

MSc position(s) Insect Chemical Ecology & Neuroethology

Acadia University, Wolfville, Nova Scotia, Canada



Application Deadline: Open until leading applicant(s) are identified.

Start date: between Jan-May 2019

Website: <http://www.acadiau.ca/~khillier>

Description

We are currently seeking motivated graduate students (MSc) to join Team Hillier on a range of chemical-ecology based research subjects:

Project 1 - Comparative Pheromones in Heliothine Moths: Heliothine moths are ubiquitous, representing the most serious agricultural pests on the planet, causing massive annual crop losses particularly in the developing world. This research project will investigate mechanisms which have led to the evolution of diverse pheromone communication strategies by comparative examination olfactory systems in an important group of agricultural pests & improve management for these & other pest species. The candidate(s) will join a research program investigating shifts in olfactory physiology in relation to insect phylogeny & host specificity. Using a comparative approach with closely-related species will provide critical information regarding evolution & divergence of these species, & new avenues for management with pheromones & host plant odorants.

Project 2 - Thermal Biology of Pheromone Response: Recent work on honeybees and ants has demonstrated that variation in developmental temperatures can have significant downstream effects on neurophysiological function and behavioural phenotype. Furthermore, adult moths exhibit reduced odor-mediated behavioural sensitivity to sex pheromones when exposed to lower temperatures during pupal development. In collaboration with Western University, this study will investigate the impact of climatological shifts and environmental chilling on the neurophysiological and behavioral response of moths to pheromone stimuli. Through this study we will elucidate the origin of these abnormal behavioral responses, and provide insights regarding seasonal behaviours such as insect migration, and links between climate change, physiological function, and behaviour.

Project 3 - Pheromone and host plant odor detection and processing in spruce budworm: Spruce budworm (*Choristoneura fumiferana*) is presently outbreaking and has spread from the Gaspé and Baie Comeau region of Quebec and now threatens much of the Atlantic region. During the last spruce budworm outbreak (1970's) an estimated 50 million hectares were defoliated – this pest can produce truly apocalyptic damage and mortality in our forests. Using single-sensillum recording-based electrophysiology, this study will investigate detection and physiological responses to its pheromones, as well as host and non-host volatiles in *C. fumiferana*. This will include both electrophysiological recording from sensilla on the antenna, and characterization of the antennal lobe structure of the brain. Data will be compared against the expression of known odorant receptors found in spruce budworm. This project will expand our knowledge regarding the detection and processing of critical odorants which modulate spruce budworm behavior and provide new avenues for mating disruption-based control strategies.

Qualifications

Successful candidates will have an opportunity to integrate elements of electrophysiology, chemical analyses, neuroanatomical studies and molecular biology (experience in any of these techniques would be an asset to applicants). Furthermore, they should be highly motivated, and have a keen interest in chemical ecology, and neuroethology. Must be able to work well independently and with a team, and have a good suite of communication and interpersonal skills.

Application Materials

Please submit a CV, a cover letter stating your interest in the position, and the names and contact information for three references to:

kirk.hillier@acadiau.ca