Tina N. Mihm

Department of Chemistry, University of Iowa | tina-mihm@uiowa.edu | (815)-701-3193

Education

Aug 2017 – Present

PhD Chemistry, **University of Iowa,** Iowa City, IA

- Advisor: Prof. James J. Shepherd
- Areas of Study: Electronic Structure

Jan 2014 - May 2017

BA Chemistry, **Carthage College**, Kenosha, WI

- Minor: Secondary Education (Grades 6-12)
- GPA: 3.71
- Honors: Magna Cum Laude

Aug 2011 – Dec 2013

AS, **McHenry County College,** Crystal Lake, IL

- GPA: 3.93
- Honors: High Honors

Research Experience

Aug 2017 – Present

PhD Thesis Projects, **University of Iowa |** Advisor: Prof. James J. Shepherd

Thesis Title: *Improving quantum chemistry methods for use in uniform electron gas and solid-state calculations*

- Collaborated in design of two new cost-saving twist-averaging algorithms for use with coupled cluster calculations
- Developed FORTRAN based code to perform twist-averaged CCD calculations on the UEG model system
- Analyzed the finite size affects in metals using our new twist-averaging coupled cluster method
- Transferred our new cost-saving twist-averaging algorithm from CCD to i-FCIQMC for use in the UEG model system
- Modified open-source code to incorporate new method for use in energy calculations
- Worked with collaborator to apply our cost-saving twist-averaging method to obtain CCSD calculations on real metals using VASP

Jan 2016 – Aug 2016

Undergraduate Research Project, **Carthage College |** Chemistry Department Researcher

- Analyzed various experiments to determine success and reasonability of experimental method proposed
- Adapted and developed experiments to meet the needs of organic and general chemistry classes'
- Modified and integrated new experiments into labs to help demonstrate various chemistry topics and reactions within time restrictions
- Collaborated with various professors and research groups to help assist in development of new experiments
- Coordinated with both research partners and project head, Professor Morris, to perform, record, and write modified labs for general chemistry and organic chemistry labs

Awards and Honors

VCTC 2020	**Outstanding Graduate Student Poster,** Virtual Conference on Theoretical Chemistry 2020 Awarded for exceptional virtual lightning talk and poster on research
Feb 2020 – May 2020	**Graduate College Post-Comprehensive Research Fellowship,** University of Iowa Awarded for distinguished academic achievement during early graduate training
May 2019	**Outstanding Teaching Assistant Award,** University of Iowa Awarded by the Council on Teaching for excellence in teaching
April 2019	**Dr. Eunice Schuytema Beam Travel Grant,** University of Iowa Awarded by Women in Science and Engineering for presenting selected research at a national conference
2011-2017	**Dean's List**, Carthage College Awarded for academic excellence and a maintained GPA of 3.0 or higher
Spring 2016	**Judith Schaumberg Scholarship,** Carthage College Awarded by the Department of Education for excellence and demonstrated passion for teaching

Teaching Experience

Aug 2017 – May 2021

Teaching Assistant, **University of Iowa, Iowa City, IA**

- Principals of Chemistry
  - Taught labs for two semesters which included introducing students to good lab safety practices
  - Assisted instruction and development of active learning-based lectures for Principals I classes
  - Ran a team of undergraduate classroom assistants for Principles I lectures
- Quantum Chemistry
  - Assisted instruction in a newly developed POGIL-based classroom
  - Completed training for teaching using POGIL-style active learning
  - Developed and ran active learning-based discussions for a POGIL-based Quantum Chemistry class
  - Completed a Teaching and Research (TAR) project to test improvements to Quantum Chemistry exam questions

Spring 2017

Student Teacher, **Lakeview Technology Academy, Pleasant Prairie, WI**

- Taught 10th grade Chemistry classes for half a semester

Spring 2017

Student Teacher, **Harborside Academy, Kenosha, WI**

- Taught 10th grade Chemistry classes for half a semester

Sep 2015 – May 2016

Chemistry Tutor, **Carthage College, Kenosha, WI**

- Tutored students in General Chemistry and Organic Chemistry

Publications

Mihm, T; Schäfer, T.; Ramadugu, S. K.; Weiler, L.; Grüneis, A.; and Shepherd, J. J, "A shortcut to finite size convergence in quantum many-body treatments of metals", currently under review at Nature Computational Science

Mihm, T; Yang, B; Shepherd, J. J. "Power laws used to extrapolate the coupled cluster correlation energy to the thermodynamic limit", *J. Chem. Theory Comput*. **17**, 5, 2752–2758 (2021); https://doi.org/10.1021/acs.jctc.0c01171

Mihm, T.;Van Benschoten, W. Z..; Shepherd, J. J. "Accelerating convergence to the thermodynamic limit with twist angle selection applied to methods beyond many-body perturbation theory". *J. Chem. Phys***. 154**, 024113 (2021); (Invited) https://doi.org/10.1063/5.0033408

Mihm, T.; McIsaac, A. R.; Shepherd, J. J. "An optimized twist angle to find the thermodynamic limit derived from the uniform electron gas". *J. Chem. Phys*. **150**, 191101 (2019); https://doi.org/10.1063/1.5091445

Presentations

Mihm, T.; Schäfer, T.; Weiler, L.; Ramadugu, S. K.; Grüneis, A.; Shepherd, J. J. *Applying coupled cluster theory to real metals using structure factor twist averaging* presented at the American Chemical Society Virtual Spring 2021 Meeting, online

Mihm, T.; Van Benschoten, W. Z.; Ramadugu, S. K.; Grüneis, A.; Shepherd, J. J. *Applying connectivity twist averaging to quantum Monte Carlo and real solids* presented at the American Physical Society Virtual March Meeting 2021, online

Mihm, T; Yang, B; Shepherd, J J. *What can the transition structure factor tell us about finite size effects in metals?,* presented as a recorded lightning talk at the Virtual Conference on Theoretical Chemistry 2020, Hosted by Stanford University, Stanford, CA, online

Mihm, T; Shepherd, J J. *Stochastic Methods in Electronic Structure Theory, A Simpler Twist Averaging for use in Uniform Electron Gas and Real System Calculations*, presented at the Telluride Science Research Center Stochastic Methods in Electronic Structure Theory 2019 workshop, Telluride, CO

Mihm, T; McIsaac, A. R.; Shepherd, J. J. *A simpler twist averaging for the uniform electron gas designed for finite basis set calculations such as coupled cluster and full configuration interaction quantum Monte Carlo,* presented at the APS March Meeting 2019, Boston, MA

Posters

Mihm, T.; Yang, B.; Weiler, L.; Schäfer, T.; Ramadugu, S. K.; Grüneis, A.; Shepherd, J. J. Virtual Poster: *Improving periodic coupled cluster theory using the transition structure factor* presented at the American Chemical Society Fall 2021 Meeting, Atlanta, GA

Mihm, T; Weiler, L.; Van Benschoten, W. Z; Ramadugu, S. K.; Schäfer, T.; Grüneis, A.; Shepherd, J. J. Virtual Poster: *Twist angle selection in full configuration interaction quantum Monte Carlo and coupled cluster theory for solids,* presented at the Telluride Science Research Center Stochastic Methods in Electronic Structure Theory 2021 virtual workshop, Hosted by Telluride, CO

Mihm, T.; Petras, H.; Scharlott, L; Weiler, L; Smith, A; Rodriguez, J-M; Al Lawati, R.; Becker, N; Shepherd, J. J. Virtual Poster: *A Scholarship of Teaching and Learning study of an upper-division Physical Chemistry classroom at the University of Iowa,* presented at National Convention for Advanced POGIL Practitioners meeting 2021

Mihm, T., Yang, B., Shepherd, J. J. Virtual Poster: *Evaluating the convergence rate of the finite size effects in the thermodynamic limit of connectivity-twist-averaged coupled cluster calculations in the uniform electron gas.* presented at Virtual Electronic Structure Workshop 2020, University of California - Merced, Merced, CA

Mihm, T; Yang, B; Shepherd, J J. Poster: *What can the transition structure factor tell us about finite size effects in metals?,* presented alongside lightning talk at the Virtual Conference on Theoretical Chemistry 2020, Hosted by Stanford University, Stanford, CA. online

Mihm, T.; Petras, H.; Shepherd, J. J. Poster: *Reflecting on using visual simulations of quantum mechanics to supplement POGIL classroom activities in upper-division Physical Chemistry classrooms at the University of Iowa,* presented at National Convention for Advanced POGIL Practitioners meeting 2019, Washington University, St. Louis, MO

Mihm, T; Ramadugu, S. K.; McIsaac, A. R.; Grüneis, A.; Shepherd, J. J Poster: *Developing the coupled cluster method in the VASP software package*, presented at American-Mexican Symposium on Supramolecular Materials Design 2019, University of Iowa, Iowa City, IA

Mihm, T; Ramadugu, S. K.; McIsaac, A. R.; Grüneis, A.; Shepherd, J. J Poster: *Developing a twist-averaged coupled cluster method in the VASP software package*, presented at American Chemical Society UI Student Chapter Symposium Design 2019, University of Iowa, Iowa City, IA

Skills

IT skills

- Intermediate knowledge of Python
- Basic knowledge of Linux
- Proficient in the use of FORTRAN
- Intermediate knowledge of VASP
- Basic knowledge of Highly Accurate N-Determinant quantum Monte Carlo software (HANDE)

Other Professional Experience

July 2021	Telluride School on Theoretical Chemistry, **Telluride, CO**
July 2019	MolSSI Stochastic Approaches to Electronic Structure Calculations Workshop**, University of Pittsburgh, Pittsburgh, PA**
October 2020	NERSC Parallelware Training Series: Motif-guided Parallelization of ZPIC with OpenMP and OpenACC, **Online training workshop**

Professional Affiliations

2018 - present	American Physical Society (APS)

2017 - present	American Chemical Society (ACS)

Leadership

2019 - 2020	Mentor for Women in Science and Engineering (WISE) mentor program, **University of Iowa**
2015 - 2016	Outreach coordinator for Chemistry Club**, Carthage College**