

Nathaniel J. Freymeyer

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EDUCATION

Vanderbilt University, Ph.D. (expected) May 2020 Nashville, TN
PhD. Chemistry
Dissertation: *Ultrafast Fluorescence Upconversion of Alloyed III-V/II-VI Core/Shell Quantum Dots*
Advisor: Sandra J. Rosenthal

Franklin and Marshall College, B.A. 2014 Lancaster, PA
Chemistry major
German minor
Research Advisor: Katherine E. Plass

RESEARCH INTERESTS

- Ultrafast spectroscopy on cadmium-free colloidal quantum dots
- Nanocrystal synthesis

WORK EXPERIENCE

Vanderbilt University Nashville, TN
Introductory Chemistry Teaching Assistant, Spring 2020

- Instructed and graded 1 section of 19 students

General Chemistry 2 Head Teaching Assistant, Spring 2020

- Facilitated the transfer of general chemistry lab to virtual instruction
- Organized teaching assistants for various roles including exam proctoring and office hours

General Chemistry 1 Teaching Assistant, Fall 2014, 2015, 2019

- Instructed and graded 2 sections per semester of approximately 24 students each

General Chemistry 2 Teaching Assistant, Summer 2019

- Instructed and graded 1 section of 7 students

Course Development Teaching Assistant for Physical Chemistry, Fall 2018

- Developed and successfully implemented two new physical chemistry experiments while modernizing and improving the remaining experiments

Physical Chemistry Teaching Assistant, Spring 2015, 2016, 2018

- Instructed and graded 4-8 computational and wet lab experiments

Franklin and Marshall College Lancaster, PA
Inorganic Chemistry Teaching Assistant, Spring 2014
Hackman Scholar, Summer 2011, 2012, 2013
Athletic Communications: Broadcast Operations, 2010-2014

PUBLICATIONS

- Frey Meyer, N. J.; Click, S. M.; Reid, K. R.; Chisholm, M. F.; McBride, J. R.; Rosenthal, S. J. Effect of Indium Alloying on the Charge Carrier Dynamics of Thick-Shell InP/ZnSe Quantum Dots. *Journal of Chemical Physics* **2020**, Accepted.
- Reid, K.R.; McBride, J. R.; Freymeyer, N. J.; Thal, L. B.; Rosenthal, S. J.; Chemical Structure, Ensemble and Single-Particle Spectroscopy of Thick-Shell InP–ZnSe Quantum Dots *Nano Letters* **2018**, *18*(2), 705-716.
- Reid, K.R.; McBride, J. R.; La Croix, A. D.; Freymeyer, N. J.; Click, S. M.; Macdonald, J. E.; Rosenthal, S. J.; Role of Surface Morphology on Exciton Recombination in Single Quantum Dot-in-Rods Revealed by Optical and Atomic Structure Correlation *ACS Nano* **2018**, *12*, 11434.
- Frey Meyer, N. F.; Cunningham, P. D.; Jones, E. C.; Golden, B. J.; Wiltrout, A. M.; Plass, K. E.; Influence of Solvent Reducing Ability on Copper Sulfide Crystal Phase. *Crystal Growth & Design* **2013**, *13*(9), 4059.
- Wiltrout, A. M.; Freymeyer, N. J.; Machani, T.; Plass, K. E. Phase-Selective Synthesis of Bornite Nanoparticles. *Journal of Materials Chemistry* **2011**, *21*, 19286- 19292.

PRESENTATIONS

- McBride, J. R.; Click, S. M.; Freymeyer, N. J.; Chisholm, M. F.; Hollingsworth, J. A.; Rosenthal, S. J. Revealing the Impact of Shell Composition and Defects on Colloidal Quantum Dot Performance, American Chemical Society National Meeting Philadelphia Spring 2020
- Effect of Indium Alloying on the Charge Carrier Dynamics of Thick-Shell InP/ZnSe Quantum Dots, NanoDay November 22, 2019
- Ultrafast Charge Carrier Dynamics of Indium-alloyed Thick-Shell InP/ZnSe Quantum Dots, American Chemical Society Fall National Meeting San Diego, August 26, 2019
- Ultrafast Charge Carrier Dynamics of Indium- alloyed Thick-Shell InP/ZnSe Quantum Dots, Materials Research Society Student Seminar Series Vanderbilt University, April 16, 2019
- Ultrafast Charge Carrier Dynamics in Thick-Shell InP-ZnSe Quantum Dots, Materials Research Society Spring Meeting Phoenix, April 3, 2018
- Carrier Dynamics of Thick-Shell InP-ZnSe Quantum Dots, NanoDay, Vanderbilt University October 25, 2017
- Ultrafast Fluorescence Upconversion Spectroscopy as a Method for Quantum Dot Characterization, Vanderbilt Chemistry Forum Series, March 16, 2017
- Plass, K. E.; Freymeyer, N. J.; Kim, C.; Wisdo, C.; Georgieva, Z. Plasmonic Behavior of Copper Iron Sulfide Nanoparticles, American Chemical Society National Meeting Denver March 22, 2015
- Plass, K. E.; Freymeyer, N. J.; Kim, C.; Georgieva, Z. Phase-selective Synthesis and Surface Passivation of Binary and Ternary Copper Sulfide Nanoparticles, American Chemical Society National Meeting Denver, March 22, 2015

Kim, C.; Freymeyer, N. J.; Wisdo, C.; Plass, K. E. Phase-selective Solution-based Synthesis of Copper Iron Sulfide Nanoparticles, American Chemical Society National Meeting Dallas, March 17, 2014

Effect of Solution Species on Relative Incorporation of Metals in Chalcogenide Nanoparticles, Franklin & Marshall A Closer Look Research Fair, April 11, 2014

Effect of Solution Species on Relative Incorporation of Metals in Chalcogenide Nanoparticles, American Chemical Society National Meeting Dallas, March 17, 2014

Control of Copper Stoichiometry in Metal Sulfide Nanoparticles, Franklin & Marshall Autumn Research Fair, October 4, 2013

Synthesizing Aluminum Chalcopyrite Nanoparticles, Franklin & Marshall A Closer Look Research Fair, April 12, 2013

Synthesizing Aluminum Chalcopyrite Nanoparticles, Haverford Undergraduate Summer Research Symposium, September 22, 2012 and Franklin & Marshall Autumn Research Fair, October 19, 2012

Synthesizing Bornite, Pyrite, and Tin Sulfide Nanoparticles, Franklin & Marshall Autumn Research Fair, September 23, 2011

PROFESSIONAL ORGANIZATIONS

Materials Research Society, Spring 2015-present

Student Chapter Treasurer, Spring 2016-Spring 2017, Spring 2018-Spring 2019

Student Chapter Vice President, Spring 2017-Spring 2018

- Organized the implementation of a monthly student seminar series
- Further expanded outreach opportunities with the Adventure Science Center including the development of a new activity based upon quantum dots

American Chemical Society, Fall 2010-present

HONORS

Mu Upsilon Sigma Music Honor and Service Society, Franklin and Marshall College
January 2012

Delta Phi Alpha, National German Honor Society, April 2014, Franklin and Marshall College

Moore-Schaeffer Mentorship Award, Franklin and Marshall College, Summer 2010

Eagle Scout, 2010

SERVICE TO THE UNIVERSITY

Vanderbilt Undergraduate Research Fair Judge, September 14, 2017

Warren Lecture Committee/Chemistry Graduate Student Council, Spring 2016-Fall 2017

- Organized the department's annual student selected seminar and other departmental events as needed

VOLUNTEER/OUTREACH EXPERIENCE

Vanderbilt Institute of Nanoscale Science and Engineering High School Blackberry Solar Cell Field Trips, Spring 2015-present

Vanderbilt Student Volunteers for Science, Fall 2015-present

Team Leader, Fall 2016, Spring 2017, Fall 2017, Fall 2018

Rural Teacher Training, Summer 2018, Summer 2019

Materials Research Society Outreach at Adventure Science Center, Spring 2014-present

Vanderbilt Summer Academy Lab Tour and Demonstration, Summer 2016-present