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INRAE, CNRS, IRD, SORBONNE UNIVERSITÉ, UNIVERSITÉ PARIS CITÉ,  
UNIVERSITÉ PARIS-EST CRÉTEIL

## Institute of Ecology and Environmental Sciences of Paris (iEES Paris)

Sensory Ecology Department

### Management of the iEES-Paris unit

Emma Rochelle-Newall, director  
Lisa Dupont, deputy director  
Pierre Federici, deputy director  
Jean-Christophe Lata, deputy  
director  
Philippe Lucas, deputy director  
Elisa Thebault, deputy director

### Management of the Sensory Ecology Department

Emmanuelle Jacquin-Joly, director

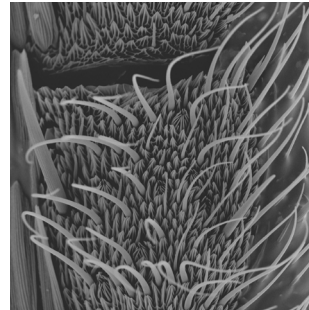
### Key Figures

- 12 scientists including assistant professors and professors
- Around 10 PhD and post-doctorals students
- 3 engineers
- 7 technicians and administrative staff
- 2 locations:
  - INRAE Ile-de-France - Versailles-Saclay
  - Sorbonne-Université Jussieu, Paris

### Mission and objectives

The main objectives of the iEES Paris unit are to analyze and model the organization, operation and ecological changes of environmental systems. The unit is structured in 5 departments and the INRAE staff from the Sensory Ecology department are located on the INRAE Versailles campus.

The Department of Sensory Ecology of iEES Paris develops research in the field of insect chemical ecology. This department studies the so-called "chemical" senses (olfaction and taste) which are essential for insects to interact with each other, to interpret their environment and to adapt to new ecological niches. Activities are balanced between fundamental research (sensory neurobiology) and applied outputs in crop protection against insect pests.



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The objectives of the Sensory Ecology department are:

- to understand how insects detect their chemical environment;
- to evaluate how phenotypic and genotypic variations allow them to adapt to a complex and changing environment;
- to propose solutions for insect crop pest biocontrol and early detection, using classical and innovative semiochemicals and tools.



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**T** Animal Science, Diversity,  
Adaptation & Health

**T** Agroecosystems  
& Environment

### Topics

## Research

Five main aspects are investigated:

- The chemical landscapes and the sensory signals the insect are sensitive to;
- The mechanisms of their detection by the insect sensory organs;
- Their integration in the central nervous system;
- The insect behavioural responses;
- The contribution of chemical senses to insect adaptation to new hosts and to the anthropic pressure.

Thus, the Department investigate all aspects of chemical communication in insects, developing approaches from genes to behavior (using omics, functional genomics, electrophysiology, physico-chemistry, neurobiology, functional imaging, and neuroethology), taking into account the ecosystem, in an adaptive context.

## Collaboration

These studies take place in a context of fruitful collaborations at the national (e.g. Universities of Rennes, Nice and Montpellier, ISA Sophia, CNRS, CEA, CSGA Dijon, CEFM Montpellier, CIRAD La Réunion...) and international levels (e.g. SLU Sweden, University of Pisa, Italy, CAS Czech Republic, KAUST Saudi Arabia, IPP-CAAS China) in chemical ecology, ecotoxicology and also modelling and robotics.

As a highlight, the department is leading an international laboratory associated with IPP-CAAS (Chinese Academy of Agricultural Sciences) devoted to plant protection.

Applications in insect pest biocontrol are also conducive to partnerships with private companies and technical and interprofessional institutes.

## Teaching

The department is very active in teaching. It provides annually around 1600 hours of courses in biology of organisms, entomology, evolution, ecophysiology, ecotoxicology, bio-statistics (it has the responsibility of 16 teaching units at Sorbonne University, Undergraduate and Master levels) in diverse Universities and Colleges (AgroParisTech, Agrocampus Ouest), as well as internationally (PhD Course in Chemical Ecology: SLU Sweden, PennState University USA).

The two teams of the department are attached to the doctoral school "Agriculture, Food, Biology, Environment, Health" (ED ABIES AgroParisTech) for hosting doctoral students.



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