



## Collaborative Postdoctoral, PhD and MSc Positions Available

### Microplastics fingerprinting at the watershed scale: from sources to receivers

We invite applications for one postdoctoral fellow (PDF), three PhD and five MSc positions to participate in a collaborative research project to advance the detection, quantification, characterization and modeling of microplastics at the watershed scale. The research project will combine field sampling, (geo)chemical and spectroscopic methods, economic analyses and fate and transport modeling.

The main supervisor for each position is listed in parentheses; however, each position will have an interdisciplinary supervisory team consisting of multiple project team members. Instructions for applying can be found below.

**PDF** will focus on (1) data-driven statistical analyses to relate microplastics loads and concentrations to watershed attributes (population density, land-use, water treatment, hydrology), and (2) the development of a watershed-scale dynamic mass balance model to simulate the fate and transport of microplastics. (Dr. Philippe Van Cappellen).

**PhD-1** will focus on the characterization of the size, structure and composition of microplastics from a variety of environmental media using advanced imaging and spectroscopic techniques. The PhD student will establish a comprehensive library for plastics identification that accounts for plastic additives and degraded products. (Dr. Rodney Smith)

**PhD-2** will focus on cost-benefit analyses of microplastics pollution to support decision-making for economically efficient microplastics risk mitigation strategies. The PhD student will delineate various options related to the waste hierarchy (prevent, reduce, reuse, recycle, dispose) in the context of a circular economy to eliminate plastic waste and promote resource recovery. (Dr. Roy Brouwer)

**PhD-3** will focus on developing standardized workflows for sample preparation, screening, analysis, and data processing and management for microplastics isolated from different environmental matrices. The PhD student will apply these methods to microplastics removal in wastewater treatment and urban stormwater runoff. The student will use analytical and imaging methods to generate the data needed to identify the design and operating conditions that minimize microplastics in treated effluents. (Dr. Wayne Parker)

**MSc-1** will focus on the spatial distribution of microplastics in the Grand River watershed (GRW) within the Lake Erie drainage basin. The MSc student will collect and analyze samples of precipitation, surface water and sediment along the Grand River and its major tributaries. Microplastics in the samples will be characterized for abundance, size, morphology and composition. (Dr. Fereidoun Rezanezhad)

**MSc-2** will focus on advancing the fundamental knowledge of plastics biodegradation and optimize strategies to accelerate end-of-use plastics biodegradation. The MSc student will conduct a series of bio-inspired and bio-mimetic degradation experiments to detect *in situ* biodegradation signatures of microplastics, identify reaction mechanisms and product characteristics. (Dr. John Honek)

**MSc-3** will focus on the response of riverine microplastics loadings and export fluxes to the intensity, duration and antecedent conditions of heavy rainfall and flooding events. The MSc student will test the hypothesis that these events cause peak loadings and transport rates of microplastics along the river system. (Dr. Fereidoun Rezaezhad)

**MSc-4** will focus on temporal changes in the abundance and composition of microplastics in the GRW as records of evolving plastic usage and entry pathways. The MSc student will collect, date and analyze sediment archives in GRW reservoirs, floodplains and nearshore plume. (Dr. Roland Hall)

**MSc-5** will focus on developing a classification of raw drinking water sources based on their microplastics loading. The MSc student will analyze microplastics in water samples collected from surface and groundwater drinking water sources and compare these to those in finished drinking water from several treatment plants that use different treatment processes. (Dr. Peter Huck)

The postdoc and students will work closely together within a highly interdisciplinary team of researchers from University of Waterloo. The university-based research team will regularly interact with scientists at stakeholder organizations, including Environment and Climate Change Canada, Ontario Clean Water Agency, Region of Waterloo, Toronto and Region Conservation Authority, City of Brantford, Hoola One Technologies, EPCOR Water Canada, and Environmental Defence.

Applicants must have (or expect to soon complete) a degree relevant to the position applied for. Preference will be given to candidates with strong quantitative skills and demonstrated experience in one or more of the following areas: aquatic biogeochemistry, analytical chemistry, environmental engineering, reactive transport modeling, environmental risk assessment, environmental economics and climate change impact analysis.

Please submit your application package electronically as a single pdf file to Mickey Nielsen ([mnielsen@uwaterloo.ca](mailto:mnielsen@uwaterloo.ca)). In your email, include "Microplastics\_yourname" in the subject line. Your applications should contain:

- Your motivation for applying to the position
- Which position(s) PDF, PhD-# or MSc-# you would like to be considered for
- Curriculum vitae
- Copy of transcripts (unofficial transcripts will be accepted at the application stage)

**Closing date:** Applications will be reviewed as they are received. The positions will remain open until filled.

**We thank all applicants for their interest, however, only those individuals selected for an interview will be contacted.**

The University is committed to implementing the Calls to Action framed by the Truth and Reconciliation Commission. We acknowledge that we live and work on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land granted to the Six Nations that includes ten kilometres on each side of the Grand River.

The University of Waterloo regards equity and diversity as an integral part of academic excellence and is committed to accessibility for all employees. As such, we encourage applications from women, persons with disabilities, Indigenous peoples (First Nations, Metis and Inuit), Black and members of racialized groups, individuals in the LGBTQ2+ communities, and others who may contribute to the further diversification of ideas.

If you have any questions regarding the application process, eligibility, or a request for accommodation during the selection process, please contact [mnielsen@uwaterloo.ca](mailto:mnielsen@uwaterloo.ca).