisotropic Hydrogels for Cardiac Tissue Engineering  
Yasmeen Rose¹, Brittany Banik², and Justin Brown²  
¹The University of Iowa, Iowa City, IA, ²The Pennsylvania State University, University Park, PA

Sat-600  
Epithelial Wound Closing in Engineered Microtissues  
Jaclyn Grode¹, Mahmut Sakar², Christopher Chen³, and Jeroen Eyckmans³  
¹Boston University, Boston, MA, ²Institute of Mechanical Engineering, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland, ³Wyss Institute for Biologically Inspired Engineering, Harvard University, Boston, MA

Sat-601  
Comparison of Polysulfone and Collagen Substrates as a Membrane for the Growth of Murine Myoblast Cell Culture  
Katherine Glaitsili¹, Lori Caldwell¹, Annelise Dykes¹, Charles Harding¹, David Britts¹, and Elizabeth Vargis¹  
¹Utah State University, Logan, UT

Sat-602  
Mechanics of Collagen Gels vs. Collagen-Hyaluronic Acid Co-Gels in Confined Compression.  
Scottland Adkins¹  
¹University of Minnesota-Twin Cities, Lake Elmo, MN

Translational Biomedical Engineering—Undergraduate

Sat-373  
Engineering Dermal Therapeutics  
Madelyn O’Gorman¹, Stella Martono¹, MaKayla Serres¹, Victoria Bedell¹, Alexander Meves², Luke Hoeppner², Debabrata Mukhopadhyay¹, and Stephen Eckert¹  
¹University of Puerto Rico-Mayaguez Campus, Moca, PR, ²University of Minnesota, Minneapolis, MN, ³Medtronic Inc., Minneapolis, MN

Sat-374  
Microenvironment Stiffness as a Phagocytic Control Mechanism of “Self” Signaling by Macrophages  
Rachel Coler¹, Cory Alvey¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA

Sat-375  
Method for the Determination of Adipose Distribution on the Epicardial Surface of Human Hearts  
Mario Soto¹, Alexander Mattson²,³, and Paul laizzo³  
¹University of Minnesota-Twin Cities, Lake Elmo, MN, ²University of Pennsylvania, Philadelphia, PA, ³Hormel Institute, Austin, MN

Sat-376  
A Novel Biomarker for Early Diagnosis of Diabetic Retinopathy Through Analysis of Clinically Relevant Fluorescein Videoangiography Data  
Miranda Poklar¹, Leanne Horvath¹, Ken Tichauer¹, Shaoxian Hu¹, Emily Dosmar¹, Wenqiang Liu¹, Jennifer Kang-Mieler¹, and William Mieler¹  
¹Illinois Institute of Technology, Chicago, IL

Sat-377  
Early Detection of Diabetic Retinopathy using a Non-invasive Measure of Retinal Vascular Permeability  
Leanne Horvath¹, Miranda Poklar¹, Shaoxian Hu¹, Emily Dosmar¹, Wenqiang Liu¹, William Mieler¹, Jennifer Kang-Mieler¹, and Kenneth Tichauer¹  
¹Illinois Institute of Technology, Chicago, IL, ²University of Illinois at Chicago, Chicago, IL

Sat-378  
Methicillin-Resistant Staphylococcus Aureus Inhibited by Photodynamic Antimicrobial Therapy  
Anna Martinez¹, Nicholas Nolan², Heather Durkee², Alejando Arboleda², Nidhi Batra², Mariela Aguilar², Cornelis Rowaan², Alex Gonzalez², Guillermo Amescua², Harry Flynn³, Darlene Miller², and Jean-Marie Parel²  
¹University of Minnesota-Twin Cities, Lake Elmo, MN, ²University of Illinois at Chicago, Chicago, IL, ³Massachusetts Institute of Technology, Cambridge, MA

Sat-379  
Design and Construction of a Virtual Bioamplification Machine  
Parker Schibel¹, Kevin Jones¹, and Olivia Coiado¹  
¹University of Portland, Portland, OR
Sat–380
Nitrile Oxide Releasing Biodegradable Polymers for Medical Applications
Nettee Brown¹, Priya Singha¹, Jennifer McCarty¹, Hitesh Handa¹, and Jasa Locklin¹
¹University of Georgia, Athens, GA

Sat–381
Development of Lifelike Training Device for Simulated Radial Artery Cannulation
Mark Doose¹
¹University of Illinois at Urbana Champaign, Urbana, IL

Sat –382
The Effect of Red Blood Cell Morphology on Cellular Membrane Stiffness
Samuel Boland¹, Carey Womack¹, Siu Ling Leung¹, and Peter Butler¹
¹The Pennsylvania State University, University Park, PA, ²University of Memphis, Memphis, TN

Sat–383
Quantification of Nanoparticles in the Systemic Circulation After Intracranial Administration by Convection-Enhanced Delivery
Christina Huang¹, Jenna DiRito¹, Alice Gaudin¹, Gregory Tietjen¹, and Mark Saltzman¹
¹Yale University, New Haven, CT

Sat–384
The Advantage of Hospital-University Partnerships for Introducing New Devices into the Healthcare System
Michelle Archambault¹, Addison Haxo¹, Kaitlin Mowery¹, Henry Stann¹, S. Mark Poler², Daniel Cavanagh¹, and Eric Kennedy¹
¹Bucknell University, Lewisburg, PA, ²Geisinger, Danville, PA

Sat–385
Detection of Nanoscale ATP-dependent Membrane Mechanics Using a Modified Optical Trap
Carey Womack¹, Samuel Boland¹, Siu Liu Leung¹, and Peter Butler²
¹The University of Memphis, Memphis, TN, ²The Pennsylvania State University, State College, PA

Sat–386
Effect of AOT Concentration on Gelatin Nanoparticle Diameter
Akindele Davies¹, Justin Dinenberg², James Coney³, and Yong Wong³
¹Carnegie Mellon University, Long Beach, CA, ²Penn State University, Philadelphia, PA, ³Penn State University, State College, PA

Sat–387
iPSC-generated HSPCs Exhibit Critical Integrins and In-Vivo-like Cell Sprouting
Michael Drakopoulos¹,², Luigi Alvarado³, Ishan Asokan¹,³, Christian Combs¹, and Andre Larochelle¹
¹Purdue University, West Lafayette, IN, ²National Heart, Lung, and Blood Institute, Hematology Branch, National Institutes of Health, Bethesda, MD, ³Vanderbilt University School of Medicine, Nashville, TN, 4National Heart, Lung, and Blood Institute, Light Microscopy Core, National Institutes of Health, Bethesda, MD

Sat–388
Advancing Capstone Projects Beyond the First Generation: An Emergency Rapid Injection Device
Pamela Johnson¹, Rebecca Osborne¹, Fatima Rezaei¹, Katherine Solley¹, Kevin Grimm¹, Eric Kennedy¹, and Daniel Cavanagh¹
¹Bucknell University, Lewisburg, PA, ²Geisinger Health System, Danville, PA

Undergraduate Research, Design & Leadership

Sat–389
Multifunctional Hyaluronic Acid Dressings with Antimicrobial Properties for Chronic Wound Healing
Lindsay Lozeau¹, Dalia Shendi¹, Alicia Aquino¹, Anjana Jain¹, and Terri Camesano¹
¹Worcester Polytechnic Institute, Worcester, MA

Sat–390
Design and Experimental Evaluation of an Improved Breast Milk Delivery Device for Premature Neonates
Guiselle Esquivel¹, Jorge Lizano¹, Johanna Madrigal¹, and Eric Richardson²
¹Instituto Tecnologico de Costa Rica, Cartago, Costa Rica, ²Rice University, Houston, TX

Sat–391
Characterizing a Peripheral-Simulating Bioreactor Bench-top Model
Carson Schaff¹, Saami Yazdani¹, John Faulk¹, and Jesus Estaba¹
¹University of South Alabama, Mobile, AL

Sat–392
Laminar Profile Underlying the Propagation of CSD: From Single Neurons to Population Activity
Daniel Rivera¹, Darlene Ramos¹, Sarahty Garcia¹, Yisel Frometa¹, Yoichiro Mori², and Jorge Riera³
¹Florida International University, Miami, FL, ²University of Minnesota, Minneapolis, MN

Sat–393
Osseointegration Correlates with Peri-prosthetic Bone Mass in Compromised Murine Bone
Arvinth Sethuraman¹, Xu Yang¹, Benjamin Ricciardi¹, Aleksy Dvorzhinskiy¹, Yuo-yu Lee¹, Joseph Koressel¹, Joseph Choi¹, Zachary Lane¹, Kevin Nishida¹, Matthew Shirley¹, Zhiwei Wang¹, Marjolein van der Meulen¹,², and Mathias Bostrom¹
¹Hospital for Special Surgery, New York, NY, ²Cornell University, Ithaca, NY

Sat–394
An In Vitro Inverted Vertical Invasion Assay to Avoid Manipulation of Rare or Sensitive Cell Types
Tanner McCord¹, Brenda Ogle¹, and Felicite Noubissi¹,²
¹University of Minnesota, Minneapolis, MN, ²Jackson State University, Jackson, MS

Sat–395
A Novel Liposomal Formulation Targeting Candida albicans
Sarah Cowles¹, Noel Vera-Gonzalez¹, Christina Bailey¹, and Anita Shukla¹
¹Brown University, Providence, RI

Sat–396
Contractile Dysfunction and VF During Sodium-Calcium Exchanger Inhibition in Hearts from TAC Rats
Mary Kate Dwyer¹, Sarah Kuzmiak-Glancy¹, Kara Garrott¹, and Matthew Kay¹
¹The George Washington University, Washington, DC

Sat–397
The Use of iPS-Derived Endothelial Cells in Organ-on-a-Chip Applications
Rose Yin¹, Yosuke Kurokawa¹, Michael Shang¹, and Steven C. George¹
¹Washington University in St. Louis, St. Louis, MO
Sat-398 | Silk Hydrogel Microfluidics Using 3D Printed Pluronic Sacrificial Elements
Shivaali Maddali¹, Thomas Valentín¹, and Ian Wong¹
¹Brown University, Providence, RI

Sat-399 | Synergistically Inducing Neural Differentiation via 3D Printed Aligned Structure and Bio-inspired Immobilization of Growth Factors
Fahed Masood¹, Wei Zhu², and Lije Grace Zhang³
¹University of Maryland, College Park, Silver Spring, MD, ²The George Washington University, Washington, DC, ³The George Washington University, Washington D.C, DC

Sat-400 | A Glucose Dehydrogenase Based Electrochemical Biosensor for Detection of Glucose in Human Saliva
Alaina Jenish¹, Chi Lin¹, Breanna Pratt¹, Amnah Alkhan¹, Susan Sheffield¹, Jonus Reyna¹, Cael Muggeridge¹, and Jeffrey LaBelle¹
¹Arizona State University, Tempe, AZ

Sat-401 | Role of Nanoparticles’ Mechanical Stiffness in Cellular Uptake
Emily Lindberg¹, Jin Xie², Liuyang Zhang¹, Shiyi Zhou¹, and Xianqiao Wang⁰
¹Syracuse University, Syracuse, NY, ²University of Georgia, Athens, GA

Sat-402 | Software for 3D Quantitative Analysis of the Eye Vasculature
Felipe Suntaxi¹, Ning-Jun Jan¹, Andrew Voorhees¹, Konstantinos Verdelis¹, and Ian A. Sigal¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-403 | Preventing Infection in Silicone Based Medical Devices Using Nitric Oxide Release
Kaylee O’Connor¹, Marcus Goudie², Priyadarshini Singha³, Jennifer McCarty³, and Hitesh Handa²
¹University of Alabama, Tuscaloosa, AL, ²The George Washington University, Washington, DC, ³The George Washington University, Washington D.C, DC

Sat-404 | Replicating Trabecular Meshwork Cellularity Changes in Glaucoma: A Modified in vitro Model
Richard Vannatta¹, Ross Ethier¹, and Eric Snider¹
¹Georgia Institute of Technology, Atlanta, GA

Sat-405 | Modeling and Experimental Analysis of the Temporary, Fully-Retreivable Stent for Traumatic Hemorrhage Control
Mark Littlefield¹, Yanfei Chen¹, Bryan Tillman², Sung Kwon Cho³, and Youngae Chun³
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh Medical Center, Pittsburgh, PA

Sat-406 | Dual Fiber Bragg Gratings Embedded Catheter for Temperature Insensitive Contact Force Sensing in Electrophysiology Therapy
Leah Feuerman¹, Li Xu², Zion Tse², and Mable Fok²
¹Occidental College, Los Angeles, CA, ²University of Georgia, Athens, GA

Sat-407 | MIP-1 Up-Regulates Mesothelial Expression of P-selectin to Increase Ovarian Cancer Cell Adhesion
Anne-Sophie Mancha¹, Molly J. Carroll¹, and Pamela K. Kreeger²
¹Fort Lewis College, Durango, CO, ²University of Wisconsin-Madison, Madison, WI

Sat-408 | Thallium Detection Using Paper-Based Cell-Free Sensor CircuIt
Maya Lemmon-Kish¹, Venkata Peddada¹, Claire Chu¹, Maddie Perdorcin¹, Aife Ni Chochlain¹, Lisa Antoszewski², Jason Lohmueller¹, Natassa Miskov-Zivanov¹, Cheryl Telmer³, Sanjeev Shroff³, and Alex Deiters¹
¹University of Pittsburgh, Pittsburgh, PA, ²Grove City College, Grove City, PA, ³Carnegie Mellon University, Pittsburgh, PA

Sat-409 | Using Texture Analysis to Characterize a Pediateric Brain Tumor Model
Kathleen Francis¹, Tien Tang¹, and M. Waleed Gaber²
¹University of Houston, Houston, TX, ²Texas Children’s Hospital, Houston, TX

Sat-410 | Differential Gene Expression of ECM Proteins and Adhesion Molecules In Tailored Polyacrylamide Gels
Zachary Weishampel¹, Dalton Berrie¹, Andria Doty¹, and Sarah Glover¹
¹University of Florida, Gainesville, FL

Sat-411 | The effect of Hydrostatic Pressure on Neuronal Cell Morphology In Vitro the Effect of Hydrostatic Pressure on Neuronal Cell Morphology In Vitro
Kallie Etten¹, Jiro Nagatomi¹, and Curtis Harper¹
¹Clemson University, Clemson, SC

Sat-412 | Axolotl Retinal ECM Promotes Down-regulation of ERK 1/2 Expression in Human Retinal Progenitor Cells.
Aanie Phillips¹, Joydip Kundu¹, and Rebecca Carrier¹
¹Northeastern University, Boston, MA

Sat-413 | Effects of Low Dose Radiation and Tetanus Toxoid on the Strength of Bone
Philip Binaco¹, Steve Ayala¹, Danielle Howe¹, Michael Pecaut², Nina Nishiyama¹, Xiao Mao³, Denise Rodriguez², Andy Kwok³, Ted Bateman⁴, Stephen Chapes⁴, Jeffrey Willey⁴, and Anthony Lau¹
¹The College of New Jersey, Ewing, NJ, ²Loma Linda University Department of Basic Sciences, Loma Linda, CA, ³Loma Linda University School of Medicine Loma Linda, Loma Linda, CA, ⁴Wake Forest School of Medicine, Winston-Salem, NC, ⁵University of North Carolina Chapel Hill, Chapel Hill, NC, ⁶Kansas State University, Manhattan, KS

Sat-414 | Creating a Scalable Tibia Model to Predict Tibial Stresses
Julie Liu¹, Karleen Bartol¹, Leela Goel¹, John Willson¹, and Stacey Meardon¹
¹East Carolina University, Greenville, NC

Sat-415 | Development of a PNA-Based Microfluidic Assay for the Detection and Quantification of HIV
Alden Moss¹, Kaylyn Oshaben², Daniel Appella², Nicole Morgan², and Thomas Pohida²
¹Oregon State University, Corvallis, OR, ²National Institutes of Health, Bethesda, MD

Sat-416 | Title: Estimation of the Viscous Properties of Skin and Subcutaneous Tissues with an Image-based Method
Ingram Jansen¹ and Jason Yao²
¹East Carolina University, Fayetteville, NC, ²East Carolina University, Winterville, NC

Sat-417 | Investigating the Role of Exosomes in Mesenchymal Stem Cell-Based Immunomodulation
Mariko Kanai¹, Holly Wobma¹, Bohao Liu¹, and Gordana Vunjak-Novakovic¹
¹Columbia University, New York, NY
Flexible Biosensor to Monitor Ion Concentrations Via Sweat Analysis
Christopher Rumrill¹, Qiwei Wang¹, and Hyeun Joong Yoon¹
¹South Dakota State University, Brookings, SD

Rapid Decrease in The Cortical Bone Mineral Density in Response To The Intake Of Cocaine
Brandon Zhuang¹, Amna Haider¹, Hyunsu Shin², Kevin Clare¹, Craig P. Allen¹, Gabriel Pagnotti¹, Congwu Du¹, Clinton T. Rubin¹, and M. Ete Chan³
¹Stony Brook University, Stony Brook, NY, ²Half Hollow Hills High School East, Stony Brook, NY, ³Stony Brook University, Stony Brook University, NY

The Effects of Modulated Glucocorticoid Receptors on Lipopolysaccharide Mediated Inflammation
Ioana Soaita¹, Irina Hutson², Kevin Bauerle², and Charles Harris²
¹Stony Brook University, Stony Brook, NY, ²Washington University in St. Louis School of Medicine, St. Louis, MO

Vimentin Affects Formation of Cellular Protrusions in hMSCs with SDF-1 During Transwell Migration
Tejasvi Peesay¹, Carlos Luna¹, Poornam Sharma¹, and Adam Hsieh¹
¹University of Maryland, College Park, MD

Association of Negative Symptoms of Schizophrenia with Fear Network Dysregulation
Phillip Dmitriev¹, Megan Quarmley¹, Daniel Wolf¹, Bruce Turetsky¹, Petra Rupert¹, Ruben Gur¹, and Raquel Gur¹
¹University of Pennsylvania, Philadelphia, PA

Fetal Development of the Bovine Anterior Mitral Valve Leaflet
Robert Laureijis¹ and Sarah Wells¹
¹Dalhousie University, Halifax, NS, Canada

Quantitative Diffuse Optical Spectroscopy of Radiation Therapy Resistance in Tumors
Paola Monterroso Diaz¹, Kinan Alhallak¹, Dakory Lee¹, Ruud Dings², and Narasimhan Rajaram¹
¹University of Arkansas, Fayetteville, AR, ²University of Arkansas for Medical Sciences, Little Rock, AR

MR-Based Wall Shear Stress Calculation in Pulmonary Hypertension
Jennifer Rickens¹ and Stephanie George²
¹Thiel College, Greenville, PA, ²East Carolina University, Greenville, NC

VEGFR1 Signaling Induced by VEGFA Stimulation
Nicole Grubb¹,², Jared Weddel³, and P.I. Imoukhuede²
¹Florida State University, Tallahassee, FL, ²University of Illinois Urbana-Champaign, Urbana, IL

A Low-Cost Device for Quantifying Tissue Stiffness with Ultrasound
Bowen Shaner¹, Kristy Walsh¹, Mark Palmeri², and Brett Byram¹
¹Vanderbilt University, Nashville, TN, ²Duke University, Durham, NC

Multi-Scale Modeling of T Cell and Antigen Presenting Cell Interaction in the Tumor Microenvironment
Jose Perez¹, Meghan Bloom², and Marcelo Behar²
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX

Assessment of Medical Equipment in Kisarawe, Tanzania
Casey Young¹, Ian DeMass¹, Carson Brewer¹, Ryan Gilbert¹, Kaleb Guion¹, Melissa McCullough¹, John DesJardins¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

Towards Developing a Convenient Tripping Testing Procedure
Vibhavari Vempala¹
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC

Characterizing Infarcted Myocardium Ultrastructure using Electron Microscopy
Elizabeth Shih¹, Ethan Kwan¹, Salma Ayoub¹, David Li¹, Michael Sacks¹, Joseph Gorman II², and Robert Gorman²
¹The University of Texas at Austin, Austin, TX, ²The University of Pennsylvania, Philadelphia, PA

Examining Effects of PEG Length and Silica Nanoparticle Size On Cell Viability
Kyle Paul¹, Alexander Kelly¹, and Allan David¹
¹Auburn University, Auburn, AL

The Effect of SOD Conjugates on the Release Of Free Radicals by Inflammatory Cells
Jeannette Rodriguez¹, Dmitry Gill¹, and Vladimir Reukov¹
¹Clemson University, Clemson, SC

Circulating MicroRNA in Blood Serum as Promising Biomarkers for Treatment Progression against Colorectal Cancer
Judy (Jiaqi) Wang¹,²
¹Johns Hopkins University, Baltimore, MD, ²VU Medical Center, Amsterdam, Netherlands

Development of Two-Photon Calcium Imaging Methods for Circuit Mapping In Mouse Motor Cortex
Dillon Thomas¹, Bryan Hooks¹, Brett Saltrick¹, and Sandra Okoro¹
¹University of Pittsburgh, Pittsburgh, PA

Spatial Frequency Domain Imaging of Tissue Phantom Models of Tumor Margins
Nyrobi Celestine¹, Will Goth², and James Tunnell²
¹Milwaukee School of Engineering, Milwaukee, WI, ²The University of Texas at Austin, Austin, TX
Sat–438
Synthesis Of Fe3O4 Nanoparticles and Quantification Of Nanoparticle Uptake In U87MG-EGFP Glioma Cells And Primary Astrocytes.
Lauren Mehanna¹, Meghan Logun², Wujun Zhao², Leidong Mao², and Lohitash Karumbaiah²
¹University of Kentucky, Lexington, KY, ²University of Georgia, Athens, GA

Sat–439
Breast Cancer Paracrine Signals Alter Osteocyte Phenotype in a 3D Bone Scaffold
Jeremy Keys¹, Mary Hagen¹, Blayne Sarazin¹, and Maureen Lynch¹
¹University of Massachusetts Amherst, Amherst, MA

Sat–440
Cumulative Head Impact Exposure On Offseason DTI and DKI Changes In Youth Football Athletes
Jordan Scott¹,², Elizabeth Davenport³, Jillian Urban³, Joel Stitzel², Joseph Maldjian³, and Christopher Whitlow²
¹University of Michigan, Ann Arbor, MI, ²Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC, ³University of Texas Southwestern, Dallas, TX

Sat–441
Effects of Orbital Shear Stress on Exogenous Gene Expression
Morghan Alters¹, Shane Noble¹, Daniel Bordner¹, and R.Christopher Geiger¹
¹Florida Gulf Coast University, Fort Myers, FL

Sat–442
The Effect of Hydrogel Degradation Mechanism on Encapsulated Submandibular Gland Cells
Brittany Schutrum¹, Andrew Shubin¹, Catherine Ovitt¹, and Danielle Benoit¹
¹University of Rochester, Rochester, NY

Sat–443
The Use of Microfluidics to Compare the Dynamic Behavior of Microtubule Plus and Minus Ends
Nikita Thomas¹ and Marija Zanic¹
¹Vanderbilt University, Nashville, TN

Sat–444
Effect of Chemically Induced Locomotion and Enzyme Activity on Janus Particle Conjugate
Dev Mandavia¹, Andrew Pan¹, and Rick Saha¹
¹Georgia Institute of Technology, Atlanta, GA

Sat–445
Pain Away with RA - Handheld Device for Improving Hand Pain and Stiffness in Patients with Rheumatoid Arthritis
Kelli Lynch¹
¹Northeastern University, Boston, MA

Sat–446
Effects of Space-flight Head-ward Fluid Shifts on Neurocognitive Abilities and Cerebral Blood Flow
Robert Hazel¹
¹University of North Carolina at Chapel Hill, Chapel Hill, NC

Sat–447
TNF- and VEGF Modulate Oligomerization of Amyloid Beta By Neurovascular Cells
Andrew Hong¹
¹Georgia Institute of Technology, Atlanta, GA

Sat–448
Bodies in Motion: Biomechanical Data Acquisition with a Skeleton Tracking Sensor
Bruce Coluccio¹, M. Ete Chan¹, Richard Mckenna¹, Zhengyang Liu¹, Anna Haider¹, Gabriel Pagnotti¹, and Clinton Rubin¹
¹Stony Brook University, Stony Brook, NY

Sat–449
Bead-based IL-6 Immunoassay on a Chip
Damian Hernandez¹
¹Illinois Institute of Technology, Chicago, IL

Sat–450
Bone Marrow Mesenchymal Stem Cell Derived Exosomes Attenuate Ischemia Induced Retinal Injury
Sara Mohamed¹, Biji Mathew¹, Leianne Torres¹, Jasmine Lopez¹, Samantha Keil¹, Clara Stelman¹, Andrew Schwartz¹, and Steven Roth¹
¹University of Illinois at Chicago, Chicago, IL
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<td>Analysis of Cell Signaling I  Room 200A</td>
<td>Analysis of Cell Signaling II  Room 200A Systems Approaches to Therapy, Therapeutics and Precision Medicine  Room 200D</td>
<td>Metabolic Models  Room 200D Omics Data and Analysis  Room 200D</td>
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<tr>
<td>BIOMATERIALS</td>
<td>Mechanics of Biomaterials  Room 101E  3D Printing and Advanced Biomaterial Manufacturing  Room 200D</td>
<td>Biomaterial Scaffolds I  Room 101E</td>
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<td>BIOMECHANICS</td>
<td>The Nucleus and Cytoskeleton in Mechanobiology  Auditorium 1 Cardiovascular Biomechanics I  Auditorium 3 Orthopedic Mechanobiology and Mechanotransduction  Room 101C</td>
<td>Mechanobiology of Cardiac &amp; Smooth Muscle  Auditorium 1 Cardiovascular Biomechanics II  Auditorium 3 Implant and Prosthetic Biomechanics  Room 101C</td>
<td>Substrate Effects in Mechanobiology  Auditorium 1 Cardiovascular Biomechanics III  Auditorium 3 Human Performance/ Sports Biomechanics  Room 101C Imaging Techniques in Biomechanics  Room 200C</td>
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<tr>
<td>BIOENGINEERING EDUCATION</td>
<td>Global Health Engineering 2.0: Building Educational Capacity in Africa  Room 200G</td>
<td>Imaging Techniques in Tissue Engineering  Room 200C</td>
<td>Imaging Techniques in Biomechanics  Room 200C</td>
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<tr>
<td>BIOMEDICAL IMAGING &amp; OPTICS</td>
<td>Imaging Techniques in Tissue Engineering  Room 200C</td>
<td>Imaging Techniques in Clinical Translation  Room 200C</td>
<td>Imaging Techniques in Biomechanics  Room 200C</td>
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<tr>
<td>CANCER TECHNOLOGIES</td>
<td>Emerging Technologies for Cancer Treatment  Auditorium 2</td>
<td>Imaging Strategies and Molecular Profiling in Cancer  Auditorium 2 Engineered Models of Breast Cancer Metastasis and the Tumor Environment  Room 101B</td>
<td>Cancer Immunotechnology  Auditorium 2 Precision Medicine and Biomarkers  Room 101B</td>
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<tr>
<td>CARDIOVASCULAR ENGINEERING</td>
<td>Cardiovascular Biomechanics I  Auditorium 1 Hemodynamics  Room 101D</td>
<td>Cardiovascular Biomechanics II  Auditorium 3 Mechanobiology of Cardiac &amp; Smooth Muscle  Auditorium 1</td>
<td>Cardiovascular Biomechanics III  Auditorium 3 Cardiovascular Tissue Engineering I  Room 200E</td>
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<tr>
<td>CELLULAR &amp; MOLECULAR BIOENGINEERING</td>
<td>The Nucleus and Cytoskeleton in Mechanobiology  Auditorium 1 Molecular and Cellular ImmunoEngineering  Room 101A Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)  Room 101B</td>
<td>Mechanobiology of Cardiac &amp; Smooth Muscle  Auditorium 1 Molecular and Cellular Engineering Functional Materials and Sensors  Room 101A</td>
<td>Substrate Effects in Mechanobiology  Auditorium 1 Single Cell and Collective Migration  Room 101A</td>
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<tr>
<td>DEVICE TECHNOLOGIES AND BIOMEDICAL ROBOTICS</td>
<td>Cardiovascular Devices I  Room 200E Biosensors  Room 200F</td>
<td>Cardiovascular Devices II  Room 200E</td>
<td>Affordable Health Devices and Frugal Innovation  Room 200F</td>
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<tr>
<td>DRUG DELIVERY</td>
<td>Nucleic Acid Delivery  Room 200H</td>
<td>Drug Delivery in Tissue Engineering and Medicine  Room 200H</td>
<td>Novel Materials and Self Assembly for Drug Delivery  Room 200H</td>
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<tr>
<td>NANO AND MICRO TECHNOLOGIES</td>
<td>Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)  Room 101B</td>
<td>Micro/Nano Tools for Monitoring Inflammation  Room 200G</td>
<td>Microfluidics for the Diagnostic and Monitoring of Viral Infections  Room 200G</td>
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<td>ORTHOPEDIC AND REHABILITATION ENGINEERING</td>
<td>Musculoskeletal Tissue Engineering I Room 102C Orthopedic Mechanobiology and Mechanotransduction Room 101C</td>
<td>Musculoskeletal Tissue Engineering II Room 102C Naturally-Derived and Extracellular Matrix Biomaterials and Tissue Engineering Room 102AB Implant and Prosthetic Biomechanics Room 101C Articular Cartilage and Joints Room 208B</td>
<td>Intervertebral Disc and Spine</td>
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<tr>
<td>RESPIRATORY BIOENGINEERING</td>
<td>Computational Modeling of the Respiratory System in Health and Disease Room 200I</td>
<td>Computational Mechanics of the Respiratory System Room 200I</td>
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<tr>
<td>STEM CELL ENGINEERING</td>
<td>Bioreactor Systems for Tissue Engineering Auditorium 3</td>
<td>Naturally-Derived and Extracellular Matrix Biomaterials and Tissue Engineering Room 102AB</td>
<td>Engineering Tissue Interfaces Room 102AB</td>
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<td>TRANSLATIONAL BIOMEDICAL ENGINEERING</td>
<td>Translation of Biomedical Products Room 200B</td>
<td>Imaging Techniques in Clinical Translation Room 200C</td>
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<td>OTHER</td>
<td>9:00 am–10:00 am INDUSTRY SESSIONS: 12:00 noon–2:00 pm Intellectual Property: Patent Process Technology Transfer Pitches and Networking Room 201</td>
<td>1:00pm–2:30pm Meet the Expert: NIH Funding: Meet Program Directors, Reviewers and Awardees Room 204</td>
<td>3:15 pm–4:45 pm Engineering Low-Cost Solutions to Address Health Care Disparities Room 208CD</td>
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<tr>
<td>2:15pm–5:00pm INDUSTRY SESSION: Special Industry Topics Room 201</td>
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<td>STUDENT AND EARLY CAREER</td>
<td>8:00 am–9:00 am Becoming a Biomedical Engineer... What you need to know and where do you fit in Room 205 9:15 am–10:15 am BME Careers in Academia Room 205</td>
<td>1:30 pm–2:45pm BME Careers in Industry Room 205</td>
<td>2:45pm–4:15pm Rapid Resume Review-Members Only Room 208CD 3:15 pm–4:30 pm BME Government and Alternative Careers Room 205</td>
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<tr>
<td>BIOINFORMATICS</td>
<td>Theory and Practice of Synthetic Biology Room 101A</td>
<td>Single-Cell Measurements and Models Room 200C</td>
<td>Computational and Multiscale Modeling in Biomechanics II Room 200C</td>
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<tr>
<td>COMPUTATIONAL AND SYSTEMS BIOLOGY</td>
<td>Computational and Multiscale Modeling in Biomechanics I Room 200C</td>
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<td>BIOMATERIALS</td>
<td>Biomaterials for Immunengineering I Room 102C</td>
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<td>Advanced Characterization and Imaging of Biomaterial Environments Room 101E</td>
<td>Natural and Bioinspired Materials I Room 101E</td>
<td>Natural and Bioinspired Materials II Room 101E</td>
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<td>Drug Delivering Biomaterials I Room 200I</td>
<td>Drug Delivering Biomaterials II Room 200I</td>
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<td>Biomechanics of Biomaterials Auditorium 3</td>
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<tr>
<td>BIOMECHANICS</td>
<td>Testing, Modeling and Exploiting Mechanobiology Auditorium 1</td>
<td>Mechanotransduction Auditorium 1</td>
<td>Mechanobiology of the Vascular and Nervous Systems Auditorium 1</td>
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<td>Concussion Biomechanics Auditorium 3</td>
<td>Traumatic Brain Injury Biomechanics &amp; Repair Auditorium 3</td>
<td>Biomechanics of Biomaterials Auditorium 3</td>
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<td>Injury Biomechanics I Room 101C</td>
<td>Biomechanics in Cell and Tissue Engineering Room 101C</td>
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<td>Computational and Multiscale Modeling in Biomechanics I Room 200C</td>
<td>Biomechanics of Rehabilitation/Injury Room 200C</td>
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<td>Cancer Mechanobiology II Room 101B</td>
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<td>BIOMEDICAL ENGINEERING EDUCATION</td>
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<td>Biomedical Design Room 200G</td>
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<td>BIOMEDICAL IMAGING &amp; OPTICS</td>
<td>Molecular Imaging Room 200D</td>
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<tr>
<td>CANCER TECHNOLOGIES</td>
<td>3D Microfluidic Cancer Models Auditorium 2</td>
<td>Microscale Cancer Cell Analysis Auditorium 2</td>
<td>Heterogenous Cell-Cell Interactions in Cancer Auditorium 2</td>
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<td>Engineered Models of Glioma and the Tumor Microenvironment Room 101B</td>
<td>Cancer Mechanobiology I Room 101B</td>
<td>Cancer Mechanobiology II Room 101B</td>
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<td>CARDIOVASCULAR ENGINEERING</td>
<td>Cardiovascular Tissue Engineering II Room 102AB</td>
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<td>Room 102AB</td>
<td>Heart Valve Structure, Function and Disease I Room 200J</td>
<td>Heart Valve Structure, Function and Disease II Room 200J</td>
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<td>CELLULAR &amp; MOLECULAR BIOENGINEERING</td>
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<td>Mechanobiology of the Vascular and Nervous Systems Auditorium 1</td>
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<td>Theory and Practice of Synthetic Biology Room 101A</td>
<td>Gene Delivery and Genome Bioengineering Room 101A</td>
<td>Adhesion to the Vascular Endothelium Room 101A</td>
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<td>CMBE Young Innovators I Room 200F</td>
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<td>DEVICE TECHNOLOGIES AND BIOMEDICAL ROBOTICS</td>
<td>Wearable Sensors and Devices Room 200H</td>
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<td>DRUG DELIVERY</td>
<td>Topics in Drug Delivery I Room 200H</td>
<td>Topics in Drug Delivery II Room 200H</td>
<td>Delivery Systems for Proteins and Vaccines Room 200H</td>
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<td>NANO AND MICRO TECHNOLOGIES</td>
<td>3D Microfluidic Cancer Models Auditorium 2</td>
<td>Microscale Cancer Cell Analysis Auditorium 2</td>
<td>Heterogenous Cell-Cell Interactions in Cancer Auditorium 2</td>
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<td>Drug Screening Technologies Technologies Room 200F</td>
<td>Organ-on-Chip Models for Study of Disease and Drug Discovery I Room 101D</td>
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## Program At-A-Glance | Friday | October 7, 2016

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| **NEURAL ENGINEERING** | Conussion Biomechanics  
Auditorium 3 | Traumatic Brain Injury  
Biomechanics & Repair  
Auditorium 3  
Neural Disease  
Room 200E | Neural Cell  
Model Systems  
Room 200E |
| **ORTHOPEDIC AND REHABILITATION ENGINEERING** | Bone  
Room 200B | Biomechanics of  
Rehabilitation/Injury  
Room 200C  
Skeletal Muscle,  
Ligaments and Tendons  
Room 200B |
| **RESPIRATORY BIOENGINEERING** | Experimental Respiratory  
Mechanobiology  
Room 200E | Cardiovascular  
Tissue Engineering II  
Room 102AB  
Printing and Patterning in Tissue Engineering  
Room 101D  
Drug Delivery in Tissue Engineering and Medicine  
Room 200I | Cardiovascular  
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Room 102AB  
Organ-on-Chip Models for Study of Disease and Drug Discovery I  
Room 101D  
Biomechanics in Cell and Tissue Engineering  
Room 101C |
| **TISSUE ENGINEERING** | | | |
| **TRANSITIONAL BIOMEDICAL ENGINEERING** | | | |
| **OTHER** | Meet the Expert: Collaborations for  
International Research  
Room 204 | Meet the Expert: Meet the Journal Editors  
Room 204  
2:00 pm–5:00 pm  
BMES-NSF Special Session on Research & Grant Writing  
Room 102DE | Meet the Expert: Collaborations with Industry  
Room 204  
Educational Approaches to Best Prepare Students for Industry  
Room 200A  
3:15 pm–6:15 pm  
The 4th US-Korea Joint Workshop on Biomedical Engineering  
Room 208AB |
| **INDUSTRY SESSIONS:** | | | |
| **STUDENT AND EARLY CAREER** | 8:30–9:30 am/9:30–10:30 am  
BMES Student Chapter Best Practices  
• Outstanding Chapter  
• Mentoring and Chapter Industry  
Room 208AB  
9:00 am–10:00 am  
Career Options for BME PhDs  
Room 205 | 1:45–3:15pm  
Undergraduate Student Design Competition  
Auditorium | 4:15 pm–5:30 pm  
BME Entrepreneurs  
Room 205 |
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<th>TRACK</th>
<th>8:00 am-9:30 am</th>
<th>1:30 pm-3:00 pm</th>
<th>3:15 pm-4:45 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIOINFORMATICS, COMPUTATIONAL AND SYSTEMS BIOLOGY</strong></td>
<td>Computational Modeling in Cardiovascular Systems I Room 101B</td>
<td>Computational Modeling in Cardiovascular Systems II Room 101B</td>
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<tr>
<td>BIOMATERIALS</td>
<td>Biomaterials for Immunengineering IV Room 102AB</td>
<td>Dynamic Biomaterials Room 102AB</td>
<td>Integration of Biomaterials with Chips and Devices Auditorium 3</td>
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<tr>
<td></td>
<td>Hydrogel Biomaterials I Room 101E</td>
<td>Hydrogel Biomaterials II Room 101E</td>
<td>Hydrogel Biomaterials III Room 101E</td>
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<td>Biomaterials for Regenerative Medicine Room 102AB</td>
</tr>
<tr>
<td><strong>BIOMECHANICS</strong></td>
<td>Advances in Biomechanical Testing of Medical Devices Auditorium 3</td>
<td></td>
<td>Biofluids Room 200H</td>
</tr>
<tr>
<td><strong>BIOMEDICAL ENGINEERING EDUCATION</strong></td>
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<td>Biomedical Curriculum Room 101D</td>
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<tr>
<td><strong>BIOMEDICAL IMAGING &amp; OPTICS</strong></td>
<td>Applications of MRI and Focused Ultrasound Room 200F</td>
<td>Imaging in Cardiovascular Systems I Room 102C Ultrasound Imaging Room 200F MRI I Room 200D</td>
<td>Imaging in Cardiovascular Systems II Room 102C Nanotheranostics Room 200F MRI II Room 200D</td>
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<td></td>
<td>Optical Imaging &amp; Microscopy Room 200D</td>
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<tr>
<td><strong>CANCER TECHNOLOGIES</strong></td>
<td>Cancer Drug Delivery Auditorium 2</td>
<td>Engineered Models of Cancer Metastasis and Treatment Response Auditorium 2 Cancer Drug Delivery I Room 200G</td>
<td>Engineered Models of Breast Cancer and the Tumor Microenvironment Auditorium 2 Cancer Drug Delivery II Room 200G</td>
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<tr>
<td><strong>CARDIOVASCULAR ENGINEERING</strong></td>
<td>Cardiac Electrophysiology Room 102C</td>
<td>Imaging in Cardiovascular Systems I Room 102C Computational Modeling in Cardiovascular Systems II Room 101B</td>
<td>Imaging in Cardiovascular Systems II Room 102C Thrombosis/Hemostasis Room 101B</td>
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<td></td>
<td>Computational Modeling in Cardiovascular Systems I Room 101B</td>
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<tr>
<td></td>
<td>Angiogenesis Room 200J</td>
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<tr>
<td><strong>CELLULAR &amp; MOLECULAR BIOENGINEERING</strong></td>
<td>Mechanobiology of Cell Adhesion I Auditorium 1 Cancer Cell Motility and Migration Room 101A</td>
<td>Mechanobiology of Cell Adhesion II Auditorium 1</td>
<td>Stem Cell Programming Auditorium 1</td>
</tr>
</tbody>
</table>
## Program At-A-Glance | Saturday | October 8, 2016

<table>
<thead>
<tr>
<th>TRACK</th>
<th>8:00 am–9:30 am</th>
<th>1:30 pm–3:00 pm</th>
<th>3:15 pm–4:45 pm</th>
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</thead>
<tbody>
<tr>
<td><strong>DEVICE TECHNOLOGIES AND BIOMEDICAL ROBOTICS</strong></td>
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<tr>
<td><strong>DRUG DELIVERY</strong></td>
<td>Cancer Drug Delivery&lt;br&gt;Auditorium 2&lt;br&gt;Nano to Micro Devices in Drug Delivery&lt;br&gt;Room 200C</td>
<td>Cancer Drug Delivery I&lt;br&gt;Room 200G&lt;br&gt;Targeted or Responsive Delivery Systems I&lt;br&gt;Room 200C</td>
<td>Cancer Drug Delivery II&lt;br&gt;Room 200G&lt;br&gt;Targeted or Responsive Delivery Systems II&lt;br&gt;Room 200C</td>
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<tr>
<td><strong>NANO AND MICRO TECHNOLOGIES</strong></td>
<td>Applications of Nanopores and Nanoparticles&lt;br&gt;Room 200E</td>
<td>Advances in Pathogen Detection&lt;br&gt;Room 200E</td>
<td>Advances in Micro/Nano&lt;br&gt;Room 200E</td>
</tr>
<tr>
<td><strong>NEURAL ENGINEERING</strong></td>
<td>Noninvasive Neuroromodulation&lt;br&gt;Room 200H</td>
<td>NeuroDevices/Neuroromodulation&lt;br&gt;Room 200H</td>
<td>Neural Invasive Devices/Interfaces: Compatibility, Stimulation, Recording and Modeling&lt;br&gt;Room 200H</td>
</tr>
<tr>
<td></td>
<td>Neural Progenitor and Stem Cell Engineering&lt;br&gt;Room 200I</td>
<td>Glial Cell Engineering&lt;br&gt;Room 200I</td>
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<tr>
<td><strong>STEM CELL ENGINEERING</strong></td>
<td>Pluripotent Stem Cell Engineering&lt;br&gt;Room 200G</td>
<td>Stem Cells in Tissue Engineering&lt;br&gt;Room 101C</td>
<td>Stem Cell Programming&lt;br&gt;Auditorium 1</td>
</tr>
<tr>
<td></td>
<td>Neural Progenitor and Stem Cell Engineering&lt;br&gt;Room 200I</td>
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<tr>
<td><strong>TISSUE ENGINEERING</strong></td>
<td>Clinical Translation of Engineered Tissues&lt;br&gt;Auditorium 3&lt;br&gt;Integration of Developmental Biology and Morphogenesis in Tissue Engineering&lt;br&gt;Room 101C</td>
<td>Stem Cells in Tissue Engineering&lt;br&gt;Room 101C</td>
<td>Inflammation and Immunomodulation&lt;br&gt;Room 101C</td>
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<tr>
<td><strong>TRANSLATIONAL BIOMEDICAL ENGINEERING</strong></td>
<td>Clinical Translation of Engineered Tissues&lt;br&gt;Auditorium 3</td>
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<tr>
<td><strong>UNDERGRADUATE</strong></td>
<td>Undergraduate Research, Design &amp; Leadership I&lt;br&gt;Room 200B</td>
<td>Undergraduate Research, Design &amp; Leadership II&lt;br&gt;Room 200B</td>
<td>Undergraduate Research, Design &amp; Leadership III&lt;br&gt;Room 200B</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td>MEET THE EXPERT: Meet the Experts on Data-Sharing&lt;br&gt;Room 204</td>
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</tr>
<tr>
<td>Time</td>
<td>Event</td>
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<tr>
<td>**WEDNESDAY</td>
<td>OCTOBER 5, 2016**</td>
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</tr>
<tr>
<td>12:00 noon – 7:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall BC/CC</td>
<td></td>
</tr>
<tr>
<td>8:30 am – 4:30 pm</td>
<td>BMES Board of Directors Meeting</td>
<td>Room 101H/CC</td>
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</tr>
<tr>
<td>1:00 pm – 4:00 pm</td>
<td>AIMBE Board of Directors Meeting (affiliate event)</td>
<td>Room 101F/CC</td>
<td></td>
</tr>
<tr>
<td>2:30 pm – 5:30 pm</td>
<td>Biotechnology Company Tours (advance registration required)</td>
<td>Departs from CC</td>
<td></td>
</tr>
<tr>
<td>3:30 pm – 5:30 pm</td>
<td>Meet the Faculty Candidates</td>
<td>Exhibit Hall B/CC</td>
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</tr>
<tr>
<td>4:00 pm – 5:00 pm</td>
<td>AIMBE Academic Council (affiliate event)</td>
<td>Room 101F/CC</td>
<td></td>
</tr>
<tr>
<td>5:00 pm – 7:00 pm</td>
<td>CMBE SIG Business Meeting</td>
<td>Room 101G/CC</td>
<td></td>
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<tr>
<td>5:30 pm – 7:00 pm</td>
<td>Welcome Reception</td>
<td>Hall B Foyer/CC</td>
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</tr>
<tr>
<td>7:30 pm – 8:30 pm</td>
<td>Industry Committee Planning Meeting (invitation only)</td>
<td>Boardroom 3/MH 3rd Floor</td>
<td></td>
</tr>
<tr>
<td>6:30 pm – 10:30 pm</td>
<td>Council of Chairs Dinner &amp; Meeting (invitation only)</td>
<td>Salon E/MH</td>
<td></td>
</tr>
<tr>
<td>8:00 pm – 9:00 pm</td>
<td>LGBT Dessert Social (ticket purchase required)</td>
<td>Symphony III/MH</td>
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<tr>
<td>**THURSDAY</td>
<td>OCTOBER 6, 2016**</td>
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<tr>
<td>7:00 am – 6:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall BC/CC</td>
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</tr>
<tr>
<td>7:00 am – 8:00 am</td>
<td>Diversity Committee Meeting</td>
<td>Room 101G/CC</td>
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</tr>
<tr>
<td>8:00 am – 9:30 am</td>
<td>PLATFORM SESSIONS – THURS-1 (19 concurrent sessions)</td>
<td>Convention Center</td>
<td></td>
</tr>
<tr>
<td>8:00 am – 9:00 am</td>
<td>Becoming a Biomedical Engineer... What you need to know and where do you fit in</td>
<td>Room 205ABCD/CC</td>
<td></td>
</tr>
<tr>
<td>9:00 am – 10:00 am</td>
<td>INDUSTRY SESSION: Intellectual Property: Patent Process</td>
<td>Room 201/CC</td>
<td></td>
</tr>
<tr>
<td>9:15 am – 10:15 am</td>
<td>BME Careers in Academia</td>
<td>Room 205ABCD/CC</td>
<td></td>
</tr>
<tr>
<td>9:30 am – 10:30 am</td>
<td>Ethics Subcommittee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>Exhibit Hall Open</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>Career Zone</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>POSTER SESSION</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 10:15 am</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
<td></td>
</tr>
<tr>
<td>10:15 am – 11:30 am</td>
<td>PLENARY SESSION &amp; STATE OF THE SOCIETY</td>
<td>Auditorium/CC</td>
<td></td>
</tr>
<tr>
<td>11:45 am – 12:45 pm</td>
<td>Celebration of Minorities in BME Luncheon (ticket purchase required)</td>
<td>Ballroom A/CC</td>
<td></td>
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<tr>
<td>11:45 am – 12:45 pm</td>
<td>Lunch on Your Own</td>
<td></td>
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<tr>
<td>12:00 noon – 2:00 pm</td>
<td>INDUSTRY SESSION: Technology Transfer Pitches and Networking</td>
<td>Room 201/CC</td>
<td></td>
</tr>
<tr>
<td>1:00 pm – 2:30 pm</td>
<td>PLATFORM SESSIONS – THURS-2 (19 concurrent sessions)</td>
<td>Convention Center</td>
<td></td>
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<tr>
<td>1:00 pm – 2:30 pm</td>
<td>International Symposium on Biomedical Engineering</td>
<td>Room 208CD/CC</td>
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<tr>
<td>1:00 pm – 4:00 pm</td>
<td>Developing Best Practices for Graduate Training in Biomedical Innovation</td>
<td>Room 102E/CC</td>
<td></td>
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<tr>
<td>1:00 pm – 3:00 pm</td>
<td>50th Anniversary Committee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>1:30 pm – 2:45 pm</td>
<td>BME Careers in Industry</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>2:15 pm – 5:00 pm</td>
<td>INDUSTRY SESSION: Special Industry Topics</td>
<td>Room 201/CC</td>
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**CC = Convention Center • MH = Minneapolis Hilton**
### THURSDAY | OCTOBER 6, 2016 (continued)

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<tr>
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<th>Location</th>
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<tr>
<td>2:30 pm – 3:15 pm</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
</tr>
<tr>
<td>2:45 pm – 4:15 pm</td>
<td>Rapid Resume Review <em>(BMES Members Only)</em></td>
<td>Room 208AB/CC</td>
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<tr>
<td>3:00 pm – 5:00 pm</td>
<td>Coop/Intern and Industrial Relations Workshop <em>(Invitation Only)</em></td>
<td>Room 102D/CC</td>
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<tr>
<td>3:15 pm – 4:30 pm</td>
<td>BME Government and Alternative Careers</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>3:15 pm – 4:45 pm</td>
<td>PLATFORM SESSIONS – THURS-3 <em>(19 concurrent sessions)</em></td>
<td>Convention Center</td>
</tr>
<tr>
<td>3:15 pm – 4:45 pm</td>
<td>Engineering Low-Cost Solutions to Address Health Care Disparities</td>
<td>Room 208CD/CC</td>
</tr>
<tr>
<td>4:30 pm – 5:15 pm</td>
<td>AEMB Annual Grand Meeting <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
</tr>
<tr>
<td>5:00 pm – 6:00 pm</td>
<td>PLENARY SESSION: Pritzker Distinguished Lecture</td>
<td>Auditorium/CC</td>
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<tr>
<td>6:30 pm – 8:00 pm</td>
<td>AEMB Annual Reception <em>(affiliate event)</em></td>
<td>Lounge A/CC</td>
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<tr>
<td>7:00 pm – 9:00 pm</td>
<td>ACS Biomaterials Science &amp; Engineering Editorial Advisory Board Meeting <em>(affiliate event)</em></td>
<td>Room 102F/CC</td>
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<tr>
<td>8:00 pm – 9:30 pm</td>
<td>University Receptions <em>(Invitations Extended by Hosts)</em></td>
<td>Minneapolis Hilton</td>
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### FRIDAY | OCTOBER 7, 2016

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<tr>
<td>7:00 am – 6:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall/CC</td>
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<tr>
<td>7:00 am – 8:00 am</td>
<td>Education Committee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>National Meetings Committee/2017 Annual Meeting Planning Committee</td>
<td>Room 101HI/CC</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>International Affairs Subcommittee Meeting</td>
<td>Room 203A/CC</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>PLATFORM SESSIONS – FRI-1 <em>(18 concurrent sessions)</em></td>
<td>Convention Center</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>WHITAKER SESSION</td>
<td>Room 200J/CC</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>AAA-BMES Symposium: Genome Editing Strategies in Bioengineering</td>
<td>Room 208AB/CC</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>INDUSTRY SESSION: SBIR/STTR</td>
<td>Room 201/CC</td>
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<tr>
<td>8:30 am – 9:30 am</td>
<td>BMES Student Chapter– Outstanding Chapter Best Practices</td>
<td>Room 208CD/CC</td>
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<tr>
<td>9:00 am – 10:30 am</td>
<td>Career Options for BME PhDs</td>
<td>Room 205ABCD/CC</td>
</tr>
<tr>
<td>9:00 am – 10:00 am</td>
<td>AEMB Ethics Session Meeting <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
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<tr>
<td>9:15 am – 10:15 am</td>
<td>INDUSTRY SESSION: Reimbursement</td>
<td>Room 201/CC</td>
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<tr>
<td>9:30 am – 10:30 am</td>
<td>BMES Student Chapter– Mentoring and Chapter–Industry Best Practices</td>
<td>Room 208CD/CC</td>
</tr>
<tr>
<td>9:30 am – 5:00 pm</td>
<td>Exhibit Hall Open</td>
<td>Convention Center</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>Career Zone</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>POSTER SESSION</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 10:15 am</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>PLENARY SESSION: NIBIB Lecture</td>
<td>Auditorium/CC</td>
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<tr>
<td>12:00 noon – 1:30 pm</td>
<td>Lunch on Your Own</td>
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<tr>
<td>12:00 noon – 1:30 pm</td>
<td>INDUSTRY SESSION: Healthcare Innovations with Physicians</td>
<td>Room 201/CC</td>
</tr>
<tr>
<td>12:00 noon – 1:30 pm</td>
<td>TAMU Luncheon–Excellence In Industry <em>(affiliate event)</em></td>
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CC = Convention Center • MH = Minneapolis Hilton
## FRIDAY | OCTOBER 7, 2016 (continued)

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<th>Location</th>
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<tbody>
<tr>
<td>12:00 noon—1:30pm</td>
<td>Women in BME Luncheon <em>(ticket purchase required)</em></td>
<td>Ballroom A/CC</td>
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<tr>
<td>1:45 pm—3:15 pm</td>
<td><strong>PLATFORM SESSIONS – FRI-2</strong> <em>(19 concurrent sessions)</em></td>
<td>Convention Center</td>
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<tr>
<td>1:45 pm—3:15 pm</td>
<td>BMES Undergraduate Student Design Competition</td>
<td>Auditorium/CC</td>
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<tr>
<td>2:00 pm—3:00 pm</td>
<td>Medical Devices SIG Business Meeting</td>
<td>Room 101HI/CC</td>
</tr>
<tr>
<td>2:00 pm—5:00 pm</td>
<td>BMES-NSF Special Grant Writing Session</td>
<td>Room 102DEF/CC</td>
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<tr>
<td>2:00 pm—3:00 pm</td>
<td><strong>INDUSTRY SESSION:</strong> Mobile/Digital Health</td>
<td>Room 201/CC</td>
</tr>
<tr>
<td>2:30 pm—3:45 pm</td>
<td>BMES Careers in Industry</td>
<td>Room 205ABCD/CC</td>
</tr>
<tr>
<td>3:15 pm—4:00 pm</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>3:15 pm—6:15 pm</td>
<td><strong>KOSOMBE - US-KOREA</strong> Joint Workshop on BME</td>
<td>Room 208AB/CC</td>
</tr>
<tr>
<td>3:15 pm—5:15 pm</td>
<td><strong>INDUSTRY SESSION:</strong> Investment Pitches &amp; Partnering</td>
<td>Room 201/CC</td>
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<tr>
<td>3:30 pm—4:30 pm</td>
<td>Membership Committee Meeting</td>
<td>Room 101G/CC</td>
</tr>
<tr>
<td>3:30 pm—4:30 pm</td>
<td>Design Competition Judges Meeting</td>
<td>Room 203A/CC</td>
</tr>
<tr>
<td>4:00 pm—5:30 pm</td>
<td>Educational Approaches to Best Prepare Students for Industry</td>
<td>Room 208CD/CC</td>
</tr>
<tr>
<td>4:00 pm—5:30 pm</td>
<td><strong>PLATFORM SESSIONS – FRI-3</strong> <em>(19 concurrent sessions)</em></td>
<td>Convention Center</td>
</tr>
<tr>
<td>4:15 pm—5:30 pm</td>
<td>BMES Entrepreneurs</td>
<td>Room 205ABCD/CC</td>
</tr>
<tr>
<td>5:45 am—6:30 pm</td>
<td><strong>PLENARY SESSION:</strong> Extraordinary Challenges and the Need for Extraordinary Competencies-The Role of the Biomedical Engineer</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>8:30 pm—11:00 pm</td>
<td><strong>BMES DESSERT BASH</strong></td>
<td>Ballroom AB/CC</td>
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</tbody>
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## SATURDAY | OCTOBER 8, 2016

<table>
<thead>
<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>7:00 am—2:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>8:00 am—9:00 am</td>
<td>Council of Industry Chapter Presidents <em>(invitation only)</em></td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>8:00 am—9:30 am</td>
<td><strong>PLATFORM SESSIONS – SAT-1</strong> <em>(18 concurrent sessions)</em></td>
<td>Convention Center</td>
</tr>
<tr>
<td>8:00 am—9:30 am</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #1</td>
<td>Room 200B/CC</td>
</tr>
<tr>
<td>9:00 am—10:00 am</td>
<td>AEMB MINDS Workshop <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
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<tr>
<td>9:30 am—10:30 am</td>
<td>BMES Industry Advisory Board <em>(invitation only)</em></td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>9:30 am—1:30 pm</td>
<td>Exhibit Hall Open</td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>9:30 am—1:00 pm</td>
<td><strong>POSTER SESSION</strong></td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>9:30 am—1:10 am</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>9:30 am—10:30 am</td>
<td>Student Affairs Subcommittee Meeting</td>
<td>Room 203A/CC</td>
</tr>
<tr>
<td>10:30 am—12:30 pm</td>
<td><strong>PLENARY SESSION</strong>-Rita Schaffer Young Investigator Lecture &amp; Diversity Award Winner</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>12:30 pm—1:30 pm</td>
<td>Lunch on Your Own</td>
<td></td>
</tr>
<tr>
<td>1:00 pm—3:30 pm</td>
<td>BMES Board of Directors Meeting</td>
<td>Room 101HI/CC</td>
</tr>
<tr>
<td>1:30 pm—3:00 pm</td>
<td><strong>PLATFORM SESSIONS – SAT-2</strong> <em>(17 concurrent sessions)</em></td>
<td>Convention Center</td>
</tr>
<tr>
<td>1:30 pm—3:00 pm</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #2</td>
<td>Room 200B/CC</td>
</tr>
<tr>
<td>3:15 pm—4:45 pm</td>
<td><strong>PLATFORM SESSIONS – SAT-3</strong> <em>(17 concurrent sessions)</em></td>
<td>Convention Center</td>
</tr>
<tr>
<td>3:15 pm—4:45 pm</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #3</td>
<td>Room 200B/CC</td>
</tr>
</tbody>
</table>

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