Associate Professor Daniele Lantagne is no stranger to getting her hands dirty. She focuses her research on effective hygiene and sanitation practices in low-income and developing regions around the world, as well as in locations affected by natural disasters, disease outbreaks, and conflicts.

Recently, Lantagne and her research group took on a large-scale project studying water use and treatment in the context of human health. The research focused on the prevention of transmission of Ebola Virus Disease in community and healthcare facilities. One strand of the work was on the materials used to wash hands and surfaces for the prevention of transmission—namely, chlorine solutions.

"Experts widely recommend using 0.05% chlorine to wash living things—hands—and 0.5% chlorine to wash non-living things, like bodies and surfaces, to prevent ongoing transmission."
Dear CEE alumni and friends,

This is an exciting time for Civil and Environmental Engineering (CEE) at Tufts, in terms of both education and research. For the 2018-2019 academic year, we are launching exciting initiatives in our undergraduate and graduate curricula and new research initiatives across all of our research themes: Climate and Energy, Extreme Events, Health and the Environment, and Resilient Systems.

Over the summer of 2018, we received the final statement from the Engineering Accreditation Commission of ABET (abet.org), and both our civil engineering and environmental engineering undergraduate programs are accredited until the next general review. The ABET review complemented our integrated design curriculum, which begins during the first year and continues through the design sequence in the senior year. At the same time, we rolled out a revision to both the BSCE and BSEVE undergraduate curricula that will provide additional instruction in remote data analytics and systems analysis, and will better integrate our design curricula with the needs of stewardship toward resilient and sustainable engineering solutions.

At the graduate level, we are revamping our programs, including developing a new M.S. program in Offshore Wind Engineering. This will be a technology-centered program in the physical infrastructure of offshore wind energy, with electives in data analytics, transmission, policy, economics, and management. The program was recently approved by the Board of Trustees and we hope to welcome our first cohort in Fall 2019. The department continues to play a leadership role in offshore wind research initiatives both on campus and across the nation, as well as in the development of industry partnerships (see Spotlight on page 6).

In December, we will host our first young alumni event to link our current students with young alumni. And please join us on Saturday, April 7 for our annual Alumni Awards Dinner.

Finally, we launched a new website in late August—so be sure to check it out at engineering.tufts.edu/cee/. We are excited about the future of CEE at Tufts and are confident that we will continue to educate tomorrow’s leaders to join our extensive Tufts CEE alumni network.

Sincerely,

Laurie Gaskins Baise
Professor and Chair

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Research Highlights

Professor Luis Dorfmann was part of a team of Tufts researchers that received the 2018 Harting Award for their paper “A Technique for Comparing Wall Pressure Distributions in Steady Flow Through Rigid Vs. Flexible Patient-based Abdominal Aortic Aneurysm Phantoms,” recognized as the best paper published in Experimental Techniques in 2016.

Associate Professor John Durant, Research Assistant Professor Neelakshi Hudda, and Adjunct Professor Doug Brugge are partnering with the City of Somerville to study sustainable air quality control in affordable housing near highways. With a grant from the U.S. Department of Housing and Urban Development, the researchers seek to quantitatively assess the benefits of the use of high-efficiency filters and optimized ventilation system design parameters. Professors Durant and Hudda continue to research linkages between air pollution at airports and health effects.

As the U.S. wind energy industry develops, Professor of the Practice Eric Hines and Professor Dan Kuchma have been working across universities to develop a national research agenda in offshore wind.

Assistant Professor Jonathan Lamontagne’s recent work includes a collaboration with the U.S. Geological Survey and U.S. Army Corps of Engineers to reassess flood risk to critical infrastructure in the Columbia River Basin, as well as an examination of non-stationary ice-jam flood frequency in the Peace-Athabasca Delta in northern Canada, with researchers from British Columbia Hydro.

In partnership with Assistant Professor Liping Liu of the Department of Computer Science, Assistant Professor Jonathan Lamontagne received a Tufts Collaborates seed grant for his proposal titled “Can Machine Learning Improve the Representation of Humans in the Hydrologic Cycle?” Lamontagne and another group of researchers also published findings in Earth’s Future on the need for a deeper understanding of the Scenario Matrix Framework. The research was recognized in Nature Climate Change.

Assistant Professor Amy Pickering, working with faculty members from the Fletcher School of Law and Diplomacy, received a Tufts Collaborates seed grant to study the effects of climate change on household drinking water access in sub-Saharan Africa.

Professor Masoud Sanaye and colleagues from Guangdong University of Technology and Acentech Inc. created a simple closed form prediction model of train-induced vibration transmission within buildings, focusing on metro stations and buildings in Shenzhen, China. The research was published in Engineering Structures.
transmission of Ebola,” says Lantagne. “But we don’t know the chemistry of the chlorine compounds, we don’t know how well they clean surfaces, and we don’t know how well they clean hands.”

The group worked to address these three strands of inquiry with a combination of traditional lab work and simulations of field situations. Undergraduate students used more conventional lab practices to determine the shelf life and best practices for testing solutions containing different chlorine compounds. Graduate students and postdoctoral scholars deployed a bacteriophage that could represent Ebola in a lab setting and tested the effects of chlorine solutions on surface cleanliness.

Finally, the group ran tests on volunteers who washed their hands 10 extra times per day, testing and surveying people to see if the washing resulted in skin breakages that could increase transmission of disease. Researchers also put the bacteriophage on volunteers’ hands before washing and tested the effects of handwashing on removing the substances.

The group published nine manuscripts detailing results from each area of research and looked at the results in combination with the goal of better implementation in emergency fieldwork, publishing their findings in journals including *Water, Environmental Science & Technology*, and *PLOS ONE*. “It’s about collaboration,” Lantagne says, citing the work of students from the high school to the doctoral level, as well as medical professionals and emergency workers, in answering the research questions.

Moving forward, Lantagne plans to study “commonly implemented but severely under-researched interventions” of cholera transmission around the world, and to continue to develop methodologies for health and water treatment that can be applied in a variety of situations.

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Effective Methods for Disease Prevention  
Continued from page 1

QUICK HITS

University Professor **Linda Abriola** and Professor **Shafiqul Islam** joined a Food and Water Nexus research group at Tufts, working with colleagues to develop systems-level advancements in natural resource impacts and use, nutrition and health, and governance and policy.

Professor and Chair **Laurie Baise** gave a plenary keynote at the Geotechnical Earthquake Engineering and Soil Dynamics V conference in Austin, Texas, titled “A geospatial approach to liquefaction assessment for rapid response and loss estimation.”

Professor **Steven Chapra** received the Tufts University 2018 Engineering Seymour Simches Award for Distinguished Teaching and Advising.

Lab coordinator **Steve Fratto** and department administrator **Laura Sacco** both celebrated their tenth year of service this year.

Research Professor **Jack Germaine** was elected to the Board of Directors for ASTM International.

Professor **David M. Gute** traveled to India in the spring of 2018 to explore new ventures in public health engineering, giving invited lectures at the Translational Health Science and Technology Institute and at the Christian Medical College. This year, he also received a Tufts Faculty Research Awards Committee open access publishing grant for his proposal, “Longitudinal Associations of Exposure to Ultrafine Particles with Blood Pressure and Systemic Inflammation in Puerto Rican Adults.”

Research Professor **Richard Hooper** was honored by the American Geophysical Union as the 2018 recipient of the Edward A. Flinn III Award, which recognizes the unsung heroes who build and maintain the infrastructure upon which science functions.

In March 2019, Assistant Professor **Jonathan Lamontagne** will be an invited speaker at a climate change scenario symposium ahead of the United Nations Intergovernmental Panel on Climate Change’s sixth assessment report.

Assistant Professor **Amy Pickering** published research in *The Lancet Global Health* on the effects of a combination of sanitation and nutrition interventions in Kenya.

Associate Professor **Chris Swan** was named Dean of Undergraduate Education for the School of Engineering in March 2018.
STUDENT HIGHLIGHTS

Steven Robert Woodruff, E17, received a Graduate Research Fellowship Program Fellowship from the National Science Foundation.

From left to right: Alan Solomont, Dean of the Tisch College of Civic Life, Professor Elena Naumova, Chair of the Division of Nutrition Data Science at the Friedman School of Nutrition and CEE Adjunct Professor, award recipient Tania Alarcón, and Tufts University President Anthony Monaco pose for a photo during the Presidential Awards for Civic Life ceremony.

Ph.D. candidate Tania Alarcón received a 2018 Tufts Presidential Award for Civic Life in recognition of her service as a founding member and president of the student chapter of the American Statistical Association at Tufts.

Elana Chan, E21, was among the first participants in Tufts’ new Global Research Assistant Program (GRAP). Over the summer, Chan traveled to Vellore, India with a research team, led by Assistant Professor Amy Pickering, using a gene sequencing technology called MinION to monitor antimicrobial resistance.

Sebastian Torrente, E18, received a Senior Award from the Tufts University Alumni Association. He managed the Tufts Daily and the Urban Planning, Policy, and Prosperity group (UP3) during his time at Tufts.

Belinda Xian, E18, won second place in the Tisch Library Undergraduate Research Awards, for the 001–099 course category.

ALUMNI HIGHLIGHTS

Harshit Agrawal and Alex Rappaport, both E17, and their team ZwitterCo tied for first place in the General & High-Tech category in the 2018 Tufts Gordon Institute $100k New Ventures Competition.

Rob Kayen, E81, and Alex Grant, E13, met in Sapporo, Japan to investigate ground failures after the September 6, 2018 Hokkaido M6.6. earthquake.

Ivan Xavier Baquerizo, E89, established the Rodolfo Baquerizo Fund for Entrepreneurship to support the Tufts $100K Roadshow, an extension of the New Ventures Competition which sends student entrepreneurs to New York City, Palo Alto, and San Francisco to pitch their ideas to Tufts alumni and investors.

Peter Chandonait, EG03, received the USAID Innovation to Action Award for creating and implementing a mobile soak pit designed to remove insecticide from wash-water generated during indoor residual spraying.

Ayman Halaseh, EG15, and his wife Shirin Haddadin brought STEM education to children at the Zaatari refugee camp in Jordan.

Steven Robert Woodruff, E17, received a Graduate Research Fellowship Program Fellowship from the National Science Foundation.
CONGRATULATIONS TO OUR GRADUATES

Undergraduate Awards
Jesse Litvin received the Max O. Urbahn, F.A.I.A. Scholarship from the Society of American Military Engineers (SAME) New York City Post, and the William P. Morse Scholarship.
Dylan Jones received the Michael E. Avtges Memorial Prize and the Joseph Bocchino Award.
Corey Snider received the Howe Walker Award.

Cataldo Awards
Declan Devine, Dylan Jones, Jonas Procton, Lauren Quickel, Elizabeth White

Undergraduate Littleton Awards
Jessie Cooper, Craig Drennan, Jesse Litvin, Aleksandr Kirpach, Margaret Zahrah

Undergraduate Littleton Fellowships for continued graduate study at Tufts
Logan Brill, Nathan Pacheco, Mandip Pokharel, Corey Snider, Neil Spazzarini, Belinda Xian

Bachelor of Science in Environmental Engineering
Lauren Brill (August 2017)
Charlotte Clarke
Jessica Cooper
Sean DeLawder
Simone Draper

Bachelor of Science in Engineering
David Mattout (February 2018)

Graduate Awards
Azin Mehrjoo and Sofia Puerto Tchemodanova were awarded Kentaro Tsutsumi Fellowships.
Brian Butts, Avis Carrero, and Paul Mullin were awarded William Edgerton Fellowships.

Graduate Littleton Awards
Xiaolei (Lei) Chen, Leah Fletcher, Wahid Palash, Justine Rayner

Master of Engineering
Lucia Hiller
Elizabeth Kirtland
Yafangzhou Huang

Master of Science
Stephanie Alimena
Parker Aubin
Tiffany Blake (August 2017)
Connor Brown (August 2017)
Xiaolei Chen
Jai Seoung Chung (February 2018)
Jae Jin Han (August 2017)
Ya Han
Anthony Hanley (August 2017)
Jiaheng Hu
Zexing Lin

Bachelor of Science in Civil Engineering
Jack Benoit (February 2018)
Carter Cole (February 2018)
Mateo Galeano (August 2017)
Leili Ghaemi (August 2017)
Allan Guberek
Aleksandr Kirpach
Jenna Kubiak
Jesse Litvin
Elia Rodriguez Lopez (August 2017)
Joseph Nault
Mandip Pokharel
Adrian Portela
Matthew Purdy
Corey Snider
Neil Spazzarini
Sebastian Torrente
Megan Wilson
Belinda Xian

Doctoral Recipients
Annalise Blum (August 2017)
Dissertation: Characterizing Streamflow Variability: Distributions, Trends, and Ecological Impacts
Advisor: Richard Vogel
Laura Corlin
Dissertation: Novel Methods for Assessing Exposures and Health Effects of Ultrafine Particles and Nitrogen Oxides
Advisor: David Gute
Wenjian Lin
Dissertation: Growth and Remodeling of Human Abdominal Aorta Aneurysms
Advisor: Luis Dorfmann
Tyler Marcet (February 2018)
Dissertation: Coupling Thermal Treatment and Microbial Reductive Dechlorination for the Enhanced Remediation of Chlorinated Ethenes
Advisor: Natalie Cápiro
Anna Murray (August 2017)
Dissertation: Evaluation and Regulation of Household Water Treatment Technologies in Developing Countries
Advisor: Daniele Lantagne
Justine Rayner (February 2018)
Dissertation: Ceramic ‘Pot’ Water Filters: Investigations into Manufacturing and Performance
Advisor: Daniele Lantagne
Matthew Simon (August 2017)
Dissertation: A Novel Model for Predicting Traffic-Related Ultrafine Particle Concentrations in Urban Neighborhoods
Advisor: John Durant
Douglas Walker (August 2017)
Dissertation: High-Resolution Metabolomics for Profiling Human Exposure and Bioeffect
Advisor: Kurt Pennell
Offshore wind energy plays a critical role in the world’s transition to an electricity-based, clean energy economy. The United States has enough offshore wind resource potential to power the entire country several times over, but is just beginning to develop this resource. Offshore wind development stands at the intersection of infrastructure, manufacturing, and the ocean, and requires a new generation of engineers who can work effectively with a wide range of partners to deliver technical excellence.

The Tufts Department of Civil and Environmental Engineering came together with other Massachusetts academic and research institutions to form the Partnership for Offshore Wind Energy Research (POWER-US), a coalition working to develop a national plan to advance U.S. innovation in offshore wind energy. Professor of the Practice Eric Hines, Professor Dan Kuchma, and Research Associate Professor Jay Borkland helped author POWER-US’s white paper, “Reaching Convergence in United States Offshore Wind Energy Research: A Multidisciplinary Framework for Innovation.”

Working with four co-primary investigators, Kuchma recently received a National Science Foundation planning grant to design a data-driven, multidisciplinary system-level framework that could identify where advances are needed to build a resilient infrastructure that would enable increased production of offshore wind energy. The project brings together collaborators from across scientific fields, engineering disciplines, industrial stakeholders, developers, the national laboratories, and state and federal resource management agencies, as well as involving residents of coastal communities.

With interest and activity in U.S. offshore wind energy growing, the Department of Civil and Environmental Engineering now offers a new field of study. Students working toward their M.S. in Civil and Environmental Engineering can choose to focus in offshore wind engineering. The field of study offers graduate-level training in offshore wind engineering, policy, and project management, for students seeking jobs in the emerging global offshore wind energy industry.

Part-Time Programs

The Department of Civil and Environmental Engineering offers part-time options for M.S. and certificate students, allowing students the flexibility to work around their busy schedules. Learn more about CEE graduate degrees on our new website: engineering.tufts.edu/cee.
On April 21, CEE alumni, students, faculty, and staff came together to view student research and projects and celebrate at the department’s annual Alumni Awards Dinner.

Adjunct Professor (former Professor and Chair) Kurt Pennell received the department’s Distinguished Service Award in recognition of his accomplishments as the Chair of the Tufts Department of Civil and Environmental Engineering and as a leader in environmental engineering education and practice.

David Thompson (E62, EG68) received the department’s Outstanding Achievement Award for his extensive achievements and leadership in the geotechnical engineering practice.
CEE Women Lead the Way

The gender balance of the Department of Civil and Environmental Engineering’s undergraduate population continues to grow more equal every year. For the 2018-19 academic year, 40% of all Tufts Engineering undergraduates, and 36% of graduate students, are women. In CEE, 57% of undergraduate students are women, as are 43% of graduate students.