

TRACEY L. NELSON

Curriculum Vitae

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EDUCATION & EMPLOYMENT HISTORY

Doctorate of Philosophy

Sept. 2023 – *Present*

University of Massachusetts Amherst

Department of Chemistry, Advisor: Dr. James P.S. Walsh

- Uncovering three novel phases within the Ti–C system synthesized with various high pressure solid-state methods and characterized using single crystal and powder X-ray diffraction in tandem with diffraction analysis programs
- Communicating interdisciplinary to be granted travel time for collecting *in situ* spectroscopic data at multiple national facilities
- Maintain maintenance of instruments to improve lifetime of laboratory equipment

Bachelor of Arts

Sept. 2019 – May 2023

St. Olaf College

Department of Chemistry, Advisor: Dr. Elodie E. Marlier

- Developed synthesis methods to isolate and characterize two organometallic N₂P₂ coordinated transition metal complexes with nickel and cobalt metals as central coordinated atoms
- Collaborated with team members to conduct and interpret spectroscopic characterization data to identify properties and purity of multiple metal complexes

Teaching Assistant, Inorganic Chemistry Lab

2024 – 2025

Teaching Assistant, Inorganic Chemistry Course

2025 – 2026

Teaching Assistant, General Chemistry Lab

2023 – 2024

University of Massachusetts Amherst, Department of Chemistry

Amherst, MA

- Contributed to improving inorganic course materials and assessments
- Provided targeted mentorship skills through reflective teaching and analysis of student feedback
- Developed an online interface to promote engagement and feedback from my general chemistry students

Laboratory Teaching Assistant, Organic Chemistry

2021 – 2023

Laboratory Teaching Assistant, General Chemistry

Jun 2022 – Aug. 2022

Laboratory Teaching Assistant, Forensic Science

Sept. 2022 – Dec. 2022

St. Olaf College, Department of Chemistry

Northfield, MN

- Supervised laboratory sections containing around 20-30 students per course
- Communicated with lab directors and students to increase accessibility for learning chemical techniques
- Provided individual feedback to students verbally and in report grading to strengthen chemical knowledge

PUBLICATIONS

Nelson, T. L.; Cote, E. E.; Wu, Changjiang; Walsh, J. P. S., Targeted Single Crystal Mapping of Ti-C High Pressure Phase via Controlled Sputtering, *Manuscript in preparation*

Cote, E. E.; Nelson, T. L.; Ambos, S. D.; Arigbede, J.; Walsh, C.; Brooks H. L.; Whitaker, M. L.; Walsh, J. P. S., High-pressure synthesis of martensite-type -VCy, *Accepted*

PRESENTATIONS

Nelson, T.L.; Cote E.; Marshall, P.; Arigbede, J.; Thiel, S.; Walsh, J. P. S.; Exploring Phase Space in Transition Metal Carbide Systems. Presented at ResearchFest 2024, Amherst, MA, August 2024; Poster.

Nelson, T.L.; Cote E.; Marshall, P.V.; Arigbede, J.; Thiel, S.; Walsh, J. P. S. Improving the Reproducibility of Transition Metal Carbide High Pressure Synthesis. Presented at ResearchFest 2025, Amherst, MA, August 2025; Poster.

Nelson, T.L.; Cote E.; Marshall, P.V.; Walsh, J. P. S. Exploring the High Pressure Phase Space of the Titanium Carbide System Using a Novel Synthetic Method for Diamond Anvil Cells. Presented at the Materials Science and Engineering and Chemistry Department's Materials Colloquium, Amherst, MA, April 2025; Invited Talk.

Nelson, T.L.; Cote E.; Walsh, C.; Wu, C.; Walsh, J. P. S. Improving the Reproducibility of Transition Metal Carbide High Pressure Synthesis. Presented at the College of Natural Sciences Graduate Research Symposium, Amherst, MA, March 2026; Poster.

AWARDS AND HONORS

- Dr. Paul Hatheway Terry Endowment Award Recipient for Outstanding ResearchFest Poster 2024
- Honorable mention for "Top Gun" TA award fall 2024
- J.C. and L.A. Duke Scholarship recipient 2019

SERVICE & PROFESSIONAL DEVELOPMENT

Service to the Institution

Department Service

Co-President Jan. 2024 - *Present*
Association for Professional Development in Chemistry, University of Massachusetts Amherst *Amherst, MA*

- Promote planned events aimed at benefiting the professional development of graduate students
- Correspond with faculty and staff within the department to facilitate organizational and event success
- Organize an annual departmental research symposium event with interdepartmental engagement

Co-President May 2020 - May 2023
Society of Chemistry Students, St. Olaf College *Northfield, MN*

- Facilitated meetings for board members, culminated goals, and delegated tasks to members
- Collaborated with faculty and students to plan upcoming chemistry-related extracurricular and fundraising events for STEM students

Treasurer Nov. 2021 - *Present*
Graduate Chemists Association, University of Massachusetts Amherst *Amherst, MA*

- Allocate finances in an efficient way to maximize the frequency of graduate student events
- Arrange social events and departmental fundraisers to cultivate community for the chemistry student body

Student Mentor Nov. 2021 - *Present*
Department of Chemistry, University of Massachusetts Amherst *Amherst, MA*

- Coordinate group meals with incoming graduate students and past graduate students to create a support system in their first year
- Initiate support and communication with incoming graduate students to promote an inclusive departmental environment

University Service

Committee Member Sept. 2024 - *Present*
Community/Police Advisory Board, University of Massachusetts Amherst *Amherst, MA*

- Inform the university police about safety improvements from a graduate student perspective
- Assist a subcommittee with law enforcement and university professionals who are dedicated to promoting pedestrian safety on campus.

Committee Member Nov. 2024 - Oct. 2025
GSG Event Planning Committee, University of Massachusetts Amherst *Amherst, MA*

- Provided input on logistics and communication with college branches to increase interdisciplinary integration
- Volunteered assistance for the setup and planning of Graduate Student Government events

SCIENTIFIC AND TECHNICAL SKILLS

- **Instrumentation**
 - X-ray diffraction (single crystal and powder)
 - Microcrystalline electron diffraction

- Energy dispersive spectroscopy
- UV-Vis spectroscopy
- Scanning electron microscopy
- Magnetron sputtering
- Photolithography
- **Synchrotron Instrumentation**
 - Laser heating table user (16-ID-B, APS; 12.2.2, ALS)
 - Single- crystal diffractometer user (BL-12, ORNL)
 - Kawai-type multi anvil press user (16-ID-D, BNL)
- **Programs**
 - Microsoft (Word, Powerpoint, Excel)
 - Adobe (Illustrator, Indesign, Express)
 - Powder diffraction analysis (Olex2 Dioptas, TOPAS Academic, CrysAlis^{Pro})
 - Crystal structure visualization (Ovito, Vesta)
 - Miscellaneous (LabView, ChemDraw, Mercury)