



TEMERTY FACULTY OF MEDICINE
UNIVERSITY OF TORONTO

**Postdoctoral Fellow in Machine Learning and Wearables for the Measurement of Human Sleep
Hurwitz Brain Sciences Program at the Sunnybrook Research Institute
Division of Neurology, Department of Medicine
Temerty Faculty of Medicine, University of Toronto**

PIs: Andrew Lim, MD
Associate Professor
Neurology
University of Toronto

Maged Goubran, PhD
Assistant Professor
Medical Biophysics
University of Toronto

Description of the Position: Sunnybrook Research Institute at the University of Toronto is seeking an exceptional postdoctoral fellow to join the Sleep and Brain Health Laboratory (<https://sleepandbrainhealth.ca/>) to lead development of novel, automated, scalable approaches to the quantification of sleep physiology and identification of sleep disorders from human wearable sensor data in support of several large CIHR and NIH-funded clinical studies of sleep and dementia.

The fellow will apply contemporary machine/deep learning approaches to address problems in the classification of sleep physiology and the identification of sleep disorders using new low-profile human flexible wearable sensors. (electroencephalography, electrocardiography, accelerometry, photoplethysmography). The fellow will leverage several already-collected lab-based datasets including >3000 nights of gold-standard polysomnography, and >70 nights (200 nights by the middle of 2022) of co-captured wearable sensor + polysomnography data. The resulting analytic approaches will then be applied to several ongoing NIH and CIHR funded cohort studies of older adults ($n > 1000$) to determine if sleep characteristics identified using these approaches can predict dementia outcomes and dementia-related brain changes. In addition to data analysis and algorithm development, the fellow will also be involved in guiding students and staff involved in data collection.

The position requires working closely with the PIs [Dr. Lim](#) (sleep and circadian physiology, neurology, genetics) and [Dr. Goubran](#) (machine learning, computational neuroscience), and with graduate students, staff and developers in the lab to achieve these aims. New approaches and ideas are encouraged, as are independent projects that dovetail with current studies. There will be opportunities for multiple publications on novel analytic approaches to wearable sensor data for sleep, and the links between these data and dementia outcomes. Training in clinical research and in the acquisition, analysis, and interpretation of human sleep physiological data will be provided.

This is a fully funded position. Salary is commensurate with experience and with CIHR/NIH stipend levels. Contract is renewable contingent on performance.

Required Qualifications:

- PhD in received within the last 5 years or graduating PhD candidate in computer science, biomedical engineering, physics, computational neuroscience, or a related quantitative field

- Solid publication record related to machine learning and signal processing
- Interest in brain signal processing
- Strong programming skills in MATLAB, R / Bioconductor, or Python
- Ability to communicate complex information clearly, orally and in writing
- Ability and willingness to work in a dynamic interdisciplinary team environment

Preferred Experience and Skills

- Experience with machine learning libraries such as Scikit-learn, Theano, Tensorflow, Keras, Pytorch
- Python software packaging, virtual environments, Anaconda/Conda, Jupyter/IPython
- Experience with version control systems (Git) and software testing
- Experience with human EEG and other human physiological signal recording and analysis

Application

To apply for this position, please:

- a) Send a) a cover letter b) Curriculum Vitae c) a writing sample (e.g. manuscript) d) statement of postdoc and career goals, and e) the names and contact information for three potential references to:

Mr. Andrew Centen
Sleep and Brain Health Laboratory
Sunnybrook Research Institute
2075 Bayview Avenue, room M1-600 Toronto, ON,
M4N 3M5 ontariosleephealthstudy@sunnybrook.ca

Links

- Sunnybrook sleep and brain health laboratory: <https://sleepandbrainhealth.ca/>
- Sunnybrook Research Institute: www.sunnybrook.ca/research
- University of Toronto: www.utoronto.ca

Sunnybrook Research Institute (SRI) is a research and teaching institute and is the research arm of the Sunnybrook Health Sciences Centre (SHSC), and is fully affiliated with the University of Toronto. SRI has around 1000 research staff, including more than 300 scientists and clinician scientists. Sunnybrook Research Institute provides a dynamic research environment for postdoctoral fellows and research scientists by linking education and training with research. There are over 60 Canadian and international postdoctoral fellows, over 190 Canadian and international graduate students, and over 475 other research staff working hands-on with research projects.

Applications are encouraged from qualified women and men, members of visible minorities, aboriginal peoples and persons with disabilities. In accordance with Canadian immigration requirements, this advertisement is directed initially to Canadian citizens and permanent residents. We thank you in advance for your interest. Only those candidates selected for an interview will be contacted. No phone calls please. Application screening will continue until a suitable candidate is identified.