**Prof. Jérôme CASAS**

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**PH.D. fellowship**

**Bio-inspiration of insect pheromonal communication by microfluidic system**

The wonderful long-distance communication of moths using chemical pheromones is still not solved. How can they end up with such minute amounts produced and over miles? Although several aspects of this communication system have been studied in depth, a systems approach is lacking. The question of how much of the molecules must be emitted by the female for at least some of it to reach the male's sensory system is therefore still unresolved. We will address this question by producing a bio-inspired microfluidic chip combining pheromone release, transport and capture allowing control with unprecedented precision. Our project, although inspired by the Bombyx mori moth, will be a proof-of-concept study. Pheromone-loaded microdroplets will be immobilized on capillary traps for release, channels of variable geometry will be fabricated for transport, and electrophysiological recording of Xenopus eggs incorporating bombykol receptors will be used for capture. This project, funded by the CNRS within the framework of 80 prime 2020, is at the interface between microfluidics and insect science, and is characterized by a systemic approach.

The student will be supervised by biologist J. Casas (IRBI Tours, thesis director, www.univ-tours.fr/annuaire/m-jerome-casas) and microfluidicist G. Amselen (LadHyX, PhD co-director, http://www.off-ladhyx.polytechnique.fr/people/amselem/). The Tours team is specialized in research on pheromones, their transport and fluid dynamics. The Polytechnique team is known for its expertise in microfluidics and organoids on chip. The PhD student would spend about 30% of his time in the Polytechnique team, with a stronger presence in the first year. The chip design and master fabrication will be done first at Polytechnique, with the Tours team building a fully functional microfluidics lab in 2021. All biotests will be performed in Tours. Support from Tours engineers in terms of chemicals and access to the chemistry lab will be provided. The same support for microfabrication will be provided to LadHyX. A facility for working in an interdisciplinary manner, juggling autonomously between two labs, working meticulously with very small quantities, as well as a certain taste for "tinkering", is more important to us than the exact background of the student.

Starting date: 1/10/2021. Procedure: Send CV, cover letter, grades from L3 to M2 and name and tel. From 3 references to JC. Recruitment will be done only via the CNRS platform, emploi.cnrs.fr, reference UMR7261-AICBEL-015, https://bit.ly/3vysLaD with a deadline of June 18.