

Kailong Jin

Kailong.jin@asu.edu • US: +1 847 644 0116

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

PROFESSIONAL EMPLOYMENT

Arizona State University, Tempe, AZ

Assistant Professor

Since 06/29/2020

University of Minnesota, Minneapolis, MN

Post-Doctoral Associate

2017 – 2020

EDUCATION

Northwestern University, Evanston, IL

Ph.D. in Chemical Engineering (GPA: 3.94/4.00)

2013 – 2017

M.S. in Chemical Engineering (GPA: 3.90/4.00)

2012 – 2013

Nanjing Tech University, Nanjing, China

B.S. in Chemical Engineering (GPA: 3.80/4.00)

2008 – 2012

HONORS AND AWARDS

1. Future Faculty Workshop Participant, University of Delaware *2018*
2. Finalist of Eastman Chemical Student Award in Applied Polymer Science, ACS Meeting *2017*
3. Teaching Apprenticeship Program Participant, Northwestern University *2017*
4. Terminal Year Cabell Fellowship, Northwestern University *2017*
5. Excellence in Graduate Polymer Research Award Symposium Participant, AIChE Meeting *2016*
6. Honorable Mention of Distinguished Graduate Researcher Award, Northwestern University *2016*
7. Sustainability Innovation Student Challenge Award (SISCA), The Dow Chemical Company *2016*
8. McCormick Research Catalyst Awards Fund, Northwestern University *2016*
9. The Fourth Annual Graduate Research Symposium at Milliken Participant, Milliken *2016*
10. Distinguished Undergraduate Thesis Award, Nanjing Tech University *2012*
11. BASF Scholarship, BASF, Shanghai, China *2011*
12. Distinguished Undergraduate Fellowships, Nanjing Tech University *2008 – 2011*

RESEARCH EXPERIENCE

Principal Investigator, Jin Research Group, Arizona State University

Since 06/29/2020

Advisees: Richard Gabriel (PhD), Harsheen Rajput (PhD), Saleh Alfarhan (MS), Rahul Saini (MS)

Collaborators: Professors Timothy Long (Arizona State University), Matthew Green (Arizona State University), Jerry Lin (Arizona State University)

- *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

PEER REVIEWED PUBLICATIONS (Google Scholar: Citations 454, h-index 11)

1. L. Li, X. Chen, **K. Jin**, B. R. Mohammed, and J. M. Torkelson, Arresting Elevated-Temperature Creep and Achieving Full Cross-Link Density Recovery in Reprocessable Polymer Networks and Network Composites via Optimal Dynamic Chemistry, *Macromolecules* **2020**, Accepted.
2. C. J. McCutcheon, B. Zhao, **K. Jin**, F. S. Bates, C. J. Ellison, 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.
3. H. J. Kim, **K. Jin**, J. Shim, W. Dean, M. A. Hillmyer, and C. J. Ellison, Sustainable Triblock Copolymers as Tunable and Degradable Pressure Sensitive Adhesives, *ACS Sus. Chem. Eng.*, **2020**, 8, 12036-12044.
4. H. J. Kim, **K. Jin**, J. Shim, W. Dean, M. A. Hillmyer, and C. J. Ellison, Sustainable Triblock Copolymers as Tunable and Degradable Pressure Sensitive Adhesives, *ACS Sus. Chem. Eng.*, **2020**, 8, 12036-12044.
5. D. T. Sheppard, **K. Jin**, L. Hamachi, W. Dean, C. J. Ellison, and W. R. Dichtel, Reprocessing post-consumer polyurethane foam using carbamate exchange catalysis and twin-screw extrusion, *ACS Cent. Sci.*, **2020**, 6, 921-927.
6. K. Nomura, X. Peng, H. Kim, **K. Jin**, H. J. Kim, A. F. Bratton, C. R. Bond, A. E. Broman, K. M. Miller, and C. J. Ellison, Multiblock copolymers for recycling polyethylene–poly(ethylene terephthalate) mixed waste, *ACS Appl. Mater. Interfaces*, **2020**, 12, 9726-9735.
7. **K. Jin**, S. Eyer, W. Dean, D. Kitto, F. S. Bates, and C. J. Ellison, Bimodally distributed nano- and micro-fiber nonwovens by melt blowing immiscible ternary polymer blends, *Ind. Eng. Chem. Res.*, **2020**, 59, 5238-5246.
8. A. Banerji, **K. Jin**, K. Liu, M. Mahanthappa, C. J. Ellison, Crosslinked nonwoven fibers by room temperature cure blowing and in situ photopolymerization, *Macromolecules* **2019**, 52, 6662-6672.
9. T. Wei, **K. Jin**, J. M. Torkelson, 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.
10. **K. Jin**, A. Banerji, D. Kitto, F. S. Bates, and C. J. Ellison, Mechanically robust and recyclable crosslinked fibers from melt blown anthracene-functionalized commodity polymers, *ACS Appl. Mater. Interfaces* **2019**, 11, 12863-12870.
11. J. Xu, J. Eagan, S. Kim, S. Pan, B. Lee, K. Klimovica, **K. Jin**, T. Lin, M. Howard, C. J. Ellison, A. LaPointe, G. W. Coates, and F. S. Bates, Compatibilization of isotactic polypropylene (iPP) and high density polyethylene (HDPE) with iPP-PE multiblock copolymers, *Macromolecules* **2018**, 51, 8586-8596.
12. **K. Jin**, S. Kim, J. Xu, F. S. Bates, and C. J. Ellison, Melt-blown crosslinked fibers from thermally reversible Diels-Alder polymer networks, *ACS Macro Lett.* **2018**, 7, 1339-1345.
13. L. Li, X. Chen, **K. Jin**, and J. M. Torkelson, Vitrimers designed both to strongly suppress creep and to recover original cross-link density after reprocessing: quantitative theory and experiments, *Macromolecules* **2018**, 51, 5537-5546.

14. **K. Jin**, E. Leitsch, X. Chen, W. H. Heath, and J. M. Torkelson, Segmented thermoplastic polymers synthesized by thiol-ene click chemistry: examples of thiol-norbornene and thiol-maleimide click reactions, *Macromolecules* **2018**, 51, 3620-3631.
15. X. Chen, L. Li, **K. Jin**, and J.M. Torkelson, Reprocessable polyhydroxyurethane networks exhibiting full property recovery and concurrent associative and dissociative dynamic chemistry via transcarbamoylation and reversible cyclic carbonate aminolysis, *Polym. Chem.* **2017**, 8, 6349-6355.
16. **K. Jin** and J. M. Torkelson, T_g -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**, 11, 85-96.
17. **K. Jin**, L. Li, and J. M. Torkelson, Bulk physical aging behavior of crosslinked polystyrene compared to its linear precursor: Effects of cross-linking and aging temperature, *Polymer* **2017**, 115, 197-203.
18. **K. Jin**, L. Li, and J. M. Torkelson, Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *Adv. Mater.* **2016**, 28, 6746-6750. (**Highlighted in a news article** entitled “Reinventing the Wheel: Northwestern Researchers Develop Recyclable Rubber”)
19. **K. Jin** and J. M. Torkelson, Enhanced T_g -confinement effect in crosslinked polystyrene compared to its linear precursor: role of fragility, *Macromolecules* **2016**, 49, 5092-5103.
20. **K. Jin**, N. Wilmot, W. H. Heath, and J. M. Torkelson, Phase-separated thiol-epoxy-acrylate hybrid networks synthesized by simultaneous thiol-acrylate and thiol-epoxy click reactions, *Macromolecules* **2016**, 49, 4115-4123.
21. **K. Jin**, W. H. Heath, and J. M. Torkelson, Kinetics of multifunctional thiol-epoxy click reactions studied by differential scanning calorimetry: Effects of Catalysis and Functionality, *Polymer* **2015**, 81, 70-78.
22. **K. Jin** and J. M. Torkelson, T_g and T_g 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. L. Li, X. Chen, **K. Jin**, and J. M. Torkelson, 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**.
2. C. J. Ellison and **K. Jin**, Urethane exchange catalysts and methods for reprocessing crosslinked polyurethanes foams, U.S. Patent Application No. 62/837,606, **2019**.
3. **K. Jin**, K. Wang, W. C. Haberkamp, F. S. Bates, and C. J. Ellison, Crosslinked nonwovens produced by melt blowing reversible polymer networks, U.S. Patent Application No. 62/682,549, **2018**.
4. J. M. Torkelson, **K. Jin**, and L. Li, Reprocessable crosslinked network polymers with alkoxyamine dynamic covalent bonds, U.S. Patent Application No. US15274619, **2017**.

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

1. **K. Jin**, F. S. Bates, and C. J. Ellison, Reversibly crosslinked nonwoven fibers: Sustainability meets melt blowing, *National AIChE Meeting*, Orlando, FL, **2019**. (Oral)
2. **K. Jin**, F. S. Bates, and C. J. Ellison, Recyclable cross-linked polymer networks via one-step controlled radical polymerization, *National AIChE Meeting*, Orlando, FL, **2019**. (Oral)
3. **K. Jin**, F. S. Bates, and C. J. Ellison, Towards sustainable polymers through integration of dynamic covalent chemistry and advanced processing, *National AIChE Meeting*, Orlando, FL, **2019**. (Poster)
4. **K. Jin**, F. S. Bates, and C. J. Ellison, Reversibly crosslinked nonwoven fibers: Sustainability meets melt blowing, *Gordon Research Seminar*, South Hadley, MA, **2019**. (Poster)
5. **K. Jin**, F. S. Bates, and C. J. Ellison, Reversibly crosslinked nonwoven fibers: Sustainability meets melt blowing, *IPRIME Annual Meeting*, Minneapolis, MN, **2019**. (Oral)
6. **K. Jin**, S. Kim, J. Xu, F. S. Bates, and C. J. Ellison, Melt-blown crosslinked fibers from thermally

- reversible Diels-Alder polymer networks, *APS March Meeting*, Boston, MA, **2019** (Poster).
7. **K. Jin**, S. Kim, J. Xu, F. S. Bates, and C. J. Ellison, Melt-blown crosslinked fibers from thermally reversible Diels-Alder polymer networks, *APS March Meeting*, Boston, MA, **2019** (Oral).
 8. **K. Jin**, J. M. Torkelson, F. S. Bates, and C. J. Ellison, Recyclable crosslinked network polymers with reversible bonds: polymer synthesis and processing, *IPRIME Annual Meeting*, Minneapolis, MN, **2018** (Oral).
 9. **K. Jin**, L. Li, and J. M. Torkelson, Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National ACS Meeting*, Washington, D.C., **2017** (Oral).
 10. **K. Jin**, L. Li, and J. M. Torkelson, Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National ACS Meeting*, San Francisco, CA, **2017** (Oral).
 11. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Invited Talk at University of Minnesota*, Minneapolis, MN **2017** (Oral).
 12. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Invited Talk at University of Chicago*, Chicago, IL, **2017** (Oral).
 13. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Invited Lecture at Nanjing University of Technology*, Nanjing, Jiangsu, China, **2017** (Oral).
 14. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Invited Talk at PPG Industries, Inc.*, Pittsburgh, PA **2017** (Oral).
 15. **K. Jin**, L. Li, and J. M. Torkelson, Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National AIChE Meeting*, San Francisco, CA, **2016** (Oral).
 16. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Distinguished Graduate Researcher Talk*, Dept. of Chem. and Biol. Eng., Northwestern University, **2016** (Oral).
 17. **K. Jin**, L. Li, and J. M. Torkelson, Recyclable crosslinked polymer networks via one-step controlled radical polymerization, *National ACS Meeting*, Philadelphia, PA, **2016** (Oral).
 18. **K. Jin** and J. M. Torkelson, Structure, properties, and sustainability of crosslinked polymers, *Invited Talk at the Fourth Annual Graduate Research Symposium at Milliken Corporate Research*, Spartanburg, SC, **2016** (Oral).
 19. **K. Jin** and J. M. Torkelson, Enhanced T_g -confinement effects and related physical aging behavior in crosslinked polystyrene characterized by ellipsometry, *PacifiChem*, Honolulu, HI, **2015** (Oral).
 20. **K. Jin**, N. Wilmot, W. H. Heath, and J. M. Torkelson, Phase-separated thiol-epoxy-acrylate hybrid networks synthesized by simultaneous thiol-acrylate and thiol-epoxy reactions, *PacifiChem*, Honolulu, HI, **2015** (Oral).
 21. **K. Jin** and J. M. Torkelson, 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).
 22. **K. Jin**, N. Wilmot, W. H. Heath, and J. M. Torkelson, 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).
 23. **K. Jin** and J. M. Torkelson, Non-isocyanate-based materials synthesized by green thiol chemistry, *Invited Talk at The Dow Chemical Company*, Freeport, TX, **2015** (Oral).
 24. **K. Jin** and J. M. Torkelson, Enhanced T_g -confinement effects in crosslinked polystyrene characterized by ellipsometry, *National APS meeting*, San Antonio, TX, **2015** (Oral).

FUNDED PROPOSALS

1. “High molecular weight polyolefins with reversibly bonded side-chains for recyclability and energy-efficient melt processing”, PI: Christopher Ellison (University of Minnesota), *A Research Proposal to ExxonMobil*, **2018** (annual funding of \$100,000 for two years).

2. “Novel, reprocessable crosslinked network polymers: A sustainable solution to rubber tire recycling, a method to produce porous materials for separation and catalysis applications, and a strategy to achieve surface patterning and self-healing capability”, PI: Kailong Jin (Northwestern University), *A Research Proposal to Dow Sustainability Innovation Student Challenge Award*, **2016** (runner up award).
3. “Novel, reprocessable crosslinked network polymers: A potential, sustainable solution to rubber tire recycling and a method to produce reorganizable polymers of uniform but complex architecture”, PI: John Torkelson (Northwestern University), *A Research Proposal to McCormick Research Catalyst Awards Fund at Northwestern University*, **2015** (annual funding of \$50,000 for one year).

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 ACTIVITIES

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