



Position: Neurophysiological Imaging Intern

Location: The Murugan Lab, Department of Biology, Algoma University

Start Date: September 1 or earlier

Application Deadline: August 30, 2022 or until position is filled

Hours: 37.5 hours/week

Salary: \$35,000

Duration of Internship: 52 weeks

The Murugan lab is inviting applications from recent post-secondary graduates who excel at solving problems both independently and as a member of a team to take on a Biophysical Imaging Intern position in the Department of Biology at Algoma University. ***The intern will join a group of motivated student-scientists to build, validate, and implement a novel biomedical imaging technique to measure brain-based changes associated with chemotherapy exposure.*** The internship is funded by the Northern Ontario Heritage Fund Corporation's (NOHFC) Internship Program.

The ideal candidate will have recently graduated from an undergraduate or graduate (M.Sc. or M.Eng.) program in Biology, Neuroscience, Biomedical Engineering, or a related discipline with experience in imaging, signal processing, data analysis, and technical writing; however, creativity and problem-solving skills are more desirable than an extensive history of experience. Knowledge of and experience with CAD modeling, programming languages (C++, Python), 3D printing, electrophysiology, and optical imaging are valuable assets but are not necessary to apply. Most importantly, the candidate should be highly motivated, with a capacity to learn quickly, communicate effectively, and meet deadlines toward the completion of a project.

The goal of the project will be to design, build, validate, and implement an imaging platform that combines two biophysical signals (potential differences and photon emissions) to non-invasively measure brain states, and predict cognitive decline associated with exposures to chemotherapy in cancer patients. Briefly, we know that people who receive chemotherapy as an anti-cancer treatment are at risk of developing a condition termed "chemofog" or "chemo brain", which is a cognitive disorder characterized by impairments of memory, attention, and executive function. These decrements are paired with the functional inhibition and deterioration of brain cells. When brain cells become dysfunction and start to die, they emit signals in the form of rhythmic electric potential differences (voltage fluctuations) or periodic light bursts (ultraweak photon emissions). However, the precise relationship between these signals, the underlying biological mechanisms, and their higher-order cognitive correlates have not yet been characterized. The project is funded by the New Frontiers in Research Fund and will deliver a novel imaging platform to anticipate and mitigate these brain-base changes in cancer survivors.

The inter will be responsible for managing data collection, data analysis, writing technical publications, and designing an integrated imaging platform that can be adapted for clinical applications. Key responsibilities will include:

- 1) Performing human brain imaging using electroencephalography and single photon detection
- 2) Collecting, curating, processing, and analyzing data sets
- 3) Validating electrical-optical integration for brain state prediction
- 4) Writing protocols and technical manuscripts for peer-reviewed publications
- 5) 3D CAD modeling of housing units for brain-imaging devices
- 6) Implementing plug-and-play integration of the imaging platform
- 7) Mentorship of undergraduate students in the lab.

Full eligibility requirements of the program can be found here: <https://nohfc.ca/en/pages/programs/people-talent-program/workforce-development-stream>. To be eligible for this program, candidates must be 18 years or older, no previous work experience in this field, must not have participated in an NOHFC funded internship in the 2021 mandate, must be legally entitled to work in Canada, and once hired must reside in the Northern Ontario community (Sault Ste Marie) in which they are employed.

Applications will be accepted until August 30, 2022. Letters of application, resumes/CVs, and samples of written or design work can be submitted by email to: nirosha.murugan@algonau.ca

Full contact details: Nirosha J. Murugan, Ph.D.
Canada Research Chair and Assistant Professor in Health Sciences
Department of Biology, Algoma University
1520 Queen Street E., CC401
Sault Ste. Marie, Ontario, Canada P6A 2G4
W. 705.949.2301 x 4764