MALLORY PAIGE LADD

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EDUCATION

Doctor of Philosophy, Energy Science and Engineering, *expected completion 2018*
The University of Tennessee, Bredesen Center for Interdisciplinary Research & Graduate Education, Knoxville, TN
Research interests: analytical chemistry, biogeochemistry, climate science, energy and environmental policy
Adviser: Dr. Robert Hettich, Oak Ridge National Laboratory, Mass Spectrometry & Laser Spectroscopy Group

Bachelor of Science, Chemistry with Magna Cum Laude Honors
Honors Thesis: *Sequence Characterization of Otter Hemoglobin Using a Combination of Bottom-Up Approach Mass Spectrometry and X-ray Crystallography,* The University of Toledo, Toledo, OH
Adviser: Dr. Wendell Griffith, Department of Chemistry

RESEARCH EXPERIENCE

2013-present: **Linking soil chemistry, ecosystem functioning, and climate change in the Arctic**, PhD Candidate, Next Generation Ecosystem Experiments-Arctic, Oak Ridge National Laboratory

- Developed and implemented analytical approach to assess the interacting effects of soil biogeochemistry and climate change on Arctic ecosystems
- Collaborated with scientists from Oak Ridge National Laboratory, Lawrence-Berkeley National Laboratory, and the University of Alaska – Fairbanks
- Secured over $180K from multiple sources to fund research activities, supplies, and travel
- Created website to communicate research findings to the public: http://malloryladd.com

2011-2013: **Seasonal patterns in Arctic soil nitrogen availability in response to accelerated warming**, Research Technician, Ecosystem and Soil Ecology Laboratory, University of Toledo

- Organized research and logistics for two field expeditions to a remote area of the Alaskan Arctic
- Guest lectured in undergraduate courses to teach principles of general chemistry
- Assisted on a multidisciplinary, collaborative project with scientists from the University of Toledo, University of California - Santa Barbara, and Colorado State University
- Hired, supervised, trained, and mentored five laboratory assistants

2009-2011: **Uncovering a mechanism for red blood cell aging through protein chemistry**, Undergraduate Research Assistant, Honors Thesis Work, Department of Chemistry, University of Toledo

- Performed purification, crystallization, and mass spectrometric analyses to examine the structure and sequence of the hemoglobin proteins
- Designed and implemented study to examine the effect of various environmental conditions on protein crystal growth
- Secured over $4K to fund research activities, supplies, and conference travel
- Completed honors thesis on research results

2008: **Synthesis, purification, & characterization of potential antibiotics for cancer**, Undergraduate Research Assistant, Department of Chemistry, University of Toledo

- Developed skills in organic synthesis and medicinal chemistry including microwave chemistry and infrared and nuclear magnetic resonance spectroscopy
- Collected and analyzed data with team of undergraduate students

FELLOWSHIPS & GRANTS

2016: **Travel Grant**, American Society of Mass Spectrometry Graduate Student Travel Award ($300)
2015: **Travel Grant**, University of Tennessee Graduate Student Travel Award ($520)
2014: **Fellowship**, National Science Foundation (NSF) Graduate Research Fellowship (GRFP) ($138,000)
2013: **Fellowship**, Energy Science & Engineering, Bredesen Center, University of Tennessee ($50,000)
2011: **Travel Grant**, University of Toledo, Honors Undergraduate Chemistry Travel Award ($500)
2010: **Fellowship**, Sullivan Honors Fellowship, University of Toledo Honors College ($3,000)
2009: **Scholarship**, Chemical and Allied Industries of Northwest Ohio Scholarship ($1,000)

PUBLICATIONS

Peer-Reviewed Journals

Darrouzet-Nardi, A., **Ladd, M.P.**, Weintraub, M.N., (2013) Fluorescent microplate analysis of amino acids and other primary amines in soils. *Soil Biology and Biochemistry*, v. 57, p. 78.

In Preparation or Review

Ladd, M.P., Hettich, R.L. (2017) Development and evaluation of a non-targeted metabolomics approach to identify biogeochemical hotspots in Arctic soils.

Thesis

Ladd, M.P., Griffith, W. P. (2011) Sequence characterization of otter hemoglobin using a combination of bottom-up approach mass spectrometry and x-ray crystallography. University of Toledo, 95 p.

Other

Ladd, M.P., Wullschleger, S.D. (2015) Challenges and Opportunities of Interdisciplinary Teamwork for Early Career Arctic Scientists. Arctic Research Consortium of the United States (ARCUS) Witness the Arctic. Fall Issue 3.

INVITED TALKS & PANEL DISCUSSIONS

2017: **Invited speaker** for an Oak Ridge Institute for Continued Learning (ORICL) course on Energy Issues of Current Concern on the topic of "Climate Change: Where do we stand?"

Invited speaker for Energy Science & Engineering doctoral program seminar on the topic of "Techniques in Effective Science Communication"

Invited speaker for Bredesen Center graduate student retreat, "Sweating the small stuff: Using non-targeted metabolomics to identify biogeochemical hotspots of soil organic matter vulnerability in the Arctic"

2016: **Panelist** at the Southeast Regional Energy Innovation Workshop in Chattanooga, TN to discuss how universities, industry, community stakeholders, and the Department of Energy national laboratories can leverage clean energy technologies to stimulate regional economic development

2015: **Panelist** alongside Nobel Laureates Dr. Harold Varmus and Dr. Brian P. Schmidt, and Marcia McNutt, former editor-in-chief of *Science,* at the Lindau Nobel Laureate Meeting in Lindau, Germany, "Communication Overkill?" a discussion on science communication and public engagement

CONFERENCE PROCEEDINGS

Ladd, M.P; Wullschleger, S.D.; Hettich, R. (2016) Characterizing low molecular weight organic matter in Arctic polygonal tundra soils to identify biogeochemical hotspots using a dual-separation high-resolution mass spectrometry approach. American Geophysical Union Annual Meeting (AGU).

Ladd, M.P.; Wullschleger, S.D.; Hettich, R. (2016) Development and evaluation of a dual-separation, high-resolution, nano-ESI-LC-MS/MS approach for dissolved soil organic matter characterization. American Society for Mass Spectrometry Annual Meeting (ASMS).

Ladd, M.P.; Abraham, P.; Gianonne, R.; Norby, R.; Hettich, R. (2015) Characterizing the range of low molecular weight organic compounds in nitrogen-limited Arctic soils using nano-electrospray mass spectrometry. American Society for Mass Spectrometry Annual Meeting (ASMS).

Graham, D.; Chowdhury, T. R.; Herndon, E.; **Ladd, M.P**.; Elias, D.; Phelps, T.; Gu, B.; Liang, L.; Wullschleger, S. (2014) Biogeochemical controls on microbial CO_2 and CH_4 production in polygonal soils from the Barrow Environmental Observatory. Department of Energy TES/SBR PI Meeting.

Ladd, M.P.; Long, H.; Phelps, T.; Graham, D. (2013) Simulating Arctic permafrost seasonal thaw conditions in the laboratory. Oak Ridge National Lab Women in Science poster session.

Ladd, M.P.; Rinkes, Z.; Weintraub, M.N. (2012) Effects of elevated N on the interaction between microbial activity and litter chemistry during decomposition of *Acer saccharum* litter. 97th Ecological Society of America.

Ladd, M.P.; Guo, J.; Griffith, W.P. (2011) Sequence characterization of otter hemoglobin using a combination of mass spectrometry and x-ray crystallography. American Chemical Society Annual Meeting (ACS).

Ladd, M.P. (2011) Sequence characterization of otter hemoglobin using a combination of bottom-up approach mass spectrometry and x-ray crystallography. National Conference for Undergraduate Research (NCUR).

Crowe, J.; **Ladd, M.**; McCann, S.; Mull, D.; Casarotto, V.; Lind, C.; Sucheck, S. (2008) To nuke or not to nuke: The joys and pitfalls of microwaves. Central Regional Meeting of the American Chemical Society (CERMACS).

SKILLS & TRAINING

Laboratory: HPLC and high-resolution, nanoESI mass spectrometry sample preparation and protocol development, gas chromatography, infrared gas analysis, water retention with HYPROP (Decagon), colorimetric and fluorimetric enzyme and metabolite assays, soil core sectioning and extractions for molecular characterization
Technical: Operation maintenance and troubleshooting on HPLC (Dionex), hybrid LTQ - Orbitrap mass spectrometry platforms including ThermoFischer XL, Velos, Pro, and Elite
Computational: Small molecule analysis via Thermo Xcalibur, MScluster, R, TensioView, Visual MINTEQ 3.1, ChemOffice, EndNote, Adobe Illustrator, Microsoft Office
Responsible Conduct in Research Training, University of Tennessee (2016)
Alan Alda Workshop on Science Communication, Oak Ridge National Labotraoy (2016)
Arctic Field Safety Training Course, NSF Polar Services (2011)

PROFESSIONAL EXPERIENCE & SERVICE

2016: **Manuscript peer reviewer**, *Ideas in Ecology and Evolution*
2015: **Staff intern for the Woodrow Wilson International Center for Scholars**, Washington, D.C
Arctic science policy recommendations and implications, Independent Research Project with the Science and Technology Innovation Program, Supervisors: Dr. Todd Kuiken and David Rejeski
2015: **Manuscript peer reviewer**, *Futeres: The Journal of Policy, Planning, and Futures Studies*
2014: **Review panel member**, University of Tennessee Graduate Student Senate travel awards committee

TEACHING & MENTORING

2016-present: **Graduate student mentor** for three undergraduate women in STEM in chemistry and physics
2014-2016: **Lecturer**, designed and led 5-week course for graduate students on writing and publishing in science with an emphasis on incorporating storytelling and other modern and innovative techniques for more effective communication, University of Tennessee
2011-2013: **Mentor** to five undergraduate students in chemistry, chemical engineering, and ecology
2010-2013: **Teaching Assistant**, General Chemistry, University of Toledo

LEADERSHIP

2014-present: Commissioner on the Commission for Women (CFW), University of Tennessee
2014-present: Founder & chair of *Pipeline: Vols for Women in STEM*, a committee of the CFW with 50+ members & an annual budget of over $12K; designed & organized an annual symposium with invited keynotes & over 75 interdisciplinary oral and poster presentations each year (http://cfwstem.weebly.com)
2014-2015: Representative – Graduate Student Senate, University of Tennessee
2013-2017: Secretary – American Chemical Society, East Tennessee Local Section
2010-2013: President, Vice President – University of Toledo American Chemical Society Student Affiliates

AWARDS & HONORS

2016: Featured as 1 of 5 selected for University of Tennessee's "Women with Big Ideas"
2015-2017: AAAS/Science Program for Excellence in Science recipient
2015: American Delegate to the 65th Lindau Nobel Laureate Meeting in Germany, Interdisciplinary
2014: University of Tennessee Chancellor's Award for Extraordinary Professional Promise
2011: American Chemical Society (ACS) Undergraduate Analytical Chemistry Award
2009-2010: Arthur H. Black Analytical Chemistry Award, University of Toledo
2007-2011: Dean's List Honoree, University of Toledo
2006-2010: NCAA Division I Athletic Scholarship, University of Toledo, Volleyball

SCIENCE COMMUNICATION

2013-present: Research Website – www.malloryladd.com, Science Blog – *Think Like a Postdoc*

05/23/2016: Speaker at Pint of Science Knoxville – "*Counting on Chemistry for Climate Change*" https://pintofscience.us/
12/04/2015: Guest author contribution to Witness the Arctic – *"Challenges and Opportunities of Interdisciplinary Teamwork for Early Career Arctic Scientists"* https://www.arcus.org/witness-the-arctic/29015/3/article/24511
06/27/2015: Guest author contribution to 65th Interdisciplinary Lindau Nobel Laureate Meeting Blog Series – *"Interdisciplinarity – More Than a Buzzword",* http://www.lindau-nobel.org/interdisciplinarity-more-than-a-buzzword/

COMMUNITY OUTREACH

2016: Co-founded student chapter of the Forum on Science, Ethics, and Policy (FOSEP) at the University of Tennessee - Knoxville
2016: National Science Bowl Judge, Oak Ridge, Tennessee
2015: Communicated science to Knoxville community members at the Saturday Farmer's Market in Market Square with the *Ask a Scientist* student organization from the University of Tennessee
2014: Volunteered for "Science Saturdays" sponsored by Oak Ridge National Laboratory to help engage middle school and high school students in hands-on STEM activities
2013: Helped Boy Scouts of America obtain chemistry merit badges at Camp Miakonda in Toledo, OH
2012: Hosted area high schools' "Math and Science Week" and "Physics Day" at Cedar Point Theme Park
2011: Group leader for the "Women in Science Day of Meetings" (WISDOM) at the University of Toledo
2011: Served on committee to establish pre-professional STEM summer camp for high school students
2007-2014: Tutored high school and college level math, science, and Spanish

PROFESSIONAL AFFILIATIONS

American Chemical Society (ACS)
Association for Women in Science (AWIS)
American Society for Mass Spectrometry (ASMS)
American Geophysical Union (AGU)
United States Permafrost Association (USPA)
Alpha Chi Sigma Professional Fraternity (AXΣ)