

The poster features the IUFRO logo (Interconnecting Forests, Science and People) and the text 'IUFRO WORLD DAY 28-29 September 2021'. It also includes the logo of the Federal Ministry of Agriculture, Regions and Tourism of Austria. The session details are: 'Wednesday, 29 September | 08:45 - 10:15 am UTC', 'Current challenges in tree breeding and genetic evaluation', 'Division 2 - Breeding Theory and Progeny Testing - (Unit 2.04.02)', and a description: 'Forest tree breeding is challenged by global environmental and socio-economic changes that have to be considered in the genetic evaluation system by integrating data from geoinformatics, genomics, remote sensing, and advanced screening technologies.' A location pin icon indicates 'Rotorua, New Zealand' with the instruction '→ FIND US ON THE WORLD DAY MAP!'. A photograph of a young tree sapling in a pot is shown on the right side of the poster.

Live session at the IUFRO World Day (Slide show)

# Current challenges in tree breeding and genetic evaluation

*Division 2 - Breeding Theory and Progeny Testing - Unit 2.04.02*

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29 September 2021, 08:45 - 10:15 UTC

📍 Rotorua, New Zealand (on the IUFRO World Day Map)

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## ABSTRACT

Climate change and a shift towards a circular bioeconomy put pressure on forest plantation productivity and resilience. These will require adjustments in the traditional breeding and genetic evaluation practices. The bioeconomy brings new opportunities for utilizing wood fibre for biofuels, heating and energy production, bioplastics or green electronics which may require different cell wall chemistry. On the other hand, resistance to various stress factors brought about by climate change will be essential to maintain high forest productivity and secure the wood supply.

Therefore, the understanding genetic variability of physiological processes and their responses to stress, and their links to productivity, may become more critical. This will require the quick adoption of emerging technologies and the development of new cost-efficient and non-destructive tools for the continual screening of large numbers of genotypes. The increasing availability of genomic information has allowed its integration in

operational breeding programmes and genetic evaluation, promising reduced generation intervals due to early selection.

Better characterization of current and future environmental conditions will allow a better understanding of genotype by environment interaction. This will enable the better-targeted location of new genetics trials, and better match deployed genetic material to current and future environments. Integrating all off the information needed into the genetic evaluation to allow effective selection will be a challenge.

#### KEYWORDS

- Tree Breeding
- Physiology
- Tree Health
- Wood Quality

#### SPEAKERS AND PROGRAM

8:45 UTC: Jaroslav Klápště, Eduardo Pablo Cappa, Greg Dutkowski  
*Current challenges in forest tree genetic evaluation*



*Dr. Jaroslav Klápště* is Scientist at Scion (New Zealand Forest Research Institute Ltd.). He graduated from the Czech University of Life Sciences in Prague with MSc in Forestry and PhD in Dendrology and Forest Tree Breeding. After graduation, he successfully applied for postdoctoral fellowship at University of British Columbia focused on statistical genomics. Currently, he works in projects focused on implementation of genomic selection in NZ forest tree breeding programmes.



*Dr. Eduardo Pablo Cappa* is quantitative forest geneticist at the National Agricultural Technology Institute in Buenos Aires (Argentina), and the National Scientific and Technical Research Council. He is also Adjunct Professor in the Department of Forest & Conservation Sciences at UBC. His main research areas are the mixed linear models and statistical methods, quantitative genetics and genomic, and genetic and genomic evaluation of forest trees. He holds his PhD (2007) in agricultural sciences from the School of Agronomy, University of Buenos Aires, Argentina



*Dr. Greg Dutkowski* works as a quantitative geneticist with Tree Breeding Australia where he works on member and client support for breeding strategies, genetic evaluation and software development. He has always worked in technical areas of forest management, including research into yield regulation, silviculture, nutrition and genetics for a number of private and public organisations in various states of Australia. He works with breeding programs in Australia, Sweden, France, China and New Zealand.

9:10 UTC: Nicholas Coops

*Use of remote sensing technology for phenotyping in forest tree breeding programmes*



*Dr. Nicholas Coops* is a faculty member in the Department of Forest Resources Management at UBC and holds a Canada Research Chair (CRC) in remote sensing. He is also an affiliate faculty member of Oregon State University. Dr. Coops obtained his PhD from the Royal Melbourne Institute of Technology in Melbourne, Australia, and then worked at CSIRO, the Australian government research labs, for 10 years prior to coming to UBC in 2004.

9:25 UTC: Rafael Tassinari Resende

*Enviromics deciphering the  $G \times E$  interaction in forest tree genetics*



*Dr. Rafael T. Resende* is adjunct professor at the University of Goiás (UFG, Brazil), in the Plant Breeding Department, occupying the chairs of Experimental Statistics and Forest Breeding. Currently invests scientific efforts in genomics, geoprocessing and geotechnologies. He is forest engineer by the University of Viçosa (UFV), concluded the master's degree in Statistics Genetics in the University of São Paulo (USP), and obtained the PhD degrees in Genetics and Breeding; and in Forest Science (both at UFV).

9:40 UTC: Blaise Ratcliffe

*Implementation of genomic selection in forest tree genetic evaluation*



*Blaise Ratcliffe* obtained a PhD degree from the University of British Columbia in Applied Forest Genetics. Since 2018, Blaise is employed as a post-doctoral fellow for Resilient Forests (RESFOR), a large-scale genomic project between the Universities of British Columbia and Alberta and the Alberta forest industry. His research focuses on the integration and use of genomic information in conifer tree improvement programs.

9:55 UCT: Panel discussion

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28-29 September 2021

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