



POSTDOCTORAL FELLOW VACANCY DASTMALCHI LAB

Department of Plant Science | McGill University, Macdonald Campus
Montreal, QC, Canada

PROJECT: Plant-derived compounds to enhance pesticide efficacy

Insect (arthropod) herbivory has damaging consequences on Canadian agriculture, reducing yield and quality. Pre-harvest losses due to arthropod pests are estimated at 13-16%, rising during outbreaks. Climate change is exacerbating these conditions, expanding the reach and intensity of current and novel pests. The conventional approach uses overwhelming amounts of pesticides as a broad and blunt tool to eliminate threats to agriculture. We seek inspiration from plants for compounds that enhance pesticide efficacy or reduce insect detoxification.

THE POSITION

Start date: June 5th or July 3rd

Hours: 40 hrs/week

Duration: 12 months; renewable, depending on performance for another 12 months; beyond 2 yrs, pending funding availability

Primary lab: Dastmalchi (<https://www.dastmalchilab.com/>)

Collaboration: Thibodeux lab (<https://www.thibodeauxlab.com>)

JOB DESCRIPTION

The postdoctoral fellow will join our team to conduct in-depth **bioinformatics, protein expression and purification, enzyme assays**, and **large-scale natural product screening**. They will begin by mining transcriptomic datasets of relevant pests and benign insects, selecting candidates for gene synthesis. Next, they will clone the synthesized genes into expression vectors and conduct protein expression and purification using standard Ni-NTA affinity chromatography. These candidates will be assayed for activity with known substrates. Subsequently, they will conduct large-scale high-throughput screening of plant NP libraries to identify novel, synergist, or other impacts. Compounds of interest will be directly assayed in ligand-receptor studies using **mass spectrometry** for high-resolution protein structure analysis.

The knowledge generated will be used in plant-insect studies, new pesticide cocktail creation, nanotechnology delivery systems, and protein-dynamics studies. The postdoctoral fellow will work closely with our collaborators Dr. Jacquie Bede (Plant Science, McGill) and Dr. Chris Thibodeaux (Chemistry, McGill). **Primarily, they will work with the Thibodeaux lab for protein analysis and structural biology aspects of the work.**

Day-to-day, the postdoctoral fellow will manage the project, including experimental design, planning, and execution. They will collect and analyze data, discussing their findings with the supervisor, Dr. Dastmalchi. They are also expected to mentor and train junior HQP in the lab. In particular, the postdoctoral fellow will **collaborate closely with 2 graduate students (PhD and MSc) on this project**. They will assist in the writing and submission of manuscripts related to the project. The postdoctoral fellow will work independently and under the supervision of Dr. Dastmalchi. Ownership of the project, aptitude for implementation, and a collaborative mentality are key success determinants.

THE LAB

The Dastmalchi lab is in the Department of Plant Science at the Macdonald campus. We have many valuable facilities, including a Multi-Scale Imaging Facility, a Research Greenhouse, growth chambers at the Phytorium, and a fleet of chemical analytical instruments at the Macdonald Mass Spectrometry Platform. We are also situated on the largest green space on the island of Montreal and agricultural fields designed for research. Part of the work for this project will be conducted downtown, in the lab of Dr. Chris Thibodeaux in the Department of Chemistry, using their state-of-the-art mass spectrometry platform.



Researchers in the Dastmalchi lab will lead original research projects and be expected to make substantial and novel contributions to science through publications and presentations. The postdoctoral fellow will have biweekly meetings with Dr. Dastmalchi. They will also participate in joint monthly lab meetings with our collaborators (Bede and Thibodeaux) on this project and an annual retreat to share findings, techniques, and expert analysis.

ELIGIBILITY

Required:

- Ph.D. (fully awarded) in one of the following disciplines: Biology, Biochemistry, Molecular Biology, Bioengineering, or Chemistry
- Expertise in enzymology: protein expression and purification, enzyme assays, and enzyme kinetics
- Expertise in bioinformatics: gene mining, genomics, transcriptomics, co-expression studies
- Excellent skills in programming languages and statistics software including, but not limited to R and data visualization
- Proven publication record: relevant first-author publications in respected peer-reviewed journals
- Good communication and collaboration skills

Preferred:

- Expertise in chemical analytics and small molecule quantification: expertise in HPLC, LC-MS, and GC-MS
- Understanding of plant specialized metabolism: plant biochemistry, gene discovery, and functional genomics
- Good track record of conference presentations
- Aptitude for teaching and training

HOW TO APPLY

Send your applications to mehran.dastmalchi@mcgill.ca

In your email subject line, please write (to help me sort your emails): **“Dastmalchi Lab Postdoctoral Position”**

Application package:

- Full CV
- Research statement (expertise and interests – specific to my lab and the posting) 1-page max.
- Contact details for 3 referees

Application deadline: May 15th

Interviews will begin on May 22nd; the chosen postdoctoral fellow will begin the position in June or July 2023.