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INRAE, CNRS, UNIVERSITÉ PARIS-SACLAY, UNIVERSITÉ ÉVRY VAL-D'ESSONNE,  
UNIVERSITÉ DE PARIS

## Institute of Plant Sciences – Paris-Saclay (IPS2)

### Management

Martin CRESPI, head

### Key figures

- 48 researchers and teachers
- 34 PhD and post-doctoral students
- 20 engineers
- 32 technicians and administrative staff
- 2 technology platforms
- 90 m<sup>2</sup> greenhouses
- 230 m<sup>2</sup> growth chambers

### Mission and objectives

IPS2 is a research unit within the scope of the Graduate School of Research Saclay Plant Sciences (SPS) of Université Paris-Saclay. We focus on the analysis of the growth and development of model plants and on the translation of this research to crops

Our main objective is to better understand the molecular and genetic mechanisms that control fundamental processes and their regulation by endogenous and exogenous signals of biotic (bacteria or fungi) and abiotic (water stress, heat, nutrients) origin. The analysis of these mechanisms is carried out in an integrated manner at the level of cells, organs and the entire plant.

IPS2 teams apply multidisciplinary approaches (genomics, molecular and cellular biology, bioinformatics, biochemistry, genetics, physiology) and aim to develop tools (notably bioinformatics and statistical modelling) to provide predictive knowledge



Pictures: © INRAE

Our research is characterised by the diversity of plant species studied, from model plants (*Arabidopsis*, *Brachypodium* and *Medicago truncatula*) to crops (tomato, melon, wheat, bean and pea), by the analytical scales (from genes in cells to plants in their environment), by the levels of integration (from cells, organs to the whole plant and their interactions with the environment), as well as by the development of translational biology.



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**T** Plant Science, Diversity,  
Health & Biotechnology

**T** Microorganisms, Health  
& Environment

Topics

## Research

The research conducted at IPS2 in plant molecular and cell biology uses a variety of approaches with a strong emphasis on genetics and genomics, physiology, biochemistry and biotic interactions of plants. They also extend to predictive biology (modelling and bioinformatics) and translational biology (innovation activities).

Three main axes can be distinguished:

- Addressing developmental genetics and plant genomics to provide new concepts for understanding the control of plant growth and development and to contribute to the development of knowledge-based agriculture;
- Understanding hormonal, metabolic and redox signalling to address agricultural challenges around healthy and sustainable agriculture in the face of climate change;
- Identify new strategies for (bio)-control of plant responses to beneficial and pathogenic organisms.

**Our scientific project is thus in line with the major societal challenges of dealing with the consequences of climate change within the framework of sustainable and safe agriculture.**

## Collaboration

IPS2 develops strong partnerships at the national and international level, both in the academic sector and with private sector collaborators. Examples include:

- an International Associated Laboratory (IAL) between M. Crespi's research team and the laboratory of F. Ariel in Argentina
- Important collaborations with the Center for Desert Agriculture of the King Abdulaah University for Science and Technology (KAUST)
- long-standing collaboration contracts between A. Bendahmane's team and the seed companies (VCO, Syngenta, TAKII, FITO, Gautier, Rijk Zwaan, BHM, Serial Genetics and BenchBio), 5 licensing contracts (Syngenta, BenchBio, VCO, Sofiprotéol, SAKATA)
- the hosting in the IPS2 building of the start-up Neoplants, which uses the latest synthetic biology tools to develop plants capable of depolluting in-door air.

## Teaching

IPS2 staff are strongly involved in training through courses (bachelor and master - more than 5300 hours per year, mainly in plant sciences) and research (PhD students, undergraduate and postgraduate students). The laboratory also focuses on specific training actions reinforcing its visibility on major topics through summer schools..



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