

Keyton D. Feller

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EDUCATION

University of Wisconsin-Platteville

Platteville, WI

- Bachelor of Science, Chemistry with Math Minor, 2017
- Participated in undergraduate research at UW-Platteville primarily working on Homogeneous catalyst development for activation of aryl-heteroatom bonds in lignin and heavy crudes and reduction of CO₂ (2015 – 2017).

Virginia Tech

Blacksburg, VA

- Ph.D., Macromolecular Science and Engineering, Spring: 2022
- Research focuses on developing characterization techniques for polymer latex systems to improve processability in vat polymerization (stereolithography)

RELEVANT COURSEWORK AND SKILLS

- Courses: Polymer Morphology, Physical Chemistry, Advanced Synthesis, Differential Equations, Engineering Materials, Polymer Synthesis, Design of Experiments, Data Analysis through Machine Learning
- Equipment Experience & Skills: NMR, SEM, FTIR, UV-Vis, TGA, DSC, DMA, Rheology, Glove Box, Schlenk Line, Instron Tester, Python Programming.

RECOGNITION AND AWARDS

- Pioneer Undergraduate Research Fellowship (PURF) (Spring 2015)
- UW-Platteville College of Engineering, Math, and Science (EMS) Dean's List (Fall 2013 – present)
- ACS Undergraduate Award in Analytical Chemistry 2017
- Interdisciplinary Graduate Education Program (IGEP) Scholarship (Fall 2017)

RESEARCH EXPERIENCE

UW-Platteville Department of Chemistry

Platteville, WI

Principal Investigator: Dr. Brian M. Barry

Investigation of guanidine-like ligands to synthesize an electron-rich and coordinatively unsaturated metal complexes that have increased tunability of electron donation and resonance stabilization for cleavage of aryl-heteroatom bonds in lignin and heavy crudes. (Spring 2015 – Spring 2017).

UW-Platteville Department of Engineering Physics

Platteville, WI

Principal Investigator: Dr. Harold Evensen

Transistors comprised of polymer-wrapped carbon nanotubes are deposited onto electrodes grafted on a silicon wafer for high sensitivity gas sensing. Work required post modification of the polymer to increase gas adsorption and amplification of the resulting signal. (Spring 2016)

Virginia Tech Macromolecule Innovations Institute (REU)

Blacksburg, VA

Principal Investigator: Dr. Christopher Williams

Vat polymerization, AKA stereolithography, via Autodesk Ember was utilized to 3D-print colloidal mixtures of calcium phosphate to fabricate structures for water/gas filtration, and insulators for heating elements. A shrinkage study was conducted to measure anisotropic effects throughout the part, as well as, test mechanical properties. (Summer 2016)

Virginia Tech Macromolecule Innovations Institute (Graduate)

Blacksburg, VA

Principal Investigator: Dr. Christopher Williams and Dr. Timothy Long

Utilize Monte Carlo ray tracing to simulate the light attenuation and intensity distribution of light scattering vat photopolymerization resins, predicting curing shape and improving the resolution of parts. Current resins of interest are polymer latexes including styrene-butadiene rubber, natural rubber, and polyurethane latexes (the process also applies to inorganic fillers). Work entails synthesis of water-soluble photoinitiator, formulation of photocurable latex resins, constructing working curves through microscopy, incorporation of Mie theory in concentrated colloids, programming in Python, and characterization via DLS, refractometer, NMR, TGA, and UV-vis.

(Fall 2017 to present)

WORK EXPERIENCE**Research Assistant (10 hr/wk)**

Air sensitive and benchtop synthesis techniques, laboratory maintenance, ^1H and ^{13}C NMR. (Spring 2015 – Spring 2017).

Drop-In Chemistry Tutor (4 hr/wk)

Assist general chemistry students with course concepts. Plan and organize exam review sessions for general chemistry courses. (Spring 2016 – Spring 2017).

Chemistry Stockroom Student Assistant (5 hr/wk)

Laboratory preparation and maintenance for general and advanced chemistry courses. Perform weekly NMR liquid nitrogen fillings, hydrogen generator fillings, and eyewash station tests. (Fall 2015 – Spring 2017).

Organic Chemistry Grader (4 hr/wk)

Grade homework for the introductory organic chemistry course. (Fall 2016–Spring 2017).

Photonic Cleaning Technologies, Inventory and Shipping Manager (7 hr/wk)

Maintain inventory of aerospace polymer coating optics cleaner, assemble and process orders. (Spring 2014 – Spring 2016).

PRESENTATIONS

“Homogeneous Catalyst Design Towards sp²-Heteroatom Insertions: Valorization of Lignin and Heavy Crudes.” K. Feller, J. Bruggen, H. Schickel, B. M. Barry. Posters in the Rotunda in Madison, WI. April 13, **2016**.

“Coordination Complexes with Guanidine-Type Ligands Towards Cleavage of Aryl-Heteroatom Bonds Found in Naturally Occurring Feedstocks.” K. Feller, J. Bruggen, H. Schickel, B. M. Barry. Poster at ACS National Meeting in San Francisco Spring **2017**.

“Development of an Organic Lab: Polymerization of Limonene.” K. Feller, R. Annamalai. Poster at Pioneer Creative Activities and Research Day (PCARD) Spring **2017**.

“3D Printing of Ceramic Suspensions Using Microstereolithography Toward Water and Gas Filtration.” K. Feller, D. Aduba, C. B. Williams. Poster at Solid Freeform Fabrication (SFF) Symposium **2017**.

“High-Temperature Vat Photopolymerization Apparatus.” Viswanath Meenakshisundarm, Nicholas A. Chartrain, Xi Chen, Mingtao Chen, Keyton D. Feller, Timothy E. Long and Christopher B. Williams. Poster at Macromolecules Innovation Institute Technical Conference, Blacksburg, VA, April 16, **2018**.

“High-Temperature Vat Photopolymerization.” Keyton D. Feller, Viswanath Meenakshisundarm, Nicholas A. Chartrain, Christopher B. Williams, and Timothy. E. Long. Poster at ANTEC 2019, Detroit, MI, March 19, **2019**.

“Exploring the Effect of Temperature in High-Temperature Vat Photopolymerization Resins.” Keyton D. Feller, Viswanath Meenakshisundarm, Christopher B. Williams, Timothy E. Long. Poster at Macromolecules Innovation Institute Technical Conference, Blacksburg, VA, November 5, **2019**.

PUBLICATIONS

Bruggen, J. A.; Feller, K. D.; Schickel, H. I.; Tuleushova, N.; Zhukush, M.; Lam, K.; Barry, B. M.; Kemp, R. A. Synthesis and Characterization of Metal (M = Al or Ga) 2-Phosphino(phenolate/benzenethiolate) Complexes and Their Electrochemical Behavior in the Presence of CO₂. *Main Gr. Chem.* **2017**, 16 (4), 307–319 DOI: 10.3233/MGC-170245.

D. C. Aduba, K. D. Feller, T. E. Long, and C. B. Williams, "A Topological Exploration of Shrinkage in Sintered Bioceramic Parts Fabricated by Vat Photopolymerization," *International Solid Freeform Fabrication Symposium, Conference Proceedings* **2017**.

Gayan A. Appuhamillage, Nicholas Chartrain, Viswanath Meenakshisundaram, Keyton D. Feller, Christopher B. Williams, Timothy E. Long, "110th Anniversary: Vat Photopolymerization-Based Additive Manufacturing: Current Trends and Future Directions in Materials Design," *Ind. Eng. Chem. Res.* **2019**, 58 (33), 15109-15118 DOI: 10.1021/acs.iecr.9b02679

Philip J. Scott, Viswanath Meenakshisundaram, Maruti Hegde, Christopher R. Kasprzak, Christopher R. Winkler, Keyton D. Feller, Christopher B. Williams, Timothy E. Long, "3D Printing Latex: A Route to Complex Geometries of High Molecular Weight Polymers," *ACS Appl. Mater. Interfaces* **2020**, 12, (9), 10918–10928 DOI: <https://doi.org/10.1021/acsami.9b19986>

ACTIVITIES

- Member, American Chemical Society. (2016 – 2018)
- Member, Vice President, UWP Alchemist Club. (2014 – 2017)
- Macromolecules Innovations Institute (MII) Ambassador, Graduate Student Assembly (2017 – 2019)
- Liaison, Society of Plastic Engineers Virginia Chapter (2018 – present)
- Member, MACR Student Council (2018 – present)