

Natalie K. Machamer

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A dedicated Organic Chemistry Senior Lecturer and Laboratory Coordinator at The University of Maine teaching both Organic Chemistry I and Organic Chemistry II to a socially and academically diverse group of students. Strives to maintain an engaging classroom atmosphere by utilizing current active learning strategies. Possesses excellent organizational, communication, and interpersonal skills. A committed team member always ready and willing to take on a leadership role. Has received numerous accolades from supervising faculty and students which include "...always willing to go above and beyond and help those who are struggling...", "...excellent teaching, her methods helped with studying and general learning...", and "...the most thoughtful, comprehensive, and clear instructor I've had thus far."

EDUCATION

- The University of Vermont, Burlington, VT August 2009 – May 2015
 - **Ph.D. in Synthetic Organic Chemistry**
Graduate Advisor: Professor Stephen P. Waters
Dissertation Title: "I. A New Route to Azomethine Ylides: Shifting the Reliance on Amino Ester Precursors; II. Applications in Total Synthesis"
- Juniata College, Huntingdon, PA Fall 2007 – Spring 2009
 - **B.S. in Chemistry (ACS Certified); Minor in Business Management**
Undergraduate Advisor: Professor Richard R. Hark

TEACHING EXPERIENCE

- **Organic Chemistry Senior Lecturer and Laboratory Coordinator at the University of Maine** May 2021 – present
Please see job responsibilities below.
- **Organic Chemistry Lecturer and Laboratory Coordinator at the University of Maine** August 2015 – May 2021
Organic Chemistry I and II Lecturer
 - Responsibilities include: Developing lesson plans, teaching large lecture sections (120+ students) with an emphasis on active learning, preparing and grading exams, daily open office hours, and creating and providing mentoring opportunities for students.
 - Member of a campus-wide STEM Faculty Collaborative Program during the 2015-2016 academic year. Nine total faculty members were chosen across all STEM disciplines on campus.

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- Was awarded a Maine Learning Assistants grant (<http://umaine.edu/mainesp/university-initiatives/maine-learning-assistants/>) to assist with Organic Chemistry I course during the Fall 2016 and Fall 2017 semesters. Four MLA students were awarded for the Fall 2016 semester and six students for the Fall 2017 semester.

Organic Chemistry Laboratory Coordinator

- Responsible for conducting weekly TA meetings to review organic chemistry laboratory practices and scientific protocol, preparing weekly quizzes for each laboratory section, and ensuring all laboratory sections follow Laboratory Standard Operating Procedures and all safety protocols.
- Spearheaded the effort to update and rewrite the University of Maine laboratory manuals for Organic I and II to become more user friendly and to be more consistently aligned with lecture materials.

Instructor for Majoring in Chemistry

- The goal of this one-credit weekly class for freshman chemistry majors is to introduce students to the department and university with student success in mind. Emphasis is placed on time management, effective study skills, campus resources, and career choices for chemistry majors.

Instructor for The Chemistry of Food and Cooking

- A non-mathematical approach to basic chemistry and chemical principles using food and cooking as the common theme. During the course of the semester, different food or cooking topics are used to explore a variety of themes in chemistry. Emphasis is placed on understanding why and how something works in a laboratory and the application to the "real-world," in this case, the kitchen. The lab complements the course by providing hands-on experience with topics covered in lecture and by emphasizing the scientific method through examination of food and cooking. This course satisfies the Lab Science general education requirements.

• **Graduate Teaching Assistant at the University of Vermont**

Fall 2009 – May 2015

Introduction to General Chemistry (laboratory)

- Duties included: Teaching safe laboratory operating procedures and following all regulations; grading quizzes, lab reports, and exams; and providing weekly open office hours.

Introduction to Organic Chemistry (laboratory)

- Taught basic organic chemistry lab techniques with a focus on the relationship between biological concepts and the classroom material.

Organic Chemistry (laboratory)

- Responsible for teaching traditional organic chemistry lab techniques and safety procedures, proper scientific language for formal lab reports, and reviewing material from lectures.

Organic Chemistry II (laboratory)

- Continuation of *Organic Chemistry I*

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- **Teaching Assistant at Juniata College** Spring 2009
The Chemistry of Art
 - Responsible for gathering materials, setting up, and assisting students in the lab portion of the class.
- **Academic Support Services Tutor at Juniata College** Fall 2007 – Spring 2009
Organic Chemical Concepts I & II and *Financial Accounting*
 - Reviewed class topics with students in a one-on-one or small group setting.
- **Peer-group Leader and Teaching Assistant at Juniata College** Fall 2007 – Spring 2009
Organic Chemical Concepts I and II
 - Led bi-weekly evening review sessions of approximately 8 – 10 students to discuss material from classroom lectures and review assigned homework problems.

RESEARCH EXPERIENCE

- **Graduate Research** (The University of Vermont) August 2009 – May 2015
 - Development of a new route to azomethine ylides to yield 5-vinyl substituted pyrrolidine rings via a [3+2] dipolar cycloaddition and application of method to the total synthesis of spirotryprostatin B
- **Undergraduate Research** (Juniata College) Fall 2007 – Spring 2009
 - Study of the base-catalyzed condensation reaction of *o*-phthalaldehyde with malonic acid (Summer 2007)
 - Analysis of pen inks using laser-induced breakdown spectroscopy (LIBS)
- **Undergraduate Research** (The University of Massachusetts, Amherst; Polymer Science and Engineering Department with Professor Todd Emrick) Summer 2008
 - Synthesis and characterization of zwitterionic ligands to be placed on gold nanoparticles

PUBLICATIONS/PRESENTATIONS (presenting author is starred)

- Development and use of laboratory videos for introductory undergraduate organic chemistry in an effort to improve preparations and confidence. Natalie Machamer (1). 2020 Biennial Conference on Chemical Education. Abstract accepted March 31, 2020. Because of the global COVID-19 pandemic, the 2020 Biennial Conference on Chemical Education was terminated on April 2, 2020, by the Executive Committee of the Division of Chemical Education, American Chemical Society; and, therefore, this presentation could not be given as intended. 2020
- Houck, J. D.; **Machamer, N. K.**; Erickson, K. E. “Graduate Student Outreach: Model of a One-Day ‘Chemistry Camp’ For Elementary School Students,” *J. Chem. Ed.*, **2014**, *91*, 1606-1610.
- **Machamer, N. K.**, Liu, X.; Waters, S. P. “A New Entry to Azomethine Ylides from Allylic Amines and Glyoxals: Shifting the Reliance on Amino Ester Precursors” *Org. Lett.*, **2014**, *16*, 4996-4999. 2014

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- ***Machamer, N. K.**, Waters, S. P., “New Route to Azomethine Ylides: Application Toward the Anti-Cancer Compound Peduncularine,” M-33, Abstract of Papers, 43rd National Organic Chemistry Symposium, Seattle, WA, June 23-27, 2013. June 2013
- ***Liu, X., Machamer, N. K.**, Waters, S. P., “Construction of *N*-heterocycles via aza-Prins cyclization and 1,3-dipolar cycloaddition,” ORGN 167, Abstract of Papers, 244th American Chemical Society National Meeting, Philadelphia, PA, August 19-23, 2012. August 2012
- ***Machamer, N. K.**, Liu, X., Waters, S. P., “New route to azomethine ylides to yield 5-vinyl substituted pyrrolidine rings via a [3+2] dipolar cycloaddition,” ORGN 500, Abstract of Papers, 244th American Chemical Society National Meeting, Philadelphia, PA, August 19-23, 2012. August 2012
- ***Machamer, N. K.**, *Albaugh, D. M., Hark, R. R., “Analysis of Inks Using Laser-Induced Breakdown Spectroscopy,” Juniata College 4th Annual Liberal Arts Symposium. April 2009
- ***Machamer, N. K.**, *Oliveri, A. F., *Page, Z. A., *Beaver, J. E., *Bloom, A. N., Maxon, J. V., Fisher, T. L., “Juniata College SAACS: Expecting Uncommon Reactions,” CHED 1083, Abstract of Papers, 237th American Chemical Society National Meeting, Salt Lake City, UT, March 22-26, 2009. March 2009
- ***Machamer, N. K.**; *Albaugh, D. M.; Hark, R. R., “Analysis of ballpoint pen inks using laser-induced breakdown spectroscopy,” ANYL 047, Abstract of Papers, 237th American Chemical Society National Meeting, Salt Lake City, UT, March 22-26, 2009. March 2009
- ***Machamer, N. K.**, Hark, R. R., “Study of the base-catalyzed condensation reaction of *o*-phthalaldehyde with malonic acid,” Juniata College 3rd Annual Liberal Arts Symposium. April 2008
- ***Machamer, N. K.**, Hark, R. R., “Study of the base-catalyzed condensation reaction of *o*-phthalaldehyde with malonic acid,” ORGN-105, Abstract of Papers, 235th American Chemical Society National Meeting, New Orleans, LA, April 6-10, 2008. April 2008
- ***Machamer, N. K.**; Hark, R. R., “Study of the base-catalyzed condensation reaction of *o*-phthalaldehyde with malonic acid,” Juniata College Summer Undergraduate Research Fellowship Symposium. August 2007

AWARDS

- 2021 College of Liberal Arts and Sciences Outstanding Lecturer Award April 2021
- Maine Learning Assistants (University of Maine RISE Center) Fall 2016 – Fall 2017
- Outstanding Graduate Teaching Fellow (UVM Graduate Student Senate) May 2015
- ACS Division of Organic Chemistry – National Travel Award Summer 2012
- Outstanding First-Year Graduate Teaching Fellow (Chemistry Department) May 2010
- von Liebig Research Fellowship Summer 2007

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SERVICE

- College of Liberal Arts and Sciences (CLAS) Awards Committee Member 2020 – present
- Faculty Senate, Member; Service and Outreach Committee (Member) 2021 – 2022
- Faculty Senate, Member; University Environment Committee (Member) 2019 – 2021
- Faculty Advisor for the University of Maine Graduate Student Chemistry Club 2019 – present
- Seminar: *Scientific Analysis of Art and Antiquities* (by Professor Richard R. Hark, Juniata College) April 2018
 - Primary organizer of a joint seminar between the University of Maine Chemistry Department, Maine Local Section of ACS, University of Maine Art Museum, and the Laboratory for Surface Science and Technology (LASST, UMaine)
- Chemistry Camp: *Passport to the Periodic Table: Explorations in Chemistry* April 2014
 - Primary organizer of a Saturday chemistry camp for 90 local elementary school students. The camp consisted of 6 element-related lab activities and concluded with a demonstration show.
- Chemistry Camp: *The Chemistry of Food* April 2013
 - Initiated and managed a Saturday chemistry camp for 60 local elementary school students put on by the University of Vermont Chemistry Graduate Students. The camp consisted of 5 food-related lab activities (tailored for each age group) and concluded with a demonstration show. Details regarding this community outreach program are published in the *Journal of Chemical Education* (see Publications).

PROFESSIONAL AFFILIATIONS

- The American Chemical Society 2008 – present
 - Maine Local Section Awards Chair (2016 – 2021)
 - Maine Local Section Treasurer (2017 – 2019)
- Gamma Sigma Epsilon (National Chemistry Honor Society) Inducted April 2009
- Juniata College Chemistry Club (Vice President, Fall 2008 – Spring 2009) Fall 2006 – Spring 2009