

Advancing river flow monitoring through image analysis

This interdisciplinary project invites environmental science students to explore the complex behavior of urban streams during major hydrological events, with a particular focus on urban streams.

1. Hosting Institution- York University, Canada

2. Faculty Supervisor

Name: Adeyemi Olusola

Position/ Title: Assistant Professor

Faculty: Faculty of Environmental and Urban Change, DERSIM & CIFAL York

Department: Geography

Email: Aolusola@yorku.ca

Biography: <https://euc.yorku.ca/faculty/adeyemi-oludapo-olusola/>

3. Time Frames for Hosting Scholar

January 2026- April 2026

May 2026- August 2026

September 2026- December 2026

January 2027- April 2027

May 2027- August 2027

4. Research Project

Project Title: Advancing river flow monitoring through image analysis

Project Description: Are you interested in how urban rivers respond to extreme weather and how we can better monitor them in real time? This interdisciplinary project invites environmental science students to explore the complex behavior of urban streams during major hydrological events, with a particular focus on urban streams. At the heart of the project is the use of mobile-based Large-Scale Particle Image Velocimetry (LSPIV), a powerful, non-contact method that uses video footage to track and measure surface water velocities. This technique involves recording the movement of naturally floating particles (such as leaves, foam, or sediment) on the water's surface using a mobile phone or camera. The footage is then processed using image analysis algorithms to derive detailed surface velocity fields. LSPIV offers a rapid, low-cost alternative to traditional flow measurement tools, making it ideal for real-time flood monitoring, particularly in ungauged or hard-to-access urban waterways. We aim to understand how storm events alter river flow paths, intensify energy regimes, and interact with features like riparian vegetation, engineered channels, and urban infrastructure. The project also examines how landscape design and land use influence the way water moves through densely built environments during and after heavy rainfall. Importantly, this initiative integrates a citizen science component, encouraging collaboration between researchers, students, and local communities. Through hands-on fieldwork and participatory monitoring, we will not only develop technical skills in LSPIV but also engage in co-creating hydrological knowledge that is both locally relevant and globally informed. This inclusive approach seeks to empower communities to better understand the flood risks they face and take an active role in developing adaptive responses. By participating in this project, you will contribute to the development of accessible, open-source tools and protocols for urban flow monitoring. You will also join a network of environmentally engaged researchers working across climate science, urban ecology, and community resilience. Future phases of the project will include year-round monitoring, including the analysis

of winter flow dynamics under ice-affected conditions, to build a more comprehensive understanding of hydrological variability in cold urban environments. Whether you're passionate about hydrology, environmental justice, climate resilience, or innovative field methods, this project offers a unique opportunity to combine science, technology, and social engagement in service of more responsive and inclusive urban water management.

Preferred Academic Background and Research Skills: Physical Geography, Civil Engineering, Natural Sciences

5. Leadership, Community Engagement and Cultural Activities (recommended)

Meetings with Southern Ontario Stream Monitoring & Research Team