Funded MSc and PhD Opportunities in Motor Learning and Control

Fall 2027 · Neural Control & Computation Lab · York University, Toronto

How does practice turn an unfamiliar movement into a skilled action? What can detailed tracking of the hands, body, face and gaze reveal about how we learn—and how movement changes following neurological injury?

Dr. Jonathan Michaels is recruiting **1–2 MSc or PhD students** to investigate these questions using **ATHENA (Automatically Tracking Hands Expertly with No Annotations)**, our newly developed platform for measuring human movement. Students will join the Neural Control & Computation Lab through York University's **Kinesiology and Health Science graduate program**.

Funded positions: minimum annual support of **CAD $25,000 for MSc students** and **CAD $28,000 for PhD students**. These opportunities are open to **Canadian citizens and Canadian permanent residents**.

The technology and the opportunity

ATHENA combines synchronized cameras, computer vision and machine learning to reconstruct hand and body movements in 3D, alongside face tracking and gaze estimation—all without attaching markers or wearable sensors. This allows us to study the details of natural actions, from manipulating objects to coordinating complex movements, and generate rich datasets that capture how behaviour changes across trials, people and learning.

You will work directly with the researchers developing ATHENA, with opportunities both to use the system to answer scientific questions and to extend what it can measure. Our lab brings together experimental research and computational models to understand how the nervous system controls and learns movement.

Possible research directions

- **Motor learning and skill acquisition.** How do practice, feedback and the structure of training change coordination between the hands, body and gaze? Which changes predict lasting learning, transfer to new tasks or faster relearning? Projects could examine dexterous object manipulation, bimanual coordination or adaptation to unfamiliar task demands.
- **Advancing ATHENA's quantitative capabilities.** How can we turn complex movement recordings into reliable, interpretable measures of behaviour? Projects could develop and validate new analysis methods, integrate movement, face and gaze data, or use statistical and machine-learning models to characterize coordination and learning. **Developing ATHENA's quantitative capabilities can be the primary focus of a thesis.**

Possible research directions (continued)

- **Motor control and recovery after stroke.** What distinguishes recovery of movement control from compensatory strategies? Projects could collect and analyze hand, arm and trunk movements in stroke survivors to investigate differences that conventional task scores may miss.
- **Motor control and individual differences in autism.** How do autistic individuals organize and adapt their movement strategies during object manipulation? Projects could investigate how task demands shape coordination, movement variability and individual approaches to completing an action.

A focused thesis will be developed around the student's interests and preparation, emphasizing experimental research, quantitative methods or a combination.

Who should apply

We are looking for students with strong scientific preparation, curiosity about motor control and learning, and the quantitative aptitude to work thoughtfully with complex data. Relevant backgrounds may include kinesiology, neuroscience, psychology, engineering, computer science or related fields.

Experience with programming—such as Python, MATLAB or R—statistics, biomechanics, computer vision or computational modelling is valuable. We welcome applicants who can demonstrate analytical thinking and a clear motivation to develop these skills further.

What you will gain

Students will take ownership of a research question, receive regular individual mentorship, and build expertise in experimental design, movement measurement and reproducible data analysis. Depending on the project, training may include participant recruitment and data collection, algorithm development, computational modelling and collaboration across research groups. Students will receive close support in developing their first research manuscript and opportunities to present their work.

How to express interest

Email **jmichae@yorku.ca** with the subject **"ATHENA graduate research — Fall 2027"**, including your CV, an unofficial transcript and a brief introduction indicating whether you are interested in an MSc or PhD.

In your own words, describe a scientific question or research direction you would like to pursue, why it interests you, and any research or quantitative experience you would bring to the project. A few thoughtful paragraphs are sufficient.

Learn more: **Neural Control & Computation Lab**

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