

# Samantha L. Kristufek, Ph.D

---

## Education

Massachusetts Institute of Technology, Department of Chemistry  
Misrock Postdoctoral Fellow, January 2019-December 2019  
Postdoctoral Research Associate, September 2018-December 2018, January 2020-present  
Advisor: Professor Jeremiah A. Johnson

The University of Melbourne, Department of Chemical Engineering  
Postdoctoral Research Fellow, March 2017-July 2018  
Advisor: Professor Frank Caruso

Texas A&M University, Department of Chemistry  
Ph.D. Organic Chemistry, May 2017  
Advisor: Professor Karen L. Wooley  
Dissertation: Synthesis and Characterization of Quercetin-Based Linear and Cross-Linked Polymers for Advanced Engineering Applications

Penn State Erie, The Behrend College  
B.S. Chemistry, May 2011  
Advisor: Professor Michael W. Justik

## Research Experience

**Postdoctoral Research Associate** Performing research under the direction of Dr. Jeremiah Johnson at Massachusetts Institute of Technology on the synthesis of bottlebrush polymers for the delivery of either anti-cancer drugs or CRISPR/Cas9 cargo. (September 2018-present)

**Postdoctoral Research Fellow** Performed research in the ARC Centre of Excellence in Bio-Nano Science and Technology (CBNS) and Nanostructured Interfaces and Materials Science (NIMS) groups directed by Dr. Frank Caruso at the University of Melbourne, Australia, within the laboratory of Professor Thomas Davis and Dr. John Quinn at Monash Institute of Pharmaceutical Sciences, Australia. Research included utilizing the chemical toolbox for the synthesis of small molecules and polymers towards functional metal phenolic networks (MPNs). (March 2017-July 2018)

**Graduate Research Assistant** Performed research under the direction of Dr. Karen L. Wooley in the area of phenolic bio-sourced polycarbonates and epoxy cross-linked networks at Texas A&M University. (June 2011-February 2017)

**Research Experience for Undergraduate (REU) Position** Performed research under Dr. Rhett C. Smith in the area of bipyridyl-modified phosphonium conjugated polyelectrolytes at Clemson University during the summer of 2010.

**Undergraduate Research Assistant** Performed research under Dr. Michael W. Justik in the area of hypervalent iodine compounds. Successfully completed a project with a focus on the preparation of vinyl iodonium salts with a pyridine-*N*-oxide moiety. Also prepared a sequence of isoxazolopyridinium reactions for analysis by X-ray crystallography. (April 2009-May 2011)

## Teaching and Outreach Experience

**Teaching Assistant** Teaching assistant for the graduate-level course, Nanomedicine, at Texas A&M University, under the direction of Dr. Karen Wooley (Fall 2013)

**Teaching Assistant** Taught sections of organic chemistry lab at Texas A&M University under the direction of Dr. Ken Harding (Fall 2011-Spring 2012)

**Teaching Assistant** Taught one section of general chemistry lab at Pennsylvania State University, The Behrend College Behrend under the direction of Ms. Luciana Arrone (Spring 2011)

**Undergraduate Outreach Assistant** Assisted in outreach preparation under Mrs. Tracy Halmi at Pennsylvania State University, The Behrend College Behrend. Created and presented programs for elementary and high school students to inspire them to be interested in science, especially chemistry. ACS Poster and Haiku Contest Coordinator, Erie chapter. (September 2008-May 2011)

## Awards

- 2021 Infinite Expansion Award, Massachusetts Institute of Technology School of Science
- 2020 Future Faculty Scholar, ACS PMSE Programming Committee
- 2019 Misrock Postdoctoral Fellowship, Massachusetts Institute of Technology
- BASF-TAMU Symposium, August 2016 (Poster), 3<sup>rd</sup> Place Poster Award (3 of 33), Texas A&M University
- Dow Chemical Graduate Symposium Award (Poster), May 2016, Texas A&M University, Dept. of Chemistry.
- Martin Corera Travel Award, May 2016, Texas A&M University, Dept. of Chemistry.
- Student Research Week 2016-Engineering Division-1<sup>st</sup> place graduate oral presentation, Texas A&M University
- Student Research Week 2016- Sigma Xi Symposium Theme Award, Texas A&M University
- Pepsico Travel Award, Journey through Science Day, sponsored by PepsiCo, 2015
- Student Research Week 2015- Astronomy, Chemistry, Physics, Material Sciences Division-2<sup>nd</sup> place graduate oral presentation, Texas A&M University.
- BASF-TAMU Symposium, August 2014 (Poster), 1<sup>st</sup> Place Poster Award (1 of 62), Texas A&M University
- PTIC student poster session, September 2013 (Poster), 1<sup>st</sup> Place Poster Award (1 of 14), Texas A&M University
- Scholastic Achievement in Chemistry, Pennsylvania State University, The Behrend College Behrend, Dept. of Chemistry
- Eli Lilly/WCC Travel Grant, Spring ACS Meeting 2011, American Chemical Society
- NSF REU Chemistry Leadership Group Travel Award, Spring ACS Meeting 2011
- 2010-2011 Academic Year Undergraduate Research Grant, Spring 2011, Pennsylvania State University, The Behrend College Behrend, Dept. of Chemistry
- 2010 Summer Undergraduate Research Fellowship, Summer 2010, Pennsylvania State University, The Behrend College Behrend, Dept. of Chemistry
- 2009-2010 Academic Year Undergraduate Research Grant, Spring 2010, Pennsylvania State University, The Behrend College Behrend, Dept. of Chemistry
- Balmer Trustee Scholarship, academic year 2009-2010 and 2010-2011, Pennsylvania State University, The Behrend College Behrend, Dept. of Chemistry
- SMART Grant, academic year 2009-2010 and 2010-2011
- Penn State Behrend/Sigma Xi Speaker Award, April 2010

## Publications

1. **Kristufek, S. L.**; Nguyen, H. V. T.; Costa, L.; Jiang, Y.; Husted, K. E. L.; Johnson, J. A. Evaluation of Drug Release from Tunable Bottlebrush Polymers *manuscript in prep.*
2. **Kristufek, S. L.**; Richardson, J. J.; Reidy, K.; Huang, L.; Lin, Z.; Quinn, J. F.; Davis, T. P.; Caruso F. Design of Fluorescent Metal Phenolic Network Particles from Block Copolymers, *manuscript in prep.*
3. **Kristufek, S. L.**; Pollack, K. A., Gustafson, T. P.; Raymond, J. E.; Wooley, K. L. A Regiochemically-controlled, High Modulus and Fluorescent Poly(Quercetin Carbonate) as a Biorenewable System Designed for Advanced Engineering Applications. *submitted*.
4. Shieh, P.; Zhang, W.; Husted, K. E. L.; **Kristufek, S. L.**; Xiong, B.; Lundberg, D. J.; Lem, J.; Veysset, D.; Sun, Y.; Nelson, K. A.; Plata, D. L.; Johnson, J. A., *Nature* **2020**, 583, 542-547
5. Rahim, M. A.; **Kristufek, S. L.**; Shuaijun Pan, S.; Richardson, J. J.; Caruso F. Phenolic Building-blocks for the Assembly of Functional Materials, *Angew. Chem. Int. Ed.*, **2019**, 58, 1904–1927.
6. **Kristufek, S. L.**; Wacker, K. T.; Tsao, Y. T.; Lu, S.; Wooley, K. L. Monomer Design Strategies to Create Natural Product-based Polymer Materials. *Nat. Prod. Rep.*, **2017**, 34, 433-459.
7. Yang, G.; **Kristufek, S. L.**; Link, L. A.; Wooley, K. L.; Robertson, M. L. Thiol–Ene Elastomers Derived from Biobased Phenolic Acids with Varying Functionality. *Macromolecules* **2016**, 49, 7737-7748.
8. Wacker, K. T.; **Kristufek, S. L.**; Lim, S.; Kahn, S.; Wooley K. L. Bio-based Polycarbonates Derived from the Neolignan Honokiol. *RSC Advances* **2016**, 6, 81672-81679.
9. **Kristufek, S. L.**; Yang, G.; Link, L.A., Rohde, B. R.; Robertson, M. L. Wooley, K. L. Synthesis and Characterization of Quercetin-based Epoxy Cross-linked Networks as a Replacement for DGEBA. *ChemSusChem* **2016**, 9, 2135–2142.

10. Kristufek, T. S.; **Kristufek, S. L.**; Lonnecker, A. T.; Link, L. A.; Raymond, J. E.; Wooley, K. L. Synthesis and Preparation of Isosorbide-based Cross-linked Networks Using Thiol-Ene Click Chemistry. *Poly. Chem.* **2016**, *7*, 2639-2644.
11. Yang, G.; **Kristufek, S. L.**; Link, L. A.; Wooley, K. L.; Robertson, M. L. Synthesis and Physical Properties of Thiol-Ene Networks Utilizing Plant-derived Phenolic Acids. *Macromolecules* **2015**, *48*, 8418-8427.
12. **Kristufek, S. L.**; Maltais, T. R.; Tennyson, E. G.; Osti, N. C.; Perahia, D.; Tennyson, A. G.; Smith, R. C. Bipyridyl-modified Phosphonium Conjugated Polyelectrolytes: Synthesis, Photophysics, Metal Ion Coordination and Layer-by-Layer Assembly with Anionic Conjugated Polymers. *Poly. Chem.* **2013**, *4*, 5387-5394.
13. Justik, M. W.; **Kristufek, S. L.**; Protasiewicz, J.D.; Deligonul, N. Preparation and X-Ray Structures of Novel Vinyl Iodonium Salts with a Pyridine-N-Oxide Moiety. *Synthesis* **2010**, *14*, 2345-2347.

#### Patent

- Wooley, Karen L; Basset, Celine J.; Lonnecker, Alexander T; Streff, Jennifer M.; **Kristufek, Samantha L.**; Hearon, Michael K.; "Degradable Polycarbonates", New International (PCT) Patent PCT/US2011/56204; Filed October 13, 2011. Based on U.S. Provisional Appl. Serial No. 61/392,893; Filed October 13, 2010.

#### Preprints

- Shieh, P.; Zhang, W.; Husted, K. E. L.; Kristufek, S. L.; Xiong, B.; Lundberg, D.; Lem, J.; Veysset, D.; Sun, Y.; Nelson, K.; Plata, D.; Johnson, J. A Comonomer Strategy for Triggered Degradation and Re/Upcycling of High-Performance Thermoset Plastics. *ChemRxiv* **2019** Preprint. <https://doi.org/10.26434/chemrxiv.11328242.v1>

#### Presentations

- **Kristufek, S. L.**; Wooley, K. L.; Johnson, J. A. Exploring Polymer Lengthscales: Synthesis and characterization of sustainable bulk materials to drug delivery systems and beyond, PMSE Future Faculty Symposium, Fall 2020 ACS National Meeting (Oral, **Invited**)
- **Kristufek, S. L.**; Nguyen, H. V. T.; Johnson, J. A. Evaluation of drug release from bottlebrush and brush-arm star polymers, 258<sup>th</sup> ACS National Meeting & Exposition, San Diego, CA, August 2019
- **Kristufek, S. L.**; Richardson, J. J.; Reidy, K.; Quinn, J. F.; Davis, T. P.; Caruso F. Utilizing the chemical toolbox for the synthesis of catechol-based polymers for the assembly of functional metal phenolic networks, 256<sup>nd</sup> ACS National Meeting & Exposition, Boston, MA, August 2018 (Oral)
- **Kristufek, S. L.**; Richardson, J. J.; Reidy, K.; Quinn, J. F.; Davis, T. P.; Caruso F. Utilizing the chemical toolbox for the synthesis of catechol-based polymers for the assembly of functional metal phenolic networks, World Polymer Congress MACRO18, Cairns, Queensland, Australia, July 2018 (Oral)
- **Kristufek, S. L.**; McKenzie, T.G.; Rahim, M. A.; Ju, Y.; Qiao, G. G.; Caruso, F. Utilizing the Chemical Toolbox for the Synthesis of Functional Metal Phenolic Networks from Small Molecules and Polymers, CBNS Annual Retreat and Poster Presentation, Sunshine Coast, Queensland, Australia, October 2017 (Poster)
- **Kristufek, S. L.**; Pollack, K.A.; Yang, G.; Link, L.A.; Rohde, B.R.; Gustafson, T. P.; Noel, A.; Jahnke, A. A., Raymond, J. E.; Robertson, M. L. Wooley, K. L. Quercetin-based Derivatives as Bisphenol A Replacements in Linear Polycarbonates and Epoxy Cross-linked Networks, 252<sup>nd</sup> ACS National Meeting & Exposition, Philadelphia, PA, August 2016 (Oral)
- **Kristufek, S. L.**; Yang, G.; Link, L.A., Rohde, B.R.; Robertson, M. L.; Wooley, K. L. Synthesis and Characterization of a Quercetin-based Epoxidized Monomer as a Natural Replacement for DGEBA in Epoxy Resins for Advanced Engineering Applications, BASF-TAMU Symposium, August 2016 (Poster)
- **Kristufek, S. L.**; Yang, G.; Link, L.A., Rohde, B.R.; Robertson, M. L.; Wooley, K. L. Synthesis and Characterization of a Quercetin-based Epoxidized Monomer as a Natural Replacement for DGEBA in Epoxy Resins for Advanced Engineering Applications, Dow Chemical Graduate Symposium Award, May 2016 (Poster)
- **Kristufek, S. L.**; Yang, G.; Link, L.A., Rohde, B.R.; Robertson, M. L.; Wooley, K. L. Synthesis and Characterization of a Quercetin-based Epoxidized Monomer as a Natural Replacement for DGEBA in Epoxy Resins for Advanced Engineering Applications, Student Research Week TAMU, March 2016 (Oral)
- **Kristufek, S. L.**; Yang, G.; Link, L.A., Rohde, B.R.; Robertson, M. L.; Wooley, K. L. Synthesis and Characterization of a Quercetin-based Epoxidized Monomer as a Natural Replacement for DGEBA in Epoxy Resins for Advanced Engineering Applications, Journey through Science Day, sponsored by PepsiCo, New York City, December 2015 (Poster)

- **Kristufek, S. L.**; Pollack, K.A.; Yang, G.; Link, L.A., Rohde, B.R.; Gustafson, T. P.; Jahnke, A. A.; Raymond, J. E.; Robertson, M. L.; Wooley, K. L. Synthesis and Characterization of Quercetin-based Linear and Cross-linked Polymers for Advanced Engineering Applications, Polymers Gordon Research Conference and Gordon Research Seminar, Mount Holyoke College, June 2015 (Poster)
- **Kristufek, S. L.**; Pollack, K.A.; Yang, G.; Noel, A.; Gustafson, T. P.; Raymond, J. E.; Robertson, M. L. Wooley, K. L. Quercetin-based Derivatives as Bisphenol A Replacements in Thermoplastics and Thermosets, BASF-TAMU Symposium, August 2014 (Poster)
- **Kristufek, S. L.**; Yang, G.; Raymond, J. E.; Robertson, M. L.; Wooley, K. L. Syntheses and Characterizations of Novel, Quercetin-Based Thermoset Polymers With Natural Cross-Linkers, 247<sup>th</sup> ACS National Meeting & Exposition, Dallas, TX, March 2014 (Oral)
- **Kristufek, S. L.**; Pollack, K. A.; Noel, A.; Gustafson, T. P.; Raymond, J. E.; Wooley, K. L. Synthesis and Characterization of Quercetin Based Polycarbonates for Biomedical Applications, Texas Biomaterials Day, June 2014 (Poster)
- **Kristufek, S. L.**; Pollack, K. A.; Gustafson, T. P.; Raymond, J. E.; Noel, A.; Wooley, K. L. High Modulus and Fluorescent Poly(Quercetin Carbonate) Designed For Advanced Engineering Applications, PTIC student poster session, September 2013 (Poster)
- **Kristufek, S. L.**; Pollack, K. A.; Gustafson, T. P.; Raymond, J. E.; Wooley, K. L. Synthesis And Characterization of a Novel, Degradable Polycarbonate Derived From 3,7,4'-Tribenzyl Quercetin, 246<sup>th</sup> ACS National Meeting & Exposition, Indianapolis, IN, September 2013 (Oral)
- **Kristufek, S. L.**; Gustafson, T. P.; Raymond, J. E.; Wooley, K. L. Synthesis and Characterization of a Novel, Fluorescent, Polycarbonate Derived from a Quercetin Derivative, BASF-TAMU Graduate Student Symposium on Excellent in Chemical Research, August 2013 (Poster)
- **Kristufek, S. L.**; Tennyson, E. G.; Osti, N. C.; Perahia, D.; Smith, R. C. Bipyridyl-modified Phosphonium Conjugated Polyelectrolytes: Synthesis, Photophysics, Metal Ion Coordination and Layer-by-Layer Assembly with Anionic Conjugated Polymers, 241<sup>st</sup> ACS National Meeting & Exposition, Anaheim, CA, March 2011 (Poster)
- **Kristufek, S. L.**; Justik, M. W.; Deligonul, N.; Protasiewicz, J. D. Preparation of a Series of  $\alpha$ -Acyloxy Ketones from the Reaction of Potassium Carboxylates with 1H-1-(1-Alkynyl)-5-Methyl-1,2,3-Benziodoxathiole 3,3-Dioxides, 241<sup>st</sup> ACS National Meeting & Exposition, Anaheim, CA, March 2011 (Poster)
- **Kristufek, S. L.**; Justik, M. W. A Regioselective Synthesis of a Series of  $\alpha$ -Acyloxy Ketones from a Novel Class of Alkynylodonium Salts, Penn State Behrend/Sigma Xi Conference, April 2011 (Poster)
- **Kristufek, S. L.**; Justik, M. W. Preparation of 4-Methyl-1-((Z)-1-phenyl-2-(phenyliodonio)ethenyl)oxy)pyridinium bis(4-methylbenzenesulfonate) and X-ray Structure, Penn State Behrend/Sigma Xi Conference, April 2010 (Oral)
- **Kristufek, S. L.**; Justik, M.W. Preparation of 4-Methyl-1-((Z)-1-phenyl-2-(phenyliodonio)ethenyl)oxy)pyridinium bis(4-methylbenzenesulfonate) and X-ray Structure, NCUR, University of Montana, April 2010 (Oral)

### Academic Services

- Reviewer for *Journal of the American Chemical Society*
- Reviewer for *Macromolecules*
- Reviewer for *Organic Letters*
- Reviewer for *Journal of Polymer Chemistry Part A*
- TAMU Departmental Safety Committee-Student Member (Spring 2015)

### Mentorship

- Four graduate students (January 2020-present)
- One graduate student and one visiting student at NIMS (March 2018-May 2018, January 2018 -July 2018)
- Two graduate students (September 2013-February 2017, June 2014-February 2017)
- Incoming Graduate Student Mentor (Summer 2015 and Summer 2016)
- Three summer undergraduate research students (1-May 2013-August 2013, 2-May 2016-February 2017)

### Professional Societies

- American Chemical Society-Member (2009-present)
- Sigma Xi-Associate Member (2010-present)
- Society of Plastic Engineers, Texas A&M Chapter (2012-2017)
- Royal Australian Chemical Institute, Chartered Member MRACI CChem (2017-present)

**Professional Activities**

- Chair of the Johnson Group Seminar Series Committee (June 2020-present)
- Women in Science and Engineering (2012-2016)
- Graduate Student Association of Chemistry-Organic Division Representative
- Member of the steering committee for the conference, Frontiers in Bio-Nano Science – a CBNS EMCR event (January 2018-July 2018)
  - Member of the conference communication committee with a focus on outreach *via* social media