

## Multiple graduate positions (MSc, PhD) available investigating the Metabolic and Community Ecology of Altered Environments

The research lab of Dr. Michael Rennie is seeking a number of highly motivated and hard working students to join a growing and exciting research group on the shores of Lake Superior in Thunder Bay, Ontario. The work in the lab is diverse and challenging, and involves work from major research vessels on the Great Lakes and Lake Winnipeg, as well as at the legendary Experimental Lakes Area in Northwestern Ontario. Students would join our lab in the Department of Biology at Lakehead University. The lab also conducts work in the newly-renovated, state-of-the-art Biology Aquatics Facility. Possible research topics are listed below, but students with good ideas and an ability to demonstrate success in research (particularly those who are funded through major scholarships) are encouraged to contact me and discuss other opportunities.

### \*Effects of whole-lake nanosilver addition on fish populations\* (1 student, MSc)

Nanosilver is the most commonly used nanomaterial in consumer products today; it is widely used as an antimicrobial, but the ecosystem-level effects of this material associated with environmental release is poorly understood. This project will investigate changes in the bioenergetics of fishes exposed to nanosilver during a whole-lake addition experiment at the Experimental Lakes Area, and investigate population-level changes in the fish community of the lake. Field work would commence May of 2015, with a program start date of Sept. 2015.

### \*Effect of food web complexity on lake trout habitat use\* (1 student, MSc or PhD)

*Mysis diluviana* has been described as a “keystone species”, and has been demonstrated to play a fundamental role in food web structure and energetic pathways to sport fishes like lake trout. Using radiotelemetry, this project will focus on a comparison of lake trout distributional patterns between lakes that differ on the basis of the presence of *Mysis*, and using this information to inform differences among populations in terms of fish productivity and life history traits. At the PhD level, the student will have an opportunity be intimately involved in a whole-lake ecosystem restoration experiment focused on the re-introduction of *Mysis*. Field work will commence May 2015, with a program start date of Sept. 2015.

### \*Evaluating the use of hydroacoustic technologies in fisheries ecology\* (1 student, PhD)

Hydroacoustics is widely used to estimate a variety of aspects of fisheries ecology, including schooling behaviour, vertical migration patterns and population abundance. However, validating the technology for a particular ecosystem or population can pose significant challenges. This project will validate hydroacoustic population estimates against those derived from long-term mark-recapture studies. In addition, it will explore the potential for refining population estimates and extending behavioural studies by integrating multi-beam hydroacoustic surveys with concurrent acoustic telemetry studies. The focus of the field work will be on whole lake experiments at the Experimental Lakes Area in Northwestern Ontario, investigating the potential effects of climate change on fishes and on limnetic food webs generally. This project may also be extended to examine how stationary hydroacoustic installations may be used to document variation in activity rates among populations (both at the Experimental Lakes Area and across the Great Lakes), and compare with bioenergetic estimates of activity. The student would be supervised jointly by Brian Shuter at the University of Toronto and Mike Rennie at Lakehead University, with the opportunity to benefit from the academic programs available at both institutions. Ideally, the person would be free to start field work in summer 2015, with formal registration in the PhD program in Sept.

### \*Plastic pollution in inland Canadian Lakes \*(1-2 students, MSc or PhD)

Though plastic pollution has been well documented in marine environments, the extent of the problem in

freshwater ecosystems is only now coming to light. Surveys will focus on documenting the extent of macro and micro-plastic pollution in Lake Winnipeg, with opportunities for lab-based experiments to examine the interaction of plastic particles with the environment. Field work would commence May of 2015, with a program start date of Sept. 2015.

\*Evolutionary ecology of predator introductions\* (1 student, MSc or PhD)

During a number of predator introduction experiments at the Experimental Lakes Area, prey populations have been decimated to the point of extirpation. Using a combination of lab and field experiments, we seek to examine the evolutionary role of predator experience in determining the adaptive abilities of prey fish to respond to novel predators. Start date negotiable.

Details on the MSc program in Biology at Lakehead University can be found here:

<https://www.lakeheadu.ca/academics/graduate/programs/masters/biology/node/7277>; as well as the PhD

program in Forest Sciences (<http://nrm.lakeheadu.ca/PhD>) and Biotechnology

(<http://biotechnology.lakeheadu.ca/?display=page&pageid=5>). Interested applicants should contact Mike Rennie

at [mrennie@lakeheadu.ca](mailto:mrennie@lakeheadu.ca) <<mailto:mrennie@lakeheadu.ca>>. For more information on the research interests of my group, please visit:

<http://www.iisd.org/biography/michael-rennie>.

-----  
Michael D. Rennie

Canada Research Chair in Freshwater Ecology and Fisheries

Assistant Professor, Department of Biology

Lakehead University, Thunder Bay, ON

Research Fellow, IISD-Experimental Lakes Area

161 Portage Avenue East, 6th Floor

Winnipeg, Manitoba Canada R3B 0Y4

Ph: 204.958.7796 Fax: 204.958.7710

Adjunct Professor, Department of Biological Sciences

University of Manitoba

Room 420, Biological Sciences Building

Ph: 204.619.0741

Twitter: @not\_Klaatu