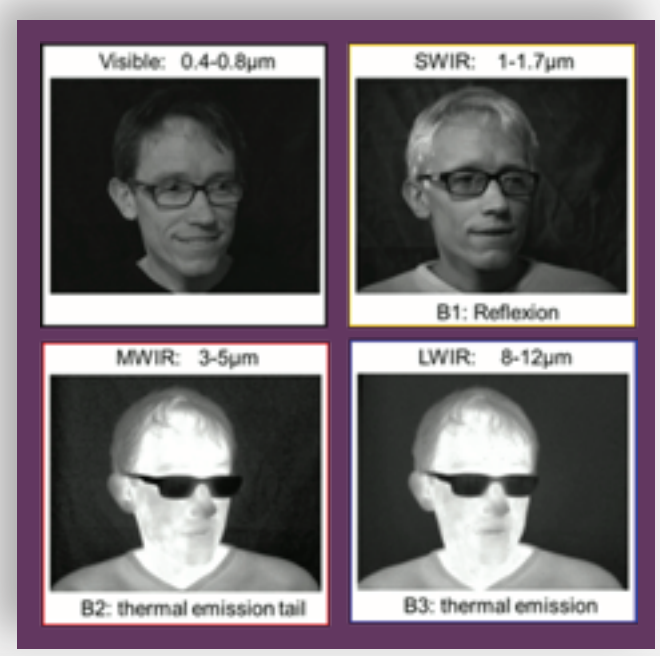
ECE Colloquium Lecture

2019 ECE SPEAKER SERIES

Olivier Gravrand

Research Director, IR Devices
CEA-LETI
France



Fri. Nov. 22, 2019 @10:30 AM
8 St. Mary's Street, PHO 339
Faculty Host: Enrico Bellotti
Light refreshments will be available outside of 339 at 10:15 AM

PROGRESS IN IR DETECTION AND IMAGING AT CEA-LETI

Abstract: IR imaging technologies have gone through a tremendous evolution in the last decades. From single pixel, we know turn to several Mega-pixel system today. CEA-LETI has been one of the pioneers in the development of those IR technologies, leading to the creation and the raise of Lynred (formerly known as Sofradir), now key player in the IR imaging world market. This presentation will introduce widely the different technical issues of high performance (cooled) IR imaging, from the detector point of view. After a general introduction of the different competing material systems, we will focus on the HgCdTe semiconductor system, now leading the market. The talk will then go through defense application needs, main driver of the IR imaging market, exposing the different progress lately made in terms of pixel pitch reduction (Lynred enters in 10µm pitch productions, and 7.5 as well as 5µm retina demonstrations have been done by LETI) and high operating temperature (HOT) for future portable systems. The second part of the presentation will be more devoted to the specific issues introduced by science applications where the detection involves very few photons and space environment constrains. LETI has demonstrated dark current as low as 0.03e/s (ie less than 2 electrons per minute leakage) for astronomy needs in short IR range. LETI and Lynred now start the demonstration of 4 Mpixel arrays. The ability to address those ultra-low flux applications is also very interesting in longer wavelengths for exoplanet investigation and will be discussed further at the end.

Bio: Olivier Gravrand has graduated from the Ecole Normale Supérieure de lyon then did a PhD on high performance magnetometry for space application in 2000 at the Institut de Physique du Globe. Since then, he has been working on IR imaging and detection device at CEA-LETI in France. He has been extensively studying different narrow gap material systems, mainly ii-vi but also iii-v semiconductors. His expertise covers material and device characterization as well as device design and simulation, focused on IR imaging applications. He is the author of more than 70 scientific papers and more than 16 patents.