DEVELOPMENT AND IMPLEMENTATION OF GENETICALLY ENCODED PROBES FOR MONITORING CRITICAL QUALITY ATTRIBUTES IN BIOPROCESSES

PhD Research Project Available

A Ph.D. project is offered within the research teams of Professor Marie-Eve Paquet (Department of Biochemistry, Microbiology, and Bioinformatics) and Professor Younès Messaddeq (Department of Physics, Engineering Physics, and Optics). Both teams are part of the Canadian Optogenetics and Vectorology Foundry (COVF), a national facility at the heart of a worldwide effort to accelerate the development, production, dissemination, and use of genetically encoded light-activated tools. Supported by the Eastern Canada Pandemic Preparedness Hub to accelerate Canada's vaccine and therapeutics production, this project focuses on developing innovative strategies for quality monitoring of cell cultures used in the production of viral vectors and recombinant proteins. The research environment is enriched by strategic partnerships with governmental and industrial organizations, including the National Research Council of Canada (NRC), INO, and Ivano Biosciences.

Research Project

The primary objective of this Ph.D. project is to apply genetically encoded fluorescent metabolite sensors (https://www.nature.com/articles/s41467-023-42230-5) for monitoring cell cultures used in biomanufacturing. The aim is to simplify of cell culture quality monitoring and rapidly detect any irregularities. Specifically, the project seeks to combine the development of cell lines expressing these sensors with specialized optical fibers capable of monitoring the emitted fluorescence. The tasks include:

- Molecular biology
- Development and validation of cell lines (bacteria, yeast, and mammalian cells)
- Development, improvement, and characterization of genetically encoded sensors
- Fabrication of optical fiber sensors
- Data acquisition and chemometric analysis

Research Environment

The research will take place at the CERVO Brain Research Center, within the laboratories of the Canadian Neurophotonics Platform – Viral Vectors, and at the Center for Optics, Photonics, and Lasers (COPL) on the Université Laval campus.

https://tools.neurophotonics.ca/
https://ymlab.ca

2024/11/26

Research Areas

Biomanufacturing – Biotechnology – Sensors – Fluorescence – Cell Culture – Cell Lines – Process Analytical Technology (PAT)

Requirements

Hold a Master's degree in one of the following disciplines: biophotonics, chemistry, biochemistry, microbiology, physics, chemical engineering, physical engineering, electrical engineering, or any other field relevant to the project.

Desired Profile

- Any experience in the following areas is considered an asset: molecular biology, cell cultures, bioprocess, sensors, optical characterization (fluorescence, UV/Vis), optical fibers

- Strong proficiency in spoken and written English

- Good work ethic

- We are looking for an organized and proactive individual with the ability to work in an interdisciplinary team

Financial Support

Funding of $35,000/year (for 3 years) will be offered to students enrolled in the PhD program at Université Laval, conditional on their commitment to complete the entire STAIR biomanufacturing training program.

Other Funding Sources Available: https://www.fesp.ulaval.ca/en/support-for-success/scholarships-and-financial-support/faculty-of-graduate-and-postdoctoral-studies-student-success-scholarships

<p style="text-align:center"><strong style="color:red">Submit Your Application Now !!</p>

Interested candidates are invited to contact Professor Marie-Eve Paquet by email at Marie-Eve.Paquet@bcm.ulaval.ca and provide a cover letter, a CV, and an academic transcript.

(Recommendation letters will be requested from shortlisted candidates during the second evaluation round.)