

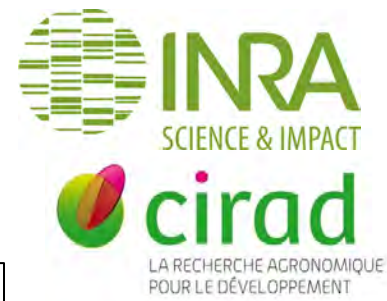
# Workshop

## Plant regeneration, transformation and genome editing

14-20 April 2018

Institut Jean-Pierre Bourgin, Versailles  
contact: [Workshop-PRTGE2018@inra.fr](mailto:Workshop-PRTGE2018@inra.fr)

For young (PhD students, post-docs) or established researchers seeking a primer on current methods and protocols, from academia or industry



Comprendre le monde,  
construire l'avenir



Brachypodium

Tomato

CRISPR-Cas9

IPS2  
Institute of Plant Sciences  
Paris - Saclay



IGEPP  
Institut de  
Génétique, Environnement  
et Protection des Plantes



Wheat

Rice

Potato



### Lectures on key topics

- Transformation of monocot and dicot crops
- Protoplast transformation and regeneration
- CRISPR/Cas9 methods, vectors, cloning, gRNA design
- Analysis of edited allele phenotypes in multiploid species
- Sequencing of mutated genes
- Rules and regulations for New Breeding Technologies

### Intensive hands-on training

- Preparation of explants: protoplasts, cotyledons, immature and mature embryos
- GFP analysis in live tissues, GUS staining
- *Agrobacterium* transformation, biolistics
- Detection of CRISPR/Cas9 mutations



## Workshop “Plant regeneration, transformation and genome editing”

**Where** IJPB, INRA-Versailles  
**When** 14-20 April 2018  
**Who** Young (PhD students, post-docs) or established researchers seeking a primer on current methods and protocols

All communications and course materials will be in English.

### Organizers

#### *Coordinators*

Michel Hernould  
UMR 1332 Fruit Biology and Pathology  
Université de Bordeaux  
INRA Bordeaux-Aquitaine  
33882 Villenave d'ornon France  
michel.hernould@inra.fr  
Tel: + 33 (0) 5 5712 26 92

Pierre Hilson  
Institut Jean-Pierre Bourgin, UMR1318  
INRA-AgroParisTech  
INRA Centre de Versailles-Grignon  
78026 Versailles France  
pierre.hilson@inra.fr  
Tel: +33 (0) 1 30 83 30 49

#### *Collaborators*

Pierre Barret and colleagues (ValFon, GDEC, INRA Clermont-Ferrand)  
Abdelhafid Bendahmane, Fabien Marcel (IPS2, INRA Orsay)  
Martine Bes, Anne-Cécile Meunier, Donaldo Meynard (AGAP, CIRAD Montpellier)  
Norbert Bollier, Frédéric Delmas (BFP, INRA, Bordeaux)  
Oumaya Bouchabké-Coussa, Anouchka Guyon, Camille Soulhat (IJPB, INRA Versailles)  
Laura Chauvin (IGEPP, INRA Ploudaniel)  
Jean-Denis Faure (AgroParisTech, IJPB, INRA Versailles)  
Sergio Ochatt (Agroécologie, INRA Dijon)

## Program outline

### **Saturday 14 April**

Arrival, possibility to organize a night trip to Paris on demand

### **Sunday 15 April**

Get together; visit of Versailles, including the Château; barbecue

### **Monday 16 to Friday 20 April**

Lectures or tutorial classes start every day around 8:30 am, end of day around 18:30 pm, lunches on site. Two half-days will include company visits outside the INRA-Versailles campus.

### **Participants**

Up to 12, from academia and industry, international

## **Lectures**

Two or three lectures per day (45 minutes plus discussion), organized as introduction to the practical sessions when relevant. All lecturers have confirmed their participation in the workshop.

A brief history of plant in vitro culture and transgenesis – P. Hilson

CRISPR-Cas9 technology – N. Bollier

Somatic embryogenesis in monocots – O. Bouchabké-Coussa

Wheat transformation and biolistics – P. Barret

Rice transformation and editing – M. Bes, A.-C. Meunier, D. Meynard

Genome editing in the moss *Physcomitrella patens*, genome repair – A. Guyon (F. Nogué lab)

Regeneration and transformation of potato protoplasts – L. Chauvin

Tomato transformation, research on developmental traits – N. Bollier, F. Delmas, M. Hernould

Analysis of mutant sequences – A. Bendahmane, F. Marcel

In planta transformation and targeted mutagenesis of the polyploid *Camelina sativa* – J.-D. Faure (AgroParisTech, IJPB, INRA Versailles)

In vitro regeneration competence... or lack thereof: what does recalcitrance mean? – S. Ochatt (Agroécologies, INRA Dijon)

## **Practical training labs**

The *Biology of the Cell and Regeneration* laboratory (BCR, IJPB) is equipped with six laminar flow hoods in the same location. Trainees will be matched in six pairs, each occupying one of the six stations. The training lab sessions will be organized so that all trainees will gain hands-on experience in every step of the protocols.

Topics addressed will include:

- Gene gun and biolistics
- GFP analysis in live tissues (platform *Plant Observatory*)
- GUS staining
- *Agrobacterium* transformation
- Detection of CRISPR/Cas9 mutations (in/del) and large fragment deletion (in stable transformants and/or protoplasts)
- Preparation of diverse explants: protoplasts (potato, Arabidopsis), cotyledons (tomato), immature and mature monocot embryos (Brachypodium, rice and wheat)

Participants will complete key steps of the protocols. Methods will be illustrated with staged developing explants. Theoretical and practical aspects will be taught by experts who routinely perform these methods.

## **Site visits**

PyMabs, Andéol Falcon de Longevialle (CEO), Evry, Thursday, 19 April (morning) – Transient expression in plant tissues for the production of highly valuable proteins

Alkion BioInnovations (alkinnov.com), Centre INRA Versailles, Wednesday, 18 April (afternoon) – Industrial process to produce natural food additives & flavors, essential oils & biopesticides

A company involved in cereal breeding and doubled haploid production [to be confirmed]