PhD offers: Synthesis and characterization of thin films for infrared microbolometers

Record number : OPR-1049

Overview

RESEARCH DIRECTION

Nadi Braidy, Professeur - Department of Chemical and Biotechnological Engineering

INFORMATION

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RESEARCH CO-DIRECTION

Luc Fréchette, Professeur - Department of Mechanical Engineering

INFORMATION

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie chimique et de génie biotechnologique
Département de génie électrique et de génie informatique
Département de génie mécanique
Institut interdisciplinaire d'innovation technologique (3IT)

LEVEL(S)

3e cycle

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation technologique

Project Description

Teledyne DALSA (TD) is collaborating with the Université de Sherbrooke to push back the frontiers of infrared camera performance by designing a new generation of thin films, and devising processes to implement them. AThese materials need to demonstrate a high sensitivity of their electrical resistance to temperature, while being stable and manufacturable on a large scale.

The aim of this project is to understand the evolution of the microstructure and composition of thin films during the manufacturing process. Films will be analyzed using transmission electron microscopy (TEM) and microanalysis techniques to characterize the structure and nature of these materials at the atomic scale. The successful candidate will develop thin-film synthesis processes and TEM characterization protocols, quantify the different structures of the films produced, and model film transformation kinetics. It will be possible to capture the evolution of the microstructure in real time using technologies that enable in situ TEM observations. Ultimately, the aim will be to understand the relationship between process parameters and microstructure in order to maximize the performance of thin films for microbolometer applications.

Two thesis will be supervised by UdeS experts in nanomaterials and microelectromechanical systems (MEMS), Profs Nadi Braidy and Luc Fréchette. The work will be carried out at UdeS's Institute for Interdisciplinary Innovation in Technology (3IT) in the new TEM laboratory, at the Centre de Collaboration MiQro Innovation (C2MI) and at TD's Bromont plant.

The 3IT is a unique institute in Canada, specializing in R&D related to energy, environment and health issues. C2MI is an international center for collaboration and innovation in MEMS and advanced encapsulation. Finally, Teledyne DALSA, one of the world's largest pure-play MEMS foundries, has been operating for over 30 years in Bromont, with 3,800 m2 of cleanroom space. The trainees will thus benefit from an exceptional research environment and a multidisciplinary academic and industrial team working hand in hand to develop the technologies of the future.

Profile required
• University degree and master's in engineering or science in the field of physics, chemistry or materials;
• Experience in thin film characterization. Experience in TEM techniques is an asset;
• Ability to communicate orally and in writing in English or French;
• Strong capacity for adaptation, autonomy, teamwork and problem-solving;
• Strong interest in materials physics, crystallography, microscopy and interdisciplinary R&D.

Contact: emplois-materiaux@usherbrooke.ca
Documents to be supplied: CV, university transcript, statement of interest and 2 references

Discipline(s) by sector

Sciences naturelles et génie

Génie chimique, Génie électrique et génie électronique, Génie mécanique

Funding offered

To be discussed

Partner(s)

Teledyne DALSA, C2MI

The last update was on 24 July 2026. The University reserves the right to modify its projects without notice.