

TWO MSc SCHOLARSHIPS TO STUDY THE EFFECTS OF MICROPLASTICS ON AGRICULTURAL CROP ROOTS

School of the Environment
University of Windsor, Ontario, Canada

About the Positions

Two fully funded MSc studentships in the area of microplastic ecotoxicological effects, root zone biogeochemical processes, and analysis of soil fertility are available under the supervision of Dr. Cameron Proctor and Dr. Jill Crossman at the University of Windsor. These students will investigate the fate and thresholds for ecotoxicity of microplastics in contaminated agricultural soils by combining imaging of a growing root system, investigation of root-soil-microbial interactions, and analysis of the fate of microplastics in the soil and plant tissues. By studying the effects of microplastics at various concentrations and particle properties, this study will provide insight into whether additional treatment of biosolids are required prior to application to agricultural land and contribute evidence-based science to the conversation over environmental concerns regarding microplastics impacts on soil fertility.



Start Date: September, 2021 + Summer studentships to participate in this research from June-August are also available.

Application Deadline: May 28th, 2021

Research Project: Investigating microplastics as an interference agent in root-soil-microbial interactions

International concern is mounting regarding the risks of microplastics accumulation due to their long residence times, ubiquity, and propensity for ingestion. In response, the Canadian government has taken steps to improve the knowledge base for assessing the risks of plastic pollution in relation to environmental and human health. Ecotoxicological effects related to the biological, chemical, and physical stressors introduced to ecosystems by the presence of microplastics require further study.

Dr. Crossman's and Dr. Proctor's research groups at the University of Windsor are working together to conduct a dose-response study that quantifies the microplastic types and soil concentration thresholds that induce ecotoxicological effects in agricultural crops utilizing biosolids as a nutrient source. Various crops form weak to strong symbiosis with soil fungal partners, which are key components of the plants' ability to access soil nutrients, yet the accumulation of microplastics on the root surface and internally can hinder root-microbial interactions and thereby weaken plant growth and beneficial root processes.

This project will investigate multiple lines of evidence of the microplastic effects upon roots. The physical root system will be imaged over time to create a time-series that statistically quantifies various root traits that are related to root stress. Stress effects on root biomass, root system architecture, and individual root segments will be quantified using imagery processing techniques and machine learning. Roots displaying evidence of microplastic stress will have the surrounding soil chemically analyzed for root metabolites that are markers of stress and overall health of the root-microbial system. This research will also be the first study to investigate whether certain microplastic types are prone to accumulation within roots of agricultural crops and the quantities present.

Qualifications:

- BSc in Biology, Chemistry, Earth or Environmental Science (or similar)
- Experience working with quantitative data and strong quantitative skills
- Laboratory experience
- Excellent written and oral communication skills
- Strong organization skills
- Attention to detail
- Demonstrated ability to work independently

How to apply

Please send the following to **cameron.proctor@uwindsor.ca**

- A cover letter explaining why you would like the position and how you meet the search criteria
- A current curriculum vitae (CV)

Only those selected for interview will be contacted

Equal opportunities

The University of Windsor sits on the traditional territory of the Three Fires Confederacy of First Nations, which includes the Ojibwa, the Odawa, and the Potawatomie. We are committed to strengthening these relationships within the University and beyond, and to ensure that indigenous perspectives and knowledge systems are incorporated and fully acknowledged in the work of this committee and our collective scholarship.

The University of Windsor is a welcoming community that is committed to equity and supports diversity in its teaching, learning, and work environments. The University recently signed on to the NSERC Dimensions Charter in a commitment to embed EDI principles in policies, practices, action plans, and culture. In pursuit of the University's Employment Equity Plan, members from the designated groups (women, visible minorities, persons with disabilities, Indigenous peoples, and members of the LGBTQ2S+ community) are encouraged to apply and to self-identify. If you need an accommodation for any part of the application and hiring process, please notify us at grantappts@uwindsor.ca. Should you require further information on accommodation, please visit the website of the Office of Human Rights, Equity & Accessibility (OHREA) at www.uwindsor.ca/ohrea. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

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The University of Windsor is a comprehensive, student-centred university with 15,500 students from more than 85 different countries enrolled in a broad range of undergraduate and graduate programs, including several professional schools. We are a welcoming community committed to equity and diversity in our teaching, learning, and work environments. In pursuit of the University's Employment Equity Plan, members from the federally designated and other minority groups including women, Aboriginal peoples, visible minorities, persons with disabilities and sexual minorities are encouraged to apply and to self-identify. The University's strength as an internationally oriented, multi-disciplinary institution actively enables a broad diversity of students, faculty, and staff to make a better world through education, scholarship, research, and engagement. Located on the scenic Detroit River waterfront in Canada's southernmost city, the University of Windsor provides a dynamic, supportive, diverse, and safe campus adjacent to urban amenities. For more information, please visit the University website.