



PhD opportunity: 'Characterisation of the physiological and metabolic costs associated with microalgal and cyanobacterial resistance to infection'

The Environmental Virology and Ecology Research Group (i.e., ENVERG; <https://uwaterloo.ca/environmental-virology-ecology-research-group/>) led by Dr. Nissimov is recruiting a PhD student to investigate the costs of virus resistance in microalgae and cyanobacteria.

Project Scope: Aquatic viruses are viewed as major drivers of biogeochemical cycles and as crucial components that shape microbial food webs. They can control the abundance of dominant microbial communities, decide the fate of algal blooms, and affect the diversity of microorganisms in aquatic environments. However, the metabolic response of microalgae and cyanobacteria to virus infection and the physiological costs associated with resistance are poorly understood. This project will work in a collaborative and cross-disciplinary environment to elucidate the potential mechanisms and metabolic costs associated with microalgal and cyanobacterial resistance and determine if resistance is affected by environmental conditions. Of particular focus will be experiments that will aim to reveal whether specific physicochemical factors related to climate change and eutrophication affect microalgal and cyanobacterial host fitness and whether they can unlock resistant host phenotypes to infection, allowing "specialist" viruses to expand their host range.

Academic Environment: The student will join Dr. Nissimov's research group (ENVERG) in the Department of Biology (<https://uwaterloo.ca/biology/graduate-studies>) at the University of Waterloo and will conduct research in the laboratory using molecular biology and microbiology techniques, flow cytometry and flow sorting instrumentation, and transcriptome analysis of hosts and their viruses.

Funding: The current stipend for graduate students at the Department of Biology is \$25,104/year. Additional details on funding breakdown and program requirements can be found in the Biology graduate handbook (<https://uwaterloo.ca/biology/graduate-studies/biology-graduate-handbook>). Eligible students are also encouraged to apply for external funding (NSERC, OGS, QEII) as this will be viewed favorably during the application process.

Essential Qualifications:

1. Successfully complete a thesis-based MSc in Biology, Biotechnology, Aquatic Sciences, Bioinformatics, or a related field, prior to the PhD proposed start date.
2. Have meaningful bioinformatics and laboratory experience in microbiology and molecular biology, and an interest in limnology, algal biology/ecology and/or environmental virology (e.g., taken upper year/graduate level classes and/or labs on these topics, or completed a relevant BSc/MSc thesis, or work experience in these areas). Prior experience with working with transcriptome data and the ability to conduct microbial infection experiments will be looked upon favourably.
3. Have strong verbal and written communication skills.
4. Be able to work independently and collaboratively.
5. Be able to embrace challenges and not afraid to ask questions.
6. Be a self driven and motivated individual.

Starting Date: January 2023 (flexible)

Instructions: E-mail Dr. Nissimov (jnissimov@uwaterloo.ca) using the subject line "PhD Cost of Resistance 2023" and include: **1)** Cover letter that outlines your research interests and how they align with the project, and how your experiences meet the stated essential qualifications; **2)** Curriculum vitae; **3)** Contact information of three references (must include name, affiliation and email address); and **4)** Unofficial transcripts. Review of applications will begin September 1st, 2022 and the posting will remain open until the position is filled. All qualified applicants are encouraged to apply; however, preference will be given to Canadian citizens and permanent residents.

The ENVERG strives to be an equitable, diverse, inclusive, collaborative, and stimulating research environment that supports and encourages each individual to cultivate their potential and attain their professional goals. We welcome applications from women, Indigenous, Black, and other under-represented individuals.