Mylena Hail

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Education

University of Waterloo Sept. 2023 – June 2028
B.Sc. Honours Materials and Nanosciences, Co-op *Current GPA: 93.18% (4.00)*

Relevant Coursework: Techniques in Materials and Nanosciences, Multivariable Vector Calculus, Ordinary Differential Equations, Linear Algebra, Organic Chemistry, Laboratory Techniques, Mechanics, Electricity & Magnetism, Scientific Calculations in Excel and Python

Activities: Materials and Nanosciences Society (Events coordinator, Social media coordinator, VP Advocacy), Department of Physics and Astronomy Undergraduate Representative, Faculty of Science Ambassador, Physics Tutorial Centre Volunteer

Core Skills

Languages Spoken: English (Fluent), French (Fluent), Spanish (Level 2)
Programming Languages: Python, Java, Qiskit, LAMMPS, OpenMM
Tools: MS Office, Excel, LaTeX, OVITO, Avogadro, NI LabVIEW
Laboratory Skills: Liquid-Liquid Extraction, Thin-Layer Chromatography, Ion-Exchange Chromatography, Rotatory Evaporation, Distillation, Organic Synthesis, Acid-Base Titration, Recrystallization, Spectrophotometry
Certifications: WMHIS 2015, Communication in the Sciences, Cyber Awareness Training, Cryogenic and Compressed Gas Safety
Interpersonal Skills: Ability to promptly deliver efficient solutions, strong written and oral communication, team player, motivated to tackle challenging tasks

Experience

In-Residence Chemistry Teaching Assistant | *University of Waterloo, Part-time* Jan. 2025 – Apr. 2025
Offering one-on-one help to students in campus housing enrolled in CHEM 123/125 (continuation of introductory first-year chemistry), in preparation for term tests and exams.

Computational Chemistry Research Assistant (NSERC USRA) | *University of Waterloo, Co-op* Jan. 2025 – Apr. 2025
Continuing work on simulations of flexible water clusters (with a focus on the hexamer - see *Projects*) using Path Integral Molecular Dynamics (PIMD) with the Roy Group, under the supervision of Dr. Pierre-Nicholas Roy (Tier 1 Canada Research Chair in Quantum Molecular Dynamics).

Computational Chemistry Research Assistant | *University of Waterloo, Internship* Apr. 2024 – Aug. 2024
Working on simulation of flexible water clusters [$(H_2O)_n$] using Path Integral Molecular Dynamics (PIMD) with the Roy Group.

Exam Proctor | *Conseil Scolaire Viamonde, Part-time* Apr. 2024 – May 2024
Proctoring and facilitating International Baccalaureate examinations at École secondaire Jeunes sans Frontières.

Language and Math Tutor | *Conseil Scolaire Viamonde, Part-time* Feb. 2022 – June 2023
Tutoring elementary school students in languages (English and French) and mathematics at various skill levels, from learning how to read, to strengthening current knowledge in preparation for EQAO standardized testing.

Projects

Study of the Properties of Water Clusters | *Python, OpenMM, LAMMPS, Linux* May 2024 – Present

- Studied the structural and energetic properties of the flexible water monomer, dimer, and hexamer using both quantum and classical models.
- Learned to use OpenMM and LAMMPS libraries within Python to write and run Ring Polymer Molecular Dynamics (RPMD) simulations.

PROJECTS (CONT'D)

- Wrote scripts to determine the optimal simulation parameters and additional characteristics of the studied systems (i.e., pair correlation functions for O-O and O-H radial distances, moment of inertia tensors of the system).
- Calculated idealized vibrational constants and compared them to experimental broadband rotational spectroscopy results for the hexamer isomer.
- Presented weekly research progress reports to supervisor and graduate students.
- Began working towards writing a paper on calculating and classifying the ground state energies of the water hexamer isomers, presenting a framework using RPMD using the LePIGS method instead of Diffuse Monte Carlo (DMC) methods.

WeCare | *Thunkable, React Native, Clip Studio Paint, Canva* Jan. 2021 – May 2021

- Developed a mobile app to provide teenagers with access to credible mental health resources for the Technovation Girls 2021 competition, achieving quarter-finalist status.
- Collaborated with psychology and mental health experts from the University of Toronto to create original resources and link reputable external sources.
- Conducted market research through surveys and literature reviews targeting the intended demographic.
- Worked on front-end and back-end development, tailoring design to specific user needs.