



PhD Opportunity

Impacts of QACs on boreal lake benthic and emergent insect communities:
Linking the molecular to the community

University of Manitoba, University of Windsor, and the IISD-Experimental Lakes Area

We are seeking a motivated, enthusiastic, and dedicated PhD student to investigate how quaternary ammonia compounds (QACs) can impact the benthic and emergent insect communities of boreal lakes. The student will use **traditional taxonomy** combined with **eDNA** and **RNA Seq** approaches to examine changes at the molecular, individual, population, and community-levels. The student will collaborate with a large number of researchers and students as part of a larger project that will examine the fate and effects of QACs on whole lakes at the IISD Experimental Lakes Area (www.iisd.org/ela/).

The student will be provided latitude to develop specific research goals aligned with their interests in the areas of benthic macroinvertebrates and emergent insects, along with cutting edge molecular tools to characterize community structure and responses. Skills that are strong assets (but not a requirement) for this project would include one or more of the following: statistical analysis (proficiency in R is particularly desirable), field and/or laboratory experience (especially in molecular techniques) and course work in freshwater ecology/limnology/molecular biology. The student will operate small boats, ATV's, and motor vehicles (vans, light trucks) and a valid driver's licence and other certifications are an asset.

The PhD student will conduct their degree at the University of Manitoba in the Department of Environment and Geography, co-supervised by [Dr. Mark Hanson](#) and [Dr. Daniel Heath](#) (Department of Integrative Biology, University of Windsor). The student will spend a significant portion of their time at the IISD-Experimental Lakes Area, interacting with affiliated scientists, graduate and undergraduate students, and international researchers visiting the site, as well as at the University of Windsor. The University of Manitoba is located in Winnipeg, a city of >700,000 people with a large range of outdoor and cultural attractions. The IISD Experimental Lakes Area (ELA) research station is located in Northwestern Ontario, approximately a 4 hour drive from Winnipeg. Room and board while at the ELA is provided.

The student will be supported at a minimum **stipend** of \$21,000 per year for four years. Students who are competitive for additional external funding (e.g., NSERC, UM Graduate Fellowship, ELA Fellowship) are strongly encouraged to apply.

Interested students should outline in a 1-page cover letter how their skills suit them for the proposed project, and indicate the date when they can be available to begin work. In addition, a CV and unofficial transcripts from at least the last two academic years should be provided, along with names of at least two potential references. Application information should be directed to: Mark Hanson (mark.hanson@umanitoba.ca) and Daniel Heath (dheath@uwindsor.ca). Only suitable candidates will be contacted for an interview. Ideally, the student would officially begin their PhD program in **September 2023 or January 2024** at the University of Manitoba. The availability of the student for preliminary fieldwork during August-October 2023 would be a benefit, but not crucial. We will begin evaluating applications immediately, but the position will remain open until a suitable candidate is found.