



AMANDA NELSON



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OBJECTIVE

Aiming to continuously develop a diverse background in my field, leveraging lab management experience with a strong background in organic synthesis, catalysis, and solving analytical and purification challenges. My greatest strength is exercising ingenuity and creative resourcefulness to push boundaries of what is achievable.



TECHNICAL AND SOFT SKILLS

- Purification proficiency in chromatography, distillation, recrystallization and sublimation
- GC-MS, operations and technical expert
- HPLC, operational competence
- Spectroscopic competence with 1&2D NMR, FT-IR, Fluorescence and UV-Vis
- Fluency in XCalibur, MassHunter, VISIONlite, OMNIC, TopSpin, Mnova software
- Literature search proficiency, e.g. SciFinder, Reaxys
- Laboratory curriculum development
- Lab hygiene, risk assessment, safety training, hazardous materials and waste management
- Leadership
- Emotional intelligence
- People and project management
- Assembly line management
- Collaboration and team building
- Delegation
- Budgeting and accounting
- Creativity and innovation in brainstorming and problem solving
- Communication, including conveying technical information to broad audiences
- Hands-on, active learning approach to teaching and training



EDUCATION

PhD | Virginia Tech

GPA: 3.7

2010 – 2016

Dissertation Title: “Metal-Catalyzed Formation and Transformation of Carbon-Boron Bonds”

BA/BS | University of North Carolina at Charlotte

GPA: 3.8

2007 – 2010

Degrees: B.A. Chemistry with Honors, B.A. Criminal Justice, B.S. Psychology

Honors Thesis Title: “A Novel Preparation of Substituted Allenes using the Gilman Reagent”



EXPERIENCE

Chemistry and Chemical Engineering Librarian | Stanford University

2022 – PRESENT

- Managed one of the largest collections budgets; ensured that renewals occurred; learned library operations; investigated reference questions; liaison with departments; supported student and faculty research and academics; hosted workshops

Laboratory Services Manager II | Stanford University

2017 – 2022

- Developed General Chemistry and Analytical Home Laboratory Kits, which featured 16 experiments uniquely tailored to their coursework. Collaborated with the instructor to redesign the experiments to be safe for home environments and liaised with EH&S to review and approve the content and protocols. Raised departmental support and approval from Stanford's Risk Management Team. Sourced materials. OSHA Certifications to package and ship chemicals; prepared over 20,000 vials of chemical reagents; assembled and shipped 600 laboratory kits to students around the world. This pioneer project inspired other departments and Stanford University to prepare kits for hands-on learning in the remote world.
- Proactive Chemical Hygiene Safety Officer of the Sapp Center for Science Teaching and Learning and the emergency responder for 9 chemistry laboratories, rotating over 700 students each week. Designed the Stanford Chemical Hygiene Safety Training Program for undergraduates as an integrated, hands-on learning experience; bolstered the instructional resources for safety training by developing SOPs, risk assessments, and training exercises for all lab experiments; increased incident reporting by and used near-miss lessons learned to improve protocols; developed new training exercises and demos; supported EH&S new graduate student on-boarding safety training programs which were adopted by other departments.
- Collaborated with instructional teams to develop 17 new experimental activities and to integrate a lab safety program into the current curriculum.
- Provided in-house preventative maintenance and sample optimization of 5 Thermo GC-MS systems; reduced runtimes by 10% to better service high throughputs of student samples. Regularly maintained 22 analytical instruments (GC-MS, UV-Vis and FTIR) to assure operating efficiencies, diagnose malfunctions, and provided in-house technical support for repair and usage.
- Engineered instrumentation for the collection and quantitative measurement of carbon dioxide evolution during fermentation to demonstrate Michaelis-Menton kinetics.
- Instituted programs that increased safety compliance, reduced the environmental impact of teaching lab operations, and maintained the overall sustainability of the program; optimized glassware washing for large courses, effectively reducing wastewater by 40% and increasing the bandwidth of direct reports to assume tasks reflective of individual talents.
- Oversaw the move of the laboratory program to a new facility; designed the laboratory setup, the chemical inventory storage system (ChemTracker), and the course management system; reduced unnecessary chemical overstock by 35% through improved inventory and course management systems.
- Maintained consumable stocks and streamlined ordering processes; balanced multiple accounts for a complex budget supporting 14 laboratory courses; developed relationships with vendors and negotiated orders resulting in quarterly savings of \$2500.

Instructor, Chem 100: Chemical Laboratory and Safety Skills | Stanford University

2019 – PRESENT

I designed this short course in collaboration with EH&S for transfer and IB-credit students to supplement their exemption from our year-long, integrated safety training program. Basic organic technique activities provided hands-on learning demonstrations of applied safety topics, such as SDS review, GHS hazard recognition, engineering controls, PPE selection, risk assessment, and waste disposal.

Instructor, Chem 121: Understanding the Natural and Unnatural World through Chemistry | Stanford University

2020 – 2021

I co-taught this second-semester Organic Chemistry course remotely during the 2020-21 academic year. I transitioned the laboratory content to the remote format by having TAs demonstrate the laboratory experiment using a combination of video and live demonstration approaches. I redeveloped the experimental protocols and analysis to focus on notebook skills, interpreting and reporting scientific data, and scientific communication of results. I developed 2 experiments that would translate better on

camera (e.g. esters cannot be smelled by remote students but a colorful extraction of an ester provided a better visual demonstration of an ester synthesis). I supported lectures, hosted office hours, and organized the grading and administrative tasks of the course.

Instructor, Chem 3L: Molecular Structural Determination | Stanford University

2018

This advanced organic laboratory short course focused on interpreting characterization data introduces multi-step synthesis, NMR spectroscopy, mass spectrometry, and polymer chemistry. I developed lecture notes and supplementary materials, introduced 2 new complementary protocols to underscore core principles with a hands-on lab experience, and added a characterization lab practical component to the final exam.

Guest Scientist, Fulbright Scholar | Julius-Maximilians-Universität Würzburg

2015 – 2016; Advisor: Prof. Todd B. Marder

- Designed and lead an investigative exploration of copper-based catalytic cross-coupling methodologies.
- Promoted international laboratory collaboration through participation in multiple boron-related projects and editorials.
- Characterized the photophysical properties of small molecule photosensitizers for PDT applications, including targeted cell death.

Graduate Research Assistant | Virginia Tech

2010 – 2015; Advisor: Prof. Webster Santos

- Developed high throughput screening methods to identify catalytic conditions for regio- and stereospecific borylations and chemoselective late-stage transformations of carbon-boron bonds.
- Developed aqueous conditions for a chemoselective copper-catalyzed borylation.
- Employed variable temperature 2D exchange NMR techniques and DFT methods to explore novel atropisomeric properties found in highly substituted cyclopropane intermediates.
- Secured independent research funding for 3 research projects.
- Managed projects for one undergraduate direct report, one graduate student collaborator, and successfully trained other graduate students on various projects and GC-MS instrumentation.
- Oversaw the maintenance, training, and protocol development of our HP and Agilent GC-MS systems.

Undergraduate Research Assistant | University of North Carolina at Charlotte

2009 – 2010; Advisor: Prof. Craig Ogle

- Employed Rapid Injection NMR techniques to observe the formation of organocuprates and studied their reactivity for producing allenic hydrocarbons



PUBLICATIONS AND CONFERENCE PROCEEDINGS

1. Feder, Sandra. Stanford chemistry team delivers hands-on learning to remote students, *Stanford Daily*, **2020**, August.
2. Chisholm, D.R.; Lamb, R.; Pallett, T.; Affleck, V.; Holden, C.; Marrison, J.; Toole, P.; Ashton, P.D.; Newling, K.; Steffen, A.; Nelson, A.K.; Mahler, C.; Valentine, R.; Blacker, T.S.; Bain, A.J.; Girkin, J.; Marder, T.B.; Whiting, A.; Ambler, C.A. Photoactivated cell-killing involving a low molecular weight, donor-acceptor diphenylacetylene, *Chemical Science*, **2019**, 10, 4673-4683.
3. Gala De Pablo, J.; Chisholm, D.; Steffen, A.; Nelson, A.; Mahler, C.; Marder, T.; Peyman, S.; Girkin, J.; Ambler, C.; Whiting, A.; Evans, S. Tandem Fluorescence and Raman (fluoRaman) characterization of a novel photosensitizer in colorectal cancer cell line SW480, *Analyst*, **2018**, 143, 6113-6120.
4. Nelson, A.K.; Peck, C.L.; Rafferty, S.M.; Santos, W.L. Chemo-, Regio-, and Stereoselective Copper(II)-Catalyzed Addition of B(dan) to Acetylenic Esters and Amides in an Aqueous Medium, *J. Org. Chem.*, **2016**, 81, 4269-4279.
 - a. Advances in Organic and Inorganic Chemistry – Enhancing International Cooperation, Würzburg, Germany, November 16, 2015. (Poster Contribution)

5. Guo, X.; Nelson, A.K.; Slebodnick, C.; Santos, W.L. Regio- and Chemoselective Diboration of Allenes with Unsymmetrical Diboron: Formation of Vinyl and Allyl Boronic Acid Derivatives, *ACS Catal.*, **2015**, 5, 2172-2176.
 - a. “Chemo- and Regioselective Diboration of Allenes with Differentially Protected Diboron.” BORAM XIV, Rutgers University, Newark, NJ, June 15-19, 2014. (Oral Contribution)
6. Shanaiah, N.*; Nelson, A.K.; Patwardhan, N.; Slebodnick, C.; Carlier, P.R.; Santos, W.L. “An NMR Investigation of Atropisomerism in *ortho*-Substituted 1,1-dibromo-2,2-diphenylcyclopropane.” 56th Experimental Nuclear Magnetic Resonance Conference, Pacific Grove, CA, United States, April 19-24, 2015.
7. Nelson, A.K.*; Ogle, C. “New Methodology for Generating Allene Analogs.” Abstracts of Papers, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010 (2010), ORGN-1168. (Poster Contribution)



HONORS AND AWARDS

- 2019** STAR (Safety in Training and Research) Award, *Stanford University*
- 2015 – 2016** Fulbright Fellowship
- 2015 – 2016** Graduate Research Development Program – Funded Research Proposal for “Sustainable Copper-Catalyzed Cross-Coupling Reactions”, *Virginia Tech*
- 2013 – 2014** Graduate Research Development Program – Funded Research Proposal for “Expanding the Scope of Unsymmetrical Diboron Reagents in Aqueous Mediums”, *Virginia Tech*
- 2010** Magna Cum Laude Distinction, *University of North Carolina at Charlotte*
- 2010** The Robert Lassiter Outstanding Undergraduate Paper, *University of North Carolina at Charlotte*
- 2009 – 2010** Cecil Prince Memorial Scholarship, *University of North Carolina at Charlotte*



LEADERSHIP ROLES

- 2019 –** Alpha Chi Sigma Fraternity – Alpha-Alpha Chapter Advisor
- 2016** “American Night” International Cultural Event hosted by the KHG, Würzburg – Co-Chair
- 2015** Advances in Organic and Inorganic Chemistry Conference – Student Ambassador
- 2013 – 15** Virginia Tech Science and Technology Policy Initiative – Co-founding President
- 2013 – 14** Virginia Tech GSA Executive Board Member – Research Development Program Chair
- 2013 – 14** Green Chemistry and Sustainability Committee – Graduate Student Representative
- 2013** Science Communication Workshop – Event Chair
- 2011 – 15** Virginia Tech Graduate Student Association (GSA) – Chemistry Delegate



LANGUAGES

- English** Native speaker
- German** B1 proficiency