

# Tree Biotechnology 2015 Conference



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**GESAAF**  
DIPARTIMENTO DI GESTIONE  
DEI SISTEMI AGRARI,  
ALIMENTARI E FORESTALI



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**DISPAA**  
DIPARTIMENTO DI SCIENZE DELLE  
PRODUZIONE AGRICOLE,  
ALIMENTARI E DELL'AMBIENTE



**8-12 June 2015**  
**Florence, Italy**

**FORESTS: THE IMPORTANCE TO THE PLANET AND SOCIETY**

**Program**

### PROGRAM

#### Monday 8 June: Aula Magna Rettorato (Piazza S. Marco)

10:30 Registration Open

#### 15:45 - 17:00 WELCOME AND OPENING SESSION

**Chairs:** Cristina Vettori (IBBR-CNR), Giovanni Giuseppe Vendramin (IBBR-CNR), Donatella Paffetti (DISPAA-UNIFI) and Davide Travaglini (GESAAF-UNIFI)

**Host organizations:** Università degli Studi di Firenze, Dipartimento di Scienze-BioAgroalimentari-CNR

**Local authorities:** Regione Toscana, Accademia Italiana di Scienze Forestali, Accademia dei Georgofili, Società Italiana di Selvicoltura ed Ecologia Forestale, Società Italiana Genetica Agraria

17:00 - 17:10 **IUFRO Presentation:** Yousry A El-Kassaby (The University of British Columbia, Canada)

17:10 - 17:55 **OPENING LECTURE:** Sally Aitken (The University of British Columbia, Canada)

*Millions of markers but what is the message? Understanding and managing local adaptation in a changing climate*

18:00 - 19:00 **WELCOME RECEPTION**

#### Tuesday 9 June: Auditorium D6/018 (Polo Novoli)

07:45 Registration Open

08:00 - 08:30 Setting up posters

#### 08:30 - 12:00 SESSION I Tree Genomics and Climate Change

**Chairmans:** Matias Kirst (University of Florida, USA) and Giovanni G. Vendramin (IBBR - CNR, IT)

#### Keynote speakers

08:30 - 09:00 Michele Morgante (University of Udine, Italy)

*Genome structure and evolution in Angiosperms and Gymnosperms: when age matters!*

09:00 - 09:30 Jean Bousquet (Université Laval, Canada)

*Exploring the landscape of the conifer genome: from gene maps to visiting intergenic regions*

#### Selected talks

09:30 - 09:45 Nathaniel R. Street (VIB-Ghent University, Belgium)

*Assembly and comparative genomics of the quaking aspens *Populus tremula* and *P. tremuloides**

09:45 - 10:00 Julien Prunier (Centre for Forest Research, Université Laval, Canada)

*Searching for genes with various copy numbers in the white spruce genome using comparative genome hybridizations*

10:00 - 10:30 **COFFEE BREAK + POSTER VIEWING**

### Selected talks

- 10:30 - 10:45** Amanda R. De La Torre (Umeå University, Sweden)  
*Gene expression and natural selection shape the evolution of protein-coding genes in Picea*
- 10:45 - 11:00** Steven G. Hussey (University of Pretoria, South Africa)  
*Epigenomic profiles of two antagonistic histone modifications, H3K4me3 and H3K27me3, in Eucalyptus grandis developing xylem*
- 11:00 - 11:15** Pal Miskolczi (Umeå Plant Science Center, Sweden)  
*Analysis of the role of chromatin remodeling in environmental control of annual growth cycle*
- 11:15 - 11:30** Igor Yakovlev (Norwegian Forest and Landscape Institute, Norway)  
*Transcriptomic responses to epitype inducing cultivation temperatures during somatic embryogenesis in Norway spruce leading to the formation of epigenetic memory*
- 11:30 - 11:45** Zander Myburg (University of Pretoria, South Africa)  
*Systems genetics dissection of lignocellulosic biomass and bioenergy-related traits in Eucalyptus*
- 11:45 - 12:00** Marçal Soler (Laboratoire de Recherche en Sciences Végétaux, France)  
*What MYB genes tell us about the specificities of woody plants?*

### 12:00 - 13:30 LUNCH

### 13:30-16:30 SESSION I Tree Genomics and Climate Change (continue)

**Chairmans:** Dario Grattapaglia (EMPRAPA, Brazil) and Zander Myburg (University of Pretoria, South Africa)

### Selected talks

- 13:45 - 14:00** Man Zhang (Virginia Tech, USA)  
*Genome-wide association studies of adaptive traits in Populus trichocarpa*
- 14:00 - 14:15** Timothy Tschaplinski (Oak Ridge National Laboratory, USA)  
*Coupling metabolomics, mQTL and association genetics analyses to identify genes regulating the production of metabolites*
- 14:15 - 14:30** Matias Kirst (University of Florida, USA)  
*A whole-genome association analysis of Populus deltoides implicates rare alleles in phenotypic variation for biomass growth and composition*
- 14:30 - 14:45** Barbara S. F. Muller (University of Brasília, Brazil)  
*Genomic selection for growth traits in Eucalyptus benthamii and E. pellita populations using a genome-wide Eucalyptus 60K SNPs chip*
- 14:45 - 15:00** Giovanni G. Vendramin (Institute of Biosciences and Bioresources, CNR, Italy)  
*Towards population genomics in Aleppo pine: the colonisation history of a keystone Mediterranean tree*

### 15:00 - 15:30 COFFEE BREAK + POSTER VIEWING

### Selected talks

- 15:30 - 15:45** Hazel Smith (University of Southampton, UK)  
*Adaptation to drought in Populus: Is leaf growth a key trait?*
- 15:45 - 16:00** Laura Gray (University of Alberta, Canada)  
*Geographic patterns of genetic variation observed in adaptive SNPs, growth chamber common gardens, and long-term field trials: implications for adaptation to climate change*

**16:00 - 16:30 Common discussion of the session I:** Chairmans, Invited speakers

**16:30 - 18:30 “Advancements in Conifer Genomics” OPEN WORKSHOP**

### Wednesday 10 June Auditorium D6/018 (Polo Novoli)

#### 08:30 - 12:00 SESSION II - Tree ecosystem, biodiversity, conservation and environment interactions

**Chairmans:** Peter Constabel (University of Victoria, Canada) and Antoine Kremer (INRA, France)

#### Keynote speakers:

**08:30 - 09:00** Santiago C. González Martínez (INIA, Spain)

*Molecular signatures of adaptation in Mediterranean conifers at range wide and local spatial scale*

#### Selected talks

**09:00 - 09:15** Julie Godbout (Laurentian Forestry Centre, Canada)

*Genomic diversity of a foundation tree species (*P. deltoides*) in relation to climate, soil, and geography: a northern perspective*

**09:15 - 09:30** Katharina Bräutigam (University of Toronto, Canada)

*The relationship between genome, epigenome, and physiology in poplar in response to drought*

**09:30 - 09:45** Silvio Schueler (Federal Research and Training Centre for Forests, Austria)

*Inter- and intra-specific variation in drought response: insights from native and non-native conifers in Europe*

**09:45 - 10:00** Mireille Cabané (Université de Lorraine, France)

*Cell wall rearrangement in wood of poplars subjected to abiotic stresses*

#### 10:00 - 10:30 COFFEE BREAK + POSTER VIEWING

#### Selected talks

**10:30 - 10:45** Guillaume deLafontaine (Université Laval, Canada)

*Genomic and geographic analysis of the introgression between progenitor-derivative spruce species (*Picea mariana* × *P. rubens*)*

**10:45 - 11:00** Ilga Porth (University of British Columbia, Canada)

*Functional genomics uncovers trait interrelations, pleiotropy, and potential tradeoffs in life-history evolution of forest trees*

**11:00 - 11:15** Oskar Franklin (International Institute for Applied Systems Analysis, Austria)

*How eco-evolutionary principles may guide tree breeding and tree biotechnology for enhanced productivity*

**11:15 - 11:30** Ilga Porth (University of British Columbia, Canada)

*Species-specific alleles at a beta-tubulin gene show significant associations with leaf morphological variation within *Quercus petraea* and *Q. robur* populations*

**11:30 - 11:45** Xiaohan Yang (Oak Ridge National Laboratory, USA)

*Discovery of Effector-like proteins in *Populus* during symbiosis formation*

**11:45 - 12:00** Sanushka Naidoo (University of Pretoria, South Africa)

*Two sides of the coin: Investigating defence responses against *Phytophthora cinnamomi* in *Eucalyptus nitens* using dual RNA-sequencing*

#### 12:00 - 13:30 LUNCH

#### 13:30 - 16:30 SESSION II - Tree ecosystem, biodiversity, conservation and environment interactions (continue)

**Chairmans:** Janice Cooke (University of Alberta, Canada) and Stephen Cavers (ETH, UK)

#### Selected talks

**13:45 - 14:00** Louise Shuey (FABI, University of Pretoria, South Africa)

**Eucalyptus grandis* defence responses against the myrtle rust pathogen, *Puccinia psidii* – insights from transcriptome profiling*

- 14:00 - 14:15** Janice Cooke (University of Alberta, Canada)  
*A genomic view of lodgepole and jack pine responses to mountain pine beetle and their fungal associates in the face of mountain pine beetle range expansion*
- 14:15 - 14:30** Carl Gunnar Fossdal (NIBIO, Norway)  
*Primed host response in the conifer Norway spruce*
- 14:30 - 14:45** Carsten Külheim (Australian National University, Australia)  
*Molecular basis of resistance to myrtle rust (Puccinia psidii) in Melaleuca quinquenervia*
- 14:45 - 15:00** Marco Michelozzi (Institute of Biosciences and Bioresources, CNR, Italy)  
*The impact of North American root-rot disease fungus Heterobasidion irregulare on ecophysiological properties, volatile terpenoids and transcripts of Pinus pinea L.*

### 15:00 - 15:30 COFFEE BREAK + POSTER VIEWING

#### Selected talks

- 15:30 - 15:45** Fred O. Asiegbu (University of Helsinki, Finland)  
*A comparative chemical and transcriptomic analysis of defence pathways activated in conifer trees by pathogenic fungi and herbivorous insect*
- 15:45 - 16:00** Gail Taylor (University of Southampton, United Kingdom)  
*Biochar alters the soil microbiome: results next generation amplicon sequencing at three European field sites*

**16:00 - 16:30 Common discussion of the session II:** Chairmans, Invited speakers

**16:30 - 18:30 EVOLTREE OPEN WORKSHOP on "Metagenomics of the tree microbiome"**

## Thursday 11 June Auditorium D6/018 (Polo Novoli)

**08:30 - 12:00 SESSION III - Tree Biotechnology: molecular understanding of tree growth and development and applications for tree improvement**

**Chairmans:** Wout Boerjan (VIB/Ghent University, Belgium) and Shawn Mansfield (University of British Columbia, Canada)

#### Keynote speaker:

- 08:30 - 09:00** Matthias Fladung (vTI, Germany)  
*Transposon activation tagging in plants for gene function discovery*

#### Selected talks

- 09:00 - 09:15** Chung-Jui Tsai (University of Georgia, USA)  
*Exploiting SNPs for CRISPR/Cas9-mediated biallelic mutations in Populus reveals 4-coumarate:CoA ligase specificity and redundancy*
- 09:15 - 09:30** Wout Boerjan (VIB/Ghent University, Belgium)  
*Discovery of the biological role of PHENYLCOUMARAN BENZYLIC ETHER REDUCTASE (PCBER), one of the most abundant proteins in poplar xylem*
- 09:30 - 09:45** Antanas Spokevicius (The University of Melbourne, Australia)  
*Specific tubulins involved in determining the cellulose microfibril angle of fibres in eucalypt stems*
- 09:45 - 10:00** Ritesh Mewalal (University of Pretoria, South Africa)  
*Arabidopsis proteins, MODIFYING WALL LIGNIN (MWL)-1 and 2 containing the domain of unknown function 1218 (DUF1218) function redundantly to alter secondary cell wall lignin content*

**10:00 - 10:30 COFFEE BREAK + POSTER VIEWING**

### Selected talks

- 10:30 - 10:45** Eliana Gonzales-Vigil (University of British Columbia, Canada)  
*A waxy cover for Populus trichocarpa leaves*
- 10:45 - 11:00** Ewa J. Mellerowicz (Swedish University of Agricultural Sciences, Sweden)  
*In planta deacetylation of glucuronoxylan – a way of enhancing sugar yields and deciphering cell wall nanostructure*
- 11:00 - 11:15** Matias Kirst (University of Florida, USA)  
*EVE Regulation of Vessel Development*
- 11:15 - 11:30** Mélanie Mauriat (INRA, France)  
*Quantitative proteomic and phosphoproteomic approaches for deciphering the signaling pathway for tension wood formation in poplar*
- 11:30 - 11:45** Fabien Mounet (Laboratoire de Recherche en Sciences Végétaux, France)  
*Cold regulation of genes related to secondary cell wall biosynthesis affects wood structure and composition*
- 11:45 - 12:00** Desré Pinard (University of Pretoria, South Africa)  
*Transcriptional networks of plastid targeted genes affecting carbon metabolism in Eucalyptus xylem*

### 12:00 - 13:30 LUNCH

### 13:45 - 17:00 SESSION III - Tree Biotechnology: molecular understanding of tree growth and development and applications for tree improvement (continue)

**Chairmans:** Jacqueline Grima-Pettenati (Université Toulouse II, France) and Matthias Fladung (vTI, Germany)

### Selected talks

- 13:45 - 14:00** Orzenil B. Silva-Junior (Empresa Brasileira de Pesquisa Agropecuária, Brazil)  
*Genome-wide patterns of recombination, nucleotide diversity and linkage disequilibrium in Eucalyptus from high density SNP genotyping and pooled whole-genome resequencing*
- 14:00 - 14:15** Dario Grattapaglia (EMBRAPA Genetic Resources and Biotechnology, Brazil)  
*Genome-wide prediction of individual tree ranking for growth, chemical and physical wood properties in Eucalyptus based on high-density SNP data*
- 14:15 - 14:30** Blaise Ratcliffe (The University of British Columbia, Canada)  
*A comparison of genomic selection models across time in interior spruce (Picea engelmannii × glauca) with use of unordered SNP imputation methods*
- 14:30 - 14:45** Patrick Lenz (Laurentian Forestry Centre, Canada)  
*From SNP discovery to operational testing of genomic selection in boreal black spruce*
- 14:45 - 15:00** David Kainer (The Australian National University)  
*Targeted repeat reduction in whole tree genomes prior to sequencing*

### 15:00 - 15:30 COFFEE BREAK + POSTER VIEWING

### Selected talks

- 15:30 - 15:45** Mike Allwright (University of Southampton, United Kingdom)  
*Improving poplar for biofuel applications: elucidating the genetic basis of important traits in Populus nigra through an association genetics approach*
- 15:45 - 16:00** Mebarek Lamara (Université Laval, Canada)  
*Genetic architecture of wood properties based on association analysis and co-expression networks in white spruce*
- 16:00 - 16:15** Orzenil B. Silva-Junior (Empresa Brasileira de Pesquisa Agropecuária, Brazil )

*Towards a Corymbia reference genome: comparative efficiencies of Illumina, PacBio and hybrid de novo assemblies of a complex heterozygous genome*

**16:15 - 16:30** C. Peter Constabel (University of Victoria, Canada)

*Characterization of the network of MYB transcription factors controlling condensed tannin synthesis in Populus*

**16:30 - 16:45** Anna Plasencia (Laboratoire de Recherche en Sciences Végétaux, France)

*The Eucalyptus transcription factor EgMYB1 interacts with the histone linker EgH1 to modulate wood formation*

**16:45 - 17:00** Kyung-Hwan Han (Michigan State University, USA)

*Targeted regulation of woody biomass formation in poplars*

**17:00 - 17:30** Presentations of the next IUFRO Tree Biotech Conference Venue

**19:00 - 20:30** Florence Walking Guided Tour (only registered delegates)

**20:30 - 23:30** CONFERENCE BANQUET (ticket required)

### Friday 12 June Sala convegni D6/018 (Polo Novoli)

**09:00 - 10:15** SESSION III - Tree Biotechnology: molecular understanding of tree growth and development and applications for tree improvement (continue)

**Chairmans:** Jacqueline Grima-Pettenati (Université Toulouse II, France) and Matthias Fladung (vTI, Germany)

#### Selected talks

**09:00 - 09:15** Juha Immanen (University of Helsinki, Finland)

*Enhanced cytokinin signaling stimulates cambial activity and biomass production in tree trunk*

**09:15 - 09:30** Henning Wildhagen (Georg-August-University Göttingen, Germany)

*Investigating the molecular and physiological basis of drought tolerance in Populus*

**09:30 - 09:45** Rishikesh P. Bhalerao (Bhalerao, Sweden)

*Polycomb and ABA mediate photoperiodic control of bud dormancy*

**09:45 - 10:15** Common discussion of the session III: Chairmans, Invited speakers

**10:15 - 10:45** COFFEE BREAK + POSTER VIEWING

**10:45 - 17:45** SESSION IV - Biosafety: environmental risk assessment, monitoring and management, and socio-economic implications

**Chairmans:** Hely Hagman (University of Oulu, Finland), Elisabeth Waigmann (EFSA)

#### Keynote speakers:

**10:45 - 11:15** Stanley Hirsch (FuturaGene Group CEO)

*Forest Biotechnology and Sustainability*

**11:15 - 11:45** Gilles Pilate (INRA, France)

*Field trials with genetically engineered forest trees: past experiences and future prospects*

**11:45 - 12:15** Elisabeth Waigmann (EFSA)

*RNAi based GM plants: EFSA activities in relation to environmental risk assessment*

**12:15 - 13:45** LUNCH

**13:45 - 17:30 SESSION IV - Biosafety: environmental risk assessment, monitoring and management, and socio-economic implications (continue)**

**Chairmans:** Gilles Pilate (INRA, France), Stanley Hirsch (FuturaGene Group CEO)

**Keynote speakers:**

**14:00 - 14:30** Sandra Sharry (Argentina)

*Socio-economic implications in relation to the use of GMTs: concerns and acceptance by the public in South America*

**Invited talks**

**14:30 - 14:45** Hely Hagman (University of Oulu, Finland)

*COST Action FP0905: final results*

**14:45 - 15:00** Othon Abrahão (FuturaGene Brasil Ltda, Brazil)

*Biosafety of a genetically modified Eucalyptus with yield enhancement characteristics*

**Selected talks**

**15:00 - 15:15** Andrea Gennaro (EFSA, GMO Unit, Italy)

*EFSA GMO Panel Scientific Opinions on the safety assessment of plants obtained through cisgenesis, intragenesis or Site-Directed Nucleases (SDN-3)*

**15:15 - 15:30**

**15:30 - 15:45** Amy L. Klocko (Oregon State University, USA)

*Containment technology for trees: a new frontier opens*

**15:45 - 16:15 COFFEE BREAK + Poster tear-down**

**Selected talks**

**16:15 - 16:30** Brad Potts (University of Tasmania, Australia)

*Assessing the risk of gene flow from plantation to native eucalypts in Australia*

**16:30 - 16:45** Konstantin Shestibratov (Institute of Bioorganic Chemistry RAS, Russia)

*Model assessment of transgenic trees impact on nitrogen and carbon cycles in forest plantations*

**16:45 - 17:30 Common discussion of the session IV:** Chairmans, Invited speakers, Società Italiana Genetica Agraria

**17:30 - 17:45 Selection of next IUFRO Tree Biotech Conference Venue**

**17:45 - 18:00 CLOSING SESSION**

**Chairs:** Cristina Vettori (IBBR-CNR), Giovanni Giuseppe Vendramin (IBBR-CNR), Donatella Paffetti (DISPAA-UNIFI), Davide Travaglini (GESAAF-UNIFI)



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