

Regenerative biosensor based on stacks of III-V quantum well microstructures

Record number : OPR-247

Overview

RESEARCH DIRECTOR

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Electrical and Computer Engineering

Information

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ADMINISTRATIVE UNIT(S)

Faculty of Engineering
Department of Electrical and Computer
Engineering
Interdisciplinary Institute for Technological
Innovation

LEVEL(S)

Ph.D.

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation
technologique

Project Description

Environment

The Université de Sherbrooke, Québec, with over 35,000 students and a teaching staff of 3,200, is one of the largest universities in Canada. The Université offers 46 undergraduate, 48 Master's and 27 doctoral programs. The project is located in the Quantum Semiconductors Group (QS Group) that is part of the Interdisciplinary Institute for Technological Innovation (3IT) harbouring a strong interaction between sciences, engineering and medical faculties. The 3IT institute belongs to one of the five Unité Mixte Internationale - 3463 of the Centre national de la recherche scientifique (CNRS) (<http://www.cnrs.fr/insis/international-europe/UMI.htm>). The 3IT rich research infrastructure, with leading surface science techniques such as XPS, FTIR and EIS spectroscopies, AFM, HIM, ALD, CBE, FIB, e-beam lithography, excimer laser lithography and others, makes us well prepared for undertaking challenging projects in the field of nanoscience and nanotechnology.

Projects summary

The QS Group has been involved in fundamental and applied research of physics and chemistry of surfaces and interfaces of III-V quantum semiconductor microstructures. One of the directions of our research concerns the so-called digital photocorrosion (DIP) effect explored for the development of a family of innovative biosensors of bacteria and, generally, electrically charged biomolecules in water. The research activity recently undertaken by the QS Group in collaboration with Health Canada (Ottawa) aims at the development of a portable workstation for monitoring water reservoirs for the presence of potential dual-use microorganisms (biothreats). A related project, supported by the Defence Research and Development Canada, aims at the development of a regenerative DIP biosensor for collecting biosensing data with the limited participation of an operator. For an overview of our projects, please visit:

https://www.researchgate.net/profile/Jan_Dubowski.

Requirements

We are looking for a PhD candidate capable of undertaking research focused on advancing the concept of a regenerative biosensor employing stacks of III-V quantum well microstructures. The candidate must have excellent knowledge of condensed matter physics and nanotechnology, and be a holder of a Master's degree in experimental physics or electrical engineering. The knowledge of semiconductor physics and technology of these materials would be an asset. The candidate will work closely with an instrumentation engineer and a biotechnologist, but he/she is also expected to collaborate with other members of our strongly interdisciplinary team. Being fluent in spoken and written English and/or French is absolutely mandatory. The position is available from May 2019, or until the suitable candidate is found.

Application

To apply, send an email with:

- a) the statement of your interest in the project
- b) résumé
- c) transcripts of BSs and MSc degrees
- d) names of three references to: jan.j.dubowski@usherbrooke.ca.

Discipline(s) by sector

Natural Sciences and Engineering

Electrical Engineering and Electronic Engineering

Funding offered

Yes

\$ 20 000

Partner(s)

Santé Canada, RDDC - Recherche et développement pour la défense Canada

The last update was on 24 November 2020. The University reserves the right to modify its projects without notice.