RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM
(one page maximum)

Field: Biology

Subfield: ecology – neurophysiology - evolution

Title: **Evolution of the detection and metabolism of ethanol in the olfactory system of drosophilids**

ParisTech School: AgroParisTech

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Lab location: Paris
(Lab/Advisor website): https://ieesparis.ufr918.upmc.fr

Short description of possible research topics for a PhD:

Ethanol (EtOH) is a known psychoactive substance but its smell also drives various behaviors in animals. Surprisingly, the processes involved in EtOH detection and detoxification in the olfactory organs are still unknown. Fermenting fruit is the social hub for Drosophila melanogaster, this insect is thus remarkably adapted to detect EtOH and to resist to EtOH stress. Interestingly, closely related species of the Sophophora group display distinct EtOH tolerances and behavioral preferences. Using D. melanogaster and two sibling species, this project aims to discover the mechanisms underlying the olfactory detection of EtOH, to decipher the processes involved in the defense of the olfactory organ against this toxic compound, and to trace the evolution of EtOH adaptation in drosophilids, in light of their respective preferences and sensitivities. Molecular actors involved in EtOH detection identified could serve as new targets for the biocontrol of insect pests, such as D. suzukii.

Required background of the student: The Phd student must have a basic knowledge of molecular biology, genetics and neurophysiology, with sensitivity to evolutionary questions.

A list of 5 (max.) representative publications of the group

1. Chertemps T., *et al*. 2015. Front Physiol. 6:315.
2. Steiner C., *et al*. 2017. Sci Rep. 7(1):12629.
3. Younus F., *et al.* 2017. Sci Rep. 7:46188.
4. Younus F., *et al.* 2014. Insect Biochem Mol Biol. 2014 Oct;53:30-43.
5. Chertemps T., et al. 2015. BMC Biol. 2012 Jun 21;10:56.