Welcome to Vienna!
Welcome to MultBioMe 2017!

Inner City Map of Vienna

Map of TU Wien

Conference Venue  
Prechtl Hall  
TU Wien, Main Building (main entrance marked with 1)  
TU Wien, Main Building, ground floor
Conference Organisation

Organising Institutions
Vienna University of Technology (TU Wien), Austria
Institute for Mechanics of Materials and Structures

École Polytechnique, France
Department of Mechanics and Biology

Rensselaer Polytechnic Institute, USA
Department of Mechanical, Aerospace and Nuclear Engineering and Department of Biomedical Engineering

Chairmen
Stefan SCHEINER (Vienna University of Technology)
Abdul I. BARAKAT (École Polytechnique)
Suvranu DE (Rensselaer Polytechnic Institute)

Secretary General
Martina PÖLL (Vienna University of Technology)

Scientific Advisory Committee
Stéphane AVRIL (École des Mines de Saint-Étienne, France)
Elisa BUDYN (École Normale Supérieure de Cachan, France)
Christian CYRON (Technische Universität München, Germany)
José Augusto FERREIRA (University of Coimbra, Portugal)
José-Manuel GARCIA-AZNAR (University of Zaragoza, Spain)
Liesbet GERIS (University of Liege, Belgium)
Christian HELLMICH (Vienna University of Technology, Austria)
Roger KAMM (Massachusetts Institute of Technology, USA)
Rob KRAMS (Imperial College London, UK)
Ellen KUHL (Stanford University, USA)
Sanjay KUMAR (University of California, Berkeley, USA)
Sean MCGINTY (University of Glasgow, UK)
Peter MCHUGH (National University of Ireland Galway, Ireland)
Chaouqi MISBAH (Laboratoire Interdisciplinaire de Physique, France)
Jérôme NOAILLY (Pompeu Fabra University, Spain)
Peter PIVONKA (Queensland University of Technology, Australia)
Giuseppe PONTRELLI (Istituto per le Applicazioni del Calcolo - CNR, Italy)
Kay RAUM (Charité - Universitätsmedizin Berlin, Germany)
Philipp THURNER (Vienna University of Technology, Austria)
Hans VAN OOSTERWYCK (University of Leuven, Belgium)
Tuoi VO (University of Limerick, Ireland)
Jolanda WENTZEL (University Medical Center Rotterdam, Netherlands)
The Conference Venue

The conference takes place at the Vienna University of Technology (TU Wien), Main Building, Karlsplatz 13, 1040 Vienna. All lectures will be held in the Prechtl Hall, located on the ground floor of the building.

Social Programme

Banquet: Tuesday, September 12, 2017, 20:00

The banquet, given by the Mayor of the City of Vienna for all registered participants, will take place at the picturesque Vienna City Hall in the Rathauskeller, Rathausplatz 1.

The banquet will start at 20:00.

The Rathauskeller can be reached by underground U2 (station "Rathaus"), or tramway lines 1, 71, D (station "Rathausplatz"). Please see the map on the cover page for details.
Your Way to the Conference Venue

The conference venue can be easily reached by public means of transport (in particular, by underground lines U1, U2, and U4; tramways lines D, J, 1, 2, 62, 65; and bus lines 4A and 59A):

**From the Airport**

- **by taxi** € 40.00
  The ride takes approximately 20 minutes.

- **by bus** € 8.00 (one way), € 13.00 (return ticket)
  Buses run at intervals of 20 minutes in front of the arrivals area of the airport: the ride to "Schwedenplatz/Morzinplatz" (connections to U1, U4) takes approx. 20 minutes.

- **by CAT (City Airport Train)** € 12.00 (one way), € 21.00 (return ticket); reduced fares available if ticket is paid online in advance
  Trains run at intervals of 30 minutes (xx:05 and xx:35); the non-stop ride to the "City Airport Terminal (Wien Mitte/Landstraße)" (connections to U3, U4) takes approx. 16 minutes.

- **by train („Schnellbahn“)** € 4.40 (one way)
  Trains also run at intervals of 30 minutes; the ride to the "City Airport Terminal (Wien Mitte/Landstraße)" (connections to U3, U4) takes approx. 25 minutes.

**From Railway Station “Wien Meidling / Philadelphiabrücke”**

- Take underground line U6 (direction Floridsdorf) to station "Längenfeldgasse". There, change to underground line U4 (direction Heiligenstadt) to "Karlsplatz".

**From Railway Station “Wien Westbahnhof”**

- Take underground line U3 (direction Simmering) to station "Stephansplatz". There, change to underground line U1 (direction Reumannplatz) to "Karlsplatz".

**From Railway Station “Wien Hauptbahnhof”**

- Take underground line U1 (direction Leopoldau) to station "Karlsplatz".

**By Car**

- The conference venue is near the main transit route through Vienna. However, parking in the central areas of Vienna is limited to 1½ – 2 hours, and parking vouchers, available at tobacconists ("Trafik"), are required.
Tourist Information

Currency
The official currency in Austria is the Euro. 1 Euro = 100 Cents. The symbol for the Euro is €.

Foreign Exchange, Banks & Credit Cards
Money can be changed at the airport, at banks, exchange bureaus, and larger hotels. For a cash withdrawal, Maestro and credit cards can be used at cash dispensers (“Bankomat”) which are available all over the city.

Important Telephone Numbers
Emergency Number 112    Police 133    Medical Service 141
Fire Brigade 122    Ambulance 144

Pharmacy
The nearest pharmacy is located on Wiedner Hauptstraße 14 (open between Mon-Fri 8:00-18:00, Sat 8:00-12:00). The same opening times apply to most pharmacies in Vienna. A 24-hour pharmacy standby service is available throughout the city. Details of the nearest open pharmacy are posted at every pharmacy. For telephone information call +43 1 1455.

Prices and Tips
Menu prices usually include service and taxes. In restaurants, a tip of approximately 5-10% is expected.

Shopping
Typical shopping hours are Monday to Friday 9:00 - 18:00 and Saturday 10:00 - 13:00 (17:00). Apart from some tobacconists and small supermarkets at petrol stations and at the main railway stations, shops are closed on Sundays. Luxury shops with an exclusive range of products can be found in the first district of Vienna, in the pedestrian zones "Graben" and "Kärntnerstraße" (reachable by underground lines U1 and U3, station "Stephansplatz"). Street entertainers and outdoor cafés contribute to the special atmosphere of this area. A well known shopping area is Mariahilferstraße (reachable by underground lines U3, stations "Neubaugasse" or "Zieglergasse", and U2, station "Museumsquartier").

Taxi
The main taxi companies in Vienna can be reached by phone: +43 1 31300, +43 1 40100, or +43 1 60160.

Transportation
The best way to discover Vienna is by public transport. The transport system includes a dense network of tramway, bus, underground, and train lines. The following tickets are available:

• Single-ride ticket: € 2.20 (at vending machines), € 2.20 (in trams only)
• 24-hour (multiple-ride) ticket: € 7.60
• 48-hour (multiple-ride) ticket: € 13.30
• 72-hour (multiple-ride) ticket: € 16.50
• Week card (multiple-ride ticket): € 16.20 (valid from Monday to Monday)
• Vienna Card: € 13.90 (24-hour (multiple-ride), € 21.90 (48-hour (multiple-ride), or € 24.90 (72-hour (multiple-ride) ticket, reduced rates for guided tours, at restaurants, ...)

Tickets are available at Vienna Transport sales counters and at tobacconists. Apart from the Vienna Card, tickets can also be obtained from vending machines at the underground stations.

Voltage
In Austria, the standard voltage is 230V, and power outlets include continental two-pin plugs. A plug adapter should be used if electronic devices incompatible with this type of power supply are used.
Scientific Programme
Information for Lecturers

- Technical staff will help with technical equipment.
- The lecture room is equipped with a notebook (Windows 7, Microsoft Office 2013, Acrobat Reader) and a beamer. Please upload your presentation to this notebook as soon as possible, but at the very latest in the break before the session.
- Please be present at least 10 minutes prior to the start of your session and inform the chairperson that you are there.
- Please make sure to be present in your session from its beginning in order to ensure smooth changes between the individual presentations.
- The time allotted for all regular presentations is 20 minutes, and for keynote presentations 40 minutes, in both cases including time for discussion. The chairpersons are requested to stop presentations after the allotted time has passed.

Information for Chairpersons

- All lecturers of your session are requested to approach you in the lecture room at least 10 minutes before the start of the session. This allows you to identify lecturers who have not arrived yet.
- Technical staff will be present, responsible for the technical equipment in general, and for uploading the presentations.
- You are kindly asked to lead through the programme by simply announcing the name of the next presenter and the title of the presentation. Due to the tight schedule, there will not be sufficient time for introducing individual lecturers in a more detailed manner.
- Please do your best to strictly limit the duration of each presentation and discussion to the allotted time.
Keynote Lectures

Monday, September 11, 2017
09:20  KL I  Mohammad Mofrad (University of California, Berkeley, USA):
Mechanobiology of the nuclear pore complex machinery

14:00  KL II  Liesbet Geris (University of Liège, Belgium):
Computational bone tissue engineering: in vitro, in vivo ... in silico

Tuesday, September 12, 2017
14:00  KL III  Hanna Isaksson (Lund University, Sweden):
A multiscale approach to study bone damage and fracture mechanisms

Wednesday, September 13, 2017
12:30  KL IV  Rob Krams (Imperial College, United Kingdom):
Multiscale modelling of the mechanobiology of blood vessels
### Monday, September 11, 2017

**Opening session**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Presenter(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td></td>
<td>Prechtl Hall</td>
<td>Abdul I. Barakat, S. Scheiner (Conference Chairmen)</td>
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</tbody>
</table>

**Keynote lecture**

Chair: Abdul I. Barakat

<table>
<thead>
<tr>
<th>Time</th>
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<th>Topic</th>
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### 10:00 - 10:30

**Coffee Break**

### Session I

**Mechanobiology**

Chair: Christian J. Cyron

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Presenter(s)</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>10:30</td>
<td>I:1</td>
<td>Prechtl Hall</td>
<td>A. D. Rauch, A.-T. Vuong, L. Yoshihara, W. A. Wall</td>
<td>Towards a comprehensive computational framework for the finite element simulation of biochemo-mechano coupled processes during cell migration</td>
</tr>
<tr>
<td>10:50</td>
<td>I:2</td>
<td>Prechtl Hall</td>
<td>K. L. Mills, X. Gong</td>
<td>The effects of physical forces on cell shape and tumor growth in 3D</td>
</tr>
<tr>
<td>11:10</td>
<td>I:3</td>
<td>Prechtl Hall</td>
<td>J. Fouchard, T. Wyatt, P. Recho, A. Lisica, N. Khalilgharibi, A. Kabla, G. Charras</td>
<td>The response of epithelial monolayers to large compressive stress: buckling and flattening reveal active and fluid-like behavior</td>
</tr>
<tr>
<td>11:30</td>
<td>I:4</td>
<td>Prechtl Hall</td>
<td>M.-I. Pastrama, S. Scheiner, P. Pivonka, C. Hellmich</td>
<td>Pore space-specific bone mechanosensation studied by means of a multiscale systems biology approach</td>
</tr>
<tr>
<td>11:50</td>
<td>I:5</td>
<td>Prechtl Hall</td>
<td>V. Damioli, A. Salvadori, G. P. Beretta, C. Ravelli, S. Mitola</td>
<td>Co-designed experiments and multi-physics modeling of the VEGFR-2 relocation on endothelial cells</td>
</tr>
<tr>
<td>12:10</td>
<td>I:6</td>
<td>Prechtl Hall</td>
<td>S. Deveraux, R. Allena, D. Aubry</td>
<td>Intracellular pressure drives confined cell migration in bleb-based motility</td>
</tr>
</tbody>
</table>

### 12:30 - 14:00

**Lunch Break**
Monday, September 11, 2017

Keynote lecture
Chair: Stefan Scheiner

14:00  KL II  **L. Geris**: Computational bone tissue engineering: in vitro, in vivo ... in silico

Session II  Prechtl Hall

**Tissue engineering**
Chair: Giuseppe Pontrelli

14:40  II:1  P. Heher, J. Tomasz, B. Maleiner, H. Redl, **C. Fuchs**: The importance of biomechanical cues for in vitro skeletal myogenesis

15:00  II:2  **C. Villette**, M. Castilho, J. Malda, A. Phillips: Optimised heterogeneous scaffolds: towards tailored bone mechanotransduction


15:40  II:4  Y. Guyot, I. Papantoniou, **L. Geris**: Spatiotemporal evolution of stem cell niches during neotissue growth on minimal surfaces in perfusion

16:00  II:5  A. R. Perestrelo, S. Pagliari, V. Vinarsky, J. Vrbsky, F. Martino, J. O. De La Cruz, G. Caluori, P. Skladal, V. Horvath, **G. Forte**: YAP mechanosensor in the regulation of cardiac phenotype and function

16:20 - 16:50  Coffee Break

Session III  Prechtl Hall

**Biomechanics**
Chair: Suvranu De


17:10  III:2  **T. Heck**, B. Smeets, D. A. Vargas, S. Vanmaercke, H. Ramon, P. Van Liedekerke, H. Van Oosterwyck: Computational modeling as a method to investigate the role of mechanics in cell migration through a degradable viscoelastic extracellular matrix

17:30  III:3  Y. J. Yoon: Permittivity does not affect the wave velocity, but charge density does in trabecular bone


Tuesday, September 12, 2017

Session IV: Biomechanics
Prechtl Hall

09:00 IV:1  W. Krasny, H. Magoariec, C. Morin, S. Avril: Kinematics of collagen fibers in carotid arteries under tension-inflation loading

09:20 IV:2  W. Karaki, Rahul, S. De: A multiscale model of radio-frequency electrosurgical tissue heating

09:40 IV:3  S.-J. Estermann, S. Scheiner: Multiscale modeling gives access to a differentiated view on the fluid flow-driven excitation of bone cellular activities

10:00 IV:4  O. G. Andriotis, L. Kain, C. Thorpe, H. R. Screen, P. J. Thurner: Nanoscale and microscale mechanics of equine tendons

10:20 IV:5  V. Vass, C. Morin, C. Hellmich: Micromechanics of plastically sliding interfaces: theoretical foundations and application to bone

10:40 - 11:10  Coffee Break

Session V: Biofluidics
Prechtl Hall

11:10 V:1  N. Nikolov, S. Tabakova, S. Radev: Pulsatile blood flow in elastic arteries


12:10 V:4  C. Wagner, T. John: A foam model highlights the differences of the macro- and microrheology of respiratory horse mucus

12:30 - 14:00  Lunch Break
Tuesday, September 12, 2017

Keynote lecture
Chair: Stefan Scheiner

14:00 KL III
H. Isaksson, M. J. Turunen, A. Gustafsson, S. Le Cann, L. Grassi: A multiscale approach to study bone damage and fracture mechanisms

Session VI

Biomechanics
Chair: Tim Ricken

14:40 VI:1
C. Collins, U. Wolfram, P. Zysset, P. Thurner: Trabecularization at the endosteal surface of the femoral midshaft significantly effects fracture toughness of human cortical bone

15:00 VI:2

15:20 VI:3
A. Kurfürst, C. Hellmich: From CT images to non-homogeneous Timoshenko beams: a computational biomechanics approach

15:40 VI:4
A. C. Guerra, J. Belinha, R. Natal Jorge: Stress analysis of skin wounds using advanced discretization techniques: a preliminary study

16:00 - 16:30
Coffee Break

Session VII

Mechanobiology
Chair: Liesbet Geris

16:30 VII:1
E. Di Costanzo, A. Barakat, G. Pontrelli: Physical mechanisms governing the modulation by flow of ATP/ADP concentration at the vascular endothelial cell surface

16:50 VII:2
M. Ceresa, A. L Olivares, J. Noailly, M. A. Gonzalez Ballester: Coupling immune reaction and tissue mechanics time scales through inflammation in an emphysema model

17:10 VII:3
D. A. Vargas, A. Izquierdo-Álvarez, Á. Jorge-Peñas, T. Heck, B. SMEETS, H. Van Oosterwyck: Capturing spatial and temporal dynamics of traction exertion to guide computational modeling: how endothelial cells react to substrate mechanical and chemical properties

17:30 VII:4
T. Thalheim, M. Quaas, M. Herberg, G. Aust, J. Galle: Growth patterns of intestinal organoids

17:50 VII:5
R. Ben Kahla, A. Barkaoui, M. Chafran: Age and gender effects on bone remodeling under fatigue damage: finite element simulation
### Wednesday, September 13, 2017

#### Session VIII

**Mechanobiology**  
Chair: Caitlyn Collins

<table>
<thead>
<tr>
<th>Time</th>
<th>09:00</th>
<th>09:20</th>
<th>09:40</th>
<th>10:00</th>
<th>10:20</th>
<th>10:40 - 11:10</th>
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</thead>
<tbody>
<tr>
<td><strong>VIII:1</strong></td>
<td><strong>C. J Cyron, F. A Braeu</strong>: A micromechanical model of volumetric growth in soft biological tissues</td>
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<td><strong>VIII:2</strong></td>
<td><strong>J.O. De La Cruz, A. R. Perestrelo, F. Martino, V. Vinarsky, S. Pagliari, J. Vrbsky, G. Caluori, P. Skládal, G. Forte</strong>: YAP controls cell mechanics by rearranging the composition of extracellular matrix</td>
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<td><strong>VIII:3</strong></td>
<td><strong>M. J. Gouveia, R. Travasso</strong>: Simulating vessel growth with extracellular matrix remodeling</td>
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<td><strong>VIII:4</strong></td>
<td><strong>M. Peyroteo, J. Belinha, L. Dinis, R. Jorge</strong>: Mechanobiological algorithm to numerically predict bone tissue remodeling behavior</td>
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<td><strong>VIII:5</strong></td>
<td><strong>L. Baumgartner, J. J Reagh, C. Ruiz Wills, M. A. Gonzalez Ballester, J. Noailly</strong>: Reduction of extracellular matrix expression in the transition zone of a lumbar intervertebral disc model due to early cartilage endplate degeneration</td>
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#### Session IX

**Mechanobiology**  
Chair: Jérôme Noailly

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<thead>
<tr>
<th>Time</th>
<th>11:10</th>
<th>11:30</th>
<th>11:50</th>
<th>12:10</th>
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<tbody>
<tr>
<td><strong>IX:1</strong></td>
<td><strong>J. Ferreira, D. Jordão, L. Pinto</strong>: Ultrasound enhanced drug delivery: mathematical modeling and simulation</td>
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<tr>
<td><strong>IX:2</strong></td>
<td><strong>N. Mandel, T. Abdulrahman, K. Sack, D. Bezuidenhout, G. Limbert, F. Moscato, N. Davies, T. Franz</strong>: Modelling the deformation of cells in a hydrogel and fibrous scaffold environment</td>
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<td><strong>IX:3</strong></td>
<td><strong>H. Safi, N. Phillips, Y. Ventikos, R. J Bumphrey</strong>: Fluid-structure interactions in abdominal aortic aneurysms: validating computational models</td>
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<tr>
<td><strong>IX:4</strong></td>
<td><strong>C. Kober, C. Hellmich, A. Gurin, V. Komlev, G. Kjeller, R. Sader, H.-F. Zeilhofer, B.-I. Berg</strong>: Results of micromechanical research applied to biomechanical simulation of macroscopic skeletal organs demonstrated for the human mandible</td>
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**Wednesday, September 13, 2017**

**Keynote lecture**  
Chair: Abdul I. Barakat

**12:30**  
**KL IV**  
M. R. K. Mofrad: Mechanobiology of the nuclear pore complex machinery

**Closing Session**  
A. I. Barakat, S. Scheiner (Conference Chairmen)