eMonogram 2021

26-30 April 2021

From The James Hutton Institute and University of Dundee to your computer

University of Dundee

The James Hutton Institute

Conference Programme

#monogram21

We are delighted by the generous support and collaboration we have received from our Partners. Our thanks and gratitude go to everyone involved.

Barley field trials in Balruddery Research Farm, 2019

Welcome

It gives us great pleasure to finally welcome you to Dundee for Monogram 2021. As we all know, Monogram 2020 was postponed due to COVid19 but it's great we can meet up albeit virtually this year. I'm sure it'll be an interesting and enjoyable experience for everyone.

Many thanks to delegates for their excellent abstract contributions. We are all looking forward to hearing fascinating presentations of your latest discoveries over the next few days. Please interact with other delegates using the virtual conference platform and remember to use the hashtag #monogram21 if you mention the conference on twitter. During the coffee break between the two sessions please take the opportunity to visit the poster booths and speak to the presenters about their work.

Due to the sensitive and confidential nature of the content being shared at the conference, we will not be recording this event and we kindly ask that you respect the privacy of the content within the presentations and posters.

On Thursday evening we are delighted to have the opportunity to listen to Sir Geoff Palmer OBE speak about his "Life Scientific" during our evening lecture. We are sure this will be an inspiring talk which will encourage discussion during the Q&A session.

If you require technical assistance during the conference, please contact us using monogram21@hutton.ac.uk as this inbox will be monitored during the conference.

We are grateful to our sponsors for providing support to allow the conference to take place this year. In particular we would like to thank Dundee & Angus Convention Bureau who have provided practical support to help us make this conference happen.

Please enjoy the virtual experience and thanks for your continued support for the Monogram community.

Warm regards Kelly Houston & Malcolm Macaulay

Join the Conversation #monogram21

We will be active on social media throughout the conference. We encourage you to share stories, photographs and comments.

International Barley Mutants Workshop 2018 - Tour of the barley mutants which was set up on the James Hutton Institute site in Invergowrie, Dundee

Acknowledgments

Meeting Organisers

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Philippa Borrill

Birmingham University

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NIAB

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Reading University

Conference Booklet designed by Malcolm Macaulay, Paul Shaw, Tracy Duncan & Debbie Ree

Our Invited Speakers

We are delighted to introduce you to our invited speakers and look forward to hearing more about their research and expertise at our first virtual Monogram 2021 Network Meeting.

Sir Geoff Palmer OBE

Sir Geoff Palmer OBE
Professor Emeritus, School of Life Sciences, Heriot-Watt University, UK

Sir Geoff Palmer OBE is Professor Emeritus in the School of Life Sciences at Heriot-Watt University in Edinburgh, Scotland, and a human rights activist.
He discovered the barley abrasion process whilst a researcher at the Brewing Research Foundation from 1968 to 1977. In 1998, and became the fourth person, and the first European, to be honoured with the American Society of Brewing Chemists Award of Distinction, considered the "Nobel prize of brewing".

In 1989, he became the first black professor in Scotland, becoming a Professor Emeritus after he retired in 2005. He was knighted in the 2014 New Year Honours.

We will hear Sir Geoff's inspiring 'Life Scientific' story including arriving in the UK from Jamaica in 1955, revolutionising the malting industry to his human rights work.

Dr Martin Mascher

Dr Martin Mascher
Independent Research Group Leader 'Domestication Genomics', Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany

Martin Mascher is head of the research group "Domestication Genomics" at IPK Gatersleben. A mathematician by training, his research focusses on topics in plant bioinformatics and computational genetics. He has developed algorithms and pipelines for assembling genome sequences and analysing resequencing data of crop diversity panels. Recently, his group has analysed sequence data from plant genetic resources, crop wild relatives and archaeological samples to understand domestication and crop evolution in cereals.

Prof Dr Anne-Katrin Mahlein

Prof Dr Anne-Katrin Mahlein
Head of the Institute of Sugar Beet Research, Göttingen, Germany

I am a trained Phytopathologist and studied agriculture at the Rheinischen Friedrich-Wilhelm-Universität Bonn, Germany.

Since 2017, I am Head of the Institute of Sugar Beet Research (IfZ) Göttingen, Germany. Study plant-pathogen interactions and ways to visualize complex reactions going on inside plants, with optical sensors and digital technologies. At the IfZ, my team and I are responsible for developing innovative sugar beet cultivation practices. This considers all aspects of sugar beet and table sugar production, like yield and quality forming, and plant diseases and protection. For plant phenotyping, we develop and use modern machines, sensors, robots, analyzing tools, field, and laboratory studies. I am currently involved in the Cluster of Excellence 'Phenorob' and we lead the digital experimental field 'Farmerspace'.

Manny Delhaize

Manny Delhaize
Honorary Visiting Scientist, ANU (Australian National University), Canberra, Australia

Manny Delhaize is an Honorary Visiting Scientist at the ANU (Australian National University) in Canberra, Australia.

He received his PhD from Murdoch University, Western Australia in 1987 and then undertook a Postdoctoral Fellowship at the Los Alamos Laboratories in New Mexico USA. After another Postdoctoral Fellowship with CSIRO Plant Industry (as it was known then) he became a research scientist. He was with CSIRO for about 30 years to become a Principal Research Scientist with Agriculture and Food in Canberra before joining the ANU.

His early work focussed on acid soils and in particular on unravelling mechanisms of aluminium tolerance in cereals and cloning the underlying genes. Subsequently his research included work on phosphorus nutrition with a focus on identifying genes that are important for improved efficiency of phosphorus uptake from soil. More recently he studies wheat mutants with altered root morphologies for developing wheat germplasm with improved traits and to understand underlying mechanisms and genes.

Prof Julie Gray

Prof Julie Gray
Professor of Plant Cell Signalling, University of Sheffield, UK

Julie Gray is the Professor of Plant Cell Signalling at the University of Sheffield. Her group study stomatal development and function. Recently, they have created barley, wheat and rice varieties with fewer stomata that have improved drought tolerance and reduced water requirement. Her research group's work on rice has been highly commended by UNESCO and recently featured in a BBC World documentary, and their work on Mexican beans won a Newton Prize. They also study the molecular pathways that allow stomata to open and close and have shown that these pathways evolved soon after the appearance of stomata in the fossil record over 400 million years ago.

Julie studied Biochemistry at Liverpool University, and was a PhD student at Nottingham University where she researched genes that control fruit ripening and was part of the team who created slow ripening tomatoes. She won Royal Society funding to carry out postdoctoral work at the University of Melbourne where she investigated how flowers prevent self-pollination.

Dr Tomislav Cernava

Dr Tomislav Cernava
Assistant Professor, Graz University of Technology, Austria

Dr Tomislav Cernava is an Assistant Professor at Graz University of Technology (Austria) and a guest professor at Guizhou University (China). Currently, he is holding several national as well international research projects at the Institute of Environmental Biotechnology (Graz University of Technology), where he obtained his PhD in 2015.

Dr. Cernava's research is focused on the plant microbiome, targeted modulation of microbial communities, host-microbe interactions, and the application of "meta-omics" techniques as an explorative tool in environmental microbiology. So far, he has authored more than 50 peer-reviewed publications, which mostly focus on potentially useful traits of the plant microbiome and specific microbes therein. He is serving as associate editor for the Nature Springer journal Microbiome, which aims to deliver substantial advances in the field of microbiome research by providing detailed insights into host/community interactions.

Kay Trafford

Kay Trafford
Head of the Grain Quality Research Group, NIAB, Cambridge

Kay Trafford is head of the Grain Quality research group at NIAB, Cambridge.
She was trained in plant biochemistry, and her research focus has been primarily on starch metabolism.

Current research projects include: control of starch granule size and number in wheat, barley and oats, control of amylose content in wheat, the influence of embryo-size on grain quality and the genetic determination of transformability in barley.

Dr Mónica Pradillo

Dr Mónica Pradillo
Associate Professor/Lecturer in the Department of Genetics, Physiology and Microbiology (Faculty of Biology), Universidad Complutense de Madrid, Spain

I graduated in Biology with a major in Genetics at the Universidad Complutense de Madrid (Spain).

Since 2019, I am an Associate Professor/Lecturer in the Department of Genetics, Physiology and Microbiology (Faculty of Biology) in the same University.

My research has been mainly focused in plant meiosis. I am particularly interested in elucidating the mechanisms that control pairing, synapsis and recombination, as well as the relationships between them, using a combination of molecular cytogenetics and molecular cell biology approaches. I apply these techniques mostly in the plant model Arabidopsis thaliana. I consider that my research could contribute to gain control over meiotic recombination. This knowledge will be essential for breeders to effectively engineer the allelic composition of plant chromosomes.

Dr Philippa Borrill

Dr Philippa Borrill
Lecturer in Plant Biology at the University of Birmingham, UK

Dr Philippa Borrill is a Lecturer in Plant Biology at the University of Birmingham, UK. Her research uses genetic and genomic approaches to understand how polyploidy influences gene expression and ultimately phenotype in wheat. Her lab is particularly interested understanding the genes regulating senescence and nutrient remobilisation to improve grain nutrient content. Her work on wheat genomics and transcriptomics has been recognised by awards such as the International Wheat Genome Sequencing Consortium Leadership Award 2017 and the New Phytologist 2019 Tansley Medal for Excellence in Plant Science.

Philippa studied Natural Sciences at the University of Cambridge and obtained her PhD from the John Innes Centre studying the genetic control of wheat senescence. She won a BBSRC Anniversary Future Leader Fellowship, held at the John Innes Centre, in which she analysed the gene networks that control senescence and nutrient remobilisation in wheat.

Prof Anthony Hall

Prof Anthony Hall
Head of Plant Genomics, Earlham Institute, UK

Professor Anthony Hall is the head of Plant Genomics at the Earlham institute in the UK, previously he was the Holbrook Gaskell Chair of Botany at the University of Liverpool. He has published over 70 papers including Nature (3), Science(1) and PNAS(1), together with discipline specific journals, Plant Cell, Genome Biology and Molecular Systems Biology. His plant genomics group started in 2009, and has focused on using and developing next generation genetic approaches to address key questions in plant science. In 2010 he was awarded a senior BBSRC research fellowship entitled "Developing Next Generation Genetic Tools for Wheat". To date he has played a leading role in generating the first draft wheat genome(s) (Brenchley *et al*, Nature 2012, Walkowiak et al. Nature 2020) and epigenome (Gardiner *et al.* Genome Biology 2015). He led an international consortium to develop a wheat exome capture and re-sequencing platform in collaboration with NimbleGen (Winfield *et al.* 2012, Allen *et al.* 2011, Jordan *et al.* 2015). His group have developed novel strategies for the identification of EMS induced point mutations in *Arabidopsis* using high throughput sequencing (Ashelford *et al.* Genome biology 2011) and extended these to wheat (Gardiner *et al.* Plant Journal 2014, Gardiner *et al.* Plant Journal 2016).

He has worked as an Arabidopsis molecular geneticist for 25 years, focusing on the field of plant circadian biology. His groups work has provided key insights into the molecular basis for temperature compensation of the Arabidopsis circadian oscillator (Gould et al. Plant Cell 2006), this has been expanded to include a first temperature compensated mathematical model of the clock, identifying an interaction between light and temperature in the control of period (Gould *et al.* 2012). His more recent work in collaboration with in a collaboration with James Locke at the Sainsbury Laboratory Cambridge has used experiment and mathematical modelling approach to investigate the clock at the single cell level in a multi-cellular context.

Sea Eagle sculpture by Ellen Brown, to celebrate the return of sea eagles to Scotland. Stannergate Cycle Path, Dundee
Image Courtesy of Dundee, One City Many Discoveries

Conference Programme

Monday 26 April 2021

Bioinformatics session

09:20	**New and updated Triticeae resources** **Chaired by Philippa Borrill & Jemima Brinton**
09:30	**Cristobal Uauy/Jemima Brinton/Ricardo Ramirez-Gonzalez**, *Haplotype viewer*
09:45	**Guy Naamati**, *Pangenome on Ensembl Plants*
09:55	**Rachel Rusholme-Pilcher/Ben White**, *Pan-transcriptome*
10:10	**Q & A**
10:25	**BREAK**
	Databases and pipelines for integration and visualisation **Chaired by Philippa Borrill & Jemima Brinton**
10:40	**Wenbin Guo**, *3D RNA-seq*
10:50	**Mark Winfield/Gary Barker**, *Cereals DB inc. minimal marker sets for variety identification*
11:00	**Paul Shaw/Sebastian Raubach**, *Bits to Bytes: Software development for genetic resources, genetics and plant breeding*
11:15	**Keywan Hassani-Pak**, *Update on KnetMiner*
11:20	**Q & A**
11:35	**BREAK**
11:50	**Panel Q & A "Current and future challenges in Triticeae bioinformatics"** **Chaired by Philippa Borrill & Jemima Brinton**
	Prof Robbie Waugh/John Baison/Sarah McKim/Nick Bird
12:30	**SESSION ENDS**

Tuesday 27 April 2021

Session 1	Development
	This session is kindly sponsored by KWS
	Chaired by Chiara Campoli & Thorsten Schnurbusch
09:20	**Prof Robbie Waugh,** Welcome
09:30	**Prof Julie Gray,** *Engineering Stomatal Development*
09:50	**Bethany Love,** *Raising wheat yield potential through optimised plant hormone spike signalling*
10:05	**Annis Richardson,** *Insights into the evolution of grass leaves*
10:20	**Nikolai Adamski,** *A dosage-dependent response to the Triticum polonicum VRT-A2 allele causes elongated glumes and grains in hexaploid wheat*
10:35	**Q & A**

10:50	**BREAK**

Session 2	Recombination & Pollen Development
	This session is kindly sponsored by Biosearch
	Chaired by Malcolm Macaulay & Isabelle Colas
11:10	**Dr Mónica Pradillo,** *Meiotic nuclear envelope is required for proper chromosome dynamics and homologous recombination*
11:30	**Abdul Kader Alabdullah,** *A novel pollen profiling approach and its application in studying wheat meiosis*
11:45	**Dominika Lewandowska,** *Barley anther proteome dynamics in early meiosis*
12:00	**Mikel Arrieta,** A *suppressor screening on MLH3 mutants show the role of a RECQL4 mutation on restoring fertility and increasing overall recombination in barley*
12:15	**Q & A**

12:30	**SESSION ENDS**

Wednesday 28 April 2021

Session 1	Genomics & Technologies I
	This session is kindly sponsored by DSV 
	Chaired by Donal O'Sullivan & Davide Bulgarelli
09:30	**Dr Tomislav Cernava,** *Implications of the seed microbiome for plant health*
09:50	**Benedict Combes,** *genomic analysis of 20 hexaploid wheat/AM. muticum introgression lines reveals new introgressed segments, homoeologous translocation of segments, extensive structural disruption, and patterns of gene expression*
10:05	**Carmen Escudero-Martinez,** *Mapping barley genes shaping the rhizosphere microbiota*
10:20	**Helen Brabham, MECEA 2020 PhD Prize Winner**, Recognition of Mildew, Rust, and Blast by the Immune Receptor *Mla*
10:35	**Q & A**

10:50	BREAK

Session 2	Genomics & Technologies II
	This session is kindly sponsored by SSCR 
	Chaired by Laura Dixon & Matt Moscou
11:10	**Dr Martin Mascher,** *Long-read sequence assembly in barley: the updated MorexV3 reference genome and prospects for pan-genomics*
11:30	**Jemima Brinton,** *A haplotype-led approach to increase the precision of wheat breeding*
11:45	**Goetz Hensel,** *Precise gene editing using ribonucleoprotein-complexes*
12:00	**Michael Scott, MECEA 2020 PostDoc Prize Winner**, *Whole genome sequence from 3,000-year-old egyptian emmer wheat reveals dispersal and domestication history*
12:15	**Q & A**

12:30	SESSION ENDS

Thursday 29 April 2021

Session 1	Abiotic & Biotic Stress
	This session is kindly sponsored by Novogene
	Chaired by Tim George & Ruth Bryant
09:30	**Manny Delhaize,** *Root mutants of wheat: a source of diversity for improved phosphorus nutrition*
09:50	**Helen Pidon,** *Positional cloning of two resistance genes to barley viral diseases from a wild relative*
10:05	**Surbhi Grewal,** *Molecular characterisation and trait analysis of wheat-triticum timopheevii introgression lines reveals new source of FHB resistance*
10:20	**Kelly Houston,** *A Grain of Salt: naturally occurring variants of HVHKT1;5 determine barley grain sodium content*
10:35	**Q & A**

10:50	BREAK

Session 2	Quality & Nutrition
	This session is kindly sponsored by James Hutton Institute
	Chaired by Beata Orman-Ligeza & Rowan Mitchell
11:10	**Kay Trafford,** *Understanding starch granule morphology in cereal grains*
11:30	**Sarah Raffan**, *Genome-editing for low acrylamide wheat*
11:45	**Rowan Mitchell,** *Mutations in a candidate gene underlying a dietary fibre QTL in wheat cause high dietary fibre*
12:00	**Sophie Harrington,** *High fe-lines: improving iron levels and bioavailability in wheat grains*
12:15	**Q & A**

12:30	SESSION ENDS

19:00	Evening Lecture with Sir Geoff Palmer OBE, 'A Life Scientific'
	This session is kindly sponsored by RAGT
	Chaired by Malcolm Macaulay & Kelly Houston
19:40	**Q&A**

20:00	SESSION ENDS

Friday 30 April 2021

Session 1	Phenotyping
	This session is kindly sponsored by University of Dundee
	Chaired by Phillip Tailby & Sonia Negrao
09:30	**Prof Dr Anne-Katrin Mahlein,** *Digital Phenotyping for the Assessment of Plant Traits*
09:50	**Andrea Matros,** *GrainCorder: A hand-held sensor for monitoring fructan profiles in cereal grain*
10:05	**Oluwaseyi Shorinola,** *Fifteen Years of UK Wheat Breeding: Using Historical Dataset for Trend Analyses and Association Mapping in UK Wheat*
10:20	**Sebastian Raubach,** *Gridscore: Plant phenotyping using mobile applications*
10:35	**Q & A**
10:50	**BREAK**

Session 2	Rank prize
	This session is kindly sponsored by Rank Prize Fund
	Chaired by Malcolm Bennett & Keith Gardner
11:10	**Dr Philippa Borrill, Rank Prize New Lecturer,** *The alternative dwarfing gene Rht13 encodes an autoactive NB-LRR gene*
11:35	**Anthony Hall, Rank Prize Lecture,** *Beyond the single wheat reference genome*
11:50	**Yeorgia Argirou, MECEA 2021 PhD Prize Winner**, *Large-eared lines as a resource for increasing yield in hybrid wheat*
12:05	**Cara Wheeldon, MECEA 2021 PhD Prize Winner**, *Understanding responses to soil volume and neighbour density in barley*
12:20	**Q&A**
12:40	**Kelly Houston,** Monogram 21 Closing remarks
12:45	**SESSION ENDS**