Kailong Jin

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School for Engineering of Matter, Transport and Energy, Arizona State University, Tempe, AZ 85287

PROFESSIONAL EXPERIENCE

Arizona State University, Tempe, AZ

Assistant Professor of Chemical Engineering *Since 06/29/2020*
School for Engineering of Matter, Transport, and Energy (SEMTE)
Arizona State University, Tempe, AZ

Current Affiliations

Member, Center for Sustainable Macromolecular Materials and Manufacturing *Since 2020*

Research Interests

Polymer design and manufacturing, Sustainable polymers with improved recyclability, Multilayer polymer films, Fluorescence technique, Polymer crystallization, Covalent organic framework membranes, Additive manufacturing of polymer nanocomposites

EDUCATION

University of Minnesota, Minneapolis, MN

Department of Chemical Engineering and Materials Science *2017 – 2020*
Advisor: *Christopher J. Ellison & Frank S. Bates*
Research Area: *Sustainable polymer design and manufacturing*

Northwestern University, Evanston, IL

Ph.D. in Chemical Engineering *2013 – 2017*
Advisor: *John M. Torkelson (Chemical Engineering and Materials Science)*
Dissertation: *Structure, Properties, and Sustainability of Cross-linked Polymeric Materials*

M.S. in Chemical Engineering *2012 – 2013*
Advisor: *John M. Torkelson (Chemical Engineering and Materials Science)*
Thesis: *Glass Transition Behavior of Bulk and Confined, Miscible Polymer Blends*

Nanjing Tech University, Nanjing, China

B.S. in Chemical Engineering *2008 – 2012*

HONORS/AWARDS & Pertinent Activities

1. Reviewer for National Science Foundation (NSF) Proposal Panels *2021*
2. National AIChE Conference Session Chair *2021*
3. Organizing Chemical Engineering Department Seminar Series in the School for Engineering of Matter, Transport and Energy at Arizona State University *2021*
4. Organizing Seminar Series in the Center for Sustainable Macromolecular Materials and Manufacturing at Arizona State University *2020*
5. Interviewee for Media Report on Recycling Polyurethane Foam Waste *2020*
6. Reviewer for Academic Journals *Since 2017*
7. Future Faculty Workshop Participant, University of Delaware *2018*
8. Finalist of Eastman Chemical Student Award in Applied Polymer Science, ACS Meeting *2017*
9. Teaching Apprenticeship Program Participant, Northwestern University *2017*
10. Terminal Year Cabell Fellowship, Northwestern University *2017*
11. Excellence in Graduate Polymer Research Award Symposium Participant, AIChE Meeting *2016*
12. Honorable Mention of Distinguished Graduate Researcher Award, Northwestern University *2016*
13. Sustainability Innovation Student Challenge Award (SISCA), The Dow Chemical Company *2016*
14. McCormick Research Catalyst Awards Fund, Northwestern University *2016*
15. The Fourth Annual Graduate Research Symposium at Milliken Participant, Milliken *2016*

FUNDING RECORD

Total: $3,167,137
Total as PI: $1,285,766
Total as Co-PI: $1,881,371
Total recognition: $1,242,834.7

Single or Lead PI

1. 2022 NSF: Interfacial Engineering Program – "Scalable Synthesis of Ultrathin 2D Covalent Organic Framework Membranes with Sub-1 nm Pores for Molecular Separations." $452,000; 10/1/2022-09/31/2025
   PI's recognition: $248,600
2. 2022 ACS: Petroleum Research Fund – "Manufacturing Large-Scale and High-Performance 2D Covalent Organic Framework (COF) Membranes for Produced Water Treatment." $110,000; 09/1/2022-08/31/2024
   PI's recognition: $110,000
3. 2021 NASA: Headquarters – "Functionalization of Nanoporous Covalent Organic Frameworks to Enhance Processability and Broaden Separation Applications (Richard Nile)." $292,155; 08/16/2021-08/15/2025
   PI's recognition: $292,155
4. 2021 Carlisle Interconnect Technologies, *Inc*. – "Material Development and Surface Modification of Silicone Jacketed Cables via Chemical and Engineering Approaches." Co-PI: Matthew Green; $431,611; 11/1/2021-05/30/2023
   PI's recognition: $215,801

Co-PI

1. 2021 NSF EFRI – "EFRI E3P: GOALI: Waste Management and Circularity of Crosslinked Polyurethane Foams." PI: Tim Long; Co-PIs: Kailong Jin, Matthew Green, Keith Kirkwood, and Jennifer Russell (Virginia Tech); $1,881,371; 09/01/2021–08/30/2025
   Co-PI's recognition: $376,274.20

PEER REVIEWED PUBLICATIONS (Google Scholar: Citations 886, h-index 16)

1. Nile, R.; Cabello, M.; Jin, K., Nonisothermal melt crystallization behavior of semicrystalline polymers monitored using an in situ fluorescence technique. Submitted **2022**.
2. Alfarhan, S.; Brown, J.; Liu, B.; Long, T. E.; Jin, K., Chemically recyclable crosslinked thiol-ene photopolymers via thiol-disulfide exchange reactions. Submitted to *Journal of Polymer Science* **2022**.
3. Joralmon, D.; Alfarhan, S.; Kim, S.; Tang, T.; Jin, K.; Li, X., 3D printing of liquid crystal with thermal sensing capability via multi-material vat photopolymerization. *ACS Applied Polymer Materials* **2022**, *Accepted*.
4. Banerji, A.; **Jin, K.**; Mahanthappa, M. K.; Bates, F. S.; Ellison, C. J., Porous Fibers Templated by Melt Blowing Cocontinuous Immiscible Polymer Blends. *ACS Macro Letters* **2021**, 1196-1203.
5. Nile, R.; Rajput, H.; Sims, C.; **Jin, K.**, Sensing the melting transition of semicrystalline polymers via a novel fluorescence technique. *Polymer* **2021,** *230*, 124070.
6. Li, L.; Chen, X.; **Jin, K.**; Rusayyis, M. B.; Torkelson, J. M., Arresting Elevated-Temperature Creep and Achieving Full Cross-Link Density Recovery in Reprocessable Polymer Networks and Network Composites via Nitroxide-Mediated Dynamic Chemistry. *Macromolecules* **2021,** *54* (3), 1452-1464.
7. McCutcheon, C. J.; Zhao, B.; **Jin, K.**; Bates, F. S.; Ellison, C. J., Crazing Mechanism and Physical Aging of Poly(lactide) Toughened with Poly(ethylene oxide)-block-poly(butylene oxide) Diblock Copolymers. *Macromolecules* **2020,** *53* (22), 10163-10178.

8. Li, L.; Qiang, Z.; Chen, X.; **Jin, K.**; Wang, M.; Torkelson, J. M., Impact of bottlebrush chain architecture on Tg-confinement and fragility-confinement effects enabled by thermo-cleavable bottlebrush polymers synthesized by radical coupling and atom transfer radical polymerization. *J Polym Sci* **2020,** *58* (20), 2887-2905.
9. Kim, H. J.; **Jin, K.**; Shim, J.; Dean, W.; Hillmyer, M. A.; Ellison, C. J., Sustainable Triblock Copolymers as Tunable and Degradable Pressure Sensitive Adhesives. *ACS Sustainable Chemistry & Engineering* **2020,** *8* (32), 12036-12044.
10. Sheppard, D. T.; **Jin, K.**; Hamachi, L. S.; Dean, W.; Fortman, D. J.; Ellison, C. J.; Dichtel, W. R., Reprocessing Postconsumer Polyurethane Foam Using Carbamate Exchange Catalysis and Twin-Screw Extrusion. *ACS Central Science* **2020,** *6* (6), 921-927.
11. Nomura, K.; Peng, X.; Kim, H.; **Jin, K.**; Kim, H. J.; Bratton, A. F.; Bond, C. R.; Broman, A. E.; Miller, K. M.; Ellison, C. J., Multiblock Copolymers for Recycling Polyethylene–Poly(ethylene terephthalate) Mixed Waste. *ACS Applied Materials & Interfaces* **2020,** *12* (8), 9726-9735.
12. **Jin, K.**; Eyer, S.; Dean, W.; Kitto, D.; Bates, F. S.; Ellison, C. J., Bimodal Nanofiber and Microfiber Nonwovens by Melt-Blowing Immiscible Ternary Polymer Blends. *Industrial & Engineering Chemistry Research* **2020,** *59* (12), 5238-5246.
13. Banerji, A.; **Jin, K.**; Liu, K.; Mahanthappa, M. K.; Ellison, C. J., Cross-Linked Nonwoven Fibers by Room-Temperature Cure Blowing and in Situ Photopolymerization. *Macromolecules* **2019,** *52* (17), 6662-6672.
14. Wei, T.; **Jin, K.**; Torkelson, J. M., Isolating the effect of polymer-grafted nanoparticle interactions with matrix polymer from dispersion on composite property enhancement: The example of polypropylene/halloysite nanocomposites. *Polymer* **2019,** *176*, 38-50.
15. **Jin, K.**; Banerji, A.; Kitto, D.; Bates, F. S.; Ellison, C. J., Mechanically Robust and Recyclable Cross-Linked Fibers from Melt Blown Anthracene-Functionalized Commodity Polymers. *ACS Applied Materials & Interfaces* **2019,** *11* (13), 12863-12870.
16. Xu, J.; Eagan, J. M.; Kim, S.-S.; Pan, S.; Lee, B.; Klimovica, K.; **Jin, K.**; Lin, T.-W.; Howard, M. J.; Ellison, C. J.; LaPointe, A. M.; Coates, G. W.; Bates, F. S., Compatibilization of Isotactic Polypropylene (iPP) and High-Density Polyethylene (HDPE) with iPP–PE Multiblock Copolymers. *Macromolecules* **2018,** *51* (21), 8585-8596.
17. **Jin, K.**; Kim, S.-s.; Xu, J.; Bates, F. S.; Ellison, C. J., Melt-Blown Cross-Linked Fibers from Thermally Reversible Diels–Alder Polymer Networks. *ACS Macro Letters* **2018,** *7* (11), 1339-1345.
18. Li, L.; Chen, X.; **Jin, K.**; Torkelson, J. M., Vitrimers Designed Both To Strongly Suppress Creep and To Recover Original Cross-Link Density after Reprocessing: Quantitative Theory and Experiments. *Macromolecules* **2018,** *51* (15), 5537-5546.
19. **Jin, K.**; Leitsch, E. K.; Chen, X.; Heath, W. H.; Torkelson, J. M., Segmented Thermoplastic Polymers Synthesized by Thiol–Ene Click Chemistry: Examples of Thiol–Norbornene and Thiol–Maleimide Click Reactions. *Macromolecules* **2018,** *51* (10), 3620-3631.
20. Chen, X.; Li, L.; **Jin, K.**; Torkelson, J. M., Reprocessable polyhydroxyurethane networks exhibiting full property recovery and concurrent associative and dissociative dynamic chemistry via transcarbamoylation and reversible cyclic carbonate aminolysis. *Polymer Chemistry* **2017,** *8* (41), 6349-6355.
21. **Jin, K.**; Torkelson, J. M., Tg-confinement effects in strongly miscible blends of poly(2,6-dimethyl-1,4-phenylene oxide) and polystyrene: Roles of bulk fragility and chain segregation. *Polymer* **2017,** *118*, 85-96.
22. **Jin, K.**; Li, L.; Torkelson, J. M., Bulk physical aging behavior of cross-linked polystyrene compared to its linear precursor: Effects of cross-linking and aging temperature. *Polymer* **2017,** *115*, 197-203.
23. **Jin, K.**; Li, L.; Torkelson, J. M., Recyclable Crosslinked Polymer Networks via One-Step Controlled Radical Polymerization. *Advanced Materials* **2016,** *28* (31), 6746-6750.
24. **Jin, K.**; Torkelson, J. M., Enhanced Tg-Confinement Effect in Cross-Linked Polystyrene Compared to Its Linear Precursor: Roles of Fragility and Chain Architecture. *Macromolecules* **2016,** *49* (14), 5092-5103.

25. **Jin, K.**; Wilmot, N.; Heath, W. H.; Torkelson, J. M., Phase-Separated Thiol–Epoxy–Acrylate Hybrid Polymer Networks with Controlled Cross-Link Density Synthesized by Simultaneous Thiol–Acrylate and Thiol–Epoxy Click Reactions. *Macromolecules* **2016,** *49* (11), 4115-4123.
26. **Jin, K.**; Heath, W. H.; Torkelson, J. M., Kinetics of multifunctional thiol-epoxy click reactions studied by differential scanning calorimetry: Effects of catalysis and functionality. *Polymer* **2015,** *81*, 70-78.
27. **Jin, K.**; Torkelson, J. M., Tg and Tg breadth of poly(2,6-dimethyl-1,4-phenylene oxide)/polystyrene miscible polymer blends characterized by differential scanning calorimetry, ellipsometry, and fluorescence spectroscopy. *Polymer* **2015,** *65*, 233-242.

PATENT FILING & INVENTION DISCLOSURES

1. Ellison, C. J.; **Jin**, **K.**; Bates, F. S.; Haberkamp, W. C.; Wang, K., Crosslinked nonwovens produced by melt blowing reversible polymer networks, U.S. Patent Application No. 15/734,849, **2021**. (https://patents.google.com/patent/US20210230781A1/en)
2. Torkelson, J. M.; **Jin**, **K.;** Li, L., Reprocessable crosslinked network polymers with alkoxyamine dynamic covalent bonds, U.S. Patent No. US 10618991, **2020**. (https://patents.google.com/patent/US10618991B2/en)
3. Li, L.; Chen, X.; **Jin**, **K.**; Torkelson, J. M., A method to eliminate undesired creep in reprocessable polymer networks and network composites via alkoxyamine dynamic chemistry, U.S. Patent Application No. 62/867,455, **2019.**
4. Ellison, C. J.; **Jin**, **K.**, Urethane exchange catalysts and methods for reprocessing crosslinked polyurethanes foams, U.S. Patent Application No. 62/837,606, **2019**.
5. **Jin**, **K.**; Wang, K.; Haberkamp, W. C.; Bates, F. S.; Ellison, C. J., Crosslinked nonwovens produced by melt blowing reversible polymer networks, U.S. Patent Application No. 62/682,549, **2018**.

PRESENTATIONS (INVITED/CONTRIBUTED TALKS PRESENTED BY K. JIN)

1. **Jin, K.**, Nile, R.; Rajput, H.; Sims, C., Sensing the melting transition of semicrystalline polymers via a novel fluorescence technique. *Annual Spring Meeting of the Polymer Korea Society*, **2022**. (Virtual)
2. **Jin, K.**, Nile, R.; Rajput, H.; Sims, C., Sensing the melting transition of semicrystalline polymers via a novel fluorescence technique. *APS March Meeting*, Chicago, IL, **2022**. (Virtual)
3. **Jin, K.**, Journey to Sustainable Macromolecular Materials and Manufacturing: Past & Current Research Efforts, *Biodesign Center for Sustainable Macromolecular Materials and Manufacturing*, Tempe, AZ, **2021**. (Oral)
4. **Jin, K.**; Bates, F. S.; Ellison, C. J., Reversibly crosslinked nonwoven fibers: Sustainability meets melt blowing, *National AIChE Meeting*, Orlando, FL, **2019**. (Oral)
5. **Jin, K.**; Bates, F. S.; Ellison, C. J., Recyclable cross-linked polymer networks via one-step controlled radical polymerization, *National AIChE Meeting*, Orlando, FL, **2019**. (Oral)
6. **Jin, K.**; Bates, F. S.; Ellison, C. J., Towards sustainable polymers through integration of dynamic covalent chemistry and advanced processing, *National AIChE Meeting*, Orlando, FL, **2019**. (Poster)
7. **Jin, K.**; Bates, F. S.; Ellison, C. J., Reversibly crosslinked nonwoven fibers: Sustainability meets melt blowing, *Gordon Research Seminar*, South Hadley, MA, **2019**. (Poster)
8. **Jin, K.**; Kim, S.; Xu, J.; Bates, F. S.; Ellison, C. J., Melt-blown crosslinked fibers from thermally reversible Diels-Alder polymer networks, *APS March Meeting*, Boston, MA, **2019** (*Poster*).
9. **Jin, K.**; Kim, S.; Xu, J.; Bates, F. S.; Ellison, C. J., Melt-blown crosslinked fibers from thermally reversible Diels-Alder polymer networks, *APS March Meeting*, Boston, MA, **2019** (*Oral*).
10. **Jin, K.**; Li, L.; Torkelson, J. M., Recyclable crosslinked polymer networks via one-step controlled

radical polymerization, *National ACS Meeting*, Washington, D.C., **2017** (*Oral*).

11. **Jin, K.**; Li, L.; Torkelson, J. M., Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National ACS Meeting*, San Francisco, CA, **2017** (*Oral*).
12. **Jin, K.**; Li, L.; Torkelson, J. M., Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National AIChE Meeting*, San Francisco, CA, **2016** (*Oral*).
13. **Jin, K.**; Torkelson, J. M., Structure, properties, and sustainability of crosslinked polymers, *Distinguished Graduate Researcher Talk*, Dept. of Chem. and Biol. Eng., Northwestern University, **2016** (*Oral*).
14. **Jin, K.**; Li, L.; Torkelson, J. M., Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National ACS Meeting,* Philadelphia, PA, **2016** (*Oral*).
15. **Jin, K.**; Torkelson, J. M., Enhanced T_g-confinement effects and related physical aging behavior in crosslinked polystyrene characterized by ellipsometry, *PacifiChem*, Honolulu, HI, 2015 (*Oral*).
16. **Jin, K.**; Wilmot, N.; Heath, W. H.; Torkelson, J. M., Phase-separated thiol-epoxy-acrylate hybrid networks synthesized by simultaneous thiol-acrylate and thiol-epoxy reactions, *PacifiChem*, Honolulu, HI, 2015 (*Oral*).
17. **Jin, K.**; Torkelson, J. M., Enhanced T_g-confinement effects and related physical aging behavior in crosslinked polystyrene characterized by ellipsometry, *National AIChE meeting*, Salt Lake City, UT, 2015 (*Oral*).
18. **Jin, K.**; Wilmot, N.; Heath, W. H.; Torkelson, J. M., Phase-separated thiol-epoxy-acrylate hybrid networks synthesized by simultaneous thiol-acrylate and thiol-epoxy click reactions, *National AIChE meeting*, Salt Lake City, UT, 2015 (*Poster*).
19. **Jin, K.**; Torkelson, J. M., Enhanced T_g-confinement effects in crosslinked polystyrene characterized by ellipsometry, *National APS meeting*, San Antonio, TX, 2015 (*Oral*).

RESEARCH EXPERIENCE

Principal Investigator, Jin Research Group**,** Arizona State University *Since 06/29/2020*

Current Advisees: Richard Gabriel (PhD), Jose Edgardo Lopez Cazares (PhD), Jared Nettles (PhD), Saleh Alfarhan (PhD), Jinlong Zhang (Postdoc), Khaled Nafee (MS), Wail Aljuhani (MS)

ASU Collaborators: Professors Timothy Long, Matthew Green, Jerry Lin, Xiangjia Li

- *Sustainable Polymers for Improved Chemical Circularity*: Dr. Jin's group is developing future plastics for improved chemical circularity using dynamical covalent chemistries.
- *3D printing polymer nanocomposites*: Dr. Jin's group is currently developing a 3D printing approach to fabricate highly engineered polymer nanocomposites with controlled filler arrangement and optimized material properties for advanced applications.
- *Covalent organic frameworks (COFs)*: Dr. Jin's group is currently developing approaches for improving the processability of COFs, which could enable the rational design of highly efficient nanoporous membranes and CO2 sequestration devices.
- *Crystallization behavior in multilayer polymer films*: Dr. Jin's group is developing a location-specific fluorescence technique for characterizing the local crystallization rate close to and away from the interfaces, which can reveal guidelines on how to properly engineer multilayer polymer films to maximize their performance for packaging applications.

Post-Doctoral Research, Dept. of Chem. Eng. and Mat. Sci., University of Minnesota *2017-2020*

Advisers: **Professors Frank Bates** and **Christopher Ellison**

Collaborators: Professors Marc Hillmyer (University of Minnesota), Theresa Reineke (University of Minnesota), Stuart Rowan (University of Chicago), William Dichtel (Northwestern University),

Geoffrey Coates (Cornell University), and Kevin Miller (Murray State University)

- *Melt blown nonwoven fiber mats*: Developed a simple, high-throughput route to melt blown crosslinked nonwoven fibers with thermally reversible crosslinks and robust recyclability; fabricated hierarchically structured nonwoven mats by melt blowing immiscible polymer blends
- *3D printing of recyclable polymer networks*: Successfully incorporated Diels-Alder chemistry into a conventional photocurable acrylate-based 3D printing formulation, leading to reversibly crosslinked photopolymers that can self-heal or self-repair (with Professor Theresa Reineke)
- *Recycling crosslinked polyurethane foams via reactive extrusion*: Successfully reprocessed commercial crosslinked polyurethane foams (e.g., mattresses) into films via *in situ* urethane-urethane exchange reactions during reactive extrusion (with Professor William Dichtel)
- *Recycling mixed plastic waste streams via block copolymer compatibilization*: Developed multiblock copolymers for recycling mixed waste streams (e.g., polyethylene/poly(ethylene terephthalate)) into tough polymer blends (with Professors Geoffrey Coates and Kevin Miller)
- *Bio-derived and bio-degradable thermoplastic pressure sensitive adhesives (PSAs)*: Developed and characterized bio-degradable PSAs based on bio-renewable monomers derived from cashewnut shell (i.e., cardanol) and corn (i.e., lactic acid) (with Professor Marc Hillmyer)
- *Ultrahigh molecular weight polyolefins with reversible bonds for energy-efficient melt processing*: Synthesizing grafted polyethylene with reversibly bonded side chains, which can be cleaved and thereby promote energy-efficient melt processing (with Professor Marc Hillmyer)
- *Film blowing of filler-reinforced poly(lactic acid) (PLA)*: Developing and processing "green" PLA/cellulose nanocrystal composites (with Professor Stuart Rowan)
- *Stimuli-responsive materials for soft robotics*: Developing adaptable, stimuli-responsive materials that can switch their modulus under external stimuli to steer motion

Doctoral Research, Dept. of Chem. and Biol. Eng., Northwestern University *2013 – 2017*

Adviser: **Professor John Torkelson**

Committee Members: Professors Wesley Burghardt, Kenneth Shull, and Muzhou Wang

- *Reprocessable/recyclable crosslinked rubbers*: Developed a one-step synthesis of recyclable crosslinked rubbers with potential for tire-to-tire recycling applications based on a controlled radical polymerization, i.e., nitroxide-mediated polymerization (NMP)
- *Vitrimers with greatly suppressed creep behavior*: Designed vitrimers with controlled fractions of permanent crosslinks, resulting in strongly suppressed creep and excellent reprocessability
- *Reprocessable polyhydroxyurethane networks*: Developed recyclable polyhydroxyurethanes exhibiting full property recovery and concurrent associative and dissociative dynamic chemistry
- *Green, non-isocyanate-based polyurethane-like materials via thiol-click chemistry*: Developed thiol-epoxy-acrylate hybrid networks with potential to replace isocyanate-based polyurethanes
- *Polypropylene (PP)/halloysite nanocomposites*: Prepared PP/PP-grafted halloysite nanotube hybrid nanocomposites with enhanced filler dispersion by solid-state shear pulverization (SSSP)
- *Polymer behavior near surfaces and interfaces within nanostructured materials*: Investigated glass transition and physical aging behavior in polymer thin films and nanocomposites; examined how polymer-substrate interactions and polymer architecture affect interfacial properties

Ph.D. Summer Research Intern, Engineered Polymer Solutions, Chicago Area *2016*

Adviser: **Dr. Allen Bulick**

- *Correlation between corrosion resistance and film properties (e.g., barrier properties) for polymeric coatings*: Developed a model for understanding how acrylics inhibit corrosion on steel

Master's Research, Dept. of Chem. and Biol. Eng., Northwestern University *2012 – 2013*

Adviser: **Professor John Torkelson**

Committee Members: Professors Wesley Burghardt and Kenneth Shull

- *Glass transition behavior of miscible polymer blends (e.g., PPO/PS) with strong attractive interactions*: Demonstrated that some miscible blends exhibit a single glass transition because of coupled component alpha-relaxations while other miscible blends exhibit two glass transitions
- *Effects of nanoscale confinement on the glass transition behavior of miscible polymer blend thin films*: Probed local glass transition behavior using a combination of fluorescence and ellipsometry spectroscopies; demonstrated that nanoconfinement can lead to chain segregation

TEACHING AND MENTORING EXPERIENCE

Instructor, Arizona State University *Since 2020*

- Teaching a undergraduate course CHE 342: Introduction to Applied Chemical Engineering thermodynamics, which is a class of 75 students
- Designing homework assignments, quizzes and exams for the course

Undergraduate/Graduate Student Research Mentor, University of Minnesota *2017-2020*

- Mentored research for **4 undergraduate students**, *David Kitto* (now at University of Michigan), *William Dean* (now at Case Western Reserve University), *Sarah Eyer*, and *Christopher Babbert*, and **4 graduate students**, *Jared Moody* (M.S. student), *Erin Maines* (Ph.D. student), *Aditya Banerji* (Ph.D. student), and *Lei Dong* (Ph.D. student from Tokyo Institute of Technology)

Co-Instructor for CHEM_ENG 361: Introduction to Polymers, Northwestern University *2016*

- Participated in the Teaching Apprenticeship Program advised by Professor John Torkelson
- Taught 10 lectures (50 min each) to a class of 30 students, designed homework sets/exams, generated solutions to problem sets/exams, held office hours, and graded homework/exams

Mentored Discussions of Teaching (MDT) Program Participant, Northwestern University *2015*

- Observed lectures and discussed with faculty instructors about teaching methods

Graduate Student Research Mentor, Northwestern University *2014 – 2015*

- Mentored research for **3** M.S. students, Lingqiao Li, Tong Wei, and Xi Chen, all of whom continued on to Ph.D. studies

Instructor for Polymerization Lab (CHEM_ENG 361), Northwestern University *2014 – 2015*

- Led fifteen lab sessions on free radical polymerization for a class of 30-40 students

Teaching Assistant for Fluid Mechanics (BME 377), Northwestern University *2013*

- Assisted professor in teaching the course: graded homework sets/exams and held office hours

PROFESSIONAL AND LEADERSHIP ACTIVITES

Polymer Sustainability Workshop Participant, University of Minnesota *2019*

- Presented a talk and had discussions on current status, challenges, and opportunities for research on the sustainability of polymers, both in academia and industry

Future Faculty Workshop Participant, University of Delaware *2018*

- Attended talks and discussions on teaching/mentoring students, identifying new research areas, writing proposals for funding, and budget planning; prepared myself as a faculty candidate

Judge for Poster Session Competition, National Graduate Polymer Research Conference *2018*

- Evaluated and provided comments on 25 posters; discussed results with other judges

3D Printing Workshop Participant, University of Minnesota *2018*

- Attended talks and discussions on challenges and opportunities for 3D printing research

Conference Session Co-chair, National AIChE Meeting *2017*

- Co-chaired the *Polymer Reaction Engineering* session (5 oral presentations) at AICHE

Peer Reviewer for Journals on Polymer Research *Since 2017*

- Have been reviewing manuscripts for journals including *Macromolecules*, *Polymer, Polymer Chemistry, International Journal of Adhesion and Adhesives, and Polymer Bulletin*

Member of Graduate Student Committee for New Faculty Hiring, Northwestern University *2016*

- Served on the graduate student committee for faculty hiring in the Dept. of Chem. and Biol. Eng. at Northwestern University; compiled comments and wrote reports to the search chair

Lab Equipment Manager, Prof. John Torkelson's group, Northwestern University *2013 – 2016*

- Oversaw maintenance of DSC and offered training to ~15 researchers in and outside the group

Entrepreneurial Experience in New Venture Development, Northwestern University *2015*

- Collaborated with 3 MBA students (Scott McNeely, Kevin Pukala, and Patrick Quintana) from Kellogg on the potential commercialization of the technology described in patent #4 above

TECHNICAL EXPERTISE

Polymer Processing

- Melt blowing, cure blowing, film blowing, multilayer film coextrusion, spin coating, spray coating, film floating, hot pressing, twin screw extrusion, batch melt mixing, injection molding, solid-state shear pulverization, and 3D printing

Polymer Chemistry

- *Polymerization techniques*: Anionic polymerization, nitroxide-mediated polymerization (NMP), ring-opening polymerization (ROP), atom transfer radical polymerization (ATRP); conventional free radical polymerization, emulsion polymerization, step-growth polymerization (e.g., polyurethane synthesis), block copolymer synthesis, and thiol-ene click chemistry
- *Dynamic covalent chemistries*: Alkoxyamine exchange, transesterification exchange (or vitrimer), carbamate exchange, urethane exchange, Diels-Alder reaction, and anthracene photodimerization
- Schlenk line and glove box techniques for air-sensitive reaction and UV light source

Polymer Characterization

- Fluorescence spectroscopy, ellipsometry, X-ray photoelectron spectroscopy, small angle X-ray scattering, electrochemical impedance spectroscopy, confocal laser scanning microscopy, scanning electron microscopy, contact angle measurement, profilometry, differential scanning calorimetry, thermogravimetric analysis, size exclusion chromatography, tensile/T-peel test, dynamic mechanical analysis, rheometry (shear and extensional), proton nuclear magnetic resonance, Fourier-transform infrared spectroscopy, and UV-Vis spectroscopy