

21 October 2020

PhD position in 3D laser bio-printing of microvasculature

A PhD position in 3D laser bio-printing of microvasculature is available at the Maisonneuve-Rosemont Hospital Research Center (CR-HMR). The successful candidate will join the laboratories of **Dr. Boutopoulos** (Biomedical applications of lasers) and **Dr. Larrivée** (Developmental and pathological angiogenesis) at CR-HMR.

Project description

Bioprinting technologies aim to fabricate tissue-like constructs by delivering biomaterials layer-by-layer. Bioprinted constructs can reduce the use of animals in drug development and hold a promise to address the shortage of organs for transplants. Existing bioprinting technologies have yet to deliver multiscale printing capabilities, i.e., fine-printed (high resolution) functional constructs of clinically relevant size. Multiscale printing is essential to build functional multicell constructs. For example, a fine-printed (resolution 100 to 200 μm) microvasculature (“capillary bed”) can ensure cell access to nutrients and oxygen, which is essential for the survival of the printed constructs in the long term.

The successful candidate will exploit a novel drop-on-demand bioprinting technology, laser-assisted side transfer (LIST), to address this challenge. LIST was recently developed by our team and uses laser-assisted ejection of bioink drops from a microcapillary to print complex structures. The successful candidate will use LIST to bio-print vasculature networks in 3D and use immunostaining and advanced imaging techniques to study their spatiotemporal evolution. Emphasis will be given to the optimization of the bio-ink composition aiming to promote long-term network stability via stimulating intercellular interactions.

The successful candidate will have an opportunity to join an interdisciplinary research environment and acquire solid training in bio-printing and angiogenesis.

Student profile:

- She/he is self-motivated and comfortable with interdisciplinary/collaborative work
- She/he is willing to work with *in-vivo* models
- She/he has experience on basic cellular/molecular methods (cell culture, microscopy etc.)
- Previous experience in any of the following fields will be considered an asset: bio-printing, biomaterials, laser instrumentation, angiogenesis assays.
- Background: biology, biomedical engineering or relevant field
- Good communication skills in English.

Salary: According to the CRHMR salary range for graduate students.

Application: For additional information, please contact Dr. Boutopoulos or Dr. Larrivée by email. For applying, send us your CV and university transcripts by email.

Application deadline: open until filled.

Relevant paper: Hamid Ebrahimi Orimi, Sayadeh Sara Hosseini Kolkooh, Erika Hooker, Sivakumar Narayanswamy, Bruno Larrivee, Christos Boutopoulos, “Drop-on-demand cell bioprinting via Laser Induced Side Transfer (LIST)”, *Scientific Reports*, 10, 9730 (2020).

Christos Boutopoulos
Vision Health Axis, CR-HMR
Assistant Professor, UdeM
Department of Ophthalmology
Institute of Biomedical Engineering
514-252-3400 x4464
christos.boutopoulos@umontreal.ca

Bruno Larrivée
Vision Health Axis, CR-HMR
Associate Professor, UdeM
Department of Ophthalmology
514-252-3400 ext.: 7749
bruno.larrivee@umontreal.ca