



SEMINAIRE EXCEPTIONNEL
(de 13 h à 14 h, salle Belledonne, IMEP-LAHC, MINATEC,
ouvert à tous : enseignants, étudiants, chercheurs, administratifs, techniciens)

Lundi 16 juin 2014

“Optical MEMS Technologies for Infrared
Spectroscopy, Sensing, and Imaging”

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Abstract: Improving current state-of-the-art infrared (IR) detector and focal plane array (FPA) technologies is focused on reducing cooling requirements, larger-format FPAs, extending to longer wavelengths, and/or adding so-called multi-colour capability, which allows real-time spectral information to be gathered from multiple wavelength bands. Multi-spectral imaging results in improved target recognition and reduced false alarm rates in military scenarios, and is applicable to numerous remote sensing spectroscopy/imaging applications in civilian arenas. In order to provide a reduced size, weight and power (SWaP) solution, a micro-electromechanical systems (MEMS) based electrically tuneable Fabry-Perot filter technology has been developed that is compatible with individual detectors or large format 2-D imaging IRFPAs. Such a hybridised technology is capable of low-voltage tuning across the NIR/SWIR and MWIR wavelength bands for field-portable spectroscopy applications. In addition, future work to extend the technology into the VIS/NIR and LWIR wavelength bands will also be presented, as well as approaches to extending the technology to large format, imaging FPAs.

Professor Faraone is a Member of the Order of Australia (AM), and a Fellow of both the Australian Academy of Science (FAA) and the Australian Academy of Technological Sciences and Engineering (FTSE). He has published more than 200 international journal papers on his research work, and supervised more than 30 PhD student completions. He is currently Head of the Microelectronics Research Group (MRG) at The University of Western Australia (UWA), and Director of the WA Centre for Semiconductor Optoelectronics and Microsystems (WACSOM). Prior to joining UWA in 1987, he worked primarily in the area of CMOS-based microelectronics and non-volatile memory technology with RCA Labs in Princeton, NJ, USA. Since joining UWA he has worked on compound semiconductor materials and devices, including AlGaIn/GaN HEMTs, HgCdTe-based infrared sensor technology and MBE growth, as well as optical MEMS technologies for infrared applications. The research activities of the MRG also include mobility spectrum techniques for magneto-transport studies in advanced semiconductor nanostructures. This has resulted in the development of the Mobility Spectrum Analysis (MSA) technique that allows the transport properties of individual carriers in a multi-layer/multi-carrier semiconductor system to be determined accurately and unambiguously.

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