

IPPS 2018 Preliminary Program

Tuesday 2 October

Day 1 - Satellite Meetings

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| 08:00 – 12:00 | <u>IPPN General Assembly</u> |
| 09:00 – 12:00 | Exhibitor bump-in |
| 12:00 – 17:00 | Registration open |
| 12:45 – 14:45 | <u>Affordable Phenotyping WG Workshop</u> |
| | <i>Coast to coast low-cost plant imaging</i> - David Rousseau (University of Angers, France) |
| | <i>Raspberry Pi-powered imaging and open source software for plant phenotyping</i> Noah Fahlgren (Donald Danforth Plant Science Center, United States) |
| 15:00 – 17:00 | <u>Controlled Environment WG Workshop</u> |
| | <i>Title tba</i> – Speaker (TBA) |
| 17:00 – 19:00 | Welcome reception – <i>proudly sponsored by the Grains Research & Development Corporation (GRDC)</i> |

Wednesday 3 October

Day 2 – “From Plant...”

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| 08:00 - 08:30 | Registration open |
| | Welcome, housekeeping and introduction to the day: “From Plant...” |
| 08:30 - 08:40 | <i>How can we measure large numbers of plants in varying environmental conditions to identify the traits that will make them more tolerant to our changing climate? How can we use latest camera and sensor technology to get a better understanding of plant physiological processes and the environment in which they grow?</i> |
| 08:40 - 09:25 | <u>Keynote speaker</u> <i>Plant phenotyping for plant genetics</i> Mark Tester (Centre for Desert Agriculture, King Abdullah University of Science & Technology, Saudi Arabia) |
| | <u>SESSION 1 - What's going on underground?</u> <u>Chair: Michelle Watt</u> (Forschungszentrum Jülich, IBG-2, Germany) |
| 09:25 – 09:45 | <i>CIAT phenomics platform: Aiming at improving eco-efficiency of cassava crops in the changing global climate</i> Michael Gomez Selvaraj (International Centre for Tropical Agriculture, Colombia) |
| 09:45 – 10:05 | <i>Phenotyping underground: Anatomical traits of roots under compaction</i> Dorien J Vanhees (University of Nottingham, United Kingdom) |
| 10:05 – 10:15 | <i>The Soybean Nodule Acquisition Program: Solving a phenomics challenge in a SANP using machine learning solutions</i> Clayton Carley (Iowa State University, United States) EC |
| 10:15 – 10:35 | <i>Root phenotyping in wheat – from cabinets to Cootamundra</i> Anton P Wasson (CSIRO, Australia) |
| 10:35 – 10:55 | <i>Phenotyping spatial and temporal dynamics of roots by Magnetic Resonance Imaging and Positron Emission Tomography</i> Robert Koller (Forschungszentrum Jülich, IBG-2, Germany) |
| 10:55 – 11:20 | Networking refreshments (25 mins) |
| | <u>SESSION 2 - Phenotyping small things</u> <u>Chair: Kioumars Ghamkar</u> (AgResearch, New Zealand) |

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| 11:20 – 11:50 | <u>Keynote speaker</u> <i>Phenotyping seeds: Traits of interest to enhance use and management of genetic resource collections</i> Christina Walters (USDA-ARS National Laboratory for Genetic Resources Preservation, United States) |
| 11:50 – 12:10 | <i>Advancing the phenomics of intact grains and spikes to facilitate selection for grain filling attributes</i> M. Fernanda Dreccer (CSIRO, Australia) |
| 12:10 – 12:30 | <i>Automated phenotyping of individual seeds of very different size and species</i> Ulrich Schurr (Forschungszentrums Jülich, Germany) |
| 12:30 – 12:50 | <i>Non-invasive determination of internal traits of wheat ears using computed tomography</i> Joelle Claussen (Fraunhofer IIS, Germany) |
| 12:50 – 13:10 | <i>Variability of fructan accumulation in mature grains of a European two row spring barley population</i> Andrea Matros (University of Adelaide, Australia) |
| 13:10 – 14:00 | Lunch (50 mins) |
| | <u>SESSION 3 - Under control</u> |
| | <i>Chair:</i> Astrid Junker (Leibniz Institute for Plant Genetics & Crop Plant Research (IPK) Gatersleben, Germany) |
| 14:00 – 14:20 | <i>Use of high-throughput plant phenotyping for the detection of developmental phase-specifically acting growth QTL in maize and growth dynamics-related transcriptome analysis</i> Thomas Altmann (Leibniz-Institute of Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany) |
| 14:20 – 14:40 | <i>Non-destructive fast vibration phenotyping for plants</i> Emmanuel de Langre (Ecole Polytechnique, France) |
| 14:40 – 15:00 | <i>High-throughput greenhouse and field-plot phenotyping tools to reveal the genetic architecture of drought resistance in rice</i> Wanneng Yang (Huazhong Agricultural University, China) |
| 15:00 – 15:20 | <i>Not a load of rubbish: Simulated field trials in large-scale containers</i> Andreas Stahl (Justus Liebig University, Germany) |
| 15:20 – 15:45 | Networking refreshments (25 mins) |
| 15:45 – 16:55 | Presentation by the Grains Research & Development Corporation (GRDC) |
| | <u>SESSION 4 - Out of control</u> |
| | <i>Chair:</i> Michael Schaefer (Australian Plant Phenomics Facility, CSIRO node, Australia) |
| 16:55 – 16:15 | <i>High-throughput phenotyping to improve early stage selection in the Australian sugarcane breeding program</i> Sijesh Natarajan (Sugar Research Australia, Australia) |
| 16:15 – 16:35 | <i>Field phenotyping photosynthesis</i> Onno Muller (Forschungszentrums Jülich, Germany) |
| 16:35 – 16:45 | <i>Selection of extra-early QPM/provitamin A inbred lines tolerant to low nitrogen stress</i> Pearl Abu (West Africa Centre for Crop Improvement (WACCI), University of Ghana, Ghana) EC |
| 16:45 – 17:05 | <i>Hyperspectral reflectance to measure photosynthetic traits in wheat</i> Viridiana Silva Perez (CSIRO, Australia) |
| 17:05 – 17:25 | <i>Clustering analysis of maize plant height and canopy spectral dynamics based on field-based UAV phenotyping platform</i> Guijun Yang (National Engineering Research Center for Information Technology in Agriculture (NERCITA), China) |
| 17:25 – 17:30 | Closing remarks and day close |

Thursday 4 October

Day 3 – “To Data...”

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| 08:00 - 08:30 | Registration open |
| | Welcome and introduction to the day: “To Data...” |
| 08:30 - 08:40 | <i>As data acquisition improves rapidly in volume and complexity, the phenotyping bottleneck is shifting to data. How do we ensure the data we capture is high-quality and relevant? How do we combine different data sources to enrich the phenotyping measurement information? How do we annotate and manage data so it can be shared, re-used and queried?</i> |

SESSION 5 - Scrutinising the data - information management and pipelines

Chair: **Noah Fahlgren** (Donald Danforth Plant Science Center, United States)

08:40 – 09:00

Computational classification of phenologs across biological diversity

Ian R Braun (Iowa State University, United States)

09:00 – 09:20

Dealing with multi-source and multi-scale information in plant phenomics: The PHIS ontology-driven information system

Llorenç Cabrera-Bosquet (INRA, France)

09:20 – 09:30

MaizeGDB: How phenotype curation has co-evolved with genomic representations

Carson Andorf (United States Department of Agriculture, Agricultural Research Service (USDA-ARS), United States) **EC**

09:30 – 09:50

From FAIRer data do faster discovery - A comprehensive infrastructure to serve plant phenotypic research data

Daniel Arend (Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany)

09:50 – 10:10

Challenges and opportunities for statistical applications in high-throughput phenomics

Scott Chapman (CSIRO, Australia)

10:10 – 10:30

From seeds to field and lab to forest - Scalable architectures for collaborative phenomics

Tim Brown (Australian Plant Phenomics Facility, ANU node, Australia)

10:30 – 11:00

Networking refreshments (30 mins)

11:00 – 11:10

Sponsor presentation - TBC

PANEL DISCUSSION - Data management

Chair: **Uli Schurr** (Forschungszentrum Jülich, IBG-2, Germany)

Panel:

11:10 - 12:30

- **Carolyn Lawrence-Dill** (Genetics, Development & Cell Biology, Iowa State University, United States)

- **Mark Cooper** (Centre for Crop Science, QAAFI, The University of Queensland, Australia)

- **Bjoern Usadel** (RWTH Aachen & Forschungszentrum Jülich, Germany)

- **Nicole Jensen** (Grains Research & Development Corporation, Australia)

- **Ross Wilkinson** (ANDS, Australia)

12:30 – 13:30

Lunch (60 mins)

SESSION 6 - A picture's worth a thousand words

Chair: **Tony Pridmore** (Computer Vision Laboratory, University of Nottingham, United Kingdom)

13:30 – 14:00

Keynote speaker

Current challenges for high throughput field plant phenotyping based on images

Seishi Ninomiya (Institute for Sustainable Agro-ecosystem Services, University of Tokyo, Japan)

14:00 – 14:25

Invited speaker

Land-based crop phenotyping by image analysis

Josh Chopin (Phenomics & Bioinformatics Research Centre, University of South Australia, Australia)

14:25 – 14:45

Seeing behind leaves: Multi-view reconstruction of three-dimensional branch structure

Fumio Okura (Osaka University, Japan)

15:05 – 15:25

High-throughput 3D imaging to dissect the genetic control of leaf elongation in barley

Bettina Berger (Australian Plant Phenomics Facility, University of Adelaide node, Australia)

15:25 – 15:45

3D phenotyping of root crown and inflorescence architecture across diverse genetics in maize and sorghum with X-Ray CT

Mon-Ray Shao (Donald Danforth Plant Science Center, United States)

15:45 – 16:15

Networking refreshments (30 mins)

16:15 – 17:15

Introduction to the Poster Session and a reminder on the Symposium Dinner later in the evening

POSTER SESSION

Free time

19:00 - 23:00

Symposium dinner – Adelaide Town Hall – proudly sponsored by the Australian Plant Phenomics Facility (APPF)

Friday 5 October
Day 4 – “To Impact...”

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| 08:00 - 08:30 | Registration open |
| | Welcome and introduction to the day: “To Impact...” |
| 08:30 - 08:40 | <i>Plant phenomics brings together a whole suite of expertise, from plant biologists to engineers and statisticians. Working collaboratively, these disciplines can advance our understanding of plant performance and resilience, so we can make progress towards identifying the genetics of stress tolerance and breeding higher yielding crops.</i> |
| 08:40 - 09:25 | Keynote speaker <i>Translating genome and phenotyping information to develop superior varieties in legume crops</i> Rajeev Varshney (International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India) |
| | SESSION 7 - Perfecting plants - selection and phenotyping <i>Chair: Greg Rebetzke (CSIRO, Australia)</i> |
| 09:25 - 09:45 | <i>Greenhouse phenotyping technologies used for trait characterization and ranking of transgenic soybean events</i> Kurt Boudonck (BASF, United States) |
| 09:45 - 10:05 | <i>Field-based high throughput phenotyping for physiological and morphological traits in bread wheat</i> Muhammad Adeel Hassan (Chinese Academy of Agricultural Sciences, China) |
| 10:05 - 10:15 | <i>Genetic components of unmanned aerial systems phenotyping variability in maize breeding</i> Nathália Penna-Cruzato (Texas A&M University, United States) EC |
| 10:15 - 10:35 | <i>An integrated sensing pipeline to map the genetic loci associated with canopy radiation use efficiency in sorghum</i> Barbara George-Jaeggli (University of Queensland, Australia) |
| 10:35 - 10:55 | <i>Is high-throughput phenotyping achievable in commercial wheat breeding?</i> James Walter (Australian Grain Technologies, Australia) |
| 10:55 - 11:20 | Networking refreshments (25 mins) |
| | SESSION 8 - From fungi, to cockatoos, to kangaroos (biotic stress) <i>Chair: Asheesh K Singh (Department of Agronomy, Iowa State University, United States)</i> |
| 11:20 - 11:40 | <i>Machine learning approaches for automated plant stress phenotyping</i> Arti AS Singh (Iowa State University, United States) |
| 11:40 - 12:00 | <i>Comparison of UAV and UGV measurements for the assessment of genotypic resistances to Cercospora on sugar beet</i> Alexis AC Comar (Hi-phen, France) |
| 12:00 - 12:20 | <i>Optimal wavebands for plant disease remote sensing</i> Dmitrii G Shadrin (Skolkovo Institute of Science and Technology, Russia) |
| 12:20 - 12:40 | <i>Combination of high-throughput multispectral and deep physiological phenotyping of barley resistances against powdery mildew in a controlled environment</i> Thomas Roitsch (University of Copenhagen, Denmark) |
| 12:40 - 13:30 | Lunch (50 mins) |
| | SESSION 9 - When soils and weather don't cooperate (abiotic stress) <i>Chair: M. Fernanda Dreccer (CSIRO, Australia)</i> |
| 13:30 - 13:50 | <i>Non-destructive phenomic tools for drought and heat tolerance at anthesis in Brassica species</i> Sheng Chen (University of Western Australia, Australia) |
| 13:50 - 14:10 | <i>Toward the integrative modelling of drought tolerance in soybean: Collaborative phenotyping and multi-omics measurements</i> Hiroyoshi Iwata (University of Tokyo, Japan) |
| 14:10 - 14:30 | <i>Defining signatures of enhanced water and nitrogen use efficiency in bioenergy sorghum using controlled environment phenotyping and integrative genomics</i> Andrea L Eveland (Donald Danforth Plant Science Center, United States) |
| 14:30 - 14:50 | <i>Phenotyping for water-N interactions</i> Cesar Mariano Cossani (South Australian Research & Development Institute (SARDI), Australia) |

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| 14:50 – 15:15 | Networking refreshments (25 mins) |
| 15:15 – 15:25 | Presentation by the Australian Plant Phenomics Facility (APPF) |
| SESSION 10 - From idea to reality - developing novel tech for future challenges <i>Chair: Xavier Sirault</i> (Australian Plant Phenomics Facility, CSIRO node, Australia) | |
| 15:25 – 15:55 | Keynote speaker <i>Title TBA</i> Nicole Jensen (Grains Research & Development Corporation, Australia) |
| 15:55 – 16:15 | <i>Agronomic applications using field high throughput phenotyping data</i> Katia KB Beauchene (Arvalis - Institut du végétal, France) |
| 16:15 – 16:35 | <i>Affordable and open source technology development in plant phenotyping for DIY phenology</i> Takanari Tanabata (Kazusa DNA Research Institute, Japan) |
| 16:35 – 16:55 | <i>Coping with drought: Anin-vivo sensor allows for the early detection of drought stress in tomato</i> Francesco Cellini (Lucana Agency for Development and Innovation in Agriculture, Italy) |
| 16:55 – 17:15 | <i>Application of "E-nose" as a gas multi-sensor array to investigate soybean under water stress</i> Paulo Herrmann (Embrapa, Brazilian Agricultural Research Corporation, Brazil) |
| 17:15 – 17:30 | Summary/looking to the future Closing remarks and thanks |

Saturday 6 October

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| Approx 09:00 – 17:00 | Social trip <i>Proposed itinerary (subject to change)</i> Day trip to Mt lofty lookout, Cleland Wildlife Reserve and then on to lunch and some local wine tasting in McLaren Vale before returning to Adelaide. |
| Approx 09:00 – 17:00 | Root phenotyping field trip Coordinated by Trevor Garnett (Australian Plant Phenomics Facility, Australia) and the Root Phenotyping WG - details TBA |

Satellite meeting in Rotorua, New Zealand

Phenotyping Forests – A potential game changer for planted forests | 8 - 9 October 2018

Given the long-lived nature of plantation forest tree species and the real-world environments that they are planted into it has not been possible to easily explore the phenotype of species in planted forests. However, with recent advances in remote sensing it is now possible to collect phenotypic data for trees, relieving the phenotyping bottle neck that has been associated with forestry. The theme of the two-day meeting is to explore the advances and opportunities in forest phenotyping and to observe current research activities in one of the largest planted forests in the world.

Abstract submission

Submissions close Friday 31 August 2018 to Annette.Brockeroff@scionresearch.com
Successful presenters will be advised by 7 September.

Workshop outline

Day 1: 08:00 – 17:30, Monday 8 October, presentations and discussions at Scion, Rotorua, followed by dinner at 18:30.
Day 2: 08:30 – 16:30, Tuesday 9 October, field trip to Kaingaroa Forest.

Registration

Full registration for two days: \$200 NZD
Single day – Day 1: \$140 NZD (includes dinner)
Single day – Day 2: \$80 NZD (includes packed lunch)
Online registration is available [here](#) and is due by 15 September 2018.

To find out more

Contact Peter Clinton, Scion Research, New Zealand. Email: Peter.Clinton@scionresearch.com

**Please note Phenotyping Forests is a separate event, not organised by the IPPS 2018 secretariat.
All enquiries, registrations and payments must be made via Peter Clinton at Scion Research, NZ.*