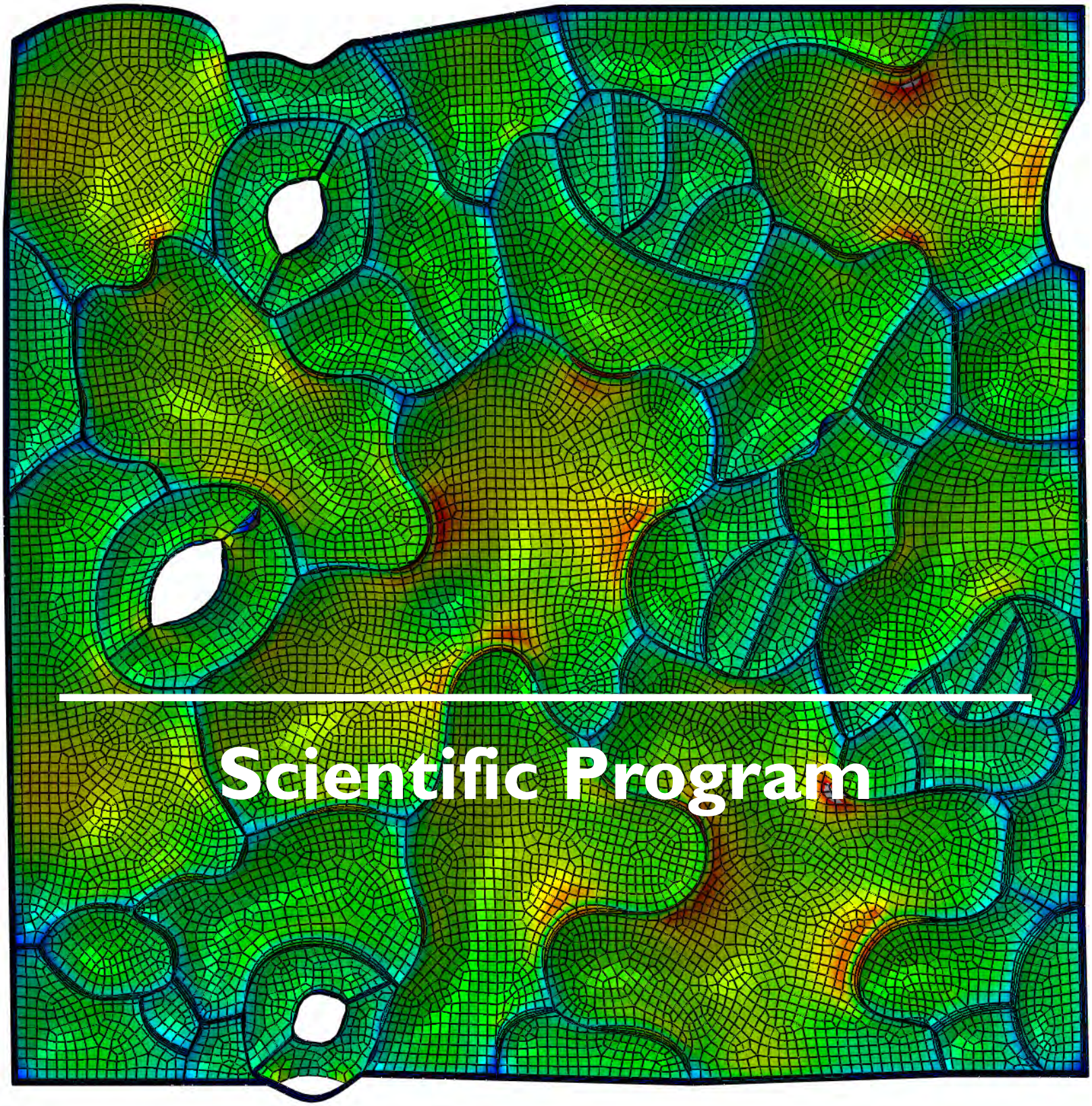
9th INTERNATIONAL PLANT BIOMECHANICS CONFERENCE

Montreal | Canada
August 9-14, 2018



Scientific Program

9th INTERNATIONAL PLANT BIOMECHANICS CONFERENCE
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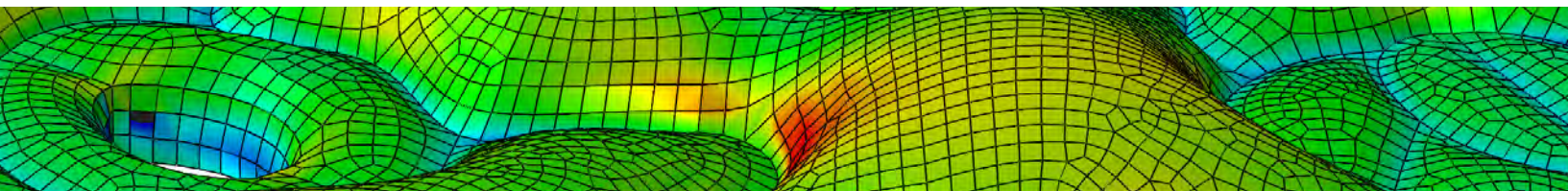
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Practical information

Venues

Symposia: Otto Maass Chemistry Building, 801 Sherbrooke Street West, Lecture Hall 112

Rest rooms are available in the basement lobby of Otto Maass that can be reached either by staircase or through the door at the bottom of the lecture hall.

Poster Sessions: Otto Maass Chemistry Building, 801 Sherbrooke Street West, ground floor lobby.

Welcome Reception: Royal Victoria College Courtyard (in case of rain: West Wing Lounge), 3425 University Street. Please ring the doorbell to gain access.

Excursion: Montreal Botanical Garden, 4101 Sherbrooke Street East. Metro station Pie IX (green line). 20 min metro ride + 5 min walking. For details see page 3.

Conference Party: Thomson House, 3650 McTavish St, Ballroom (10 min walking from Otto Maass).

Presenters

Presenters of regular and invited oral presentations

- Please either upload your talk to the available laptop computer (Windows) or test whether your own computer will connect to the projector.
- The format of the projection is 4:3. A 16:9 format will likely project fine, just does not exploit the available height of the screen.
- Please do the testing and uploading half a day ahead of your talk to allow enough time for troubleshooting.
- Regular oral presentations are scheduled for 12 minutes with a 3 minute question period. This time frame will be enforced and going overtime will cut into your question period. A light signal will indicate when the time is up.

Poster flashtalks

- The timing of the flashtalks is 2 minutes (120 seconds!) and will be strictly enforced. There is no question period as your talk is only meant to pitch your poster.
- All presenters will line up near the podium prior to the beginning of the flashtalk session.
- The flashtalk can be accompanied by up to 5 slides which have to be sent to the organizing committee by July 28.
- Flashtalks are scheduled in 4 sessions on August 10 and 11. The day of the flashtalk corresponds to the allotted poster session during which the poster presenter should attend their poster.

Poster sessions

- Poster sessions are scheduled for 17:00-18:30 on August 10 and 11. Poster sessions are accompanied by refreshments.
- Poster presenters with odd numbers should attend their posters for the first hour of the poster session on August 10 and poster presenters with even numbers on August 11.

Awards

Awards for the best oral and poster presentations given by a student will be handed out during the Closing Ceremony on August 14. Students presenting a poster and wishing to be considered for an award must attend their poster for the first hour of the poster session on the day on which they are assigned to do so.

WiFi

Eduroam is available at the conference venue. If you don't have access to Eduroam through your own institution, you can use the following networks: mcgill.ca or wpa.mcgill.ca
Participants will receive an individual code (user name and password).

Certificate of Attendance

If you require a certificate of attendance, please inform the Registration desk before August 12. The certificate will be ready for pick-up on August 14.

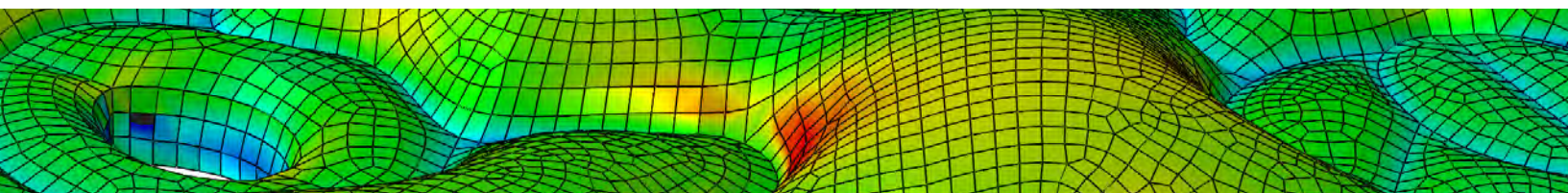
Social Media & Photography

Conference Twitter handle: **@PBM2018**
Conference hashtag: **#PBM2018**

Photos: Photographs taken at the 9th International Plant Biomechanics Conference may be used in future publications, on websites, in the Twitter feed, or in other materials. By registering for this meeting, you agree to allow the conference organizers to use your photo for purposes related to the conference, McGill University and the field of plant biomechanics. Unless specifically agreed to by the participant, this applies only to photos not revealing scientific data.

If you wish that no photos be taken of you at all, please inform the registration desk.

Photos taken by conference participants: The above also applies to photos taken by conference participants. We trust in the good judgement of all photographers to only post suitable material on social media.



Symposia and poster sessions: Any pictures showing research data (symposia slides or poster) can **only** be taken and posted on social media with the consent of the respective author. Consent for picture taking during symposia/poster session and social media posting is specified for each author in the conference program. Poster presenters have the opportunity to label their poster with the respective symbols. We ask all conference participants to respect authors' choices.

Meals

The following meals and refreshments are included in the regular conference registration

- All morning and afternoon coffee breaks
- Lunches on August 10-13
- Welcome reception on August 9 (refreshments only; not a full meal)
- Conference party on August 13 (cocktail dinatoire). A cash bar is available for specialty and late night drinks.

Social Events

These events are included in your full registration. If you wish to bring any family members traveling with you to any of these events, please acquire guest passes at the Conference Registration Desk. Your badge, or a guest pass, will be required to get access to all events.

Welcome Reception: Join us for refreshments in the courtyard of the Royal Victoria College. In case of rain, the event is held in the West Wing Lounge of the same building.

Poster Sessions: Refreshments will be served during the poster sessions. Please note, that our alcohol permit does not allow for alcoholic beverages to be taken outdoors or into the staircases of the building. Thank you for respecting this constraint.

Excursion: Volunteers of the 'Friends of the Botanical Garden' will give groups of conference participants a tour of the Botanical Garden. Groups gather at the entrance of the Garden between 14:00 and 16:00. As participants arrive, groups will be formed and enter the Garden. To gain entrance to the Botanical Garden participants must show the conference badge or a guest pass.
Transport to the Botanical Garden is by Metro: approximately 20 min on the green line from Metro McGill to Metro Pie IX, plus 5 min walk. Participants can venture to the Garden themselves or join one of the student volunteers to be guided to the Metro. Participants who signed up for this excursion receive 2 Metro passes in the registration package.

Conference Party: Thomson House is located about 10 minutes walking from Otto Maass. Food will be served in the style of a 'cocktail dinatoire'. Be prepared for the requisite a cappella singing of a song typical for your country (we allow for association with friendly neighbor nations for the purpose of creating critical choir mass, of course). Later in the evening, you will be invited to join the dance floor even if you have no experience whatsoever: Contra-dancing is fun and one of the band members is the Manager of McGill's Horticultural Centre!

Waiver of Liability

Each individual attending the 9th International Plant Biomechanics Conference assumes all risks associated with his or her attendance and participation in on- and offsite activities. Each individual attendee agrees to indemnify and hold harmless the Organizers of the 9th International Plant Biomechanics Conference, staff, volunteers and/or agents from all loss, damage, or liability arising out of or related to his or her attendance at the 9th International Plant Biomechanics Conference.

Meeting Attendance Etiquette

Acceptance of your registration entitles you to attend the meeting conditioned upon you not engaging in conduct that interferes with the opportunity for others to attend, enjoy, and derive value from the meeting. Attendees who the conference organizers determine in their discretion are disruptive to speakers, staff, or other attendees are subject to having their registration and permission to attend the meeting immediately revoked, without refund of their registration fee.

Smoking

The campus of McGill University is smoke-free. In order to be able to smoke you need to locate a dedicated smoking spot or leave the premises, for example to University Street or Sherbrooke Street.

Sustainability

The conference has obtained Silver Rating for Sustainabiliy from McGill's Office of Sustainability for a series of choices including for example:

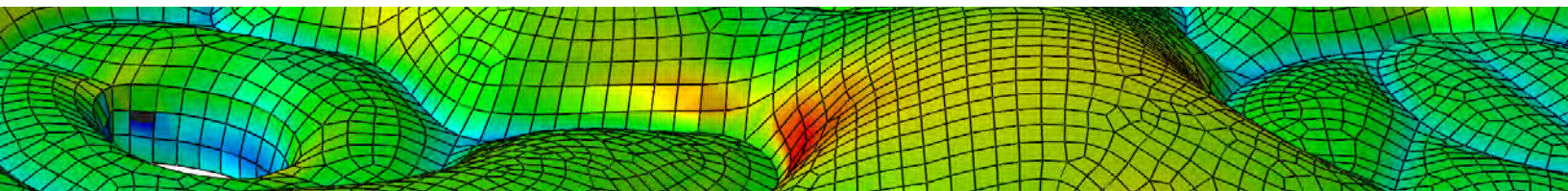
- Meat-free menu (although some seafood may appear) emphasizing produce that is locally sourced where possible
- Distribution of reusable tumblers for coffee breaks and refreshments
- Reduction of printed material and unnecessary swag
- Use of public transport for excursion
- Date of meeting aligned with availability of university residences (to limit cost of accommodation for participants)

Luggage Check

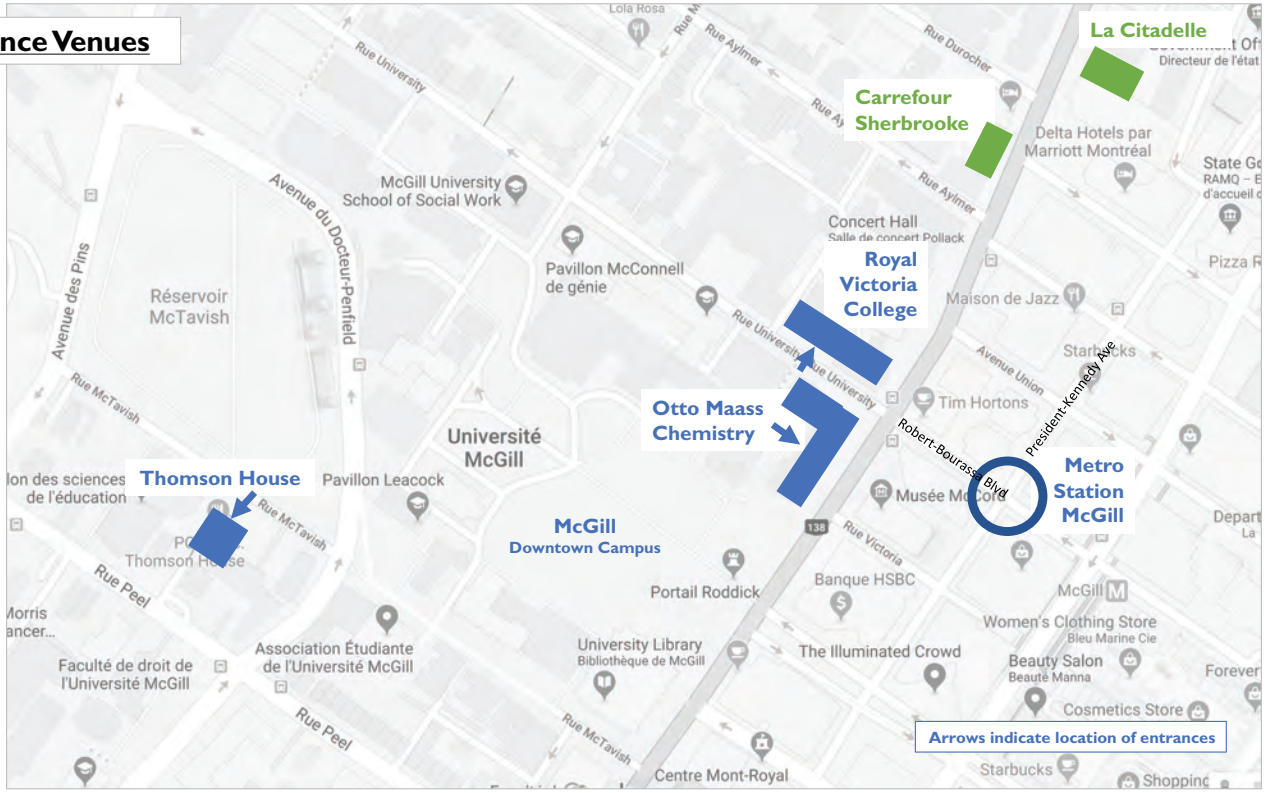
On August 14, a luggage check will be available to store suitcases until 14:00 on that day. While the room will be locked, the use of this service is at the risk of the participant. The conference organizers do not assume any responsibility for lost or stolen luggage.

Land Recognition

McGill University is on land which long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We acknowledge and thank the diverse Indigenous people whose footsteps have marked this territory on which peoples of the world now gather.



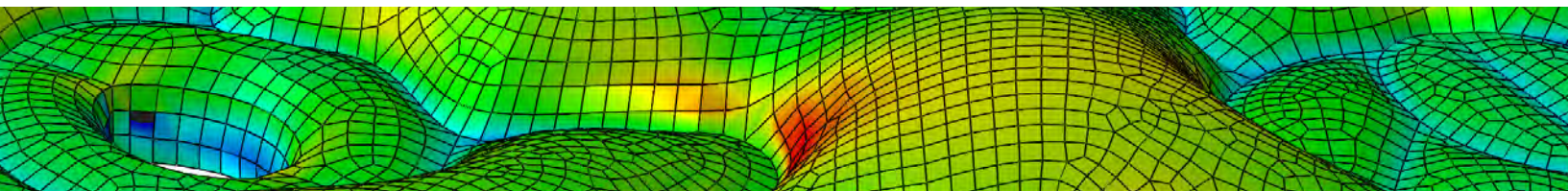
Conference Venues



Excursion on August 12: Montreal Botanical Garden Jardin botanique de Montréal



- Take green Metro line in direction Honoré-Beaugrand to station 'Pie IX';
  if you wish, follow a student guide leaving Otto Maass between 13:30 and 14:00
- Walk up hill and cross Sherbrooke St
- Enter Botanical Garden, keep to the right of the fountain
- Go to the meeting point at the booth of the '**Friends of the Botanical Garden / Amis du Jardin botanique**' located behind the **Information Booth**
- Show conference badge or guest pass to get free access to the Garden and/or follow a guided tour
- Tours leave between 14:00 and 16:00; if you arrive later, you are welcome to visit on your own; the garden remains open until 18:00



Thursday – August 9, 2018

17:30-19:30 Welcome Reception
(Courtyard of the Royal Victoria College, McGill University)

Friday – August 10, 2018

08:30 Welcome and Opening
(Otto Maass Chemistry Building, McGill University, Lecture Hall 112)

Chair of the Conference: **Anja Geitmann**, McGill University, CA
Vice-Principal Research & Innovation: **Martha Crago**, McGill University, CA

Cell Wall, Cells and Tissues I

08:45-10:00

Session sponsored by Botany – An International Journal for Plant Biology

Session Chair: Douglas Cook

08:45 **Siobhan Braybrook**, UCLA, US – Invited Speaker
The soft side of growth - investigating the mechanical contribution of pectin to growth
Speaker sponsored by Journal of Experimental Botany
S 1

09:15 **Richard Morris**, John Innes Centre, GB
How plants breathe – finite element models of guard cells
R 1

09:30 **Charles Anderson**, The Pennsylvania State University, US
Biomechanical influences of guard cell walls on stomatal development and function in Arabidopsis thaliana
R 2

09:45 **Daniel Cosgrove**, The Pennsylvania State University, US
The nature of wall extensibility: Insights from three biomechanical assays and the actions of selective enzymes
R 3

Poster Mounting & Coffee

10:00 - 10:45

Break sponsored by ZEISS

Cell Wall, Cells and Tissues II

10:45 - 12:00

Session Chair: Rivka Elbaum

10:45 **Mingyuan Zhu**, Cornell University, US
A MYB domain protein controls organ size uniformity through affecting cell wall stiffness in Arabidopsis
R 5

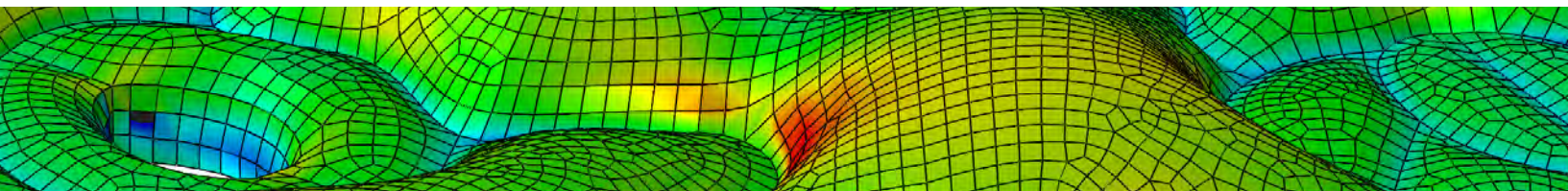
11:00 **Tobias I. Baskin**, University of Massachusetts, US
Mechanics of cellulose synthesis: Insights from imaging
R 6

11:15 **Dorothee Stoeckle**, University of Zurich, CH
MAPping the roles of the cytoskeleton during lateral root formation
R 7

11:30 **Matthew Grasso**, University of Vermont, US
Engineering mechanically tunable microenvironments for individual plant cells
R 8

11:45 **Naomi Nakayama**, University of Edinburgh, GB
Psi-trap: A microfluidic platform to capture dynamic reactions of plant single cells to physico-chemical stimuli
R 9

Legend: Photo ok | Social media ok | No photos | No social media



Poster Flashtalks

12:00 - 12:30

Marc Thielen, University of Freiburg, DE — P 1
Springs and dashpots: Rheological models in plant biomechanics

Xuan Wang, Pennsylvania State University, US — P 3
Wall softening by pectin methylesterase through enhanced wall hydration

Liudmila Kozlova, Kazan Institute of Biochemistry and Biophysics, Russian Academy of Sciences, RU — P 5
Nano-mechanical properties of primary cell walls probed by AFM on nonfixed maize root inner tissues

Derek Gray, McGill University, CA — P 7
Isolation and utilization of structural elements from the plant cell wall

Euan Smithers, University of Birmingham, GB — P 9
Modelling biological hotspots can explain enzyme behaviour in primary cell wall growth

Stefanie Schmier, University of Freiburg, DE — P 11
Hierarchical structure and mechanical properties of the endocarp of Cocos nucifera as inspiration for concrete based building components

Kaiyang Yin, Dartmouth College, US — P 13
Structure-property-processing correlations and in vivo performance of freeze-cast chitosan-nanocellulose scaffolds

Keunhwan Park, Technical University of Denmark, DK — P 15
Fluid dynamics of torus-margo pits: From biophysics to biomimetics

Jolet de Ruiter, Technical University of Denmark, DK — P 19
Optimal flow through a passive gas pump inspired by an emergent plant lung

Christopher Stubbs, New York University, US — P 23
A methodology for determining the role of the leaf sheath on the strength of maize stalks

Veronique Brulé, McGill University, CA — P 25
Investigating water-responsive actuation using Selaginella lepidophylla as a model system

Lunch

12:30-13:30

Lunch sponsored by SFR MAGNIFYING NANOSCIENCE

Mechano and Gravity Sensing I

13:30 - 14:30

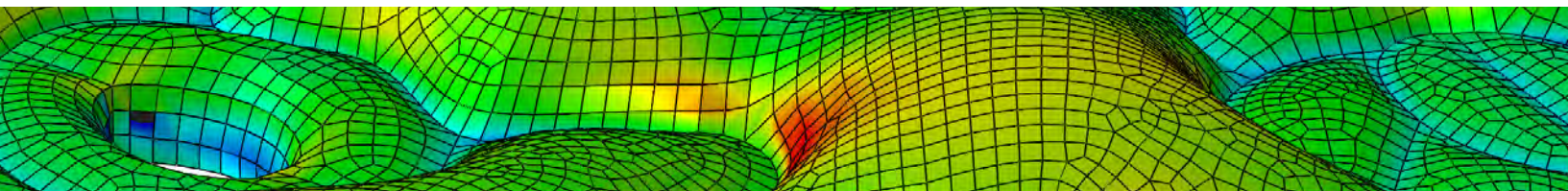
Session sponsored by frontiers in Plant Science

Session Chair: Bruno Moulia

13:30 **Gwyneth Ingram**, CNRS, FR – Invited Speaker — S 2
Functional analysis of the DEK1 protein links the perception of mechanical cues to epidermal cell fate

14:00 **Yoël Forterre**, Aix-Marseille University, CNRS, FR — R 10
Gravisensors in plant cells behave like an active granular liquid

14:15 **Hadrien Oliveri**, Inria, FR — R 11
Morphogenesis in plant organs: Understanding emerging behavior of stress-reacting tissues



Poster Flashtalks

14:30 - 15:00

Olivier Pouliquen, CNRS, Aix Marseille University, FR — P 27
Revealing the time scale hierarchy that controls the tropic response of shoots to gravi-stimulations

Bruno Moulia, INRA, FR — P 29
Habituation to wind as a prime driver of secondary growth in forest trees: How trees filter chronic wind-signals to acclimate strongly to high winds

Coraline Llorens, AMU CNRS, FR — P 31
Hydraulic signals in plants: A universal poroelastic mechanism

Jennette Shoots, Washington University in Saint Louis, US — P 33
Multitasking mechanosensitive channels: Membrane tension-activated ion flux and cell death signaling are independent functions of the MS ion channel MSL10

Naomi Nakayama, University of Edinburgh, GB — P 37
Separated vortex ring underlies the flight of the dandelion

Winfried Peters, Washington State University, US — P 39
Reversible cell wall swelling, an ignored factor in cellular biomechanics

Daniel Robertson, University of Idaho, US — P 41
Nondestructive measurement of plant diameter, rind thickness, and bending strength

Jin Woo Choi, Seoul National University, KR — P 43
The mechanical role of soft axial parenchyma cells in enduring drought

Eric Badel, INRA, FR — P 45
Mechanical stress drives wood formation and properties

Miyuki Matsuo-Ueda, Nagoya University, JP — P 47
The influence of g-layer on hygrothermal recovery of tension wood

Kwamina Otseidu, Cornell University, US — P 49
The effect of seasonality on the biomechanics of Pinus taeda

Coffee

15:00-15:30

Mechano and Gravity Sensing II

Session sponsored by MSC·SMC

Session Chair: Yoël Forterre

15:30 - 17:00

15:30 **Lazar Novakovic**, University of Melbourne, AU — R 12
Investigating the role of DEK1 in regulation of cell wall synthesis and plant growth

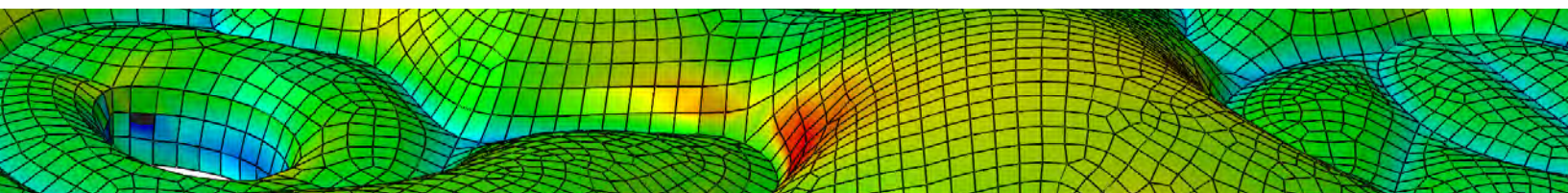
15:45 **Bruno Moulia**, INRA, FR — R 13
Wind acclimation (thigmomorphogenesis) and wind hazards as major drivers of the shaping of trees through evolution

16:00 **Adelin Barbacci**, INRA, FR — R 14
Thigmoimmunity: Mechanical signals prime the quantitative disease resistance of plant

16:15 **Miyo Morita**, Nagoya University, JP — R 15
Arabidopsis LZY family regulates GSA of lateral roots through the interaction with RLD family proteins

16:30 **Frank Telewski**, Michigan State University, US — R 16
Does actin have a role in mechanosensing in tomato?

16:45 **Juan Alonso-Serra**, University of Helsinki, FI — R 17
Towards understanding tree's proprioception



Poster Session – Refreshments

17:00 - 18:30

Session sponsored by New Phytologist Trust

All posters listed under Flashtalks on August 10 as well as the following posters:

Benjamin Graham, North Carolina State University, US — P 35
Influence of cortical microtubules on cotton fiber elongation and tip diameter

Frank W. Telewski, Michigan State University, US — P 51
Molecular characterization of the role of WEEP in directing branch orientation in peach trees

Thomas Speck, University of Freiburg, DE — P 53
Leech suction in air and under water: Secure attachment on plant leaves and other biological surfaces

Arata Yoshinaga, Kyoto University, JP — P 57
Heterogeneous distribution of xylan and lignin in tension wood G-layers of the S1+G type in several Japanese hardwoods

Saturday – August 11, 2018

Cell Wall, Cells and Tissues III

Session Chair: Charles Anderson

08:30 - 10:00

08:30 **Rivka Elbaum**, Hebrew University of Jerusalem, IL — R 18
Lignin modifications of secondary cell walls characterized on a subcellular level: Implication to hygroscopic movement in the stork's bill's awn

08:45 **James Tyrrell**, University of Birmingham, GB — R 19
Vesicle transport and cytoplasmic streaming in the pollen tube

09:00 **Tina Steinbrecher**, Royal Holloway University London, GB — R 20
Tissue mechanics and expression of cell wall remodelling proteins in the micropylar endosperm of Lepidium sativum seeds germinating at sub- and supra-optimal temperatures

09:15 **Tatyana Gorshkova,** Kazan Institute of Biochemistry and Biophysics, Kazan Scientific Center, Russian Academy of Sciences, RU — R 21
Tension development in tertiary cell wall of plant fibers: RG-I as the causative agent

09:30 **Dominique Derome**, Empa, CH — R 22
Understanding and predicting the hysteretic hygromechanical behavior of wood S2 cell layer with atomistic simulations

09:45 **Gabriella Mosca**, University of Zurich, CH — R 23
Why make complex cell shapes? A modelling approach

Coffee

10:00 - 10:30

Break sponsored by EDGE scientific

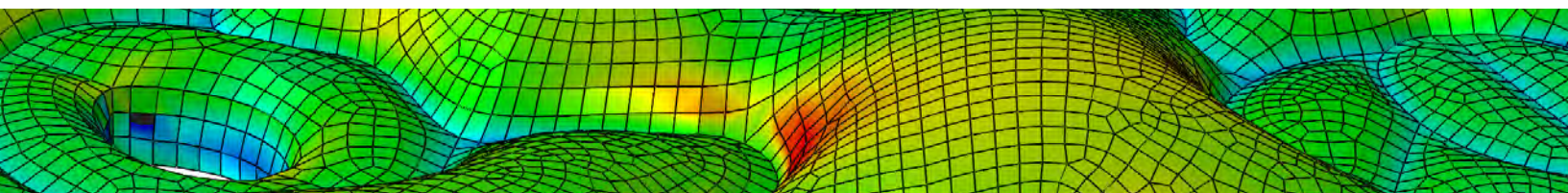
Cell Wall, Cells and Tissues IV

Session Chair: Derek Gray

10:30 - 12:00

10:30 **Stéphane Verger**, ENS de Lyon / INRA, FR — R 24
The tension-adhesion nexus in plant epidermis

10:45 **Jessica C. Huss**, Max-Planck Institute of Colloids and Interfaces, DE — R 25
How fire triggers opening in Banksia seed pods



11:00 **Douglas Cook**, Brigham Young University, US R 26
Including spatial variation of tissue properties in computational models of plant stems

11:15 **Arezki Boudaoud**, ENS de Lyon, FR R 27
Spatial and temporal variations in turgor during development

11:30 **Przemyslaw Prusinkiewicz,** University of Calgary, CA R 28
Incorporating collisions into biomechanical models of plant architecture

11:45 **Jean-François Louf**, DTU, DK R 29
Fluid dynamics of cytoplasmic mixing: From biomimetic aphids to rheology

Poster Flashtalks
12:00 - 12:30

Elien Diels, KU Leuven, BE P 2
Modelling the micro-mechanics of plant tissue upon failure using the Discrete Element Method

Loay Al-Zube, New York University Abu Dhabi, AE P 4
Measuring the modulus of elasticity of maize stems

Thomas Stanislas, Université de Lyon, ENS de Lyon, UCBL, INRA, CNRS, FR P 6
A phosphoinositide map at the shoot apical meristem in Arabidopsis thaliana

Lilan Hong, Cornell University, US P 8
Maintaining flattened laminar structure requires balanced growth on two sides of the organ

Olivier Ali, École Normales Supérieure de Lyon, FR P 10
Numerical study of turgor-induced stress patterns in multi-layered plant tissues during organogenesis

Wojciech Pałubicki, Adam Mickiewicz University, PL P 12
Modeling growth and signaling using a Discrete Element Method

Adelin Barbacci, INRA, FR P 14
Self-organized division of labor underpins the invasive lifestyle of a fungal plant pathogen

Anna Petrova, Kazan Institute of Biochemistry and Biophysics, RU P 16
Finite element modeling of tension creation in tertiary cell wall

Tom Lindtner, Humboldt-University Berlin, DE P 18
The seed dispersal unit in Avena sterilis: A hygroscopic-driven actuator

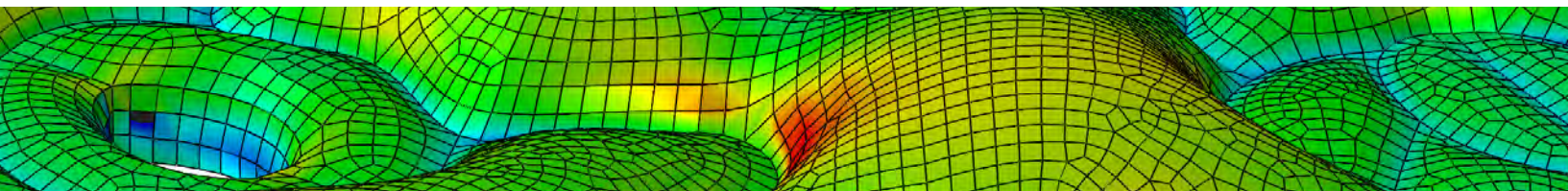
Lunch
12:30-13:30

Wood and Trees I
Session Chair: Emmanuel de Langre
13:30 - 14:30

13:30 **Delphine Jullien**, University of Montpellier, FR – Invited Speaker S 3
Growth stresses and their consequences on tree mechanics

14:00 **Tancrède Alméras**, CNRS, FR R 30
Wind-resistance strategies of trees: Effects of size and material properties

14:15 **Bruno Clair**, CNRS, FR R 32
The bark side of the force



Poster Flashtalks

14:30 - 15:00

Brandi Griffin, Valdosta State University, US — P 20
The functional morphology of Tillandsia usneoides nodal region based on scanning electron microscopy, stress-strain tests and chemical analysis for lignin content

Akane Okamoto-Nakazato, Showa Pharm. Univ., JP — P 22
Development of horizontal micro-extensometer: Implications of Y control mechanism

Adam Roddy, Yale University, US — P 24
Coordinated evolution of hydraulic and biomechanical traits allows for cheaper flowers

Anna Maria Łoboda, Institute of Geophysics PAS, PL — P 26
To what we endeavor in the biomechanics of aquatic plants?

Hiraku Suda, National Institute for Basic Biology, JP — P 28
Real-time cytosolic calcium imaging to elucidate the molecular mechanism of memory system in the Venus flytrap

Shuoye Chen, Nagoya University, JP — P 30
Changes in dynamic viscoelastic properties of compression wood due to hygrothermal treatment and their relationships with hygrothermal recovery

Joseph Gril, CNRS, FR — P 32
Vulnerability of water conduction in compression and normal wood

Winfried Peters, Washington State University, US — P 34
A rare case of plamoptysis in a vascular plant, and its implications for the mechanism of tissue tension phenomena

Jan Carmeliet, ETH Zurich, CH — P 36
Studying the environmental impact of trees and vegetation on the urban climate: Experiments and modeling

Olga Speck, University of Freiburg, DE — P 38
Force transmission and actuation in the transition zone between rod-shaped and planar plant organs

Gabriella Mosca, University of Zurich, CH — P 42
MorphoDynamX, a novel, user-friendly tool for plant morphogenesis and a test case on A. thaliana ovule development

Christopher Stubbs, New York University, US — P 44
Determining the transverse Young's modulus of maize stems using specimen-specific finite element models and computed tomography

Romain Lehnebach, Université Montpellier, FR — P 46
Does mechanical state of bark change with ontogeny? A study on several tropical rain forest species

Coffee

15:00-15:30

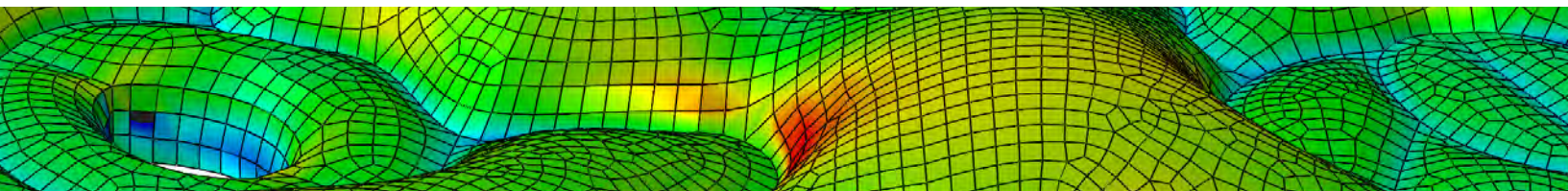
Break sponsored by Ag-West Bio

Wood and Trees II

Session Chair: Bruno Clair

15:30 **Romain Lehnebach**, Université de Montpellier, FR — R 31
Interlocked grain and density changes in Bagassa guianensis: A way to improve trunk biomechanics during ontogeny

15:45 **Thiéry Constant,** INRA, FR — R 33
Disentangling the effect of mechanical stimulations in the tree growth response after thinning: First results of an experiment carried out in a beech stand



16:00 **Eric Badel,** INRA, FR — R 35
The multiple mechanosensitive responses of wood formation to bending: Anatomical and wood properties consequences

16:15 **Hiroyuki Yamamoto**, Nagoya University, JP — R 36
Does gymnosperm Gnetum gnemon forms tension wood or compression wood in its inclined stem? A biomechanical investigation in Indonesia

16:30 **Deborah Woodcock,** Clark University, US — R 37
Vessel diameter and density patterns in tropical trees

Poster Session
16:45 - 18:30

All posters listed under Flashtalks on August 11 as well as the following posters:

Marc Thielen, University of Freiburg, DE — P 50
4D-printed material systems for sports and medicine inspired by the deformation of butterwort (Pinguicula sp.) leaves

Satoru Tsugawa, Riken, JP — P 52
Soft spot emergence in the shape deformation model with spatio-temporal growth noise

Arata Yoshinaga, Kyoto University, JP — P 54
Orientation of lignin aromatic rings in secondary walls in Cryptomeria japonica and Quercus crispula as revealed by polarized Raman microscopy

Eva Gril, IRD, FR — P 56
Foliar strategies and within-leaf allocating patterns across three leaf types in the Araliaceae of New Caledonia

Sunday – August 12, 2018

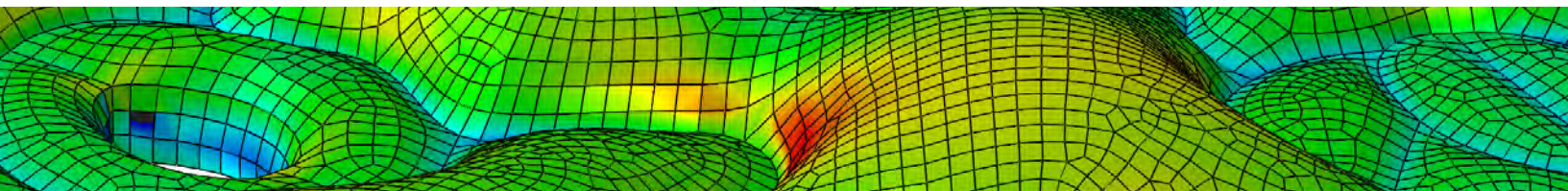
Applied Biomechanics and Biomimetics I
Session Chair: Matthew Harrington
08:30 - 10:30

08:30 **Olga Speck**, University of Freiburg, DE — R 38
Self-repair of succulent plant organs

08:45 **Marilia Sonego**, Federal University of São Carlos (UFSCar), BR — R 39
Learning from mesocarp of brazil nut (Bertholletia excelsa): Mechanical behaviorunder compression forces monitored by shearography

09:00 **Camille Goudenhooft**, University of South Brittany (UBS), FR — R 40
Flax stems: Using the plant architecture to provide models of bioinspired composite structures

09:15 **Linnea Hesse**, Botanic Garden Freiburg, DE — R 41
Magnetic resonance imaging reveals load-adapted structuring and development of dragon tree branches: Models for technical fibre-reinforced branchings



09:30 **Hongbo Li**, Shanxi Agricultural University, CN — R 42
Trans-scale analysis of the mechanical properties of Moso bamboo

09:45 **Simon Poppinga**, Botanic Garden Freiburg, DE — R 43
Abstraction of slow and fast plant movement principles for the technical transfer into biomimetic structures

10:00 **Nils Horbelt**, Max Planck Institute of Colloids and Interfaces, DE — R 44
Elucidating self-assembly of cellulose hierarchical structure in mistletoe viscin fibers

10:15 **Thomas Speck**, University of Freiburg, DE — R 45
From stems to struts – plant ramifications as concept generators for the development of biomimetic branched support structures in building construction

Coffee
10:30 - 11:00

Break sponsored by ELSEVIER

Applied Biomechanics and Biomimetics II

Session Chair: Olga Speck

11:00 - 12:45

11:00 **Alixander Perzon**, University of Copenhagen, DK — R 46
Enzymatically modified cellulose microfibrils from vegetable waste can be used to assemble strong gels and materials

11:15 **Amir J Bidhendi**, University of Montreal, CA — R 47
Damage control by geometry – fracture toughness of plant tissues determined by the cell shape

11:30 **Christopher Barrett**, McGill University, CA — R 48
Light-responsive opto-mechanical polymers that mimic phototaxis

11:45 **Markus Rueggeberg**, Empa, CH — R 49
Smart wooden actuators for architecture and construction

12:00 **Ulrike G.K. Wegst**, Thayer School of Engineering, US — R 50
Ice-templating palm- and bamboo-inspired materials with hierarchical structures and gradient properties

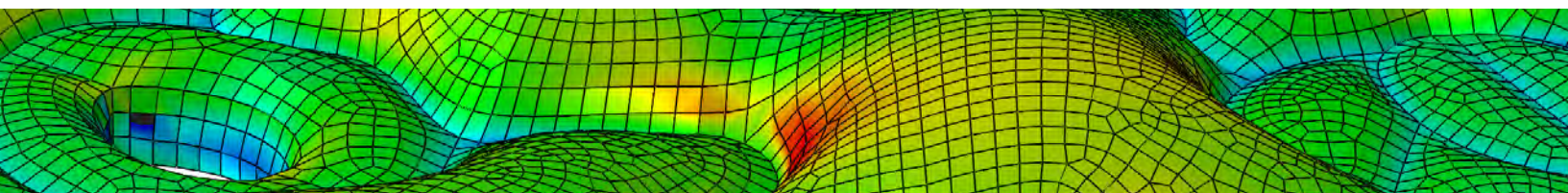
12:15 **Anna Westermeier**, University of Freiburg, DE — R 51
The fast snap-traps of the carnivorous aquatic waterwheel plant (Aldrovanda vesiculosa) – biomechanics, functional morphology, ecology, and biomimetic potential

12:30 **Kaare H. Jensen**, Technical University of Denmark, DK — R 52
Masters of defence: Biomechanics of stinging nettles

Lunch
12:45-13:30

13:30-14:00 Departures on metro in groups

14:00-18:00 Excursion (Montreal Botanical Garden)



Monday – August 13, 2018

Memorial Symposium for Hanns-Christof Spatz

Session Chair: Thomas Speck

08:30 - 10:00

08:30 The work of Hanns-Christof Spatz at the University of Freiburg
Thomas Speck, University of Freiburg, DE

08:45 **Karl Niklas**, Cornell University, US – Invited Speaker — S 4
Size-dependent variation in plant structure and function

09:15 **Tim Kampowski**, Albert-Ludwigs University of Freiburg, DE — R 53
Herbaceous shape memory material systems: Structural and biomechanical adaptations to desiccation in the resurrection plant Ramonda myconi (Gesneriaceae)

09:30 **Darshil Shah**, University of Cambridge, GB — R 54
Imaging and modelling of liquid transport in timber through in-situ X-ray CT and high-resolution μ-CT

09:45 **Evelyne Kolb**, PMMH, FR — R 55
Mechanics of roots in modeled soil substrates

Coffee

10:00 - 10:30

Break sponsored by Nikon

Ecological and Evolutionary Biomechanics I

Session Chair: Frédérick Gosselin

10:30 - 12:30

Session sponsored by McGill Faculty of Science

10:30 **Daniel Robertson**, University of Idaho, US — R 56
The effect of micro, meso and macro environments on plant bending strength

10:45 **Erin Sparks**, University of Delaware, US — R 57
Bracing for impact: The role of aerial roots in plant stability

11:00 **Rena Schott**, State Museum of Natural History Stuttgart, DE — R 58
What can we learn from Equisetum hyemale var. robustum cells dealing with subzero temperatures?

11:15 **Ariana Rupp**, University of Akron, US — R 59
Biomimetic investigation of leaf shapes and margins for evaporation and heat dissipation

11:30 **Valerie Legué**, INRA and Clermont Auvergne University, FR — R 60
Importance of root cap on root response to mechanical impedance

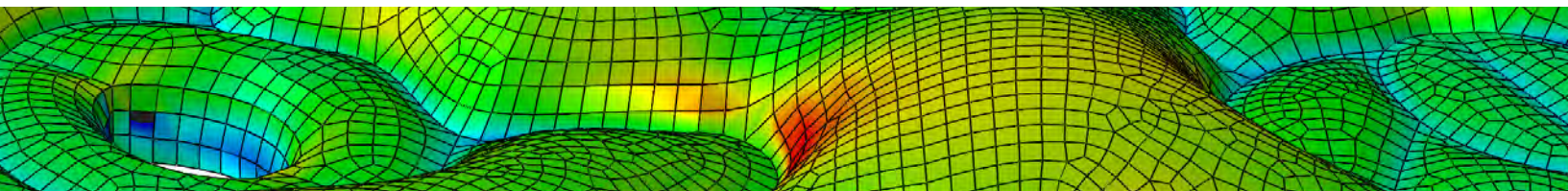
11:45 **Ilana Shtein**, Eastern Region R&D, IL — R 61
Autotomy in plants: self-amputation mechanism in Oxalis leaves

12:00 **Charchit Kumar,** University of Freiburg, DE — R 62
Adhesion in polymeric plant leaf replicas: insight into the real-contact zone, using in situ visualization

12:15 **Venkata Amarnadh Surapaneni**, University of Freiburg, DE — R 63
Ontogenic variations of plant surface microstructures and insect adhesion

Lunch

12:30-13:30



Ecological and Evolutionary Biomechanics II

Session Chair: Naomi Nakayama

13:30 - 15:00

Session sponsored by *Plant Physiology*

13:30 **Patrick Martone**, University of British Columbia, CA – Invited Speaker — S 5
Life in the weeds: Biomechanics lessons from wave-swept seaweeds

14:00 **Sara Puijalon**, University Lyon 1, FR — R 64
Effects of aquatic plant patches on hydrodynamics and biogeochemical processes

14:15 **Sophie Lejeune**, University of Liège, BE — R 65
Raindrop impact and fragmentation at the edge of leaves, in the context of foliar disease transmission

14:30 **Oleksandr Zhdanov**, University of Glasgow, GB — R 66
Influence of wind on structural, aerodynamic and mechanical properties of Arabidopsis thaliana

14:45 **Liam Coleman**, University of British Columbia, CA — R 67
New insights into the physiological mechanisms facilitating morphological plasticity in response to mechanical stress in the kelp Nereocystis luetkeana

Coffee
15:00-15:30

Break sponsored by SOQUELEC

Ecological and Evolutionary Biomechanics III

Session Chair: Markus Rueggeberg

15:30 - 17:00

15:30 **Emmanuel de Langre**, Ecole polytechnique, FR — R 68
Phenotyping plants by vibrations

15:45 **Frédérick Gosselin**, Polytechnique Montreal, CA — R 69
Drag reduction by reconfiguration: Influence of twist, chirality and flutter

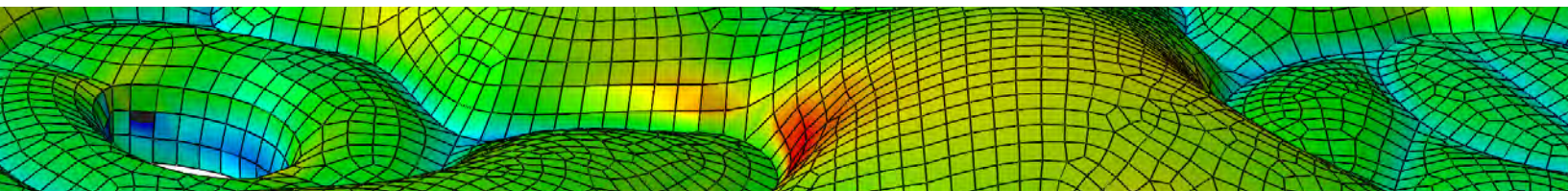
16:00 **Dwight Whitaker**, Pomona College, US — R 70
Aerodynamic effects on seed dispersal range in Ruellia

16:15 **Madeleine Seale**, University of Edinburgh, GB — R 71
The dandelion clock: Biomechanics of dispersal

16:30 **Waheed Arshad,** Royal Holloway, University of London, GB — R 72
Dispersal biomechanics and adaptation mechanisms in the dimorphic fruits and seeds of Aethionema arabicum

16:45 **Tomohiko Sano,** Ritsumeikan University, JP — R 73
Slip morphology of strips: Inspiration from plant-soil mechanical interactions

18:30-24:00 Conference Party (Thomson House)



Tuesday – August 14, 2018

Morphogenesis and Pattern Formation I

Session Chair: Daniel Kierzkowski

09:15 - 10:30

09:15 **Lakshminarayanan Mahadevan**, Harvard University, US – Invited Speaker — S 6
Morphogenesis of pollen tubes, flowers, spurs and shoots

09:45 **Michal Sahaf,** The Hebrew University of Jerusalem, IL — R 74
Physically-induced changes in material properties and growth patterns of leaves

10:00 **Aleksandra Sapala**, Max Planck Institute for Plant Breeding Research, DE — R 75
Why do plants make puzzle cells?

10:15 **Benjamin Graham**, North Carolina State University, US — R 76
Influence of cortical microtubules on cotton fiber elongation and tip diameter

Coffee
10:30 - 11:00

Break sponsored by SFR MAGNIFYING NANOSCIENCE

Morphogenesis and Pattern Formation II

Session Chair: Ulrike Wegst

11:00 - 12:15

11:00 **Daniel Kierzkowski**, University of Montreal, CA — R 77
An integrated model of leaf shapes development

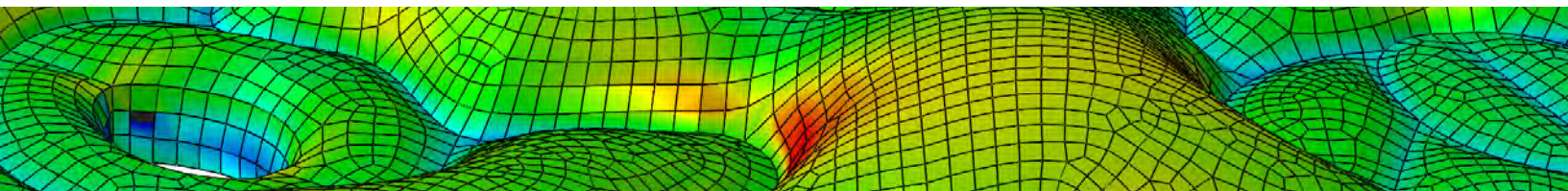
11:15 **Julien Derr,** Université Paris Diderot, FR — R 78
Fluttering of growing leaves as a way to reach flatness: Experimental evidence on Persea americana

11:30 **Adam Saffer**, Yale University, US — R 79
Pectin suppresses the helical growth of plant cells

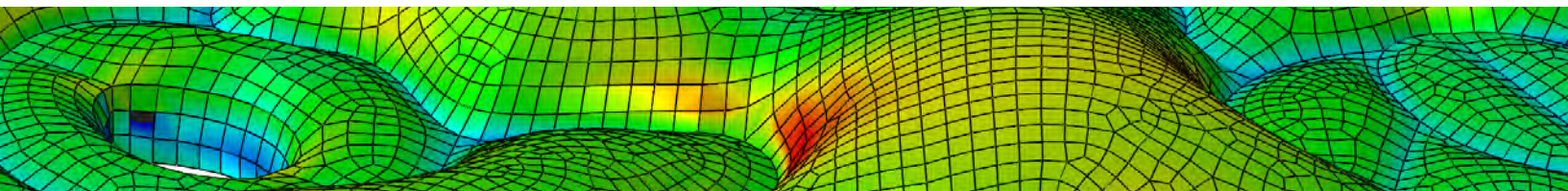
11:45 **Ibrahim Cheddadi**, Université Grenoble Alpes, FR — R 80
Coupling water fluxes with cell wall mechanics in multicellular models of plant development

12:00 **Dorota Kwiatkowska,** University of Silesia in Katowice, PL — R 81
Hoopskirt-like mechanical design of the holly leaf

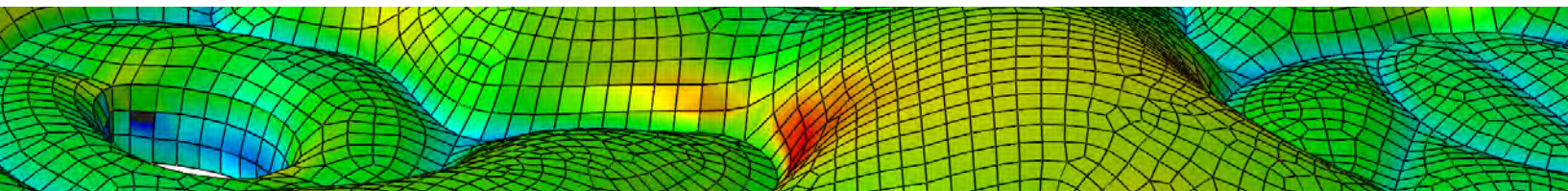
12:15 Awards & Closing



Notes



Notes



History of the Plant Biomechanics Conferences

The first International Plant Biomechanics Conference was held in 1994 in Montpellier, France, organized by Bernard Thibaut and colleagues. Since then the conference has been held at three-year intervals.

8th Conference 2015
Nagoya, Japan
Organizers: Hiroyuki Hamamoto, Miyo T. Morita, Joseph Gril

7th Conference 2012
Clermont-Ferrand, France
Organizers: Bruno Moulia, Meriem Fournier

6th Conference 2009
Cayenne, French Guyana
Organizer: Bernard Thibaut

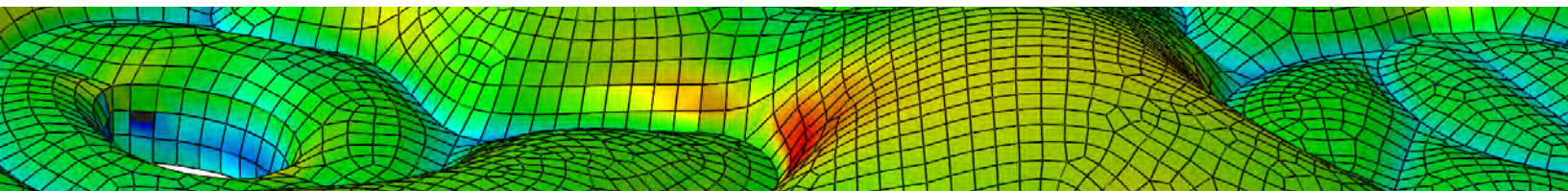
5th Conference 2006
Stockholm, Sweden
Organizer: Lennart Salmén

4th Conference 2003
East Lansing, Michigan, USA
Organizer: Frank W. Telewski

3rd Conference 2000
Freiburg-Badenweiler, Germany
Organizers: Thomas Speck, Hanns-Christof Spatz

2nd Conference 1997
Reading, United Kingdom
Organizer: George Jeronimidis

1st Conference 1994
Montpellier, France
Organizer: Bernard Thibaut



9th INTERNATIONAL PLANT BIOMECHANICS CONFERENCE
Montreal | Canada
August 9-14, 2018

Schedule at a Glance

	Thursday, August 9	Friday, August 10	Saturday, August 11	Sunday, August 12	Monday, August 13	Tuesday, August 14
8-9						
9-10		8:30 **Opening** 8:45-10:00 ***Cell Wall, Cells & Tissues*** Invited: Siobhan Braybrook	8:30-10:00 ***Cell Wall, Cells & Tissues***	8:30-10:30 ***Applied Biomechanics & Biomimetics***	8:30-10:00 **Memorial Symposium for Hanns-Christof Spatz** Invited: Karl Niklas	9:15-10:30 ***Morphogenesis & Pattern Formation*** Invited: L. Mahadevan
10-11		**Poster mounting** & Coffee	Coffee	Coffee	Coffee	Coffee
11-12		10:45-12:00 ***Cell Wall, Cells & Tissues***	10:30-12:00 ***Cell Wall, Cells & Tissues***	11:00-12:45 ***Applied Biomechanics & Biomimetics***	10:30-12:30 ***Ecological & Evolutionary Biomechanics***	11:00-12:15 ***Morphogenesis & Pattern Formation*** **Awards & Closing**
12-13		**Poster Flashtalks**	**Poster Flashtalks**			
13-14		12:30-13:30 Lunch provided	12:30-13:30 Lunch provided	12:45-13:30 Lunch provided	12:30-13:30 Lunch provided	
14-15		13:30-14:30 ***Mechano & Gravity Sensing*** Invited: Gwyneth Ingram	13:30-14:30 ***Wood & Trees*** Invited: Delphine Jullien	Departure	13:30-15:00 ***Ecological & Evolutionary Biomechanics*** Invited: Patrick Martone	
15-16		**Poster Flashtalks**	**Poster Flashtalks**	14:00-18:00 Visit **Botanical Garden** Guided tours leaving at booth of 'Les Amis du Jardin Botanique' between 14:00 and 16:00 Conference badge required	Coffee	
16-17		Coffee	Coffee		15:30-17:00 ***Ecological & Evolutionary Biomechanics***	
17-18		15:30-17:00 ***Mechano & Gravity Sensing***	15:30-17:00 ***Wood & Trees***			
18-19	17:30-19:30 **Welcome Reception** Royal Victoria College	17:00-18:30 **Poster Session** & Refreshments	17:00-18:30 **Poster Session** & Refreshments		18:30-24:00 **Conference Party** Thomson House	
19-20						

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