

PHD POSITION AVAILABLE

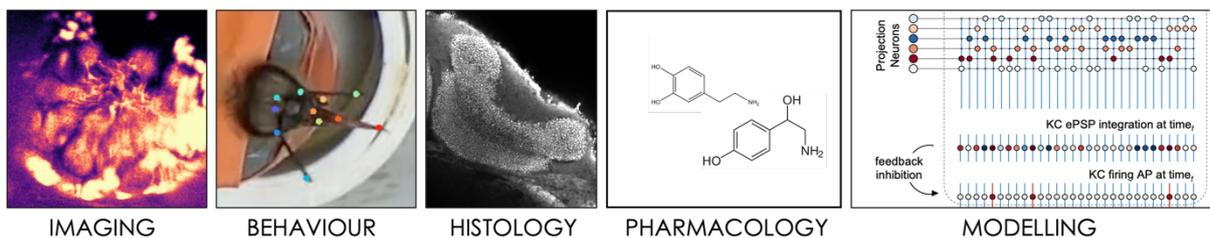
Laboratory: Center of Taste and Food Sciences, Doctoral School in Health and Environment, Dijon (FRANCE)

Supervisor: Marco Paoli, CPJ CNRS **email:** marco.paoli@u-bourgogne.fr

Application deadline : 2025-05-22

Impact of alarm pheromone on honey bee olfactory neurophysiology

In vertebrate and invertebrate species, alarm signals can rapidly suppress food-related behaviors, triggering a fight-or-flight response. Likewise, in honey bees, exposure to alarm pheromone components shifts behavior from foraging to aggression and disrupts olfactory appetitive learning and memory. This project will investigate the influence of isoamyl acetate, the main component of the honey bee alarm pheromone, on olfactory coding and the neuromodulatory pathway mediating its effects on olfactory cognition and neurophysiology. First, the doctoral candidate will confirm that isoamyl acetate affects olfactory learning (Urlacher et al., 2010). Then, using functional calcium imaging of the honey bee antennal lobe (the first olfactory processing center), the candidate will evaluate whether the pre-exposure to isoamyl acetate influences the neural representation of neutral or appetitive odorants. Finally, the candidate will investigate the underlying neuromodulatory pathways using a pharmacological approach. He/she will perform olfactory conditioning (with or without isoamyl pre-exposure) under pharmacological interference (i.e., octopamine, dopamine, and serotonin receptor agonists and antagonists). This will offer valuable information on the role of monoamines in mediating alarm state-induced changes in olfactory cognition and neurophysiology.



Presentation of the host institution

The CSGA (<http://csga.fr>) is a laboratory investigating various aspects of feeding-related behavior across animals. I have recently joined the lab with a Chaire de Professeur Junior CNRS. The research team investigates different aspects of the neurophysiology and neurobiology of feeding and odor/taste perception in *Drosophila*. I will address similar questions using the honey bee as a model. We have hives on campus, and perform behavioral/cognitive assays (mainly olfactory learning, memory, and perception) coupled with movement tracking, and calcium imaging analysis to investigate olfactory coding and how odor representation changes with internal and external factors (e.g., internal state, pheromones, pesticides).

Candidate's profile

We are seeking a dedicated and reliable PhD candidate who is eager to contribute to our research efforts. The ideal candidate should be someone who can work independently, take initiative, and consistently meet deadlines. A background in coding, or a strong willingness to learn coding, is essential for the role. Experience with dissection techniques or knowledge of insects would be a valuable asset, though not required. What matters most is a genuine interest in learning and a commitment to the research process. This position offers an opportunity to develop a wide range of skills and contribute meaningfully to ongoing projects.