

# Bryan W. Boudouris

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## Education

### **Ph. D. in Chemical Engineering, August 2009**

University of Minnesota, Minneapolis, MN

Advisors: Professors C. Daniel Frisbie and Marc A. Hillmyer

Thesis: "Polythiophene-Containing Block Copolymers for Organic Photovoltaic Applications"

### **B. S. in Chemical Engineering, May 2004**

University of Illinois at Urbana-Champaign, Urbana, IL

Undergraduate Advisors: Professors Richard C. Alkire and Paul J. A. Kenis

## Academic Positions

### **Robert and Sally Weist Associate Professor**

Davidson School of Chemical Engineering, Purdue University

*October 2016 – Present*

### **Associate Professor of Chemistry, by Courtesy**

Department of Chemistry, Purdue University

*August 2016 – Present*

### **Director of the Professional M.S. Program**

Davidson School of Chemical Engineering, Purdue University

*July 2016 – August 2019*

### **Associate Professor**

Davidson School of Chemical Engineering, Purdue University

*August 2016 – October 2016*

### **Assistant Professor of Chemistry, by Courtesy**

Department of Chemistry, Purdue University

*October 2013 – August 2016*

### **Assistant Professor**

Davidson School of Chemical Engineering, Purdue University

*August 2011 – August 2016*

### **Postdoctoral Fellow**

Department of Chemical & Biomolecular Engineering, University of California, Berkeley and

Materials Science Division, Lawrence Berkeley National Laboratory *September 2009 – July 2011*

## Selected Honors and Awards

- Dudley A. Saville Lectureship at Princeton University 2020
- Named as a Future Chemical Engineering Faculty Leader for the CACHE 50<sup>th</sup> Meeting 2019
- Featured in the "Emerging Investigators" Issue of *Soft Matter* 2019
- Purdue College of Engineering Early Career Research Award 2018
- Featured in the "Young Talents in Polymer Science" Issue of *Macromol. Chem. Phys.* 2016
- Purdue College of Engineering Exceptional Early Career Teaching Award 2016

- NSF Faculty Early Career Development Program (CAREER) Award 2016
- Purdue Innovators Hall of Fame 2015
- NAE Frontiers of Engineering Education Invited Participant 2015
- APS Division of Polymer Physics-UK Polymer Physics Group Lectureship 2015
- IMPACT Faculty Fellow at Purdue University 2015
- NAE Frontiers of Engineering Invited Participant 2013
- DARPA Young Faculty Award 2012
- AFOSR Young Investigator Research Program Award 2012

### **Service and Professional Associations**

- Member of the American Institute of Chemical Engineers (AIChE), the American Chemical Society (ACS), the American Physical Society (APS), the Electrochemical Society (ECS), the Materials Research Society (MRS), the American Association for the Advancement of Science (AAAS), and the American Society for Engineering Education (ASEE)
- AIChE Materials Engineering and Science Division (MESD, Division 8) Director (2017-2019)
- AIChE Area 8A (Polymers) Vice-Chair (2016) and Chair (2017)
- Alternate Councilor for the Purdue Section of the American Chemical Society (2012 – 2018)
- Associate (2012-2015) and Full Member (2016-Present) of the National American Chemical Society Project SEED Executive Committee
- Founding Program Director of the Purdue Section's ACS Project SEED program, which encourages high school students from economically-disadvantaged families to conduct summer research in University laboratories under the guidance of Purdue faculty
- Editorial Advisory Board Member for *ACS Macro Letters* (2020 – Present)
- Editorial Advisory Board Member for the *Journal of Applied Polymer Science* (2013 – Present)
- Guest Editor for the “Structure, Transport, and Device Application of Thermoelectric Polymers” Special Issue of the *Journal of Applied Polymer Science*
- Manuscript reviewer for *Nature Communications*, *Nature Materials*, *Journal of the American Chemical Society*, *Angewandte Chemie*, *ACS Macro Letters*, *Macromolecules*, *ACS Nano*, *ACS Applied Materials and Interfaces*, *ACS Applied Nano Materials*, *ACS Applied Polymer Materials*, *Chemistry of Materials*, *ACS Omega*, *Molecular Systems Designs and Engineering*, *Macromolecular Rapid Communications*, *Chemical Science*, *Chem*, *Soft Matter*, *Polymer Chemistry*, *Journal of Physical Chemistry*, *Biomacromolecules*, *Advanced Materials*, *Advanced Energy Materials*, *Advanced Materials Interfaces*, *Advanced Electronic Materials*, *Applied Physics Letters*, *Journal of Polymer Science*, *European Polymer Journal*, *Journal of Membrane Science*, *Journal of Materials Chemistry*, *Journal of Organic Chemistry*, *Polymer Chemistry*, *Polymer*, *Environmental Science and Technology*, *Journal of Vacuum Science and Technology*, *Applied Physics A*, *Nanoscale*, *Industrial and Engineering Chemistry Research*, *Materials Science in Semiconductor Processing*, *Journal of Applied Polymer Science*, *Journal of Electronic Materials*, *Thin Solid Films*, *European Polymer Journal*, *ChemSusChem*, *Chemical Engineering Education*, *Bulletin of the Chemical Society of Japan*, and the *Korean Journal of Chemical Engineering*
- Proposal reviewer for the National Science Foundation (NSF), the Department of Energy (DOE), the Air Force Office of Scientific Research (AFOSR), the National Institute of Standards and Technology (NIST), the Royal Society, the Israel Ministry of Science, Technology, and Space, the US-Israel Binational Science Foundation, and the German Research Foundation (DFG)

- Reviewer for the Stanford Synchrotron Radiation Lightsource (SSRL) and the Molecular Foundry at Lawrence Berkeley National Laboratory (LBNL) User Proposals
- Focus Topic Co-organizer for the “Organic Electronics and Photonics” session of the 2014 APS March Meeting and the “Flexible and Stretchable Organic Electronics” session of the 2017 APS March Meeting
- Session Chair and Co-Chair at the 2011, 2012 and 2014-2017 APS and 2011 – 2017 AIChE National Meetings

### **Submitted Manuscripts and Refereed Publications**

74. “Recent Advances and Opportunities for Mixed Ion and Charge Conducting Polymers,” Chung, J.; Khot, A.; Savoie, B. M.; Boudouris, B. W. **2020**, *submitted for review*.
73. “Rethinking the Analysis of the Linear Viscoelastic Behavior of an Epoxy Polymer Near and Above the Glass Transition,” Ni, Y.; Song, H.; Wilcox, D. A.; Medvedev, G.; Boudouris, B. W.; Caruthers, J. M. **2020**, *submitted for review*.
72. “Fostering Motivation for Chemical Engineering Students’ Academic Success: An Example from a Sophomore Materials and Energy Balances Courses,” Godwin, A.; Boudouris, B. W. **2020**, *submitted for review*.
71. “A Vapor Phase Trinitrotoluene Threshold Detector Enabled by Nonlinear Feedback,” Bajaj, N.; Laster, J. S.; Boudouris, B. W.; Chiu, G. T.-C.; Rhoads, J. F. **2020**, *submitted for review*.
70. “Additively Manufactured Conductive Polymer Spark Gap Igniters,” McConnell, M. P.; Murray, A. K.; Boudouris, B. W.; Gunduz, I. E.; Son, S. F.; Rhoads, J. F. **2020**, *submitted for review*.
69. “A Resonant CO<sub>2</sub> Sensor Functionalized with a Polymerized Ionic Liquid,” Siefker, Z. A.; Murray, A. K.; Zhao, X.; Boudouris, B. W.; Bajaj, N.; Chiu, G. T.-C.; Rhoads, J. F. **2020**, *IEEE Sensors*, Montreal, Canada.
68. “Tailored Thioxanthone-based Photoinitiators for Two-Photon-Controllable Polymerization and Nanolithographic Printing,” Chi, T.; Somers, P.; Wilcox, D. A.; Iyer, V.; Le, R.; Gengler, J.; Ferdinandus, M.; Liebig, C.; Pan, L.; Xu, X.; Boudouris, B. W. *J. Polym. Sci. Part B: Polym. Phys.* **2019**, *57*, 1462-1475.
67. “Molecularly Engineered Organic-Inorganic Hybrid Perovskites Quantum Wells,” Gao, Y.; Shi, E.; Snaider, J. M.; Shiring, S. B.; Liang, C.; Liebman-Pelaez, A.; Yoo, P.; Deng, S.; Zeller, M.; Boudouris, B. W.; Liao, P.; Zhu, C.; Yu, Y.; Savoie, B. M.; Huang, L.; Dou, L. *Nat. Chem.* **2019**, *11*, 1151-1157.
66. “Accurate Determination of the Equilibrium Surface Tension Values including Area Perturbation Tests,” Chung, J.; Boudouris, B. W.; Franses, E. I. *J. Vis. Exp.* **2019**, *150*, e59818.
65. “Effects of the Water-Oil Volume Ratio and Premixing or Pre-equilibration on the Interfacial Tension and Phase Behavior of Biphasic Mixtures,” Chung, J.; Boudouris, B. W.; Franses, E. I. *Colloids Surf. A Physicochem. Eng. Asp.* **2019**, *571*, 55-63.
64. “Tuning the Interfacial and Energetic Interactions between a Photoexcited Conjugated Polymer and Open-Shell Small Molecules,” Wilcox, D. A.; Snaider, J.; Mukherjee, S.; Yuan, L.; Huang, L.; Savoie, B. M.; Boudouris, B. W. *Soft Matter* **2019**, *15*, 1413-1422.
63. “Radical Polymers Alter the Carrier Properties of Semiconducting Carbon Nanotubes,” Joo, Y.; Mukherjee, S.; Boudouris, B. W. *ACS Appl. Polym. Mater.* **2019**, *1*, 204-210.

62. "High-Affinity Detection and Capture of Heavy Metal Contaminants using Block Polymer Composite Membranes," Zhang, Y.; Vallin, J. R.; Sahoo, J. K.; Gao, F.; Boudouris, B. W.; Webber, M. J.; Phillip, W. A. *ACS Central Science* **2018**, *4*, 1697-1707.
61. "A Rheometry Method to Assess the Evaporation-induced Mechanical Strength Development of Polymer Solutions used for Membrane Applications," Caicedo-Casso, E.; Sargent, J.; Dorin, R. M.; Wiesner, U. B.; Phillip, W. A.; Boudouris, B. W.; Erk, K. A. *J. Appl. Poly. Sci.* **2018**, *136*, 47038.
60. "Energetic Microparticle Adhesion to Functionalized Surfaces," Hoss, D. J.; Mukherjee, S.; Boudouris, B. W.; Beaudoin, S. P. *Propell. Explos. Pyrot.* **2018**, *43*, 862-868.
59. "Phase and Rheological Behavior of Aqueous Mixtures of a Propoxylated Surfactant," Yang, Y.-J.; Tang, H.; Chung, J.; Santagata, M.; Franses, E. I.; Boudouris, B. W. *Colloids Surf. A Physicochem. Eng. Asp.* **2018**, *554*, 60-73.
58. "Highly Transparent Crosslinkable Radical Copolymer Thin Film as the Ion Storage Layer in Organic Electrochromic Devices," He, J.; Mukherjee, S.; Zhu, X.; You, L.; Boudouris, B. W.; Mei, J. *ACS Appl. Mater. Interfaces* **2018**, *10*, 18956-18963.
57. "Enhancing the Thermoelectric Performance of an Open-Shell Donor-Acceptor Conjugated Polymer Doped with a Radical-Containing Small Molecule," Joo, Y.; Huang, L.; Eedugurala, N.; London, A. E.; Kumar, A.; Wong, B. M.; Boudouris, B. W.; Azoulay, J. D. *Macromolecules* **2018**, *51*, 3886-3894.
56. "Impact of Surface Chemistry on the Adhesion of a Small Molecule to a Conducting Polymer Substrate," Laster, J. S.; Ezeamaku, C. D.; Beaudoin, S. P.; Boudouris, B. W. *Colloids Surf. A Physicochem. Eng. Asp.* **2018**, *551*, 74-80.
55. "A Nonconjugated Radical Polymer Glass with High Electrical Conductivity," Joo, Y.; Agarkar, V.; Sung, S. H.; Savoie, B. M.; Boudouris, B. W. *Science* **2018**, *359*, 1391-1395.
54. "Fit-for-Purpose Block Polymer Membranes Molecularly-Engineered for Water Treatment," Zhang, Y.; Arbelo, N. A.; Weidman, J. L.; Corti, D. S.; Boudouris, B. W.; Phillip, W. A. *npj Clean Water* **2018**, *1*, 2.
53. "Advancing Polymer Science by Revisiting Known Plastics," Olsen, B. D.; Boudouris, B. W. *Chem* **2018**, *4*, 927-929.
52. "Stable Radical Materials for Energy Applications," Wilcox, D. A.; Agarkar, V.; Mukherjee, S.; Boudouris, B. W. *Ann. Rev. Chem. Bio. Eng.* **2018**, *9*, 083945.
51. "Surface Tension Behavior of Aqueous Solutions of a Propoxylated Surfactant and Interfacial Tension Behavior against a Crude Oil," Chung, J.; Boudouris, B. W.; Franses, E. I. *Colloids Surf. A Physicochem. Eng. Asp.* **2018**, *537*, 163-172.
50. "Radical Polymers as Interfacial Layers in Inverted Hybrid Perovskite Solar Cells," Zheng, L.; Mukherjee, S.; Wang, K.; Hay, M. E.; Boudouris, B. W.; Gong, X. *J. Mater. Chem. A* **2017**, *5*, 23831.
49. "Fabrication of Silver Nanostructures using Femtosecond Laser-Induced Photoreduction," Barton, P.; Mukherjee, S.; Prabha, J.; Boudouris, B. W.; Pan, L.; Xu, X. *Nanotechnology* **2017**, *28*, 505302.
48. "Solution Self-assembly Behavior of A-B-C Triblock Polymers and the Implications for Nanoporous Membrane Fabrication," Sargent, J. L.; Hoss, D. H.; Phillip, W. A.; Boudouris, B. W. *J. Appl. Polym. Sci.* **2017**, *135*, 45531.

47. “Analyzing Adhesion in Microstructured Systems through a Robust Computational Approach,” Hoss, D. J.; Boudouris, B. W.; Beaudoin, S. P. *Surf. Interface Anal.* **2017**, *49*, 1165-1170.
46. “Enhancing Polymer Thermoelectric Performance using Radical Dopants,” Tomlinson, E. P.; Mukherjee, S.; Boudouris, B. W. *Org. Electron.* **2017**, *51*, 243-248.
45. “Controlling Open-Shell Loading in Norbornene-Based Radical Polymers Modulates the Solid-State Charge Transport Exponentially,” Hay, M. E.; Wong, S. H.; Mukherjee, S.; Boudouris, B. W. *J. Polym. Sci. Part B: Polym. Phys.* **2017**, *55*, 1516-1525.
44. “Block Polymer Membranes Functionalized with Nanoconfined Polyelectrolyte Brushes Achieve sub-Nanometer Selectivity,” Zhang, Y.; Mulvenna, R. A.; Qu, S.; Boudouris, B. W.; Phillip, W. A. *ACS Macro Lett.* **2017**, *6*, 726-732.
43. “Nanoporous Block Polymer Thin Films Functionalized with Bio-Inspired Ligands for the Efficient Capture of Heavy Metal Ions from Water,” Weidman, J. L.; Mulvenna, R. A.; Boudouris, B. W.; Phillip, W. A. *ACS Appl. Mater. Interfaces* **2017**, *9*, 19152-19160.
42. “Design of a Three-State Switchable Chromogenic Radical-based Moiety and Its Translation to Molecular Logic Systems,” Mukherjee, S.; Boudouris, B. W. *Mol. Syst. Des. Eng.* **2017**, *2*, 159-164.
41. “Nanomanufacturing of High-Performance Hollow Fiber Nanofiltration Membranes by Coating Uniform Films from Block Polymer Solutions” Zhang, Y.; Mulvenna, R. A.; Boudouris, B. W.; Phillip, W. A. *J. Mater. Chem. A* **2017**, *5*, 3358-3370.
40. “Organic Radical Polymers: New Avenues in Organic Electronics,” Mukherjee, S.; Boudouris, B. W. **2017**, Springer Publishing, New York, NY.
39. “Bioinspired Systems,” Adigun, O.; Freer, A. S.; Mueller, L.; Gilpin, C.; Boudouris, B. W.; Harris, M. T. **2017**, *Chapter within Nanotechnology Commercialization*, John Wiley & Sons, Inc., Hoboken, NJ.
38. “Impact of the Addition of Redox-Active Salts on the Charge Transport Ability of Radical Polymer Thin Films,” Baradwaj, A. G.; Wong, S. H.; Laster, J. S.; Wingate, A. J.; Hay, M. E.; Boudouris, B. W. *Macromolecules* **2016**, *49*, 4784-4791.
37. “Radical Polymers Improve the Metal-Semiconductor Interface in Organic Field-Effect Transistors,” Sung, S. H.; Bajaj, N.; Rhoads, J. F.; Chiu, G. T.; Boudouris, B. W. *Org. Electron.* **2016**, *37*, 148-154.
36. “Design of Free-Standing Microstructured Conducting Polymer Films for Enhanced Particle Removal from Non-Uniform Surfaces,” Laster, J. L.; Deom, N. A.; Beaudoin, S. P.; Boudouris, B. W. *J. Polym. Sci. Part B: Polym. Phys.* **2016**, *54*, 1968-1974.
35. “Unusually Stable Hysteresis in the pH-Response of Poly(Acrylic Acid) Brushes Confined within Nanoporous Block Polymer Thin Films,” Weidman, J. L.; Mulvenna, R. A.; Boudouris, B. W.; Phillip, W. A. *J. Am. Chem. Soc.* **2016**, *138*, 7030-7039. (Google Scholar Citation Count = 42).
34. “Integrating Exposure to Nanotechnology through Projectwork in a Large First-Year Engineering Course,” Rogers, K. J.; Harris, M. T.; Boudouris, B. W.; Diefes-Dux, H. A. *Proceedings of the ASEE Annual Conference and Exposition 2016 (June), New Orleans, LA.*
33. “Nanoscale Mapping of Dielectric Properties of Nanomaterials over Wide Frequency Bandwidths using Small Cantilevers,” Cadena, M. J.; Sung, S. H.; Boudouris, B. W.; Reifenger, R.; Raman, A. *ACS Nano* **2016**, *10*, 4062-4071.

32. “An Evaluation of Complementary Approaches to Elucidate Fundamental Interfacial Phenomena Driving Adhesion of Energetic Materials,” Hoss, D. J.; Knepper, R.; Hotchkiss, P. J.; Tappan, A. S.; Boudouris, B. W.; Beaudoin, S. P. *J. Colloid. Interface Sci.* **2016**, *473*, 28–33.
31. “Recent Advances in the Syntheses of Radical-Containing Macromolecules,” Wingate, A. J.; Boudouris, B. W. *J. Polym. Sci. Part A: Polym. Chem.* **2016**, *54*, 1875–1894.
30. “Solution-Based Synthesis and Characterization of Earth Abundant Cu<sub>3</sub>(As,Sb)Se<sub>4</sub> Nanocrystal Alloys: Towards Scalable Room-Temperature Thermoelectric Devices,” Balow, R. B.; Tomlinson, E. P.; Abu-Omar, M. M.; Boudouris, B. W.; Agrawal, R. *J. Mater. Chem. A* **2016**, *4*, 2198–2204.
29. “On the Environmental and Electrical Bias Stability of Radical Polymer Conductors in the Solid State,” Baradwaj, A. G.; Rostro, L.; Boudouris, B. W. *Macromol. Chem. Phys.* **2016**, *217*, 477–484.
28. “Design of Super-Paramagnetic Core-Shell Nanoparticles for Enhanced Performance of Inverted Polymer Solar Cells,” Jaramillo, J.; Barrero, C.; Boudouris, B. W.; Jaramillo, F. *ACS Appl. Mater. Interfaces* **2015**, *7*, 25061–25068.
27. “Nanostructured Membranes from Triblock Polymer Precursors as High Capacity Copper Adsorbents,” Weidman, J. L.; Mulvenna, R. A.; Boudouris, B. W.; Phillip, W. A. *Langmuir* **2015**, *31*, 11113–11123. (Google Scholar Citation Count = 28).
26. “Tuning the Thermoelectric Properties of a Conducting Polymer through Blending with Open-shell Molecular Dopants,” Tomlinson, E. P.; Willmore, M. J.; Zhu, X.; Hilsmier, S. W. A.; Boudouris, B. W. *ACS Appl. Mater. Interfaces* **2015**, *7*, 18195–18200.
25. “Polymerization Rate Considerations for High Molecular Weight Polyisoprene-*b*-Polystyrene-*b*-Poly(*N,N*-dimethyl acrylamide) Triblock Polymers Synthesized Via Sequential Reversible Addition-Fragmentation Chain Transfer (RAFT) Reactions,” Mulvenna, R. A.; Prato, R. A.; Phillip, W. A.; Boudouris, B. W. *Macromol. Chem. Phys.* **2015**, *216*, 1831–1840.
24. “Collection-limited Theory Interprets the Extra-ordinary Response of Single Semiconductor Organic Solar Cells,” Ray, B.; Baradwaj, A. G.; Khan, M. R.; Boudouris, B. W.; Alam, M. A. *Proc. Natl. Acad. Sci.* **2015**, *112*, 11193–11198.
23. “Synthesis and Thin Film Self-Assembly of Radical-Containing Diblock Copolymers,” Rostro, L.; Baradwaj, A. G.; Muller, A. R.; Laster, J. S.; Boudouris, B. W. *MRS Commun.* **2015**, *5*, 257–263.
22. “Systematic Control of the Nanostructure of Semiconducting-Ferroelectric Polymer Composites in Thin Film Memory Devices,” Sung, S. H.; Boudouris, B. W. *ACS Macro Lett.* **2015**, *4*, 293–297.
21. “Effect of Intrachain Sulfonic Acid Dopants on the Solid-State Charge Mobility of a Model Radical Polymer,” Chan, H.; Wang, Y.; Boudouris, B. W. *Thin Solid Films* **2015**, *577*, 56–61.
20. “Suppressing the Environmental Dependence of the Open-Circuit Voltage in Inverted Polymer Solar Cells through a Radical Polymer Anodic Modifier,” Rostro, L.; Galicia, L.; Boudouris, B. W. *J. Polym. Sci. Part B: Polym. Phys.* **2015**, *53*, 311–316.
19. “Nanoporous Membranes Generated from Self-Assembled Block Polymer Precursors: *Quo Vadis?*,” Zhang, Y.; Sargent, J. L.; Boudouris, B. W.; Phillip, W. A. *J. Appl. Poly. Sci.* **2015**, *132*, 41683.
18. “Radical Polymers and Their Applications to Organic Electronic Devices,” Tomlinson, E. P.; Hay, M. E.; Boudouris, B. W. *Macromolecules* **2014**, *47*, 6145–6158.
17. “Defect Characterization in Organic Semiconductors: Forward Bias Capacitance Analysis,” Ray, B.; Baradwaj, A. G.; Boudouris, B. W.; Alam, M. A. *J. Phys. Chem. C* **2014**, *118*, 17461–17466.

16. “Tunable Nanoporous Membranes with Chemically-Tailored Pore Walls from Triblock Polymer Templates,” Mulvenna, R. A.; Weidman, J. L.; Jing, B.; Pople, J. A.; Zhu, Y.; Boudouris, B. W.; Phillip, W. A. *J. Membr. Sci.* **2014**, *470*, 246–256.
15. “Solid State Electrical Conductivity of Radical Polymers as a Function of Pendant Group Oxidation State,” Rostro, L.; Wong, S. H.; Boudouris, B. W. *Macromolecules* **2014**, *47*, 3713–3719.
14. “Quantification of Solid-State Charge Mobility in a Model Radical Polymer,” Baradwaj, A. G.; Rostro, L.; Alam, M. A.; Boudouris, B. W. *Appl. Phys. Lett.* **2014**, *104*, 213306.
13. “Controlled Radical Polymerization and Quantification of Solid State Electrical Conductivities of Macromolecules Bearing Pendant Stable Radical Groups,” Rostro, L.; Baradwaj, A. G.; Boudouris, B. W. *ACS Appl. Mater. Interfaces* **2013**, *5*, 9896–9901.
12. “Intramolecular Exciton Diffusion in Poly(3-hexylthiophene),” Healy, A.; Boudouris, B. W.; Frisbie, C. D.; Hillmyer, M. A.; Blank, D. A. *J. Phys. Chem. Lett.* **2013**, *4*, 3445–3449.
11. “Engineering Optoelectronically-active Macromolecules for Polymer-based Photovoltaic and Thermoelectric Devices,” Boudouris, B. W. *Curr. Opin. Chem. Eng.* **2013**, *2*, 294–301.
10. “Infrared Conductivity of Hole Accumulation and Depletion Layers in (Ga,Mn)As- and (Ga,Be)As-based Field-effect Devices,” Chapler, B. C.; Mack, S.; Ju, L.; Elson, T. W.; Boudouris, B. W.; Namdas, E.; Yuen, J. D.; Heeger, A. J.; Samarth, N.; Di Ventra, M.; Segalman, R. A.; Awschalom, D. D.; Wang, F.; Basov, D. N. *Phys. Rev. B* **2012**, *86*, 165302.
9. “PN Junction Rectification in Electrolyte Gated Mg Doped InN,” Alarcon-Llado, E.; Mayer, M. A.; Boudouris, B. W.; Segalman, R. A.; Miller, N.; Yamaguchi, T.; Wang, K.; Nanishi, Y.; Haller, E. E.; Ager, J. W. *Appl. Phys. Lett.* **2011**, *99*, 102106.
8. “Real-Time Observation of Polythiophene Crystallization and the Correlation with Transient Optoelectronic Properties,” Boudouris, B. W.; Ho, V.; Jimison, L. H.; Toney, M. F.; Salleo, A.; Segalman, R. A. *Macromolecules* **2011**, *44*, 6653–6658.
7. “Poly(3-alkylthiophene) Diblock Copolymers with Ordered Microstructures and Continuous Semiconducting Pathways,” Ho, V.; Boudouris, B. W.; McCulloch, B. L.; Shuttle, C. G.; Burkhardt, M.; Chabinyc, M. L.; Segalman, R. A. *J. Am. Chem. Soc.* **2011**, *133*, 9270–9273.
6. “Controlling Inelastic Light Scattering Quantum Pathways in Graphene,” Chen, C.-F.; Park, C.-H.; Boudouris, B. W.; Horng, J.; Geng, B.; Girit, C.; Zettl, A.; Crommie, M. F.; Segalman, R. A.; Louie, S. G.; Wang, F. *Nature* **2011**, *471*, 617–620.
5. “Tuning Polythiophene Crystallization through Systematic Side Chain Functionalization,” Ho, V.; Boudouris, B. W.; Segalman, R. A. *Macromolecules* **2010**, *43*, 7895–7899.
4. “Polylactide-Polythiophene-Polylactide Triblock Copolymers,” Boudouris, B. W.; Frisbie, C. D.; Hillmyer, M. A. *Macromolecules* **2010**, *43*, 3566–3569.
3. “Synthesis, Optical Properties, and Microstructure of a Fullerene-terminated Poly(3-hexylthiophene),” Boudouris, B. W.; Molins, F.; Blank, D. A.; Frisbie, C. D.; Hillmyer, M. A. *Macromolecules* **2009**, *42*, 4118–4126.
2. “Nanoporous Poly(3-alkylthiophene) Thin Films Generated from Block Copolymer Templates,” Boudouris, B. W.; Frisbie, C. D.; Hillmyer, M. A. *Macromolecules* **2008**, *41*, 67–75.
1. “Intramolecular Exciton Relaxation and Migration Dynamics in Poly(3-hexylthiophene),” Wells, N. P.; Boudouris, B. W.; Hillmyer, M. A.; Blank, D. A. *J. Phys. Chem. C* **2007**, *111*, 15404–15414.

**Total Google Scholar Citation Count = 2,230; h-index = 23; i-index = 39**

### **Pending Patents**

7. Filed Patent. "Non-metallic Ignition Devices," Rhoads, J. F.; McConnell, M. P.; Son, S. F.; Boudouris, B. W., Filed: August 22, 2018, Under Review with Application Number: 62720947.
6. Filed Patent. "Novel Radical Polymer Film with High Electrical Conductivity," Boudouris, B. W.; Savoie, B. M.; Joo, Y.; Agarkar, V.; Seung, S. H. Filed: July 24, 2018, Under Review with Application Number: 62702377.
5. Filed Patent. "Continuous and Scalable 3D Nanoprinting," Xu, X.; Boudouris, B. W.; Pan, L., Filed: July 17, 2017, Under Review with Application Number: 20180015661.
4. Filed Patent. "Engineered Polymer Swab for Explosives Residue Detection: A Nanobrush," Boudouris, B. W.; Beaudoin, S. P., Filed: September 18, 2014, Under Review with Identifying Number: 62052375.

### **Issued Patents**

3. United States Patent 10,513,621. "Ink and Method of Conducting an Examination," Boudouris, B. W.; Dodd, R. R.; Sargent, J. L.; Alcorace, E., Issued: December 24, 2019.
2. United States Patent 10,333,045. "Solution Based Synthesis of Copper-Arsenic-Chalcogen Derived Nanoparticles," Agrawal, R., Boudouris, B. W., Balow, R. B., Issued: June 25, 2019.
- 1b. Japan Patent 6330230. "Multiblock Copolymers and Methods of Use", Phillip, W. A.; Boudouris, B. W., Issued: May 11, 2018.
- 1a. United States Patent 10,022,679. "Multiblock Copolymers and Methods of Use", Phillip, W. A.; Boudouris, B. W., Issued: July 17, 2018.

### **Invited Presentations**

38. "Designing High-Performance Block Polymer-based Membrane Adsorbers for Water Purification." 2019 AIChE Annual Meeting [Area 8A (Polymers) Plenary Lecture Session]. November 12, 2019.
37. "Tailoring Macromolecular Design for Water Purification and Organic Electronic Applications." University of Southern Mississippi, School of Polymer Science and Engineering. October 9, 2019.
36. "Designing Functional Polymers for Next-Generation Energy, Water, and Health Applications." National Cheng Kung University, Department of Chemical Engineering. December 19, 2018.
35. "Designing Functional Polymers for Water Purification and Flexible Electronic Applications." University of Pittsburgh, Department of Chemical and Petroleum Engineering. October 26, 2018.
34. "The Nanoscale Features that Allow Non-conjugated Radical Polymer Glasses to Achieve High Electrical Conductivity Values." 4<sup>th</sup> Functional Polymeric Materials Conference. June 8, 2018
33. "Designing Charge Neutral, Non-Conjugated Radical Polymers with High Electrical Conductivity Values." 2018 ACS Spring Meeting. March 21, 2018.
32. "Designing Functional Polymers for Water Purification and Flexible Electronic Applications." University of Illinois at Chicago, Department of Chemical Engineering. February 13, 2018.



31. "Designing Functional Macromolecules for Electronic Applications and Water Purification." Purdue-University – Korea University Workshop at the 2017 AIChE Annual Meeting. October 29, 2017.
30. "Elucidating Charge Transport in Radical-Containing Polymers and the Application to Energy Conversion Devices." Soft Materials Summer School hosted by the University of Freiburg (Germany). July 6, 2017.
29. "Elucidating Solid-State Charge Transfer in Radical Polymers." American Chemical Society (ACS) PanPoly Conference. March 23, 2017.
28. "Designing Functional Macromolecules for Water Purification and Electronic Applications." Tufts University, Department of Chemical and Biological Engineering. February 23, 2017.
27. "Designer Polymers for Next-Generation Flexible Electronic and Water Purification Applications." University of Wisconsin – Madison, Department of Chemical and Biological Engineering. December 13, 2016.
26. "Solid State Transport in Radical Polymer Glasses and Their Application to Organic Electronic Devices." 2016 AIChE Annual Meeting (Area 8A (Polymers) Plenary Lecture Session). November 14, 2016.
25. "Designing Functional Macromolecules for Water Purification and Electronic Applications." University of Akron, Department of Polymer Science. October 14, 2016.
24. "Designer Macromolecules for Next-Generation Flexible Electronic and Membrane Adsorber Applications." BASF Committee for Scientific Innovation and Interaction Seminar Series. October 11, 2016.
23. "Manipulating the Solid-state Charge Transport of Radical Polymer Glasses." Notre Dame-Purdue Symposium on Soft Matter and Polymers. October 8, 2016.
22. "Controlling the Self-Assembly and Nanoscale Structure of Block Polymers for the Design and Fabrication of Nanofiltration Membranes and Membrane Adsorbers." Center for Nanoscale Materials Science at Oak Ridge National Laboratory User Meeting. August 11, 2016.
21. "Correlating Structure with Charge Transport in Radical Polymers." Polymer Physics Gordon Research Conference (GRC). July 27, 2016.
20. "Design of Triblock Polymers and Their Implementation as High-Performance Nanostructured Membranes and High Capacity Metal Ion Adsorbent Systems." American Chemical Society (ACS) Central Region Meeting (CERM). May 19, 2016.
19. "Making Glasses Conduct: Electrochemical Doping of Redox-Active Polymer Thin Films." American Physical Society (APS) March Meeting. March 17, 2016.
18. "Self-assembly of Open Shell-Containing Block Polymer Thin Films." American Physical Society (APS) March Meeting. March 15, 2016.
17. "Designing Macromolecules for Advanced Energy Conversion and Separations Membrane Applications." 3M Corporation. December 10, 2015.
16. "Design of Functional Polymers for Advanced Energy Conversion and Water Purification Applications." University of Illinois at Urbana Champaign, Department of Chemical and Biomolecular Engineering. November 19, 2015.
15. "Tuning the Thin Film Self-Assembly of Radical-Containing Diblock Copolymers." 2015 AIChE Annual Meeting. November 11, 2015.
14. "Designing Macromolecules for Advanced Energy Conversion and Separations Applications." Massachusetts Institute of Technology, Program in Polymers and Soft Matter. October 21, 2015.

13. "Solid-State Charge Transport in Redox-Active Radical Polymers." 228<sup>th</sup> Electrochemical Society (ECS) Meeting. October 14, 2015.
12. "Charge Transport Physics of Non-conjugated Glassy Radical Polymer Conductors." Physical Aspects of Polymer Science Meeting of the Institute of Physics (IOP). September 10, 2015.
11. "Radical Polymers in Solid-State Organic Electronic Devices." 250<sup>th</sup> National Meeting of the American Chemical Society (ACS). August 17, 2015.
10. "Designing Macromolecules for Advanced Energy Conversion and Nanofiltration Applications." University of Wisconsin – Madison, Department of Chemistry. May 4, 2015.
9. "Designing Macromolecules for Advanced Energy Conversion and Nanofiltration Applications." University of Minnesota, Department of Chemical Engineering and Materials Science. April 28, 2015.
8. "Designing Macromolecules with Specific Optoelectronic and Chemical Functionalities for Advanced Membrane and Energy Conversion Applications." Purdue University, School of Chemical Engineering. September 9, 2014.
7. "Non-conjugated Radical Polymers as an Emerging Class of Transparent Conductors for Organic Photovoltaic and Thermoelectric Applications." 30<sup>th</sup> International Conference of the Polymer Processing Society (PPS-30). June 11, 2014.
6. "The Utilization of Radical Polymers in Next-Generation Thermoelectric Devices." United States Air Force Academy. October 21, 2013.
5. "The Utilization of Radical Polymers in Next-Generation Thermoelectric Devices." Air Force Office of Scientific Research, Flexible Thermoelectrics Workshop. July 10, 2013.
4. "Designing Macromolecules with Specific Optoelectronic and Chemical Functionalities for Advanced Energy and Biomedical Applications." Purdue University, Department of Chemistry (Organic Chemistry Division). April 2, 2013.
3. "Design of Optoelectronically-active Polymers for Organic Photovoltaic Applications." Purdue Solar Research Series, Birck Nanotechnology Center. January 24, 2013.
2. "Radical Polymers for Nanostructured, Next Generation Thermoelectric Devices." DARPA Young Faculty Award Kick-Off Meeting. July 31, 2012.
1. "Designing Semiconducting Polymers for Advanced Energy Applications." Purdue University, Birck Nanotechnology Center. September 28, 2011.

### **Postdoctoral Scholars Mentored (7 Total, 3 Current)**

- Dr. Xikang Zhao (May 2018 – present), Ph.D. in Chemistry from Purdue University
- Dr. Hongguang Shen (August 2019 – present), Ph.D. in Chemistry from the Institute of Chemistry, Chinese Academy of Sciences
- Dr. Wenchao Zhao (August 2019 – present), Ph.D. in Chemistry from the Institute of Chemistry, Chinese Academy of Sciences

### **Former Postdoctoral Scholars**

- Dr. Steven Gaik (October 2013 – February 2014), Ph. D. in Chemical Engineering from Purdue University
  - Employed at BASF

- Dr. Sanjoy Mukherjee (January 2016 – November 2017), Ph.D. in Chemistry from the Indian Institute of Science
  - Employed as a postdoctoral researcher at the University of California, Santa Barbara
- Dr. Betty Yang (January 2017 – November 2017), Ph.D. in Chemical Engineering from Purdue University
  - Employed at the Intel Corporation
- Dr. Yongho Joo (April 2017 – November 2018), Ph.D. in Materials Science from the University of Wisconsin – Madison
  - Employed as a research scientist at the Korea Institute of Science and Technology (KIST)

### **Visiting Scholars Mentored (7 Total, 2 Current)**

- Xiping He (September 2019 – present), Ph.D. Student in Chemical Engineering at Tsinghua University
- Ning Xie (October 2019 – present), Ph.D. Student in Chemical Engineering at the South China University of Technology

### **Former Visiting Scholars**

- Dr. Teona Cotan, M.D. (January 2013 – August 2013), Medical Doctor from Lafayette, Indiana
- Rafael Prato (August 2013 – August 2014), B.S. in Chemical Engineering from the University of California, Santa Barbara
- Si Hui Wong (August 2015 – January 2017), B.S. in Chemical Engineering from Purdue University
- Dr. Junfeng Zhu (November 2015 – December 2016), Ph.D. in Applied Chemistry from Shaanxi University of Science and Technology
- Dr. Zhenping Cheng (January 2017 – April 2017), Ph.D. in Organic Chemistry from Soochow University

### **Graduate Students Mentored (30 Total, 14 Current)**

- Noelia Almodovar (November 2015 – present), Chemical Engineering, Purdue University – Ph.D.
- Jaeyub Chung (November 2015 – present), Chemical Engineering, Purdue University – Ph.D.
- Daniel Wilcox (November 2015 – present), Chemical Engineering, Purdue University – Ph.D.
- Teng Chi (August 2017 – present), Chemistry, Purdue University – Ph.D.
- John Hodul (October 2017 – present), Chemistry, Purdue University – Ph.D.
- Kuluni Perera (October 2017 – present), Chemistry, Purdue University – Ph.D.
- Siddhartha Akkiraju (November 2017 – present), Chemical Engineering, Purdue University – Ph.D.
- Ho Joong (Roy) Kim (May 2018 – present), Chemical Engineering, Purdue University – Ph.D.
- Sheng-Ning Hsu (November 2018 – present), Chemical Engineering, Purdue University, Ph.D.
- Oluwafemi Ogunlalu (November 2018 – present), Chemistry, Purdue University, Ph.D.
- Ying Tan (November 2018 – present), Chemical Engineering, Purdue University, Ph.D.
- Carsten Hansen-Flores (November 2019 – present), Chemistry, Purdue University, Ph.D.
- Kangying (Connie) Liu (November 2019 – present), Chemistry, Purdue University, Ph.D.
- Aaron Woepfel (November 2019 – present), Chemical Engineering, Purdue University, Ph.D.

### Former Graduate Students, Degree, and Current Affiliation

- Lizbeth Rostro (October 2011 – July 2015, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at The Dow Chemical Company
- Ryan Mulvenna (October 2011 – December 2015, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at The Dow Chemical Company
- Aditya Baradwaj (October 2011 – August 2016, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at the Intel Corporation
- Edward Tomlinson (October 2012 – May 2017, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at Bostik, Incorporated
- Seung Hyun Sung (October 2012 – May 2017, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at LG Displays
- Darby Hoss (October 2013 – August 2017, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at the Intel Corporation
- Jennifer Laster (October 2013 – December 2017, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at the Intel Corporation
- Martha Hay (October 2013 – May 2018, Graduated with a Ph.D. Degree in Chemical Engineering)
  - Employed at the Intel Corporation
- Holly Chan (October 2012 – August 2014), Graduated with a M.S. Degree in Chemical Engineering)
  - Employed at Acorda Therapeutics, Inc.
- Michael Bauman (October 2012 – August 2013, Graduated with a M.S. Degree in Chemical Engineering)
  - Returned to The Whirlpool Corporation
- Nicole Perrelli (August 2013 – August 2014, Graduated with a M.S. Degree in Chemical Engineering)
  - Returned to The Whirlpool Corporation
- Nicholas Vaive (October 2015 – May 2016, Graduated with a M.S. Degree in Chemical Engineering)
  - Returned to The Whirlpool Corporation
- Jessica Sergeant (October 2013 – May 2017, Graduated with a M.S. Degree in Chemical Engineering)
  - Doctoral Student in Materials Engineering at Purdue University
- Adam Wingate (October 2014 – May 2017, Graduated with a M.S. Degree in Chemical Engineering)
- Stephen Gilbert (October 2015 – May 2018, Graduated with a M.S. Degree in Chemistry)
- Varad Agarkar (October 2016 – August 2018, Graduated with a M.S. Degree in Chemistry)
  - Doctoral Student in Chemistry at Louisiana State University

### Undergraduate Students Mentored (40 Total, 10 Current)

- Marley Jonah (June 2019 – present), Chemistry, Purdue University
- Wilson Lee (January 2019 – present), Chemical Engineering, Purdue University
- Katherine Wysocki (January 2018 – present), Chemical Engineering, Purdue University
- Anthony Maquet (August 2018 – present), Chemical Engineering, Purdue University
- John Vergados (January 2019 – present), Chemical Engineering, Purdue University
- Leyla Akmanligil (August 2019 – present), Chemical Engineering, Purdue University

- Arsh Bhatia (August 2019 – present), Chemical Engineering, Purdue University
- Kelly Brayton (August 2019 – present), Chemical Engineering, Purdue University
- Laura Hoagland (August 2019 – present), Chemical Engineering, Purdue University
- Janessa Schaefer (August 2019 – present), Chemical Engineering, Purdue University

#### Former Undergraduate Students

- Elliot Sepos (August 2011 – December 2012), Chemical Engineering, Purdue University
- Sean Hadley (August 2011 – May 2013), Chemical Engineering, Purdue University
- Adewale Adeyemo (January 2012 – January 2014), Chemical Engineering, Purdue University
- Michael Lehn (February 2012 – May 2013), Chemical Engineering, Purdue University
- Sara Berger (September 2012 – May 2013), Chemical Engineering, Purdue University
- Monica Del Real (May 2013 – January 2014), Chemical Engineering, Purdue University
- Dominic Hurley (August 2013 – May 2014), Chemistry, Purdue University
- Anna Knowles (August 2013 – May 2014), Chemical Engineering, Purdue University
- Lucio Galicia (May 2013 – August 2014), Chemical Engineering, Purdue University
- Yucheng Wang (September 2012 – December 2014), Chemical Engineering, Purdue University
- Matthew Willmore (August 2014 – December 2014), Chemical Engineering, Purdue University
- Si Hui Wong (September 2012 – May 2015), Chemical Engineering, Purdue University
- Krystopher Jochem (January 2013 – May 2015), Chemical Engineering, Purdue University
- Ryan Pitzer (January 2015 – May 2015), Chemical Engineering Purdue University
- Alexander Muller (September 2012 – August 2015), Chemical Engineering, Purdue University
- Xiaoqin Zhu (August 2013 – August 2015), Chemical Engineering, Purdue University
- Nicholas Deom (October 2014 – May 2016), Chemical Engineering, Purdue University
- Stuart Hillsmier (September 2013 – May 2016), Chemical Engineering, Purdue University
- Alec Bokhart (January 2015 – August 2016), Chemical Engineering, Purdue University
- Christian White (August 2015 – August 2016), Chemical Engineering, Purdue University
- Emily Alcorace (August 2013 – May 2017), Chemical Engineering, Purdue University
- Toni Adetayo (January 2015 – May 2017), Chemical Engineering, Purdue University
- Elizabeth Jergens (January 2015 – May 2017), Chemical Engineering, Purdue University
- Ryan Bing (August 2017 – January 2018), Chemical Engineering, Purdue University
- Michael Steinerd (January 2015 – May 2018), Chemical Engineering, Purdue University
- Daniel Ebert (January 2016 – May 2018), Chemical Engineering, Purdue University
- Allison Strong (August 2016 – May 2018), Chemical Engineering, Purdue University
- Haley Vapnik (August 2016 – May 2018), Chemical Engineering, Purdue University
- Matthew Saunders (August 2018 – May 2019), Chemical Engineering, Purdue University
- Omobolaji Oniwinde (June 2019 – December 2019) Chemical Engineering, Purdue University

#### **High School Students Mentored (10 Total, 0 Current)**

##### Former High School Students

- David Gonzalez (August 2017 – February 2018) from Lafayette, Indiana
- Ian Trinh (June 2017 – August 2017) from West Lafayette, Indiana
- Alexia Umberger (February 2015 – August 2015) from West Lafayette, Indiana
- Veronica Bawling (June 2015 – August 2015) from Lafayette, Indiana
- Yanqiao Fang (October 2014 – May 2015) from Lafayette, Indiana
- Jamila Abu-omar (October 2013 – May 2015) from West Lafayette, Indiana

- Devon Wolfe (June 2014 – August 2014) from Lafayette, Indiana
- Estivan Carreon (August 2013 – May 2014) from Lafayette, Indiana
- Yasmeen Hafeez (June 2012 – August 2012) from West Lafayette, Indiana