

10th International Plant Biomechanics Conference

22nd-26th August 2022

Lyon, France

Detailed schedule

List of sponsors



Ecole normale supérieure de Lyon



Centre national de la recherche scientifique



Institut national de recherche pour l'agriculture, l'alimentation et l'environnement



Monday, August 22, 2022

TIME	EVENT
08:30 - 10:00	Welcome participants and poster mounting - Welcome participants and poster mounting Coffee offered
10:00 - 10:15	Opening
10:15 - 11:15	Hydraulics
10:15 - 10:55	› Fluid-structure interactions in plant vascular flows - <i>Kaare Jensen, Department of Physics, Technical University of Denmark</i>
10:55 - 11:15	› Hydraulic stress at the meristem-organ boundaries - <i>Juan Alonso-Serra, Laboratoire de Reproduction et Développement des Plantes, ENS de Lyon, INRAE, CNRS, Inria, Lyon.</i>
11:15 - 11:35	Break
11:35 - 12:15	Hydraulics
11:35 - 11:55	› Diffusion and flow across shape-perturbed plasmodesmata nanopores in plants - <i>Anneline H. Christensen, Technical University of Denmark</i>
11:55 - 12:15	› Leaf squeeze-flow rheometry: measuring plant water status via static uniaxial compression of the leaf lamina - <i>Tomás Fuenzalida, The Australian National University</i>
12:15 - 12:35	Flash talks #1
12:35 - 14:00	Lunch break
14:00 - 15:20	Woods and trees
14:00 - 14:40	› Regulation of Cell Size of Vessel Elements, and Related Effects on Water Transport and Drought Response in Populus - <i>Andrew Groover - US Forest Service, UC Davis Department of Plant Biology</i>
14:40 - 15:00	› Biomechanics and functional morphology of the European mistletoe and its connection to the host tree - <i>Max D. Mylo, Cluster of Excellence livMatS @ FIT – Freiburg Center for Interactive Materials and Bioinspired Technologies, Plant Biomechanics Group @ Botanic Garden Freiburg, University of Freiburg, Germany</i>
15:00 - 15:20	› Effect of soil removal on the tree stability in confined space - <i>Luděk Praus, Mendel University in Brno</i>
15:20 - 15:40	Flash talks #2
15:40 - 16:10	Break
16:10 - 17:10	Woods and trees
16:10 - 16:30	› Which compression wood behaviors depend on high MFA or thick S2L? - A new mechanical model to explain origin of longitudinal dimensional changes peculiar to conifer compression wood tracheid - <i>Hiroyuki Yamamoto, Graduate School of Bio-agricultural Sciences</i>
16:30 - 16:50	› Modelling the growth stress distribution during the life of tree branches: impact of different growth strategies - <i>Arnoul VAN ROOIJ - Institut Pascal, F-63000, Clermont-Ferrand, Laboratoire de Physique et Physiologie Intégratives de l'Arbre en environnement Fluctuant - Clermont Auvergne</i>
16:50 - 17:10	› Bark biomechanical function: smart tissue organization enables extreme mechanical performance in the secondary phloem of Malvaceae - <i>Tançrède Alméras, LMGC, CNRS, Univ Montpellier, Montpellier, France</i>
17:10 - 17:30	Flash talks #3
17:30 - 19:30	Posters and refreshments #1

Tuesday, August 23, 2022

TIME	EVENT
08:30 - 08:45	Welcome - Welcome participants and poster mounting
08:45 - 10:45	Morphogenesis and pattern formation
08:45 - 09:25	› Differential growth dynamics controls aerial organ geometry - <i>Yuling Jiao - School of Life Sciences, Peking University, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences</i>
09:25 - 09:45	› A deeply conserved polygalacturonase functions in flower development in <i>Arabidopsis thaliana</i> - <i>Ellen Zelinsky - Department of Biology, The Pennsylvania State University</i>
09:45 - 10:05	› A field theory for plant tropisms - <i>Hadrien Oliveri - Mathematical Institute [Oxford]</i>
10:05 - 10:25	› Temporal integration in shoot gravitropism - <i>Mathieu Rivière - Tel Aviv University</i>
10:25 - 10:45	› Plant tendril mechanics and development - <i>Dražen Zanchi - Laboratoire matière et systèmes complexes</i>
10:45 - 11:15	Coffee break
11:15 - 12:15	Morphogenesis and pattern formation
11:15 - 11:35	› Robustness in laminar sepal shape in <i>Arabidopsis</i> requires growth coordination between abaxial and adaxial surfaces - <i>Avilash Singh Yadav, Cornell University</i>
11:35 - 11:55	› Mechanical interactions between tissue layers underlie anther morphogenesis - <i>Sylvia Silveira, IRBV, Department of Biological Sciences, University of Montréal</i>
11:55 - 12:15	› Dynamic of growth and tension in explosive fruits - <i>Gabriella Mosca, Technical University of Munich, Max Planck Institute for Plant Breeding Research</i>
12:15 - 12:35	Flash talks #4
12:35 - 14:00	Lunch break
14:00 - 15:20	Ecology and evolution
14:00 - 14:40	› Where the only constant is change: balancing biophysical and physiological constraints on wave-swept shores - <i>Emily Carrington, University of Washington</i>
14:40 - 15:00	› Holding on or falling off: the attachment mechanism of epiphytic <i>Anthurium obtusum</i> (Engl.) <i>Grayum</i> changes with substrate roughness - <i>Jessica Tay, University of Oldenburg, Institute for Biology and Environmental Sciences, Functional Ecology of Plants</i>
15:00 - 15:20	› Divergent trade-offs associated to stem posture control in maritime pine - <i>Rosario Sierra-de-Grado, iuFOR, University Institute for Research in Sustainable Forest Management, University of Valladolid</i>
15:20 - 15:40	Flash talks #5
15:40 - 16:10	Coffee break
16:10 - 17:10	Ecology and evolution
16:10 - 16:30	› Anatomy and biomechanics of peltate <i>Begonia</i> leaves - <i>Annabell Rjosk, Institut für Botanik [Dresden]</i>
16:30 - 16:50	› Comparative biomechanics of energy storage and release across seed-shooting witch hazels - <i>Justin Jorge - Duke university [Durham]</i>
16:50 - 17:10	› Upward transport in a canopy assisted by raindrop impacts on plant leaves - <i>Tristan Gilet, Microfluidics lab (Université de Liège)</i>
17:10 - 17:30	Flash talks #6
17:30 - 19:30	Posters & refreshments #2

Wednesday, August 24, 2022

TIME	EVENT
08:30 - 08:45	Welcome - Welcome participants
08:45 - 10:45	Cell walls, cells, and tissues
08:45 - 09:25	› How does cell division alter the mechanical properties of growing tissues? - <i>Sarah Robinson, SLCU</i>
09:25 - 09:45	› Rigidity charts of plant axes with various cross-sectional geometry and reinforcement patterns - <i>Olga Speck, Cluster of Excellence livMatS @ FIT – Freiburg Center for Interactive Materials and Bioinspired Technologies, Plant Biomechanics Group @ Botanic Garden Freiburg, University of Freiburg, Germany</i>
09:45 - 10:05	› Formation of gas spaces in pimpernel (<i>Anagallis grandiflora</i>) petal epidermis – interplay between growth, geometry and cell wall mechanics - <i>Dorota Kwiatkowska, University of Silesia</i>
10:05 - 10:25	› Nonlinear mechanics of epidermal cell walls contradicts classical viscoelastic behavior - <i>Jingyi Yu, Pennsylvania State University</i>
10:25 - 10:45	› Parallelized plant morphogenesis in a controllable microfluidic environment. - <i>Valentin LAPLAUD, Laboratoire d'hydrodynamique</i>
10:45 - 11:15	Coffee break
11:15 - 12:35	Cell walls, cells, and tissues
11:15 - 11:35	› Plant root growth against a mechanical obstacle : the early growth response of a maize root facing an axial resistance agrees with the Lockhart model - <i>Manon Quiros, Physique et mécanique des milieux hétérogènes (PMMH)</i>
11:35 - 11:55	› Expansins control cell wall stiffness and root growth via cell type-specific expression in <i>Arabidopsis</i> - <i>Marketa Samalova, CEITEC-MU</i>
11:55 - 12:15	› Nano-mechanical response in stressed living root tissues - <i>Harinderbir Kaur, IBS</i>
12:15 - 12:35	› Life without support: survival of flax plants with impaired intrusive growth - <i>Anna Petrova, Kazan Institute of Biochemistry and Biophysics</i>
12:35 - 14:00	Lunch break
14:00 - 18:00	Botanical garden - See the Social events page for details.

Thursday, August 25, 2022

TIME	EVENT
08:30 - 08:45	Welcom - Welcome participants
08:45 - 10:45	Applied biomechanics and biomimetics
08:45 - 09:25	› A Search for New Water Harvesting Technologies in the Driest Desert on Earth - <i>Jacques Dumais, UAI</i>
09:25 - 09:45	› Soft artillery: biomimetic cannon inspired by infectious spore dispersal - <i>Sif Fink Arnbjerg-Nielsen, Technical University of Denmark</i>
09:45 - 10:05	› Plant structure and motion: Inspiration for novel biomimetic soft machines and architecture - <i>Thomas Speck, University of Freiburg Plant Biomechanics Group @ Botanic Garden, Cluster of Excellence livMatS @ FIT – Freiburg Center for Interactive Materials and Bioinspired Technologies, Freiburg Materials Research Center (FMF)</i>
10:05 - 10:25	› Pressure dependent mechanical properties of pulvinus - <i>Loïc Tadrist, Bio-inspired design team, Institut des Sciences du Mouvement</i>

TIME	EVENT
10:25 - 10:45	› A multi-scale suite of cell wall architectural features powers plant organ actuation - <i>Anja Geitmann, McGill University</i>
10:45 - 11:15	Coffee break
11:15 - 12:35	Applied biomechanics and biomimetics
11:15 - 11:35	› Using Mechanistic, Multiscale Knowledge of Plant Biomechanics to Improve Genome to Phenome Modeling Efforts - <i>Daniel Robertson, University of Idaho</i>
11:35 - 11:55	› A Parametric Process for Root System Architecture Analysis: Case Study Analyzing Topology and Morphological Traits Across Tree Species Imaged in the Field - <i>Thibaut Houette, Department of Biology, The University of Akron, USA - Elena Stachew, Department of Biology, The University of Akron, USA</i>
11:55 - 12:15	› Coordinated Bacterial Migration During Root Colonisation - <i>Lionel Dupuy, Ikerbasque, Neiker Institute</i>
12:15 - 12:35	› Fluttering leaves to determine water stress in plants - <i>Sunghwan Jung, Cornell University</i>
12:35 - 14:00	Lunch break
14:00 - 15:40	Cell walls, cells, and tissues
14:00 - 14:40	› Dandelion 'decisions': to fly or not to fly – that is the question - <i>Naomi Nakayama, Imperial College London</i>
14:40 - 15:00	› An Automated, Parameterized Model of Maize Stalk Strength via Machine Learning - <i>Douglas Cook, Brigham Young University</i>
15:00 - 15:20	› Mechanics of the 3D puzzle cells in nutshells - <i>Jessica Huss, University of Natural Resources and Life Sciences Vienna</i>
15:20 - 15:40	› The central role of the cell-cell interface during tissue morphogenesis: local integration of wall stress and microtubule-encoded cell wall anisotropy - <i>Daniel Szymanski, Purdue University</i>
15:40 - 16:10	Coffee break
16:10 - 17:30	Cell walls, cells, and tissues
16:10 - 16:30	› Edge-based growth control in Arabidopsis involves two cell wall-associated Receptor-Like Proteins - <i>Charlotte Kirchhelle, Reproduction et développement des plantes</i>
16:30 - 16:50	› Self-similar tip growth links exocytosis profile with cell wall shape - <i>Min Wu, Worcester Polytechnic Institute</i>
16:50 - 17:10	› Excess growth combined with reduced cell wall stiffness in Arabidopsis triggers flowering stem breakag - <i>Mariko Asaoka, Laboratoire de Reproduction et Développement des Plantes, Université de Lyon, ENS de Lyon, UCB Lyon 1, CNRS, INRAE, Department of Biology, Tokyo Gakugei University, Faculty of Science Kanagawa University</i>
17:10 - 17:30	› Mechanics and dynamics of cell-cell adhesion in plants - <i>Stéphane Verger, Swedish University of Agricultural Sciences</i>
19:00 - 23:30	Dinner cruise - See the Social events page for details.

Friday, August 26, 2022

TIME	EVENT
08:30 - 08:45	Welcome - Welcome participants
08:45 - 09:25	Applied biomechanics and biomimetics
08:45 - 09:25	› Multifunctional Banksia Seed Pods - <i>Michaela Eder, MPI of Colloids and Interfaces, Department of Biomaterials</i>

TIME	EVENT
09:25 - 10:45	Mechanosensing and mechanotransduction
09:25 - 09:45	› Integrating Jasmonate-mediated defense with plant osmotic potential - <i>Debora Gasperini, Leibniz Institute of Plant Biochemistry</i>
09:45 - 10:05	› A novel kinematic method for quantifying gravitropic and proprioceptive sensitivities illustrated on Arabidopsis wild type and XI myosin mutants. - <i>Bruno MOULIA, UMR PIAF</i>
10:05 - 10:25	› MCAs are land plant-specific, inherently mechanosensitive Ca ²⁺ -permeable channels - <i>Hidetoshi Iida, Tokyo Gakugei University</i>
10:25 - 10:45	› The temporal modification of histone marks plays a significant role in gene regulation in poplar after once or repeated mechanostimulation. - <i>Ritesh Ghosh, Université Clermont Auvergne, INRAE, U.M.R. PIAF, F-63000 Clermont-Ferrand, France</i>
10:45 - 11:15	Coffee break
11:15 - 11:55	Mechanosensing and mechanotransduction
11:15 - 11:35	› Pathogen-derived mechanical cues regulate the spatio-temporal implementation of plant defense - <i>Adelin Barbacci, Université de Toulouse, INRAE, CNRS, Laboratoire des Interactions Plantes Micro-organismes Environnement (LIPME); 31326 Castanet-Tolosan, France.</i>
11:35 - 11:55	› The mechanics of seed size control in Arabidopsis - <i>Benoit Landrein, Reproduction et développement des plantes</i>
11:55 - 12:30	Awards and closing