



PLANT HEALTH and QUALITY  
SUMMER SCHOOL – 2019  
Angers, FRANCE  
Scientific and social program

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# PLANT HEALTH and QUALITY

## SUMMER SCHOOL – 2019

### Overview of the scientific program

*Slight amendments may occur until the opening of the summer school*

#### *Plant Health sessions:*

- Plant pathology : new technologies for disease diagnostic and pathogen detection
- Phenotyping of plant diseases
- Chemical ecology of insect crop pests
- Plant resistance inducers (elicitors) in crop protection
- Parasitic plants
- Seed-borne pathogens : pathogenicity determinants and microbial communities

#### *Plant Quality sessions:*

- Fruit post harvest quality
- Architecture characterization of ornamental plant
- Plant breeding and varietal resistance
- Physiological quality of seeds
- Phenotyping for seed germination

#### *Studying in Angers and preparing a PhD thesis in France*

- Presentation of the Plant Science campus
- Roundtable with PhD students

#### Hands-on activities

- Droplet digital PCR applied to plant health and quality
- e-phytia, web applications and mobile tools specialized in Plant Health
- Bioinformatic with Galaxy for Dummies
- Analytical and sensory methods to assess fruit quality
- Quantitative Trait Loci
- Aphid olfactory choice experiments
- Electrophysiological recordings of insect antennae
- qPCR - a methodology to quantify defense gene expression in plant
- Characterization of parasitic plant- host plant relationship
- Plant photosynthetic activity
- Architectural analysis of plant by 3D digitization
- Phenotyping -Image analysis and study of germination
- Phenotyping - Quantification of disease severity using image analysis

## Scientific visits

- [SNES GEVES](#) (Variety and Seed Study and Control Group)
- [LSV-ANSES](#) (Plant Health Laboratory)
- [CIRM-CFBP](#) (French Collection of Plant associated Bacteria)
- [PHENOTIC](#) (instrumentation for high throughput plant phenotyping)
- [ITEIPMAI](#) (French research institute for perfume, medicinal and aromatic plants)
- [Roses Loubert](#) (national collection, old rose garden)
- [VILMORIN](#) (Seed company)
- [Tropical greenhouse of the National Museum of Natural History, Paris](#)

PLANT HEALTH and QUALITY  
SUMMER SCHOOL – 2019  
Detailed scientific and social program

*Slight amendments may occur until the opening of the summer school*

**Monday 24<sup>TH</sup> June**

9:00 – 10:30 Welcome coffee and Distribution of the Welcome packs

Presentation of the Plant Health and Quality Summer School by Marion Fischer-Le Saux & Pascal Poupard (scientific coordinators of the Summer School) - Presentation of the participants and their research interests / experiences

FISCHER – LE SAUX Marion IRHS-INRA - Angers (FR)  
POUPARD Pascal, IRHS - University of Angers (FR)  
buddystudents

*Campus Santé*

10:30-11:00 Coffee Break

11:00 – 12:00

Opening ceremony introduced by the President of the University of Angers (with all the Summer Schools)

Plenary conference (with all the Summer Schools): Invited Speaker Perrine PAUL-GILLOTEAUX, CNRS Nantes “to be a young scientist in the 21<sup>st</sup> Century “

*Campus Santé*

12:00-15:00 Welcome Barbecue

*Campus Santé*

15:00-16:00

Plenary Conference (Plant Science students): Invited Speaker

Yuanyang rice terraces, an example of social structures responsible for the sustainability of resistance based on diversity: J.B. Morel, INRA Montpellier.

*Ground floor meeting room – Maison de la Recherche*

16:00-16:15 Coffee Break

16:15-16:20 Welcome presentation by D. Vollet, Director of AgroCampus Ouest-Angers

16:20-16:50

Presentation of VEGEPOLYS (competitive cluster)  
Nicolas Fegeant, Vegepolys

16:50-17:20 Presentation of the Federative research structure on Plant Quality and Health

Marie-Agnès Jacques, IRHS, SFR Quasav

*Ground floor meeting room – Maison de la Recherche*

**Social Program at evening: Visit of Angers – wine taste**

## **Tuesday 25<sup>TH</sup> June**

9:00 – 12:00

*French class*

**French language course**

THOMAS Caroline, CeLFE - Angers (FR)

*Room A119 - Faculty of Sciences*

12:00 – 13:30

Lunch at cafeteria L'Escale  
*Campus Belle-Beille*

13:30-16:30

*French class*

**French language culture**

DESGRANGES Guillaume, CeLFE - Angers (FR)

*Room A119 - Faculty of Sciences*

**Social Program at evening : KAYAK Session**

## **Wednesday 26<sup>TH</sup> June**

9:00 – 12:00 **French language course**  
*French class*  
THOMAS Caroline, CeLFE - Angers (FR)  
*Room A119 - Faculty of Sciences*

12:00 – 13:30 Lunch at cafeteria L'Escale  
*Campus Belle-Beille*

13:30-16:30 **French language culture**  
*French class*  
DESGRANGES Guillaume, CeLFE - Angers (FR)  
*Room A119 - Faculty of Sciences*

**Social program at evening: summer school students challenges**

## Thursday 27th June

9:00 – 12:00 **French language course**

*French class*

THOMAS Caroline, CeLFE - Angers (FR)

*Room A119 - Faculty of Sciences*

12:00 – 13:30 Lunch at cafeteria L'Escale

*Campus Belle-Beille*

13:30-16:30 **French language culture**

*French class*

DESGRANGES Guillaume, CeLFE - Angers (FR)

*Room A119 - Faculty of Sciences*

## Friday 28<sup>th</sup> June.

Plant Health Session: Chemical ecology of insect crop pests

9:00-10:30: Sylvia Anton, IGEPP-EGI- Angers

Chemical communication in insects and its application in plant protection

*Amphi D AgroCampus Ouest*

10:30-11:00 Coffee Break

11:00-12:00

Conference (Invited speaker) Marco TASIN, Sweden

Applied chemical ecology at work in apple orchards

*Amphi D AgroCampus Ouest*

12:00-13:30 Lunch

13:30-14:45/ 15:00-16:30

Workshop 1 (Group A/B) : Aphid and parasitoid olfactory choice experiments

Martin Luquet and Zoé Sol-Mochkovitch IGEPP-EGI, Angers

*Room E232 –Bât E Agrocampus Ouest*

Workshop 2 (Group B/A): Electrophysiological recordings of Insect antennae  
Sylvia Anton IGEPP-EGI, Angers

*Room E222-Bât E- AgroCampus Ouest*

### **Saturday 29<sup>th</sup> June**

Atlantic seacoast day

### **Sunday 30<sup>th</sup> June**

Visit of Terra Botanica, Angers

### **Monday 1<sup>st</sup> July**

Plant Health Session : Plant pathology : new technologies for pathogen detection

9:00-10:00

Visit of the LSV (Plant Health Laboratory) - ANSES (Agency for Food, Environmental and Occupational Health & Safety)

Pascal Gentit, ANSES-Angers

10:00-10:15 Coffee Break

10:15-12:00

Workshop : Droplet digital PCR applied to plant health and quality

Mathieu Rolland, Méryl Le Gallo, ANSES-Angers

*ANSES*

12:00-13:30 Lunch

13:30-15:30

Workshop : Bioinformatic with Galaxy for Dummies

Benoît Remenant, Pascal Gentit, Mathieu Rolland, ANSES-Angers

*room Authion SDAR-INRA*

15:45-17:15

Visit of CIRM-CFBP: a microbial resource center

Perrine Portier, IRHS-Angers

*Campus du Végétal, bâtiment C*



**Social program at evening: to be defined**

**Tuesday 2th July**

Plant Health Session : Phenotyping of plant diseases

9:00-10:00

Conference: pathogenicity determinants and plant partial resistance against fungal pathogens (Romain Berruyer, IRHS-Angers)

*Ground floor meeting room –Maison de la recherche*

10:00-10:30 coffee break

10:30-11:15

Introduction of the workshop “Phenotyping – Quantification of disease severity using image analysis” (Tristan Boureau, IRHS-Angers)

*Ground floor meeting room –Maison de la recherche*

11:15-12:00 visit of the Phenotic facilities in greenhouses (Tristan Boureau, IRHS-Angers)

12:00-13:30 lunch

13:30-16:30 :

Plant Health Session : Phenotyping of plant diseases

13:30-14:45

Workshop : Phenotyping - Quantification of disease severity using image analysis  
Tristan Boureau (IRHS, Angers)

*Room Authion, SDAR-INRA*

14:45-15:15 Coffe Break

15:15-16:30

Workshop : e-phytia, web applications and mobile tools specialized in Plant Health  
Jonathan Gaudin, INRA –Bordeaux ; M.A. Le Moigne, IRHS, Angers)

*Room Authion, SDAR-INRA*

**Wednesday 3th July**

Plant Quality session:

9:00-10:00 Conference on ornamental plant architecture and environmental factors  
(Soulaïman Sakr, IRHS-Angers)

*Ground floor meeting room-Maison de la recherche*

10:00-10:30 Coffee Break

10:30-12:00 Personal work to prepare the presentation of Master's project

*Room Authion, SDAR-INRA*

12:00-13:30 Lunch

13:30-15:00 / 15:00- 16:30

Plant Quality Session : Architecture characterization of ornamental plant

Workshop 1 (group A/B): plant photosynthetic activity

Lydie Huché-Thélier, IRHS- Angers

Workshop 2 (group B/A): Architectural analysis of plant by 3D digitization

Laurent Crespel & Philippe Morel-Chevillé, IRHS, Angers

*Room B106 and B107 at AgroCampus Ouest*

18h30 Evening program with dinner included:

General information about PhD fellowships – Friendly evening with local doctoral and post-doctoral students

*Restaurant Le Quai Angers*

Greenyd association (Thibault Barrit, Justine Colou, Diana Lopez, Lili Zang)

<https://associationgreenyd.wixsite.com/associationgreenyd-1>

## **Thursday 4<sup>th</sup> July**

Plant Health Session: Plant resistance inducers (elicitors) in crop protection

9:00-9:30

Matthieu Gaucher, A Degrave et MN Brisset - IRHS, Angers

*Room Authion, SDAR-INRA*

9:30-12:00

Workshop: a methodology to quantify defense gene expression in plant by qPCR quantitative polymerase chain reaction

*Room Authion SDAR-INRA*

Matthieu Gaucher, Brice Marolleau, Alexandre Degrave, MN Brisset , IRHS-Angers

12:00-13:30 Lunch

Plant Quality Session : Plant breeding and varietal resistance

13:30-14:30 Conference : Apple breeding program

François Laurens, IRHS- Angers

*Room Authion, SDAR-INRA*

14:45-17:00

Workshop : Quantitative Trait Loci detection using RQTL

Diana Arias Lopez, IRHS-Angers, Juliette Benejam, IRHS-Angers & Laurence Hibrand Saint Oyant IRHS-Angers

*Room Authion, SDAR-INRA*

## **Friday 5th July**

Visit of Paris - departure Angers 5:30 bus transport

10:30-12:00 Visit of the tropical greenhouse of the National Museum of Natural History (MNHN)

Marie-Anne LE MOIGNE, IRHS-Angers and buddystudents

12:00-13:00 picnic in the Gardens of the MNHN

After 13:00 Free time,

19:00 Dinner in a restaurant in Paris and possibility of return from Paris at 21:00 by bus

## **Saturday 6<sup>th</sup> July and Sunday 7<sup>th</sup> July**

Free time in Paris (Nights in Paris and Return transportation not included, to be organized by the students)

## **Monday 8th July**

Plant Quality Session: Fruit post-harvest quality

9:00 - 12:00

Workshop: Analytical and sensory methods to assess fruit quality

Ronan Symoneaux, GRAPPE- ESA, Angers

*Room at ESA*

12:00-14:00 Lunch at ESA

14:00-17:00

Oral presentation of the students works and projects

M. Fischer-Le Saux, P. Poupard IRHS, Angers, N. Dueso, S Soulié, T. Redjala, RFI Objectif  
Vegetal, University of Angers

*Ground floor meeting room, Maison de la Recherche*

## **Tuesday 9<sup>th</sup> July**

Plant health session : characterization of parasitic plant-host plant relationship

9:00-9:45 Conference (invited speaker): Stimulants dependent germination of parasitic  
plants: from understanding to leverage; Kaori Yoneyama, Japan

*Ground floor meeting room, Maison de la Recherche*

9:45-10:30 Questions and Coffee Break

10:30-11h Workshop presentation G. Montiel and J.B. Pouvreau LBPV (Laboratory of plant  
biology and pathology) -University of Nantes

*Ground floor meeting room, Maison de la Recherche*

11:00-12:00 Workshop: parasitic plant seed preparation

*group A/B in parallel in rooms E228 and E225 at Agrocampus Ouest*

Grégory Montiel & Jean-Bernard Pouvreau

12:00-13:30 Lunch

13:30-15:30 Workshop 1 (group A/B): parasitic plant seed germination: a Strigolactone  
Bioassay, JB Pouvreau ,

*Room E228 Agrocampus Ouest*

13:30-15:30 Workshop 2 (group B/A): parasitic plants - host plant interaction: minirhizotron  
experiment, G. Montiel,

*Room E225 Agrocampus Ouest*

15:30-16:30 plate reading at IRHS (FungiSem Lab, 2<sup>nd</sup> Floor Campus du Végétal) and  
workshop conclusion,

*Ground floor meeting room Maison de la Recherche*

### **Wednesday 10th July**

Seed quality session

9:00 -10:00 Conference : Introduction to seed biology, O. Leprince, IRHS, Angers

*Ground floor meeting room, Maison de la Recherche*

10:00-10:15 Coffee Break

10:15-11:05 Conference: The secrets of eternal life: anhydrobiosis, J. Buitink, IRHS, Angers

*Ground floor meeting room, Maison de la Recherche*

11:05-12:00 Conference: Seeds capsule of time (seed conservation), O. Leprince, IRHS, Angers

*Ground floor meeting room, Maison de la Recherche*

12:00-13:30 Lunch

13:30-14:30 Conference: Impact of abiotic stresses on seed quality, J. Verdier, IRHS

*Ground floor meeting room, Maison de la Recherche*

14:45-17:00 Visit of a seed company (Vilmorin, La Ménitré, Pierre Ferraton)

**Social activity : pic-nic or dinner in a restaurant near the Loire River**

### **Thursday 11<sup>th</sup> July**

Seed quality session

9:00-10:00 Conference (invited speaker) : Maternal effects in seeds

Steve Penfield, John Innes Center, UK

*Ground floor meeting room, Maison de la Recherche*

10:00-10:15 Coffee Break

10:30-12:00 Visit: Activities of the Variety and Seed Study and Control Group

Isabelle Sérandat, Sophie Perrot, GEVES - Angers

*GEVES*

12:00-13:30 Lunch

13:30-14:30: Conference : Processes involved in assembly of the seed microbiota, M. Barret, IRHS, Angers

*Ground floor meeting room, Maison de la Recherche*

14:30-15:30

Visit of Phenotic facilities

Didier Demilly, GEVES- Angers

*GEVES*

15:30-16:45

Workshop : Phenotyping -Image analysis and study of germination

Didier Demilly (GEVES, Angers)

*Room Authion, SDAR – INRA*

## **Friday 12<sup>th</sup> July**

Visit session

9:00-12:00

Visit of iteipmai -The French research institute for perfume, medicinal and aromatic plants

Laurence Hibrand Saint Oyant & Tatiana Thouroude - IRHS, Angers

12:00-13:30 Lunch (Picnic in an old rose garden)

13:30-15:30

Visit of an old rose garden (Roses Loubert, Rosiers s/ Loire)

Laurence Hibrand Saint Oyant & Tatiana Thouroude - IRHS, Angers

**16:30-17:30**

**Closing ceremony of the summer school Plant Health and Quality** in the presence of  
Philippe Simoneau Vice-President (Research) University of Angers

*Room Aubance at INRA-SDAR and hall*

## **Saturday 13<sup>th</sup> July**

**Departure from Angers to Paris by train**

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**List of speakers**

**ANTON Sylvia**, IGEPP-EGI-INRA – Angers (FR)  
**BARRET Matthieu**, IRHS-INRA-Angers (FR)  
**BENEJAM Juliette**, IRHS-University of Angers (FR)  
**BERRUYER Romain**, IRHS-University of Angers (FR)  
**BOUREAU Tristan**, IRHS – University of Angers (FR)  
**BRISSET Marie-Noëlle**, IRHS-INRA-Angers (FR)  
**BUITINK Julia**, IRHS-INRA-Angers (FR)  
**CREPEL Laurent**, IRHS-Agrocampus Ouest – Angers (FR)  
**CUNTY Amandine**, ANSES-Angers (FR)  
**DEGRAVE Alexandre**, IRHS-AgroCampus Ouest-Angers (FR)  
**DEMILLY Didier**, GEVES – Angers (FR)  
**DESRANGES Guillaume**, CeLFE - Angers (FR)

**FEGEANT Nicolas**, Végépolys-Angers (FR)

**FERRATON Pierre**, Vilmorin (FR)  
**FISCHER-LE SAUX Marion**, IRHS-INRA – Angers (FR)  
**GAUCHER Matthieu**, IRHS-INRA – Angers (FR)  
**GENTIT Pascal**, ANSES – Angers (FR)  
**HIBRAND SAINT OYANT Laurence**, IRHS-INRA – Angers (FR)  
**HUCHE-THELIER Lydie**, IRHS-INRA – Angers (FR)  
**JACQUES Marie-Agnès**, IRHS-INRA-Angers (FR)  
**LAURENS François**, IRHS-INRA – Angers (FR)  
**LE GALLO Méryl**, ANSES-Angers (FR)  
**LEMOIGNE Marie-Anne**, IRHS-University of Angers (FR)  
**LEPRINCE Olivier**, IRHS-AgroCampus Ouest (FR)  
**LOPEZ ARIAS Diana**, IRHS-INRA-Angers (FR)  
**LUQUET Martin**, IGEPP-EGI-INRA – Angers (FR)  
**MAROLLEAU Brice**, IRHS-INRA – Angers (FR)  
**MONTIEL Grégory**, LBPV - University of Nantes (FR)  
**MOREL-CHEVILLET Philippe**, IRHS-INRA – Angers (FR)  
**PERROT Sophie**, GEVES – Angers (FR)  
**PORTIER Perrine**, IRHS-INRA – Angers (FR)  
**POUPARD Pascal**, IRHS-University of Angers (FR)  
**POUVREAU Jean-Bernard**, LBPV - University of Nantes (FR)  
**REDJALA Tanegmart**, Business Developer, RFI Objectif Végétal, Angers (FR)  
**REMANANT Benoît**, ANSES-Angers (FR)  
**ROLLAND Mathieu**, ANSES-Angers (FR)  
**SAKR Soulaïman**, IRHS-AgroCampus Ouest-Angers (FR)  
**SERANDAT Isabelle**, GEVES – Angers (FR)  
**SOL-MOCHKOVITCH Zoé**, IGEPP-EGI-INRA – Angers (FR)  
**SYMONEAUX Ronan**, GRAPPE – ESA - Angers (FR)  
**THOMAS Caroline**, CeLFE - Angers (FR)

**THOUROUDE Tatiana**, IRHS-INRA – Angers (FR)

**VERDIER Jérôme**, IRHS-INRA – Angers (FR)

## **Confirmed invited speakers**

**GAUDIN Jonathan**, INRA – Bordeaux (FR)

**MOREL Jean-Benoît**, INRA –Montpellier (FR)

**PAUL-GILLOTEAUX Perrine**, CNRS Nantes (FR)

**PENNFIELD Steve**, John Innes Center-Norwich (UK)

**TASIN Marco**, Swedish University of Agricultural Science (SE)

**YONEYAMA Kaori**, Ehime University (JP)





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**Partners**  
**List of organizers and facilitators**

**Scientific Coordinators:**

**FISCHER-LE SAUX Marion**, IRHS-INRA – Angers (FR)  
**POUPARD Pascal**, IRHS-University of Angers (FR)

**Organisation, logistics:**

**BURON Laëtitia**, Logistic Coordinator, University of Angers (FR)  
**GIACOMINI Aurélie**, Project Coordinator, University of Angers (FR)  
**HUBERT Fabienne**, Administrative Supervisor, University of Angers (FR)  
**HOUSSAY Clarisse**, expenditure management, University of Angers (FR)  
**LERAY Sophie**, expenditure management, University of Angers (FR)  
**ROUSSEAU Audrey**, University of Angers (FR)  
**ALIGON Sophie**, Agrocampus Ouest (FR)  
**DEGRAVE Alexandre**, Agrocampus Ouest (FR)  
**POUTIER Nathalie**, Agrocampus Ouest (FR)  
**REMOND David**, Agrocampus Ouest (FR)

**Other organisers and facilitators:**

**BARRIT Thibault**, PhD student, University of Angers (FR)  
**BOUESDRON Yasmine**, CELFE, University of Angers (FR)  
**CHEVASSUS-LOZZA Emmanuelle**, President, INRA Angers-Nantes (FR)  
**COLOU Justine**, PhD student, University of Angers (FR)  
**DUESO Nadine**, Operational Director, RFI Objectif Végétal, Angers (FR)  
**GROLLEAU Françoise**, Vice-President (International Relations) University of Angers (FR)  
**JOUYS Lydie**, International Relations, University of Angers (FR)  
**LEBSATARD Elodie**, Faculty of Science, University of Angers (FR)  
**LOPEZ ARIAS Diana**, PhD student, University of Angers (FR)  
**SOULIE Sébastien**, Educational project developer, RFI Objectif Végétal, Angers (FR)  
**SIMONEAU Philippe**, Vice-President (Research) University of Angers (FR)  
**VOLLET Dominique**, Director AgroCampus Ouest Angers (FR)  
**ZANG Lili**, PhD student, University of Angers (FR)

**Buddy students:**



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