

Lower Saxony – Scotland Joint Forum 2021

22 – 23 November 2021

Workshop Programme

Genome enabled biology and contemporary agriculture

1. Workshop Organizers



Nils Stein. Georg-August University Göttingen, Lower Saxony, Germany

Nils, plant geneticist by training, has contributed in a leading role to the genome sequencing of the three small grain cereal crops barley wheat and rye. He is currently focused on unlocking genomic diversity at the species level through pan-genome analysis and genebank genomics. Through multi-national collaborations, he uses genomic information to gain better insights into barley biology for application in research and plant breeding.



Robbie Waugh. Dundee University, Tayside, Scotland

Robbie has made major contributions to the development and exploitation of barley as both a cereal crop and model for the research and commercial sectors. He developed a range resources that now pervade global basic and applied barley genetics research. He exploits these platforms for high resolution genetic analyses to isolate and characterize genes and networks determining variation in plant morphology and developmental aspects of natural diversity and adaptive traits

2. Workshop Description

Focusing on barley as an exemplar crop for Scotland and Lower Saxony, the workshop will explore how as a research community we can respond to key issues that are currently impacting crop production including the changing climate, demand for lower inputs, soil health and environmental impact concerns. In particular, we aim to discuss how new large scale genetic, genomic and phenomic data gathered and made available by the academic research community as (formalized) knowledge (e.g. in models) alongside new and open digital technologies can be translated into value in commercial end-use sectors to tackle headline global challenges.

3. Programme

GMT times (+ 1 hr in Germany)

12:00 Welcoming Addresses

Prof. Dr. Nils Stein and Prof. Dr. Robbie Waugh

12:10 Session One - Short Presentations

Prof. Dr. Reimund Roetter: Model-aided design of climate-resilient cereal cultivars.

Reimund is an agronomist, agrosystems modeller and agro-ecologist with 30 years work experience in Europe, Africa and Asia, dedicated to finding solutions for food security under climate change and resources limitation.

Dr. Joanne Russell: Understanding and using natural biodiversity.

Joanne is a geneticist who's research has evolved from interpreting and understanding genetic diversity to using genetic resources for sustainable and resilient barley production. She is currently exploring how biodiverse germplasm can contribute to future crop improvements.

12:30 Q&A and Discussion

13:00 Coffee Break

13:10 Session 2 - Short Presentations

Prof. Dr. Roy Nielson: Resilient soils for future-proofing sustainable cereal production

Roy is a soil ecologist. His expertise lies in understanding functional interactions between plants and soils, mediated by soil biology in the context of food security and sustainable production

Prof. Dr. Stefan Siebert: Crop water response: upscaling from canopy to global scale

Stefan is an agronomist and crop scientist, seeking strategies for increasing crop production with reduced environmental footprint. He studies the impact of climate change and variability on crop growth and yield, with focus on water and nutrient availability

13.30: Q&A and Discussion

13:50: Summing up

13.55: Close

Note: To participate you need to register (free) for the meeting [here](https://www.conftool.net/joint-forum-2021/register.php):

<https://www.conftool.net/joint-forum-2021/register.php>

Further information about the Joint Forum can be found [here](http://www.joint-forum.org):

www.joint-forum.org

Information about invited participants in the workshop is given below:

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23 November 2021

Session II – 1 pm CET

Genome Enabled Biology and Contemporary Agriculture



Speakers

Dr Joanne Russell: Barley Geneticist at the James Hutton Institute

Research over the past 27 years has focused on developing genetic markers to explore and understand diversity within the extensive assembled collections of barley germplasm, including cultivars, globally distributed landraces and wild progenitors. Following technological advances our emphasis has shifted from cataloguing diversity to recognition of the genetic value of these resources for sustainable and resilient barley production. Recent research has focused on developing novel ‘breeder-ready-to-go’ germplasm.

Contact: e-mail: joanne.russell@hutton.ac.uk; tel: 01382 568857



Dr Roy Neilson: Group Leader Plant Soil Interactions Research Group, The James Hutton Institute

Roy is a soil ecologist with 39 years research experience. His expertise lies in understanding functional interactions between plants and soils, mediated by soil biology in the context of food security and sustainable production.

e-mail: roy.neilson@hutton.ac.uk; tel: 07866 051161



Prof Reimund Roetter: Chair of Tropical Plant Production and Agricultural Systems Modelling, and is Dean of Research, Faculty of Agricultural Sciences, Georg-August-University Göttingen

Reimund is an agronomist, agrosystems modeller and agro-ecologist with 30 years work experience in Europe, Africa and Asia, dedicated to finding solutions for food security under climate change and resources limitation.

e-mail: reimund-paul.roetter@agr.uni-goettingen.de; tel: +49 551 39 33751



Prof Stefan Siebert: Chair of Agronomy, Georg-August-University Göttingen

Stefan is an agronomist and crop scientist, seeking strategies for increasing crop production with reduced environmental footprint. He studies the impact of climate change and variability on crop growth and yield, with focus on water and nutrient availability.

e-mail: stefan.siebert@uni-goettingen.de; tel: +49 551 39 24359

Invited Participants - Scotland



Dr Paul Shaw: Senior Scientist Bioinformatics/Information Systems, International Barley Hub (IBH)/The James Hutton Institute

Paul is a bioinformatician and has worked on the development of database and software to help in the storage, visualization and analysis of data from the plant genetics, genetic resources and plant (pre) breeding domains for over 20 years. His recent research interests include the development of informatics platforms including Germinate (<https://germinateplatform.github.io/get-germinate/>) for the storage of experimental data resulting from plant germplasm collections and Helium (<https://ics.hutton.ac.uk/helium>) for the visualization of complex plant pedigrees. His group is also active in the development of mobile applications for the efficient collection of experimental data (<https://cropgeeks.github.io/gridscore>).

Contact: e-mail: paul.shaw@hutton.ac.uk tel: 01382 568864



Dr Tim George: Rhizosphere Scientist, The James Hutton Institute

Tim is a plant physiologist/soil scientist and has worked on the dynamics of nutrients in the rhizosphere of plants and variation in root traits for the last 24 years. His recent research includes work on the ability of Bere barley to cope with extreme micronutrient deficiency, the role of root exuded enzymes and mycorrhizae in making organic P available and the impact of root hairs on the ability of barley to acquire soil resources.

Contact: e-mail: tim.george@hutton.ac.uk;



Prof Adrian C Newton: Senior Research Leader in Cereal Pathology / Agroecology at the James Hutton Institute and Honorary Professor of Cereal Pathology at SRUC.

Adrian is an agroecologist and barley / cereal pathologist with over 40 years of research experience. His recent focus has been on plant diversity interactions in the field from genotypes to species including intercropping, and variety/genotype interactions with soil tillage and crop sequence.

Contact: e-mail: adrian.newton@hutton.ac.uk tel: 01382 568824



Dr Davide Bulgarelli: Senior Lecturer and Principal Investigator, The University of Dundee

Davide is an experimental scientist interested in deciphering the molecular interactions between plants and the microbial communities thriving at the root-soil interface, collectively referred to as the rhizosphere microbiome. Similar to the microbiome defined by the digestive tract of humans, the rhizosphere microbiome can positively impact on the nutritional status, growth and health of its host plants.

Contact: e-mail: d.bulgarelli@dundee.ac.uk ; tel: 01382 568934



Dr Kelly Houston: Barley geneticist, The James Hutton Institute

Kelly is a geneticist and has worked in barley genetics research for over 12 years. Much of her research has been on two main aspects of grain composition, the plant cell wall (including (1,3;1,4)- β -glucan, arabinoxylan and phenolic acids), and micronutrient content. She identifies and characterizes genes responsible for these traits using a powerful combination of high-density marker sets to carry out statistical genetic analysis and genetic resources (including natural germplasm, mutants and CRISPR-Cas9 gene edited lines) to learn more about how these genes ultimately influence the trait of interest. Recently, Kelly has become interested in utilizing georeferenced datasets to understand more about genetic adaptation to a range of environmental conditions and how this can be applied to future predicted climates.

Contact: e-mail: kelly.houston@hutton.ac.uk; tel: 01382 568960



Dr Alison Karley: Agroecologist – Integrated Cropping Systems, Department of Ecological Sciences, The James Hutton Institute (Dundee)

Ali has expertise in plant production and plant-insect interactions. Her research tests alternative cropping practices and pest control strategies to reduce reliance on external inputs and increase resilience to environmental stress. She uses participatory research and co-design with farmers and other agricultural stakeholders to trial innovative practices for crop diversification and integrated pest management to improve agricultural sustainability.

Contact: e-mail: alison.karley@hutton.ac.uk; tel: 01382 568820



Prof Claire Halpin: Associate Dean of Research and Professor of Plant Biology and Biotechnology

Claire's research focuses on plant cell walls, particularly lignin biosynthesis, and on manipulating these plant components using molecular genetics and plant biotechnology in order to learn more about them. The translational push behind some of her work is to identify how crop biomass can be improved for agricultural and industrial processes.

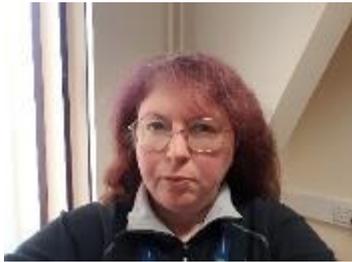
Contact: c.halpin@dundee.ac.uk; tel. +44 (0)1382 388052



Dr Pete Iannetta: leads 'Ecological Food Systems', a sub-Group of Agroecology (Dept. of Ecological Sciences) and is an Honorary Lecturer at the University of Dundee.

Pete is a plant biologist and ecologist who studies the complex interactions which determine the sustainability of food- and feed-systems. His research is strongly focused on legume-supported systems from production to consumption, and this includes developing novel cropped systems, processing-innovation, and the provision of extension services to value-chain stakeholders including policy-makers.

Contact e-mail: pete.iannetta@hutton.ac.uk; tel., +44 (0) 77 3630 7189



Dr Tracy Valentine: Research Leader Plant:Soils interactions. Soils@hutton coordinator

Tracy has over 20 years experience in applied and basic research at the plant root:soils interface. Utilising both image analysis and molecular based methods she has investigated processes and impacts of soil management on plant root growth and development, and root soil biological and physical interactions with the aim of understanding how to improve crop genotypes and management systems, via increasing knowledge of root:soil biological and physical processes at a range of scales.

Contact: e-mail: Tracy.Valentine@hutton.ac.uk; tel: 01382 568731



Dr Sarah McKim: Principal Investigator and Senior Lecturer, Division of Plant Sciences, The University of Dundee

Sarah is a development biologist who has led a research team exploring how barley plants grow and develop for the last eight years. Her research has revealed the genes and mechanisms which control architectural traits important to yield, such as stem elongation, spike density, row type and grain size and shape. Her recent research investigates how development interacts with responses to heat and drought, and the role of grain surface to grain quality.

Contact: e-mail: smckim@dundee.ac.uk tel: 01382 568 8916

Invited Participants – Lower Saxony



Prof. Tim Beissinger: Chair of Plant Breeding Methodology, Managing Director of the Center for Integrated Breeding Research, Georg-August-University Göttingen

Tim is a quantitative geneticist interested in developing and applying methods to better understand complex genotype-phenotype relationships in crop species. His recent research is relating to experimental evolution, genetic mapping, and genomic prediction, primarily applied to maize.

Contact: beissinger@gwdg.de; tel. +49 551 39 24369



Prof. Stefan Scholten: Chair of Crop Plant Genetics, Georg-August-University Göttingen

Stefan is a molecular geneticist and developmental biologist interested in the genetic and epigenetic regulation of crop genomes in reproduction and hybridization. With a focus on the role of non-coding, regulatory RNAs he studies heterosis, crop performance prediction, and RNA-based interactions between plant and pests.

Contact: stefan.scholten@uni-goettingen.de; tel. +49 551 39 24295



Prof. Henner Simianer: Chair of Animal Breeding and Genetics, Georg-August-University Göttingen

Henner has a quantitative genetics background and has made significant contributions in the field of genomic breeding strategies and population genomics applied both to livestock and crops, especially maize.

Contact: hsimian@gwdg.de; tel. +49 551 39 25604



Prof. Michael Rostas: Chair of Agricultural Entomology, Georg-August-University Göttingen

Michael is a chemical ecologist interested in the interactions between crop plants, herbivorous insects and their natural enemies (parasitoids, pathogens). He also studies induced and genetic resistance in plants against insect pests and investigates how abiotic stress resulting from climate change alters bottom-up and top-down control of insects.

Contact: michael.rostas@uni-goettingen.de; tel. +49 551 39 29744



Prof. Johannes Isselstein: Chair of Grassland Science, Georg-August-University Göttingen

Johannes is a grassland agronomist interested in managed grasslands and their ecosystem services. A focus is on grazing livestock and the consequences for biodiversity. His group develops grazing management systems while utilizing smart farming technologies.

Contact: jissel@gwdg.de; tel. +49 551 39-24375



Prof. Michaela Dippold: Group Leader Biogeochemistry of Agroecosystems, Georg-August-University Göttingen / Chair Geo-Biosphere Interactions, University of Tuebingen

Michaela is a biogeochemist interested in the interactions of crops and soils with focus on root and rhizosphere interactions. Her group develops novel methods to screen for belowground crop traits of contrasting genotypes to identify those traits improving crop performance under future climate change scenarios.

Contact: dippold@gwdg.de; tel. +49 551 39 33546



Dr Viktor Korzun: Global Lead Scientific Affairs, KWS SAAT SE & Co. KGaA, Einbeck, Germany <https://www.kws.com/corp/en/>

Viktor has about 30 years' experience in development and application of molecular markers and novel breeding technologies in cereal crops. This includes the establishment, participation and coordination of national and international projects and strategic evaluation of new discoveries in plant science and cereals molecular breeding. He has authored 170 scientific publications and he is currently representing the KWS Group in the world of Scientifics, Politics and Associations by initiating new relationships and new relevant projects, streamline interaction and opportunities.

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