

**Bryan S. Beckingham**  
Dept. of Chemical Engineering,  
Auburn University, Auburn, AL 36849  
<https://ecm.eng.auburn.edu/wp/polymerlab/>

**Education and Training**

Undergraduate:	Clarkson University	Chemical Engineering	B.S.	2007
Graduate:	Princeton University	Chemical and Biological Engineering	M.A.	2009
	Princeton University	Chemical and Materials Engineering	Ph.D.	2013
Postdoctoral:	Lawrence Berkeley	Fellow, Material Science Division &		2013-2015
	National Laboratory	Joint Center for Artificial Photosynthesis		

**Professional Appointments**

2016-present Assistant Professor, Dept. of Chemical Engineering, Auburn University  
2016-2020 Research Affiliate, Joint Center for Artificial Photosynthesis

**Synergistic Activities:**

1) *Undergraduate Education and Mentorship:* National Academy of Engineering: Frontiers of Engineering Education 2016 invited participant; Undergraduate research mentor (14) (8 from underrepresented groups) including 6 Auburn Undergraduate Researchers Fellows (5 from underrepresented groups); ASEE 2017 Summer School for Chemical Engineering Faculty; Level 1 EASL certified by Biggio Center for the Enhancement of Teaching and Learning (CETL); Biggio CETL 2016 Summer Course (Re)Design Participant; Auburn New Faculty Scholar 2016-2017; Auburn New Faculty Scholar Faculty Mentor 2018-2019, Air Products Assistant in Instruction Award 2011.

2) *Graduate Education and mentorship:* Founder and Organizing Committee Chair Auburn Center for Polymers and Advanced Composites Graduate Summer Seminar Series 2018-present; Research Advisor/co-Advisor 7 Ph.D. and 3 M.S. (4 from underrepresented groups), Dissertation Committee member 9 students (6 Chemical Eng., 2 Polymer and Fiber Eng., 1 Chemical Eng. at Tuskegee University); Auburn Chemical Eng. graduate recruiting committee chair 2018-2020 (member 2016-present)

3) *Outreach and Service:* Auburn Engineering Jr. TIGER Camp organizer 2018-present, Sr. TIGER Camp organizer 2020; Auburn Chemical Eng. Faculty Senator (2017-present); Auburn Center for Polymer and Advanced Composites, Faculty Steering and Education Committee Member (2016-present); APS March Meeting Abstract sorter (2017, 2018) and Session Chair (2017, 2018); AIChE Annual meeting session organizer/chair (2019, 2020) Auburn E-day demonstration organizer (2017-present); ASEE Southeast Region Chemical Engineering Vice-chair (2018-present)

4) *Invited Reviewer:* ACS Macro Letters, Macromolecules, Soft Matter, Membranes, Macromolecular Chemistry and Physics, Materials Letters, IJCEE, Cambridge Press, JoVE, Helyion, Biomacromolecules, Biomedicines, Fuel, Macromolecular Rapid Communications, Sensors, Scientific Reports, ACS Applied Polymer Materials, Polymer Bulletin, Molecules, Progress in Material Science, Medical Devices and Sensors, RSC Advances, and Magnetic Resonance in Chemistry, In addition to serving as a proposal reviewer for the National Science Foundation, Department of Defense, and the Department of Energy.

5) *Scientific Society Affiliations:* American Institute of Chemical Engineers (AIChE), North American Membrane Society (NAMS), American Physical Society (APS), American Chemical Society (ACS), American Geophysical Union (AGU), American Society for Engineering Education (ASEE), Tau Beta Pi, Omega Chi Epsilon, Pi Mu Epsilon.

**Research Support**

11. **Beckingham, B.S. [PI]** *Dissolution, Thermal & Macromolecular Characterization Of Polyethersulfone*, Baxter Inc., \$4,000, 12/9/20-12/31/21
10. **Beckingham, B.S. [PI]** *DOE CAREER: Transport of complex mixtures in ion-containing polymer membranes*, Department of Energy, \$750,000, 9/1/20-8/31/25

9. Beckingham, L.E. [PI], **Beckingham, B.S. [co-PI]** *3D printing of reactive porous media to enhance understanding of porosity-permeability evolution*, National Science Foundation-EAR, \$331,833, 8/1/20-7/31/23.
8. **Beckingham, B.S. [PI]** *Cooperative Transport in Ion Conducting Membranes* National Science Foundation-CBET, \$259,036. 6/1/20-5/31/23.
7. **Beckingham, B.S. [PI]**, *Actively shaken in situ passive sampler platform for methylmercury*, Smithsonian Environmental Research Center, SERDP Project ER-2540. \$30,000. 5/1/19-12/1/20
6. Elizabeth Lipke, E. (PI/PD), David, A. (co-PI). Faculty: E. Lipke, A. David, V. Davis, P. Lall, M. Auad, E. Davis, **B. Beckingham**, R. Pantazes, M. Greene, R. Arnold, A. Wooldridge, D. Crumbley, L. De La Fuente, D. Blerch, *Graduate Fellowships in Biomaterials Engineering and Biomanufacturing*, Dept. of Education. \$960,600. 10/1/19-9/30/22
5. **Beckingham, B.S. [PI]**, Villacorta, F.L. (co-I), *Improved asphalt additive materials*, Auburn Intramural Grants program, \$20,000. 5/1/19-4/30/21
4. Beckingham, L.E. (PI), A. Uddin, **B. Beckingham [co-PI]**, C. Carrero, D. King, A. Schindler, T.S. Oh, A. Adamczyk, M.K. Lee, M. Miletic. *Development of an Alabama CO<sub>2</sub> Utilization and Storage Center at Auburn University*. Auburn University Presidential Awards for Interdisciplinary Research. \$255,000. Duration 3 years: 7/1/2018-06/31/2021.
3. **Beckingham, B.S. [PI]**, Celestine, A.D. (co-I) *Additive manufacturing of self-healing composites*, Auburn Intramural Grants program, \$69,510. 5/1/18-4/30/20
2. Oh, T.S. [PI], **Beckingham, B.S. [co-I]**, Auad, M., *Electrospun organic-inorganic composite membranes for water treatment*, Auburn Intramural Grants program, \$6,000. 5/1/17-4/30/19
1. **Beckingham, B.S. [PI]**, *Smart-gating polymersomes for regulated insulin release*, Auburn Intramural Grants program, \$6,000. 5/20/17-5/19/19

#### **Peer Reviewed Publications:**

25. Kim, J.M.; Beckingham, B.S. “Comonomer effects on co-permeation of methanol and acetate in cation exchange membranes” *European Polymer Journal*, 2021. *In Press*
24. Alizadeh, N.; Barde, M.; Minkler, M.; Celestine, A.D.; Agrawal, V.; Beckingham, B.S.; Auad, M.L. “High-fracture-toughness acrylic-polyurethane-based graft-interpenetrating networks for transparent applications” *Polymer International*, 2020, <https://doi.org/10.1002/pi.6149>
23. Shinde, V.V.; Celestine, AD; Beckingham, L.E.; Beckingham, B.S. “Stereolithography 3D printing of Microcapsule-Catalyst based Self-healing Composites” *ACS Applied Polymer Materials*, 2020, 2020, 2,11, 5048-5057.
22. Dobyns, B.M.; Kim, J.M.; Beckingham, B.S. “Multicomponent transport of alcohols in Nafion 117 measured by in situ ATR FTIR spectroscopy” *Polymer*, 2020, 209, 123046.
21. Kim, J.M.; Dobyns, B.M.; Zhao, R.; Beckingham, B.S. “Multicomponent transport of methanol and sodium acetate in a series of PEGDA-AMPS cation exchange membranes” *Journal of Membrane Science*, 2020, 614, 118486.
20. Dobyns, B.M.; Kim, J.M.; Beckingham, B.S. “Multicomponent transport of methanol and sodium acetate in poly(ethylene glycol) diacrylate membranes of varied fractional free volume” *European Polymer Journal*, 2020, 134, 109809. **FEATURED COVER ARTICLE**
19. Kim, J.M.; Chakrapani, S.B.; Beckingham, B.S. “Tuning Compositional Drift in the Anionic Copolymerization of Styrene and Isoprene” *Macromolecules*, 2020, 53, 10, 3814-3821.
18. Minkler, M.J.; Kim, J.M.; Shinde, V.V.; Beckingham, B.S. “Low-field 1H NMR spectroscopy: Factors impacting signal-to-noise ratio and experimental time in the context of mixed microstructure polyisoprenes” *Magnetic Resonance in Chemistry*, 2020, 1-9. Doi:10.1002/mrc.5022 **INVITED SPECIAL ISSUE**
17. Minkler Jr., M.J.; Kim, J.; Lawson, K.E.; Ali, A.; Zhao, R.; Adamczyk, A.J.; Beckingham, B.S. “Solution processible statistical poly(3-methoxythiophene)-co-poly(3-hexylthiophene) copolymer” *Materials Letters*, 2019, 256, 126563.

16. Minkler Jr., M.J.; Beckingham, B.S. “Statistical Copolymers of 3-hexyl thiophene and thiophene: Impact of thiophene content on optoelectronic and thermal properties.” *Materials Today Communications*, 2019, 20, 100547.
15. Lynd, N.A.; Ferrier, R.C.; Beckingham, B.S. “Recommendation for Accurate Experimental Determination of Reactivity Ratios in Chain Copolymerization.” *Macromolecules*, 2019, 52, 6, 2277-2285.
14. Chakrapani, S. B.; Minkler Jr., M.J.; Beckingham, B.S. “Low-Field <sup>1</sup>H-NMR Spectroscopy for Compositional Analysis of Multicomponent Polymer Systems” *Analyst*, 2019, 144, 1679-1686.
13. Beckingham, B.S.; Lynd, N.A.; Miller, D.J. “Monitoring multicomponent transport using in situ ATR FTIR spectroscopy” *Journal of Membrane Science*, 2018, (550), 348-356.
12. Carter, B.M.; Dobyns, B.M.; Beckingham, B.S.; Miller, D.J. “Multicomponent transport of alcohols in an anion exchange membrane measured by in-situ ATR FTIR spectroscopy” *Polymer*, 123 (2017), 144-152. [doi]
11. Sanoja, G.E; Popere, B.C.; Beckingham, B.S.; Evans, C.M.; Lynd, N.A.; Segalman, R.A. “Structure-Conductivity Relationships of Block Copolymer Membranes based on Hydrated Protic Polymerized Ionic Liquids: Effect of Domain Spacing” *Macromolecules*, 2016, 49 (6), 2216–2223. [doi]
10. Beckingham, B.S.; Sanoja, G.E.; Lynd, N.A. “Simple and Accurate Determination of Reactivity Ratio Using a Nonterminal Model of Chain Copolymerization” *Macromolecules*, 2015, 48 (19), 6922-6930. [doi]
9. Davidson, E.C.; Beckingham, B.S.; Ho, V.; Segalman, R.A. “Confined Crystallization in Lamellae Forming Poly(3-(2'-ethylhexylthiophene) (P3EHT) Block Copolymers” *J. Polym. Sci. Part B: Polym. Phys.*, 54: 205–215. doi:10.1002/polb.23904. [doi]
8. Himmelberger, S.; Duong, D.T.; Northrup, J.E.; Rivnay, J.; Beckingham, B.S.; Koch, F.P.V.; Smith, P.; Stingelin, N.; Segalman, R.A.; Mannsfeld, S.C.B.; Salleo, A. “Role of Side-Chain Branching on Thin-film Structure and Electronic Properties of Polythiophenes” *Advanced Functional Materials*, 2015, 25, 2616-2624. [doi]
7. Beckingham, B.S., Ho, V. and Segalman, R. A. “Melting Behavior of Poly(3-(2'-ethyl)hexylthiophene)” *Macromolecules*, 2014, 47, 8305-8310. [doi]
6. Beckingham, B.S.; Ho, V.; Segalman, R.A. “Formation of a Rigid Amorphous Fraction in Poly(3-(2'-ethyl)hexylthiophene)” *ACS Macro Letters*, 2014, 684-688. [doi]
5. Ho, V.; Beckingham, B. S.; Hoi, H. Ng; Segalman, R. A. “Control of Thermal and Optoelectronic Properties in Conjugated Poly(3-alkylthiophenes)” *MRS Communications*,
4. Beckingham, B.S., and Register, R.A. “Architecture-Induced Microphase Separation in Nonfrustrated A-B-C Triblock Copolymers” *Macromolecules*, 2013, 46, 3486-3496. [doi]
3. Beckingham, B.S., and Register, R.A. “Regular Mixing Thermodynamics of Hydrogenated Styrene-Isoprene Block-Random Copolymers” *Macromolecules*, 2013, 46, 3084-3091. [doi]
2. Beckingham, B.S., Burns, A.B., and Register, R.A. “Mixing Thermodynamics of Ternary Block-Random Copolymers Containing a Polyethylene Block” *Macromolecules*, 2013, 46, 2760-2766. [doi]
1. Beckingham, B.S. and Register, R.A. “Synthesis and Phase Behavior of Block-Random Copolymers of Styrene and Hydrogenated Isoprene” *Macromolecules*, 2011, 44, 4313-4319. [doi]

### **Conference Proceedings**

1. Beckingham, B.S. “Visual learning experiences to enhance understanding in the material and energy balance course” in *Proceedings of the ASEE Southeastern Section Annual Conference 2019*. March 2019. <http://www.asee-se.org/proceedings/ASEE2019/2019papersbynumber.htm>
2. Miller, D.J., Beckingham, B.S. Monitoring multicomponent transport using in-situ FTIR spectroscopy, in *Advanced Membrane Technology VII*, Isabel C. Escobar, Professor, University of Kentucky, USA Jamie Hestekin, Associate Professor, University of Arkansas, USA Eds, ECI Symposium Series, (2016). [http://dc.engconfintl.org/membrane\\_technology\\_vii/22](http://dc.engconfintl.org/membrane_technology_vii/22)

## ***g: Presentations***

### ***Invited:***

11. Bryan S. Beckingham “Low Field NMR of Polymer Materials: An Introduction to Characterizing Multicomponent Polymer Systems” Oxford Instruments Webinar, Sept. 24, 2020.
10. Bryan S. Beckingham “Investigating Multicomponent Transport in Hydrated, Dense Polymer Membranes” Invited Seminar (virtual) Mississippi State, Oct. 16, 2020.
9. Bryan S. Beckingham “Towards Understanding Multicomponent Transport in Polymer Membranes” Invited Seminar (virtual) U. Southern Mississippi, Oct. 7, 2020.
8. Bryan S. Beckingham “Multicomponent Transport in Dense Polymer Membranes” U. of Alabama, Oct. 24, 2019.
7. “Manipulating Polymer Properties Through Synthetic Design: Copolymerization!” Rochester Institute of Technology, Sept. 17, 2019.
6. Bryan S. Beckingham “Evaluation of copolymerization kinetics and copolymer compositional analysis with low-field <sup>1</sup>H NMR” Oxford Instruments. May 3<sup>rd</sup>, 2017.
5. Bryan S. Beckingham “In situ spectroscopic methods towards copolymerization kinetics and emergent transport in polymer membranes” U. South Carolina, Columbia, SC. Feb. 9<sup>th</sup>, 2017
4. Beckingham, B.S. “Structure-Property Relationships in Polymer Materials” Virginia Tech, Dept. of Chemical Engineering Seminar. April 2015.
3. Beckingham, B.S. “Design and Synthesis of Hierarchical Macromolecular Materials”. University of Arkansas, Distinguished Lecture Series. February 2015.
2. Beckingham, B.S. “Polyolefin mixing thermodynamics and structure-property relationships of poly(alkylthiophenes)” Exxon Corporate Research, Annandale, NJ. July 2014.
1. Beckingham, B.S., and Register, R.A. “Phase Behavior of Amorphous and Semicrystalline ABC Block-Random Copolymers.” Invited oral presentation at Gordon Research Seminar. Mount Holyoke, MA. July, 2012.

### ***Contributed 2016-present***

Note: 1. \* indicates Auburn graduate student contributions.

2. † indicates presenter.

3. ^ indicates Auburn undergraduate student contributions.

4. + indicates non-Auburn student contributions

70. Beckingham, B.S.<sup>†</sup>, Minkler, M.J.\*<sup>†</sup>, Hou, X.<sup>^</sup>, Iloejesi, C.O.\*<sup>†</sup>, Schindler, A.K., Beckingham, L.E. *Polymer Network Materials for Wellbore Repair: Curing kinetics and physical properties of thiol-crosslinked PEOD/DGEBA Copolymers* Presented at American Geophysical Union Annual meeting, Washington D.C., December 12<sup>th</sup>, 2019.
69. Dobyns, B.M.\*<sup>†</sup>, Beckingham, B.S. *Complex Multicomponent Transport through Polymeric Membranes* Presented at AIChE Fall meeting Orlando, FL. Nov. 12, 2019.

68. Dobyns, B.M. and Beckingham B.S. “Multicomponent Transport Speciation of Membranes with Differing Fractional Free Volume via In-Situ Characterization.” American Institute of Chemical Engineers. Orlando, FL. Nov. 12, 2019.
67. Kim, J.\*†, Dobyns, B.M.\*, Zhao, R.\*, Beckingham B.S. *Molecular transport of aqueous mixtures in sulfonated polyether-based ion exchange membrane* Presented at AIChE Fall meeting Orlando, FL. Nov. 12, 2019.
66. Calopiz, M.C.<sup>+</sup>, Marie, J.S.<sup>+</sup>, Kim, J.M., Beckingham, B.S., Padmanabhan, P.<sup>†</sup> *Thermodynamic Mixing Rules of Block-Random Copolymers* Presented at AIChE Fall meeting Orlando, FL. Nov. 12, 2019.
65. Minkler Jr., M.J.\*†, Beckingham, B.S. *Structure-Property-Processing Relationships of Statistical 3-hexylthiophene Containing Copolymers* Presented at AIChE Fall Meeting 2019. Orlando, FL. November 14<sup>th</sup>, 2019.
64. Shinde, V.V.\*†, Beckingham, B.S. *Microcapsule based self-healing for 3D printing* Presented at AIChE Fall meeting at Orlando, Nov.15,2019.
63. Beckingham, B.S.<sup>†</sup>, Leiva Villacorta, F.. *Improved Asphalt Additive Materials: Functional Block Copolymers* Presented at Auburn Faculty This is Research. Oct. 2019.
62. Beckingham, B.S.<sup>†</sup> *Enhanced Understanding of Chemical Engineering Concepts through Visual Demonstrations*. Auburn Conversations in Celebration of Teaching. Nov, 2019.
61. Kim, J.\*†, and Beckingham, B.S. *Preliminary study to improve ion exchange membrane for CO2 reduction cells* Presented at the Three Minute Thesis (3MT®) Exhibition Presentation as Runner-Up, Auburn, AL, Nov. 21, 2019
60. Kim, J.\*†, Dobyns, B.M.\*, Zhao, R., Beckingham B.S. *Transport of polyatomic anion and alcohol in cation exchange membranes* Presented at the Graduate Engineering Research Showcase. Auburn, AL November 7<sup>th</sup>, 2019.
59. Dobyns, B.M.\*†, Beckingham B.S. *In-situ Speciation of Multicomponent Transport through Polymeric Membranes* Presented at the Graduate Engineering Research Showcase. Auburn, AL November 7<sup>th</sup>, 2019.
58. Minkler, Jr., M.J.\*†, Kim, J.M.\*, Shinde, V.S.\*, Chakrapani, S.B.\*, Beckingham B.S., *Experimental and Instrumental Parameters Affecting Signal-to-Noise Ratio in Low-Field <sup>1</sup>H Nuclear Magnetic Resonance Spectroscopy: A Case Study with Mixed Microstructure Polyisoprenes* Presented at the Graduate Engineering Research Showcase. Auburn, AL November 7<sup>th</sup>, 2019.
57. Shinde, V.V.\*†, Beckingham, B.S. *Microcapsules based Self-healing for 3D printing* Presented at the Auburn Student Research Symposium, Auburn, AL. Apr. 9, 2019.
56. Kim, J.M.\*†, Beckingham, B.S. *Preliminary study to improve ion exchange membrane for CO2 reduction cells* Presented at the Three Minute Thesis (3MT®) Competition, Auburn, AL, Oct. 24, 2019.
55. Kim, J.M.\*†, Dobyns, B.M.\*, Beckingham, B.S. *Transport of a Binary Mixture in Nonporous Ion Exchange Membranes* Presented at the Center for Polymers and Advanced Composites (CPAC) Graduate Student Summer Seminar Series 2019, Auburn, AL, Aug. 8, 2019.
54. Dobyns, B.M.\*†, Beckingham, B.S. “*In-situ Speciation of Multiple Component Transport through Polymeric Membranes* Presented at the Center for Polymers and Advanced Composites (CPAC) Graduate Student Summer Seminar Series 2019, Auburn, AL, Aug. 8, 2019.

53. Minkler, Jr., M.J.\*<sup>†</sup>, Hou, X.<sup>^</sup>, Beckingham, B.S., *Curing Kinetics of Thiol-crosslinked PEOD/DGEBA Copolymers with Varied Comonomer Compositions* Presented at Auburn University Center for Polymers and Advanced Composites Graduate Student Summer Seminar Series. July 11th, 2019.
52. Dobyns, B.M.\*<sup>†</sup>, Miller, D.J., Beckingham, B.S.<sup>†</sup> *Multicomponent transport in hydrated polymer membranes: Alcohols, Formate and Acetate in Nation 117* Presented at International Society for Porous Media 11th Annual Meeting: InterPore 2019, Valencia, Spain May 8th 2019.
51. Shinde, V.S.\*<sup>†</sup>, Beckingham, B.S. *Microcapsules based Self-healing for 3D printing* Presented at Research Symposium held at Auburn university, AL. April 9th 2019.
50. Dobyns, B.M.\*<sup>†</sup>, Beckingham, B.S. *Molecular transport through ion exchange membranes for artificial photosynthesis: An in situ spectroscopic approach to investigating multicomponent transport behavior* Presented at SECCUS Symposium Auburn, AL. April 15th, 2019.
49. Beckingham, B.S.<sup>†</sup>, *Multicomponent transport in membranes for solar fuels devices* Presented at SECCUS Symposium Auburn, AL. April 15th, 2019.
48. Kim, J.M.\*<sup>†</sup>, Beckingham, B.S. *Multi-solute transport behavior of aqueous mixtures through polyether-based membranes* Poster presented at North American Membrane Society Pittsburgh, PA. May 13th, 2019.
47. Minkler Jr., M.J.\*<sup>†</sup>, Hou, X.<sup>^</sup>, Beckingham, B.S. *Curing Kinetics for PEOD/DGEBA Copolymer Using DSC* Poster presented at SECCUS 1st Annual Meeting Auburn, AL. April 15th, 2019.
46. Kim, J.M.\*<sup>†</sup>, Beckingham, B.S. *Solute sorption and transport behavior of methanol and acetate in Selemion® AMV-N* Presented at Auburn Research Student Symposium Auburn, AL. April 9th, 2019. (Awarded Best Oral Poster: College of Engineering)
45. Minkler Jr., M.J.\*<sup>†</sup>, Sparks, T.M.<sup>^</sup>, Beckingham, B.S. *Effect of 3-Position Functional Groups on GRIM- Synthesized Polythiophene Reactivity Ratios* Presented at Auburn Student Research Symposium Auburn, AL. April 9<sup>th</sup>, 2019.
44. Kim, J.M.\*<sup>†</sup>, Baird, M.<sup>^</sup>, Beckingham, L.E., Beckingham, B.S. *CO<sub>2</sub> transport in hydrated porous geologic systems: diffusion cell design and performance* Presented at SECCUS Symposium Auburn, AL. April 15th, 2019.
43. Baird, M.<sup>^</sup><sup>†</sup>, Kim, J.M.\*<sup>†</sup>, Thakur, R.K.\*<sup>†</sup>, Carrero, C.A., Beckingham, B.S. *Polymer-Catalyst Mixed Membranes: Impact on CO<sub>2</sub> Permeability* Presented at SECCUS Symposium Auburn, AL. April 15th, 2019.
42. Beckingham, B.S.<sup>†</sup>, Minkler Jr., M.J.\*<sup>†</sup>, Ilojesi, C.O.\*<sup>†</sup>, Schindler, A.K., Beckingham, L.E.. *Polymer-based wellbore sealant degradation and sealant-cement interactions towards improved wellbore cement fracture sealants* Poster presented at American Geophysical Union Fall meeting, Washington, D.C. Dec. 14th, 2018.
41. Minkler Jr., M.J.\*<sup>†</sup>, Beckingham, B.S. *Variation of Thermal and Optoelectronic Properties Through Compositional Control of Thiophene-Containing Statistical Copolymers* Presented at American Physics Society Los Angeles, CA. March 7th, 2018.
40. Dobyns, B.M.\*<sup>†</sup>, Beckingham, B.S. *Complex Solute Transport through a Cation Exchange Membrane Via in Situ ATR FTIR Spectroscopy* Poster presented at North American Membrane Society Annual meeting, Lexington, KY June 11 2018.
39. Kim, J.M.\*<sup>†</sup>; Beckingham, B.S. *Transport Behavior of Block Copolymer Membranes: Diffusion Cell and Pervaporation Performance* Poster presented at North American Membrane Society Annual meeting, Lexington, KY June 12th, 2018.

38. Dobyns, B.M.\* , Beckingham, B.S.† *Co-permeation of alcohols in hydrated polymer membranes* Presented at AICHE annual meeting, Pittsburgh, PA. Oct. 31st, 2018.
37. Kim J. ^† , Minkler Jr., M.J.\* , Beckingham B.S. *Synthesis and Properties of PTEMA* Poster presented at The Greater Alabama Black Belt Region (GABR) Louis Stokes Alliance for Minority Participation (LSAMP) Alliance Making to Achieve Knowledge, Excellence and Recognition in STEM (MAKERS) S-STEM Alliance 1st Joint Annual Conference. Tuskegee, AL. Apr. 15, 2018.
36. Kim J. ^† , Minkler Jr., M.J.\* , Beckingham B.S. *Synthesis and Properties of PTEMA* Poster presented at American Institute of Chemical Engineering Southern Regional Conference. Baton Rouge, LA. Apr. 7, 2018.
35. Minkler Jr., M.J.\*† , Beckingham, B.S. *Effect of Statistical Polythiophene Copolymer Microstructure on Physical and Optoelectronic Properties* Presented at Auburn University This Is Research Symposium. Auburn, AL. March 26th, 2018.
34. Dobyns, B.M.\*† , Beckingham, B.S. *Complex Solute Transport through the Polymeric Cation Exchange Membrane, Nafion* Poster Presented at Auburn University This is Research Symposium. Auburn, AL. March 26th, 2018.
33. Kim, J.M.\*† , Beckingham, B.S. *Fundamental Understanding of Pervaporation Membranes for Organic-Organic Mixtures* Poster Presented at Auburn University This is Research Symposium. Auburn, AL. March 26th, 2018.
32. Kim J. ^† , Minkler Jr., M.J.\* , Beckingham B.S. *Synthesis and Properties of PTEMA* Poster presented at This is Research Student Symposium. Auburn University, Auburn, AL. Mar. 26, 2018
31. Kim, J.M.\*† , Beckingham, B.S. *Transport Behavior of Block Copolymer Membranes: Diffusion Cell and Pervaporation Performance* Poster presented at Auburn CPAC Graduate Student Summer Symposium. Auburn, AL. June 14th, 2018.
30. Kim, J.M.\*† , Beckingham, B.S. *Liquid Phase Transport in Polymeric Membranes: Pervaporation, Diffusion Cell, Stirred Cell Performance* Poster presented at Auburn University CPAC Advisory Board Meeting. Auburn, AL. October 19th, 2018.
29. Shinde, V.V.\*† , Beckingham, B.S. *Self healing polymer filaments for additive manufacturing* Poster presented at Auburn University, This is Research Symposium. Auburn, AL. March 26th, 2018.
28. Kim, J.M.\*† , Beckingham, B.S. *Liquid Phase Transport in Polymeric Membranes: Pervaporation, Diffusion Cell, Stirred Cell Performance* Poster presented at Auburn University Chemical Engineering Open House. Auburn, AL. November 2nd, 2018.
27. Shinde, V.V.\*† , Beckingham, B.S. *Self healing polymer filaments for additive manufacturing* Poster presented at Auburn University, CPAC Advisory board session, Auburn, AL. October 19th, 2018.
26. Dobyns, B.M.\*† , Beckingham, B.S. *Complex Solute Transport through Polymeric Membranes via in situ ATR FTIR Spectroscopy* Poster Presentation at Auburn University Chemical Engineering Open House. Auburn, AL. November 2nd, 2018
25. Shinde, V.V.\*† , Beckingham, B.S. *Self healing polymer filaments for additive manufacturing* Poster presented at Auburn University, Open house event Auburn, AL. November 2nd, 2018.
24. Minkler Jr., M.J.\*† , Beckingham, B.S. *Effect of Statistical Thiophene Copolymer Microstructure on Solid-State and Optoelectronic Properties* Poster presented at Auburn University CPAC Advisory Board Meeting. Auburn, AL. October 19th, 2018.

23. Shinde, V.V.\*<sup>†</sup>, Beckingham, B.S. *Self healing polymer filaments for additive manufacturing* Poster presented at Auburn University, Graduate research showcase, 2018, Auburn, AL. October 24th, 2018.
22. Minkler Jr., M.J.\*<sup>†</sup>, Beckingham, B.S. *Effect of Statistical Thiophene Copolymer Microstructure on Solid-State and Optoelectronic Properties* Poster presented at Chemical Engineering Alumni-Council Open House. October 19th, 2018 and November 2nd, 2018. Auburn, AL.
21. Dobyns, B.M.<sup>†\*</sup>, Beckingham, B.S. *Determination of Neutral Solute Permeabilities and Membrane Selectivities through PPO/PAGE Copolymer Membranes via in situ ATR FTIR Spectroscopy* Poster presented at APS March meeting, New Orleans, LA. March 15th, 2017.
20. Minkler, M.J.<sup>†\*</sup>, Beckingham, B.S. *Effect of Polyalkylthiophene Microstructure on Physical and Optoelectronic Properties* Poster presented at APS March meeting, New Orleans, LA. March 15th, 2017.
19. Miller, D.J.<sup>†</sup>, Beckingham, B.S. *Multicomponent transport in membranes for solar fuels devices* Presented at 253rd American Chemical Society National Meeting & Expo, San Francisco, CA. April 2nd, 2017.
18. Dobyns B.M.<sup>†\*</sup>, Beckingham, B.S. *Determination of Solute Permeabilities and Membrane Selectivities through Copolymer Membranes via in situ ATR FTIR Spectroscopy* Poster presented at This is Research April Meeting, Auburn, AL. April 13th, 2017.
17. Minkler, M.J.<sup>†\*</sup>, Beckingham B.S. *Impact of Microstructure on Physical and Optoelectronic Properties of Polyalkylthiophenes* Poster presented at This Is Research Student Symposium Auburn, AL April 13th, 2017.
16. Miller, D.J.<sup>†</sup>, Beckingham, B.S. *Multicomponent transport in membranes for solar fuels devices* 11th International Congress on Membranes and Membrane Processes. San Francisco, CA July 2017.
15. Beckingham, B.S.<sup>†</sup> *Accelerating the learning curve: Improving problem solving skills in sophomore chemical engineers* Poster presented at American Society for Engineering Education: Summer school for Chemical Engineering Faculty” August, 2017.
14. Dobyns, B.M.\*<sup>†</sup>, Minkler, M.J.\*<sup>†</sup>, Chakrapani, S.B.\*<sup>†</sup>, Beckingham, B.S.<sup>†</sup> *The Beckingham Polymer Lab: Precise polymer synthesis and characterization towards functional polymer materials: Reaction Kinetics, Polymer Membranes, and Semi-conducting polymers* Presented at Auburn: This is Research; Faculty Symposium, Auburn, AL. Sept. 22, 2017.
13. Miller, D.J. Dobyns, B.M.\*<sup>†</sup>, Beckingham, B.S.<sup>†</sup> *In Situ Monitoring of Emergent Transport in Polymer Membranes* Presented at AIChE annual meeting, Minneapolis, MN. Nov. 2nd, 2017.
12. Minkler, M.J.<sup>†</sup>, Beckingham, B.S. *Effect of Poly(3-substituted thiophenes) microstructure on Physical and optoelectronic properties* Poster presented at Auburn CEGS Graduate Engineering Research Showcase, Nov. 2017.
11. Dobyns, B.M.<sup>†\*</sup>, Beckingham, B.S. *Evaluation of the multicomponent transport of alcohols across Nafion® 117 using in situ ATR FTIR spectroscopy* Poster presented at Auburn CEGS Graduate Engineering Research Showcase, Nov. 2017.
10. Minkler, M.J.<sup>†\*</sup>, Beckingham, B.S. *Manipulation of Thermal and Optoelectronic Properties via Compositional Control in Polythiophene Statistical Copolymers* Poster presented at Applied Polymer Technology Extension Consortium. Hattiesburg, MS. November 13th, 2017
- 9.. Dobyns, B.M.<sup>†\*</sup>, Beckingham, B.S. *Characterization of Neutral Multicomponent Transport through Cationic Nafion® 117 Membrane Utilizing in situ ATR FTIR Spectroscopy* Poster presented at Applied Polymer Technology Extension Consortium. Hattiesburg, MS. November 13th, 2017.



8. Beckingham, B.S.<sup>†</sup> Minkler, M.J.\*; Hou, X.<sup>^</sup>, Schindler, A.K., Beckingham, L.E. *Polymer-cement interactions towards improved wellbore cement fracture sealants* Poster presented at American Geophysical Union Fall Meeting, New Orleans, LA, Dec. 12th, 2017.
7. Beckingham, B. S.<sup>†</sup>, Sanoja, G., Lynd, N. A. *Single Polymerization Determination of Reactivity Ratios Via in Situ Spectroscopic Techniques and a Simple Nonterminal Model for Chain Copolymerization* Presented at American Institute of Chemical Engineering Annual Meeting. November 2016
6. Miller, D. J., Beckingham B. S.<sup>†</sup> *Characterization of Multicomponent Transport in Membranes for Solar Fuels Devices* Presented at American Institute of Chemical Engineering Annual Meeting. November 2016
5. Dobyns, B.D.\*; Kim, J.<sup>^</sup>; Beckingham, B.S. *Quantitative in-situ speciation of multicomponent transport through Nafion™117 membranes* Poster presented at NanaBio Summit 2016, Auburn, Al. October, 2016.
4. Beckingham, B.S.<sup>†</sup>, Miller, D.J. *Quantitative monitoring of membrane permeation via in-situ ATR FT-IR spectroscopy* Presented at American Physical Society, March Meeting. Baltimore, MD. March 2016.
3. Sanoja, G.<sup>††</sup>, Popere, B., Beckingham, B.S., Evans, C., Lynd, N., Segalman, R. *Conductivity scaling relationships of nanostructured membranes based on hydrated protic polymerized ionic liquids: effect of domain spacing* Presented at American Physical Society March Meeting. Baltimore, MD. March 2016.
2. Miller, D. J., Dobyns, B.M.\*; Beckingham B. S.<sup>†</sup> *Real-time Monitoring of Single and Multicomponent Permeation via In-Situ ATR FTIR Spectroscopy* Poster presented at Gordon Research Conference: Polymer Physics. July, 2016
1. Miller, D. J.<sup>†</sup>, Beckingham, B. S. *Monitoring Multicomponent Transport using in-situ FTIR Spectroscopy* Presented at (16AK) Advanced Membrane Technology VII, ECI Conference Series Cork, Ireland September 2016.

### **Contributed Pre-2016**

15. Beckingham, B.S., Sanoja, G.E, and Lynd, N.A. “Single Polymerization Determination of Reactivity Ratios for Ideal Ionic and Coordination Copolymerizations Using in situ Spectroscopic Techniques” Presented at the International Symposium on Ionic Polymerization 2015. Bordeaux, France. July 2015
14. Beckingham, B.S., Ho, V. and Segalman, R. A. “Manipulation of P3AT Crystallization Behavior” Oral presentation at American Physical Society March Meeting. Denver, CO. March 7, 2014.
13. Beckingham, B.S., Ho, V., and Segalman, R.A. “Manipulation of P3AT Crystallization Behavior” Oral presentation at American Institute of Chemical Engineers Annual Meeting. San Francisco, CA. Nov. 5th 2013.
12. Beckingham, B.S., and Register, R.A. “Phase Behavior of All-Hydrocarbon Diblock-Random Copolymers” Oral presentation at American Physical Society March Meeting. Baltimore, MD. March 22, 2013.
11. Beckingham, B.S., and Register, R.A. “Phase Behavior of Amorphous and Semicrystalline ABC Block-Random Copolymers.” Poster presentation at Gordon Research Conference. Mount Holyoke, MA. July 24-25, 2012.
10. Beckingham, B.S., and Register, R.A. “Phase Behavior of Linear ABC Triblock-Random Copolymers with a Semi-crystalline End Block.” Oral presentation at American Physical Society March Meeting. Boston, MA. Feb. 29, 2012.
9. Beckingham, B.S., and Register, R.A. “Phase Behavior of Hydrogenated Derivatives of Linear ABC Block-Random Copolymers of Styrene and Isoprene.” Poster presentation at American Physical

Society March Meeting. Boston, MA. Feb. 27, 2012.

8. Beckingham, B.S., and Register, R.A. "Phase Behavior of 'Block-Random' Copolymers." Oral presentation at American Institute of Chemical Engineers Annual Meeting. Minneapolis, MN. Oct. 18, 2011.
7. Beckingham, B.S., and Register, R.A. "Melt and Solid-State Structures of Semicrystalline Linear ABC 'Block Random' Copolymers." Oral presentation at American Institute of Chemical Engineers Annual Meeting. Minneapolis, MN. Oct. 18, 2011.
6. Beckingham, B.S., and Register, R.A. "Styrene-Isoprene 'Block-Random' Copolymers: Synthesis and Phase Behavior" Oral presentation at 2011 Princeton-MIT Microsymposium on Polymers, Boston, MA. Jun. 1, 2011.
5. Beckingham, B.S., and Register, R.A. "Microphase Separation in Block-Random Copolymers of Styrene and Hydrogenated Isoprene" Oral presentation at American Physical Society National Meeting, Dallas, TX. Mar. 21, 2011.
4. Beckingham, B.S., and Register, R.A. "Frustrated ABC Linear Block-Random Copolymer with a Semicrystalline End Block" Poster presentation at American Physical Society National Meeting, Dallas TX. Mar. 21, 2011.
3. Beckingham, B.S., and Register, R.A. "Synthesis of and Microphase Separation in Block-Random Copolymers of Styrene and Isoprene" Poster presentation at 2010 Chemical & Biological Engineering Graduate Student Symposium. Princeton University, Princeton, NJ. Oct. 22, 2010.
2. Beckingham, B.S., Nekkanti, V. and Jachuck, R. "Photo Polymerization of Styrene Using Process Intensification" Oral presentation at Clarkson University Honors Program thesis defense, Potsdam, NY. April, 2007.
1. Beckingham, B.S., Hoopes, M.I., Goksu, E.I., Noro, M. and Longo, M. "The Stratum Corneum: Formation of Supported C24:0 Ceramide/Stearic Acid/Cholesterol Bilayers" Poster presentation at Symposium for Undergraduate Research. Stanford University, Stanford, CA. Aug. 10, 2006.