



Multiple Stressors and Cumulative Effects in the Great Lakes:

An NSERC CREATE Program to Develop Innovative Solutions through International Training Partnerships

Project Title	Accumulation and toxicology of microcystins in Great Lakes fish
Position	PhD
Institution	University of Guelph
Department	School of Environmental Sciences
Primary Advisor(s)	Dr. Paul Sibley
Term	3 years/9 semesters
Start	May 2016
Stipend	\$21,000 /annum

Project Description

The freshwater commercial fishery in Lake Erie is the largest in the Great Lakes and Canada and its recreational fishery generates over \$1 billion annually. There are concerns that these important fisheries may be threatened by the increasing frequency, size, and severity of harmful and nuisance algal blooms over the past 10 years. Toxic microcystins, produced by blue-green algae, have the potential to accumulate in fish; however, their accumulation by, and levels in, Lake Erie and other Great Lakes fish are poorly documented. Consequently, the risk(s) to human consumers of these fish are poorly understood. This lack of sound knowledge is threatening the commercial, recreational and sustenance fisheries of Lake Erie and may be placing populations who consume a high proportion of fish at risk.

Collaborating with Dr. Satyendra Bhasvar at the Ontario Ministry of Environment and Climate Change, this project is aimed at improving our understanding of microcystin behavior in Lake Erie in relation to its potential effects on fish health and population dynamics, and risk(s) to human health. Specific objectives of the research include (but are not limited to): (1) understanding the extent of microcystin toxins in Lake Erie fish before, during and after an algal bloom in relation to those observed in water; (2) characterizing spatial and temporal variations of microcystin toxin levels in both water and fish; (3) examining the toxicokinetics (e.g., uptake, accumulation and depuration) and toxicodynamics (e.g., tissue/organ disposition) of microcystins in fish; (4) understanding the mode of action of microcystins in exposed fish; and (5) assessing the effects, if any, from interactions between microcystins and other legacy or emerging contaminants.

Student Responsibilities

The successful candidate will undertake a PhD program at the University of Guelph which will include:

- Required course work as directed by the advisory committee (dependent upon previous education and experience)
- Working with senior researchers to conduct field work, develop experiment designs, execution of experiments, sample preparation, data analysis, and publication of results
- Complete all requirements of a PhD degree as outlined by the University of Guelph and the NSERC CREATE program (www.creategreatlakes.org)

Apply to	
Contact	<p>Dr. Paul Sibley/Dr. Soren Brothers School of Environmental Sciences University of Guelph Guelph, ON Canada, N1G 2W1 psibley@uoguelph.ca; sbrother@uoguelph.ca 519-824-4120-52707 (Sibley)</p>
Pre-Screening Application Material	<p>Please provide (for CREATE program)</p> <ul style="list-style-type: none"> • Short cover letter (1-page) • Transcripts (unofficial are suitable for initial application) • Statement of research interests (<i>Note: the statement of research interest will also be used as a gauge of written communication proficiency</i>)
Formal Application to the University	<p>Once the candidate has been screened and deemed an appropriate fit for the position, the student will be required, with assistance from advisors, to submit a formal application to the University of Guelph, including:</p> <ul style="list-style-type: none"> • Two academic reference letters (due upon formal submission of application to the University) • Proof of English proficiency (if English is not the candidates first language) <p>For further details, see: http://www.creategreatlakes.org/how-to-apply.html</p> <p>For a full break down of general requirements for a PhD at the University of Guelph please visit: https://www.uoguelph.ca/graduatestudies/future/apply/requirements</p>