

## Postdoctoral position

Position available: 01/01/2020

SEA project (Surface enhanced infrared absorption spectroscopy for bio-molecules detection)

Project: Making the right diagnosis in the case of illness is a crucial but not an easy task. Generally, it relies on invasive medical testing. Eventually, patient's medical status is related to pollutants in their environment. Optical lab-on-chip have recently emerged as a technique to identify moieties of molecules quantities notably in human laboratory analysis. Better and precise information from biological samples need information from a broadband spectral range. Molecules absorb light from the visible to far-IR spectral region. In the SEA project, we want to design, fabricate and characterize high sensitivity sensor based on perfect absorber structures to address the far- and mid-IR ranges that cover the whole fingerprint region of molecules [1,2,3]. The use of metasurfaces and plasmonic nanostructures based in metals and semiconductors in these optical sensors will achieve a higher sensitivity and easier molecule identification due to their specific spectral vibrational modes.

Environment: the applicant will work at the Nanomir group in the theme plasmonic. The originality of the group is to address the plasmonic sensing using heavily doped semiconductor. Nanomir is able to grow the layered structures, fabricate the nanostructures [1] (using the facilities of the Central Technologique de Montpellier), to functionalize the sensor surface [2] (in collaboration with the startup Sikémia) and characterize the sensor with a FTIR coupled to a microscope and a focal plan array (FPA) [3].

Profile: The applicant should have a Ph.D. in device fabrication using clean room techniques and skills in condensed matter physics, electromagnetism (experiment and theory) and spectroscopy. Knowledge in surface functionalisation and microfluidics will be appreciated. The candidate should have social skills to integrate a multidisciplinary and international research group. The candidate should demonstrate interest for the topic, be organize and creative. He/she will demonstrate a high capacity to be autonomous and self-critic. The workgroup will be in English mainly.

Conditions: A 18<sup>th</sup> months position is available starting from January 1<sup>st</sup>, 2020, with possibility of extension. Contract with the University of Montpellier. Salary depending on your experience 2076-2145€ brut in 12 allowances a year. Reimbursement of half of the expenses of your public transport to workplace. Possibility of lunch at the administrative restaurant at subsidized price (5-6€ 3 dish meals). Holidays a year: 30 days.

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References:

- [1] F. Bahro, F. Gonzalez-Posada, M.J. Milla Rodrigo, M. Bomers, L. Cerutti, E. Tournié and T. Taliercio, *Nanophotonics* 2018, 7(2), 507-516
- [2] Mario Bomers, Aude Mezy, Laurent Cerutti, Franziska Barho, Fernando Gonzalez-Posada Flores, Eric Tournié, Thierry Taliercio, *Applied Surface Science* 2018, 451, pages 241-249
- [3] Franziska B. Barho, Fernando Gonzalez-Posada Florès, Aude Mezy, Laurent Cerutti, Thierry Taliercio, *ACS photonics* 2019, 6, 1506