Matthew J. Panzer, Ph.D.

4 Colby St., SciTech Center Room 144
Medford, MA 02155
T: 617.627.4633 F: 617.627.3991
matthew.panzer@tufts.edu

Education

Ph.D. in Chemical Engineering, Minor in Nanoparticle Science & Engineering
Thesis: "Polymer Electrolyte-Gated Organic Field-Effect Transistors"
Advisor: Prof. C. Daniel Frisbie
University of Minnesota, Minneapolis, MN, *May 2007*

Honors Bachelor of Chemical Engineering with Distinction, Minor in Mathematics
University of Delaware, Newark, DE, *May 2002*

Employment

Associate Professor, Department of Chemical and Biological Engineering
Tufts University, Medford, MA, *Sept. 2015 to present*

Assistant Professor, Department of Chemical and Biological Engineering
Tufts University, Medford, MA, *2009-2015*

Postdoctoral Associate, Research Laboratory of Electronics, Advisor: Prof. Vladimir Bulović
Massachusetts Institute of Technology, Cambridge, MA, *2007-2009*

Awards

- Massachusetts Clean Energy Center Catalyst Program Award (Aug 2017)
- Favorite Professor Award, Tufts ChBE Department (May 2017)
- Lillian and Joseph Leibner Award for Distinguished Teaching and Advising, Tufts University (May 2016)
- Henry and Madeline Fischer Award (Engineering Teacher of the Year), Tufts University (May 2015)
- Favorite Professor Award, Tufts ChBE Department (May 2015)
- Recognition of Undergraduate Teaching Excellence Award, Tufts University (May 2014)
- Massachusetts Clean Energy Center Catalyst Program Award (Feb 2012)
- Best Professor Award, Tufts ChBE Department (May 2011)
- Dr. Gerald R. Gill Professor of the Year Award, Tufts University (April 2011)
- IGERT for Nanoparticle Science & Engineering Graduate Fellowship
- Chemical Engineering & Materials Science Department (Minnesota) TA of the Year Award
- NSF Graduate Research Fellowship
- Tau Beta Pi Fellowship (Fellow #676)

Service & Professional Activities

- 2016 AIChE Annual Meeting, Session Chair, "Semiconducting Nanocrystals and Quantum Dots"
- 2014 AIChE Annual Meeting, Chair, Area 8E (Electronics & Photonics)
- 2013 AIChE Annual Meeting, Co-Chair, Area 8E (Electronics & Photonics)
- 2013 AIChE Annual Meeting, Session Chair, "Organic and Hybrid Semiconductors"
- 2013 MRS Fall Meeting, Co-Organizer, Symposium M "Large-Area Processing and Patterning for Active Optical and Electronic Devices"
- 2012 AIChE Annual Meeting, Session Chair, "Materials for Batteries, Capacitors, and Energy Storage I & II"
- 2012 APS March Meeting, Session Chair, "Physics of Batteries and Fuel Cells"
- 2012 Tufts Energy Conference, Panel Moderator

- Tufts Dow Sustainability Innovation Student Challenge Award Selection Committee, Member, 2012
- Tufts Environmental Literacy Institute Fellow, Spring 2011
- Tufts CELT Faculty Fellow, 2009-2010
- Tufts University Committee on Committees, Member, 2017-present
- Tufts University Library Committee, Member, 2013-present
- Tufts School of Engineering Graduate Studies Committee, Member, 2017-present
- Tufts School of Engineering Ad Hoc Committee on Tenure & Promotion, Member, 2017-present
- Tufts School of Engineering Academic Standing Committee, Member, 2010-2015
- Tufts Engineering Leadership Program Freshman Experience Working Group, Spring 2011
- Tufts Engineering Leadership Program Professional Practice Working Group, Spring 2010
- Tufts ChBE Department Graduate Program Chair, 2017-present
- Tufts ChBE Department Graduate Admissions Chair, 2013-2017
- Tufts ChBE Department Graduate Program Committee, Member, 2009-present
- Tufts ChBE Department Faculty Search Committee, Chair, 2017-2018
- Tufts ChBE Department Faculty Search Committee, Member, 2010-2011; 2012-2013
- Tufts ChBE Department Library Liaison, 2009-present
- Tufts AIChE Student Chapter Faculty Advisor, 2010-2016
- Tufts Tau Beta Pi Chapter Faculty Advisor, 2013-present
- Editorial Board Member, *AIMS Materials Science*, 2013-present
- NSF proposal reviewer, 2010; 2011; 2014; 2017
- Tau Beta Pi Scholarship application reviewer, 2017
- DOE Graduate Fellowship Program application reviewer, 2012
- ACS PRF proposal reviewer, 2012
- Manuscript Reviewer for: *Nano Lett., ACS Nano, J. Mater. Chem., IEEE J. Display Technol.*, *Applied Optics, J. Vac. Sci. Technol. B, Organic Electronics, IEEE Trans. Electron Dev., Nanomater. Nanotechnol., J. Am. Chem. Soc., Appl. Catal. B, ACS Appl. Mater. Interfaces, Electrochem. Commun., Mater. Res. Bulletin, Nano Reviews, Appl. Phys. Lett., Thin Solid Films, Adv. Energy Mater., Opt. Lett., Nanoscale, J. Mater. Chem. A, Transl. Mater. Res., Macromolecules, Angew. Chem. Int. Ed., J. Phys. Chem., Green Chem., ACS Sustainable Chem. Eng., PLOS ONE, Sci. Adv., Ind. Eng. Chem. Res.*
- AIChE, Member since 1999
- Tau Beta Pi, Member since 2000
- MRS, Member since 2006

Refereed Publications

42. "Chemically Cross-Linked Poly(2-hydroxyethyl methacrylate)-Supported Deep Eutectic Solvent Gel Electrolytes for Eco-Friendly Supercapacitors," Qin, H.; Panzer, M. J., *ChemElectroChem* **2017**, *4*, 2556-2562.

41. "Enhanced Lithium Ion Transport in Poly(ethylene glycol) Diacrylate-Supported Solvate Ionogel Electrolytes via Chemically Cross-linked Ethylene Oxide Pathways," D'Angelo, A. J.; Panzer, M. J., *J. Phys. Chem. B*, **2017**, *121*, 890-895.

40. "Zwitterion-Containing Ionogel Electrolytes," Lind, F.; Rebollar, L.; Bengani-Lutz, P.; Asatekin, A.; Panzer, M. J., *Chem. Mater.* **2016**, *28*, 8480-8483.

39. "Flexible 3D Graphene Transistors with Ionogel Dielectric for Low-Voltage Operation and High Current Carrying Capacity," Kabiri Ameri, S.; Singh, P. K.; D'Angelo, A. J.; Panzer, M. J.; Sonkusale, S. R., *Adv. Electron. Mater.* **2016**, *2*, 1500355.

38. "Etching of Electrodeposited Cu_2O Films Using Ammonia Solution for Photovoltaic Applications," Zhu, C.; Panzer, M. J., *Phys. Chem. Chem. Phys.* **2016**, *18*, 6722-6728.

37. "Formulation Influence on the Sol-Gel Formation of Silica-Supported Ionogels," Horowitz, A. I.; Westerman, K.; Panzer, M. J., *J. Sol-Gel Sci. Technol.* **2016**, *78*, 34-39.

36. "Deciphering Physical versus Chemical Contributions to the Ionic Conductivity of Functionalized Poly(methacrylate)-Based Ionogel Electrolytes," D'Angelo, A. J.; Grimes, J. J.; Panzer, M. J., *J. Phys. Chem. B* **2015**, *119*, 14959-14969.

35. "Spectroscopic Determination of Relative Brønsted Acidity as a Predictor of Reactivity in Aprotic Ionic Liquids," Horowitz, A. I.; Arias, P.; Panzer, M. J., *Chem. Commun.* **2015**, *51*, 6651-6654.

34. "Synthesis of Zn:Cu_2O Thin Films Using a Single Step Electrodeposition for Photovoltaic Applications," Zhu, C.; Panzer, M. J., *ACS Appl. Mater. Interfaces* **2015**, *7*, 5624-5628.

33. "Poly(dimethylsiloxane)-Supported Ionogels with High Ionic Liquid Loading," Horowitz, A. I.; Panzer, M. J., *Angew. Chem*. **2014**, *53*, 9780-9783.

32. "Seed Layer-assisted Chemical Bath Deposition of CuO Films on ITO-coated Glass Substrates with Tunable Crystallinity and Morphology," Zhu, C.; Panzer, M. J**.**, *Chem. Mater.* **2014**, *26*, 2960-2966.

31. "Rapid, Microwave-Assisted Thermal Polymerization of Poly(Ethylene Glycol) Diacrylate-Supported Ionogels," Visentin, A. F.; Dong, T.; Poli, J.; Panzer, M. J**.**, *J. Mater. Chem. A* **2014**, *2*, 7723-7726.

30. "Integration of UV-cured Ionogel Electrolyte with Carbon Paper Electrodes," Flores Zopf, S.; Panzer, M. J., *AIMS Materials Science* **2014**, *1*, 59-69.

29. "Influence of Ionic Liquid Selection on the Properties of Poly(Ethylene Glycol) Diacrylate-Supported Ionogels as Solid Electrolytes," Visentin, A. F.; Alimena, S.; Panzer, M. J**.**, *ChemElectroChem* **2014**, *1*, 718-721.

28. "Influence of ITO Electrode Surface Composition on the Growth and Optoelectronic Properties of Electrodeposited Cu_2O Thin Films," Osherov, A.; Zhu, C.; Panzer, M. J**.**, *J. Phys. Chem. C* **2013**, *117*, 24937-24942.

27. "Reclamation and Reuse of Ionic Liquids from Silica-Supported Ionogels Using Spontaneous Water-Driven Separation," Horowitz, A. I.; Wang, Y.; Panzer, M. J., *Green Chem.* **2013**, *15*, 3414-3420.

26. "Surface Chemistry of Electrodeposited Cu_2O Films Studied by XPS," Zhu, C.; Osherov, A; Panzer, M. J**.**, *Electrochim. Acta* **2013**, *111*, 771-778.

25. "Role of Solution Chemistry in Determining the Morphology and Photoconductivity of Electrodeposited Cuprous Oxide Films," Osherov, A.; Zhu, C.; Panzer, M. J., *Chem. Mater.* **2013**, *25*, 692-698.

24. "Acene-Doped Polymer Films: Singlet Oxygen Dosimetry and Protein Sensing," Koylu, D.; Sarrafpour, S.; Zhang, J.; Ramjattan, S.; Panzer, M. J., Thomas III, S. W., *Chem. Commun.* **2012**, *48*, 9489-9491.

23. "High-performance, Mechanically Compliant Silica-based Ionogels for Electrical Energy Storage Applications," Horowitz, A. I.; Panzer, M. J., *J. Mater. Chem.* **2012**, *22*, 16534-16539.

22. "Ion Electrodiffusion Governs Silk Electrogelation," Kojic, N.; Panzer, M. J.; Leisk, G. G.; Raja, W. K.; Kojic, M.; Kaplan, D. L., *Soft Matter* **2012**, *8*, 2897-2905. **(Featured on Inside Front Cover)**

21. "Poly(Ethylene Glycol) Diacrylate-Supported Ionogels with Consistent Capacitive Behavior and Tunable Elastic Response," Visentin, A. F.; Panzer, M. J**.**, *ACS Appl. Mater. Interfaces* **2012**, *4*, 2836-2839.

20. "Contact Printing of Colloidal Nanocrystal Thin Films for Hybrid Organic/Quantum Dot Optoelectronic Devices," Panzer, M. J.; Aidala, K. E.; Bulović, V., *Nano Reviews* **2012**, *3*, 16144.

19. "Morphology of Contact Printed Colloidal Quantum Dots in Organic Semiconductor Films: Implications for QD-LEDs," Aidala, K. E.; Panzer, M. J.; Anikeeva, P. O.; Halpert, J. E.; Bawendi, M. G.; Bulović, V., *Phys. Status Solidi C* **2011**, *8*, 120-123.

18. "Electroluminescence from Nanoscale Materials via Field-Driven Ionization," Wood, V.; Panzer, M. J.; Bozyigit, D.; Shirasaki, Y.; Rousseau, I.; Geyer, S.; Bawendi, M. G.; Bulović, V., *Nano Lett.* **2011**, *11*, 2927-2932.

17. “Nanoscale Morphology Revealed at the Interface Between Colloidal Quantum Dots and Organic Semiconductor Films,” Panzer, M. J.; Aidala, K. E.; Anikeeva, P. O.; Halpert, J. E.; Bawendi, M. G.; Bulović, V., *Nano Lett.* **2010**, *10*, 2421-2426.

16. “Measuring Charge Trap Occupation and Energy Level in CdSe/ZnS Quantum Dots Using a Scanning Tunneling Microscope,” Hummon, M. R.; Stollenwerk, A. J.; Narayanamurti, V.; Anikeeva, P. O.; Panzer, M. **J.**; Wood, V.; Bulović, V., *Phys. Rev. B* **2010**, *81*, 115439.

15. “Tunable Infrared Emission from Printed Colloidal Quantum Dot/Polymer Composite Films on Flexible Substrates,” Panzer, M. J.; Wood, V.; Geyer, S. M.; Bawendi, M. G.; Bulović, V., *IEEE J. Display Technol.* **2010**, *6*, 90-93.

14. “Air-Stable Operation of Transparent, Colloidal Quantum Dot Based LEDs with a Unipolar Device Architecture,” Wood, V.; Panzer, M. J.; Caruge, J.-M.; Halpert, J. E.; Bawendi, M. G.; Bulović, V., *Nano Lett.* **2010**, *10*, 24-29.

13. “Selection of Metal Oxide Charge Transport Layers for Colloidal Quantum Dot LEDs,” Wood, V.; Panzer, M. J.; Halpert, J. E.; Caruge, J.-M.; Bawendi, M. G.; Bulović, V., *ACS Nano* **2009**, *3*, 3581-3586.

12. “Alternating Current Driven Electroluminescence from ZnSe/ZnS:Mn/ZnS Nanocrystals,” Wood, V.; Halpert, J. E.; Panzer, M. J.; Bawendi, M. G.; Bulović, V., *Nano Lett.* **2009**, *9*, 2367-2371.

11. “Inkjet Printed Quantum Dot-Polymer Composites for Full Color AC-Driven Displays,” Wood, V; Panzer, M. J.; Chen, J.; Bradley, M. S.; Halpert, J. E.; Bawendi, M. G.; Bulović, V., *Adv. Mater.* **2009**, *21*, 2151-2155. **(Featured on Inside Front Cover)**

10. “Exploiting Ionic Coupling in Electronic Devices: Electrolyte-Gated Organic Field-Effect Transistors,” (Research News) Panzer, M. J.; Frisbie, C. D., *Adv. Mater.* **2008**, *20*, 3177-3180.

9. “Polymer Electrolyte-Gated Organic Field-Effect Transistors: Low Voltage, High Current Switches for Organic Electronics and Testbeds for Probing Electrical Transport at High Charge Carrier Density,” Panzer, M. J.; Frisbie, C. D., *J. Am. Chem. Soc.* **2007**, *129*, 6599-6607.

8. “Ion Gel Gated Polymer Thin-Film Transistors,” Lee, J.; Panzer, M. J.; He, Y.; Lodge, T. P.; Frisbie, C. D., *J. Am. Chem. Soc.* **2007**, *129*, 4532-4533.

7. “Vibrational Spectroscopy Reveals Electrostatic and Electrochemical Doping in Organic Thin Film Transistors Gated with a Polymer Electrolyte Dielectric,” Kaake, L. G.; Zou, Y.; Panzer, M. J.; Frisbie, C. D.; Zhu, X.-Y. *J. Am. Chem. Soc.* **2007**, *129*, 7824-7830.

6. “High Charge Carrier Densities and Conductance Maxima in Single-Crystal Organic Field-Effect Transistors with a Polymer Electrolyte Gate Dielectric," Panzer, M. J.; Frisbie, C. D., *Appl. Phys. Lett.* **2006**, *88*, 203504.

5. "High Carrier Density and Metallic Conductivity in Poly(3-hexylthiophene) Achieved by Electrostatic Charge Injection," Panzer, M. J.; Frisbie, C. D., *Adv. Funct. Mater.* **2006**, *16*, 1051-1056.

4. "High Mobility Top-Gated Pentacene Thin-Film Transistors," Newman, C. R.; Chesterfield, R. J.; Panzer, M. J.; Frisbie, C. D., *J. Appl. Phys.* **2005**, *98*, 084506.

3. "Polymer Electrolyte Gate Dielectric Reveals Finite Windows of High Conductivity in Organic Thin Film Transistors at High Charge Carrier Densities," Panzer, M. J.; Frisbie, C. D., *J. Am. Chem. Soc.* **2005**, *127*, 6960-6961.

2. "Low-Voltage Operation of a Pentacene Field-Effect Transistor with a Polymer Electrolyte Gate Dielectric," Panzer, M. J.; Newman, C. R.; Frisbie, C. D., *Appl. Phys. Lett.* **2005**, *86*, 103503.

1. "Mass Transfer Properties of Monoliths," Hahn, R.; Panzer, M.; Hansen, E.; Mollerup, J.; Jungbauer, A., *Sep. Sci. & Tech.* **2002**, *37*, 1545-1565.

Book Chapters

3. "Wearable Energy Storage Based on Ionic Liquid Gels," S. F. Zopf, A. J. D'Angelo, H. Qin, M. J. Panzer, Chapter 14 in *Polymerized Ionic Liquids* (Edited by A. Eftekhari), The Royal Society of Chemistry, Smart Materials Series (Book 29), 2018. ISBN: 9781782629603.

2. "Colloidal Quantum Dot Light Emitting Diodes," V. Wood, M. Panzer, S. Coe-Sullivan, V. Bulović, Chapter 6 in *Colloidal Quantum Dot Optoelectronics and Photovoltaics* (Edited by G. Konstantatos and E. H. Sargent), Cambridge University Press, 2013. ISBN: 9780521198264

1. "Contact Effects in Organic Field-Effect Transistors," M. J. Panzer and C. D. Frisbie, Section 2.4 in *Organic Field-Effect Transistors* (Edited by Z. Bao and J. Locklin), CRC Press, Optical Science and Engineering Series, *128*, 2007. ISBN: 9780849380808

Patents

4. C. Zhu, M. J. Panzer. 2015. Cupric Oxide Semiconductors. US Patent Application 20170025555, filed Apr. 2, 2015.

3. A. I. Horowitz, M. J. Panzer. 2014. Silicone-Containing Ionic Materials. US Patent Application 20160315349, filed Dec. 15, 2014.

2. V. Wood, M. J. Panzer, J. E. Halpert, M. G. Bawendi, V. Bulović. 2017. Light Emitting Device Including Semiconductor Nanocrystals. US Patent 9,574,134, filed May 7, 2010, and issued Feb. 21, 2017.

1. V. Wood, M. J. Panzer, J. M. Caruge, J. E. Halpert, M. G. Bawendi, V. Bulović. 2013. Light Emitting Device Including Semiconductor Nanocrystals. US Patent 8,536,776, filed May 7, 2010, and issued Sept. 17, 2013.

Invited Research Presentations & Seminars

18. Chemical Engineering Department Seminar, The City College of New York, Mar. 13, 2017
17. Gordon Research Conference on Ionic Liquids, Sunday River, ME, Aug. 15, 2016
16. PRISM/PCCM Seminar, Princeton University, Mar. 23, 2016
15. Soft Materials for Energy Applications Workshop, University of Edinburgh, Feb. 11, 2016
14. Condensed Matter Physics Group Seminar, Tufts University, Feb. 3, 2016
13. Chemical Engineering Department Seminar, University of Edinburgh, Sept. 14, 2015
12. Natick Chapter of Sigma Xi (The Scientific Research Society), Natick, MA, Nov. 21, 2014
11. Chemical Engineering Department Seminar, Carnegie Mellon University, Oct. 21, 2014
10. Bioengineering Program Seminar, Tufts University, Oct. 9, 2013
9. Physics Department Seminar, Mt. Holyoke College, Mar. 14, 2013
8. Energy Frontier Research Center Seminar, Columbia University, Oct. 3, 2012
7. Integrated Systems Laboratory, ETH Zurich, Sep. 14, 2012
6. Center for STEM Diversity, Tufts University, Feb. 8, 2012
5. Urban Science Academy, West Roxbury, MA, Jan. 25, 2012
4. US Army Natick Soldier Research, Development & Engineering Center, Natick, MA, Jan. 12, 2012
3. QD Vision, Inc., Lexington, MA, Dec. 13, 2011
2. Electrical and Computer Engineering Department Seminar, Tufts University, Sep. 28, 2010
1. Biomedical Engineering Department Seminar, Tufts University, Nov. 16, 2009