Mary Curie

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Education

Chemical Engineering & Bioengineering Co-op (BEng.Biosci)   *2024 – 2030*

McMaster University

- Enrolled in level 2 of McMaster University's Chemical Engineering & Bioengineering Program, eligible for 4-moth co-op placement starting May 2026
- Relevant courses: Numerical Methods & Computing for Chemical Engineers, Fluid Mechanics, Statistical Methods for Materials Engineers, Chemical Engineering Principles I & II, Anatomy & Physiology

Experience

Research Assistant | *McMaster University Ocular Technologies Lab*   *May - Aug 2025*

- Supported development of biomaterials for ocular drug delivery, contributing to a 15% increase in hydrogel stability by preparing and characterizing polymer samples using UV-Vis spectroscopy
- Contributed to the development of mucoadhesive nanoparticles for anterior eye drug delivery, assisting in nanoparticle synthesis and characterization using dynamic light scattering (DLS) and zeta potential analysis
- Streamlined data collection by designing Excel-based tracking tools, reducing analysis time by 20% for in vitro drug release studies
- Maintained detailed records of experiments and results, demonstrating organizational skills and attention to detail
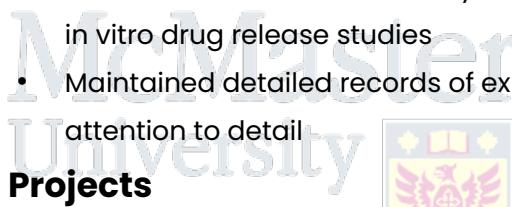
Projects

Batch Reactor Kinetics Modeling | *Personal Project*   *Jan - Apr 2026*

- Developed a dynamic simulation of a batch reactor for a first-order irreversible reaction to study concentration and temperature profiles over time
- Implemented numerical ODE solvers in MATLAB to model reaction kinetics
- Conducted sensitivity analysis on rate constants and activation energy to assess their impact on conversion efficiency
- Visualized results using MATLAB plots to compare model behavior under varying initial conditions

Wastewater Filtration System | *First Year Engineering Design Project*   *Jan - Feb 2025*

- Collaborated with 4 other students to design a filter for treatment of microplastic contaminated effluent
- Performed materials selection using GRANTA EduPack, choosing the best materials that met objectives and constraints of cost efficiency and environmental footprint
- Conducted life cycle analysis and eco audit to reduce environmental impact of the final filter
- Performed administrative duties and met all deadlines, demonstrating management skills

Skills

Software: Python, MATLAB, Excel, MS Office, GSuite, Autodesk Inventor

Lab Skills: Temperature & pH sensors, hydrogels, electrochemistry, PCR, micro-pipetting, spectroscopy