

LEAD Project Workshop on Mechanics, Modeling and Simulation of Aortic Dissection

Riegersburg, Austria October 9-11, 2019



AORTIC DISSECTION
MECHANICS - MODELING - SIMULATION

Coordinated by

Gerhard A. Holzapfel, Institute of Biomechanics, TU Graz
Benjamin Marussig, Graz Center of Computational Engineering (GCCE)



Conference Venue

Seminarhotel Riegersburg
Starzenberg 144
8333 Riegersburg, Austria

<https://www.genusshotel-riegersburg.at/>

	Wednesday Oct 9	Thursday Oct 10	Friday Oct 11	
9:00		Guest Lecture 2 W.A. Wall	Guest Lecture 5 G. Mistelbauer	9:00
9:15				9:15
9:30				9:30
9:45				9:45
10:00		LEAD PhD 3 Douglas Pacheco	LEAD PhD 8 Antonio Pepe	10:00
10:15				10:15
10:30		Coffee break	Coffee break	10:30
10:45				10:45
11:00		Guest Lecture 3 B. Staber	Guest Lecture 6 I. Karšaj	11:00
11:15				11:15
11:30				11:30
11:45				11:45
12:00		LEAD PhD 4 Gian Marco Melito	LEAD PhD 9 Ishan Gupta	12:00
12:15				12:15
12:30		LEAD PhD 5 Sascha Ranftl	LEAD PhD 10 Alireza Jafarinia	12:30
12:45				12:45
13:00		Lunch	Lunch	13:00
13:15				13:15
13:30				13:30
13:45				13:45
14:00		2 nd Talk (45 min) D. Fleischmann	2 nd Talk (45 min) X.Y. Xu	14:00
14:15				14:15
14:30				14:30
14:45		LEAD PIs 1-5: O. Biro, G. Brenn K. Ellermann G.A. Holzapfel W. von der Linden	LEAD PIs 6-10: T.-P. Fries, M. Schanz T. Hochrainer D. Schmalstieg, O. Steinbach	14:45
15:00				15:00
15:15				15:15
15:30				15:30
15:45				15:45
16:00	Welcome	Coffee Break	Coffee Break	16:00
16:15				16:15
16:30	Guest Lecture 1 D. Fleischmann	Guest Lecture 4 X.Y. Xu	Guest Lecture 7 J. Mizerski	16:30
16:45				16:45
17:00				17:00
17:15				17:15
17:30	LEAD PhD 1 Malte Rolf-Pissarczyk	LEAD PhD 6 Thomas Müller	Feedback	17:30
17:45				17:45
18:00	LEAD PhD 2 Richard Schussnig	LEAD PhD 7 Vahid Badeli		18:00
18:15				18:15
18:30	Dinner at the hotel	Dinner at Buschenschank Bernhart		18:30
18:45				18:45
19:00				19:00
19:15				19:15
19:30				19:30

Guest Lecture	Lectures of invited international experts (total time is 60 min)
LEAD PhD	Presentation of past and current research activities within the LEAD project (30 min)
LEAD PI	Short talks (max 15 min) of each PI for an outlook to future research steps Interrelation between the LEAD project and to other institutes
Feedback	Feedback to the workshop and formulation of the next goals of the LEAD project

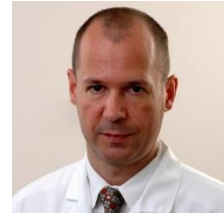
Dominik Fleischmann (Stanford University, USA)

“Understanding aortic dissection”

Wednesday, October 9, 16:30-17:30

“Imaging features predict late complications in aortic dissection”

Thursday, October 10, 14:00-14:45



Dominik Fleischmann is full Professor of Radiology, Chief of Cardiovascular Imaging, Director of Computed Tomography, and Medical Director of the Stanford Radiology 3D Lab. He was trained in Vienna, and did a two-year research fellowship in 98/99 at the Stanford 3D Lab, from where he went back to Vienna to build his own research group, which has received federal funding to this date. Prior to returning to Stanford as a faculty in 2002, he was an Associate Professor and Vice Section Chief in the Cardiovascular and Interventional Radiology Division at the University of Vienna. Dominik Fleischmann is an internationally known expert in the fields of Computed Tomography, Contrast Medium Application, Non-invasive Cardiovascular Imaging using CT and MRI, and Image post-processing. He has authored numerous research papers, reviews, and book chapters in this field, and is an associate editor of European Radiology, and Radiology (cardiac section). His current research and scholarly interests focus on Non-invasive Cardiovascular Imaging, Image Post-processing, and Contrast Medium Dynamics.

For more details see: <https://profiles.stanford.edu/dominik-fleischmann>

Wolfgang Wall (Technical University of Munich, Germany)

"Valuable computational approaches for fluid-structure interaction and UQ for complex (coupled) problems"
Thursday, October 10, 9:00-10:00



Note: Professor Wall has to leave the workshop already on Thursday around noon.

Wolfgang A. Wall is full Professor and founding Director of the Institute for Computational Mechanics at the Technical University of Munich. He studied at the University of Innsbruck and received his Ph.D. from the University of Stuttgart. Among others he acted as founding director of the Munich School of Engineering and is co-founder of the companies AdCo EngineeringGW and Ebenbuild GmbH. Wolfgang Wall has received several esteemed awards and serves on a large number of prestigious boards. His research interests can be described as "application motivated fundamental research" in a broad range of areas in computational mechanics. The current focus lies on coupled multifield and multiscale problems (like fluid-structure interaction, contact dynamics, thermo-structure interaction, electro-chemo-mechano-thermo interaction, porous media), computational biophysics (on sub-cellular and cellular scale), and biomedical engineering (like modeling of respiratory and cardiovascular systems, cancer growth). Meanwhile, the research activities of his group also include optimization, inverse analysis, uncertainty quantification, machine learning as well as experimental work.

For more details see: <https://www.lnm.mw.tum.de/staff/wall/>

Brian Staber (Safran-Tech and Centre des Matériaux, France)

“A stochastic framework to model variability in the nonlinear mechanical properties of arterial walls”

Thursday, October 10, 11:00-12:00



Brian Staber obtained his bachelor's degree in Physics and master's degree in Mechanics of Materials and Structures at the University of Paris-Est Marne-la-Vallée where he was awarded the *Chancellerie des Universités de Paris* in 2013 for his academic records. At the same university, he also acquired his Ph.D. in Mechanics in 2018 under the supervision of Prof. Johann Guilleminot (Duke University, Université Paris-Est). His Ph.D. thesis was concerned with the construction, simulation and identification of stochastic models in finite elasticity. It received the *CSMA award for the best Ph.D. theses of 2018 on Computational Methods in Applied Sciences and Engineering* as well as *ECCOMAS award for the best Ph.D. theses of 2018 on Computational Methods in Applied Sciences and Engineering*. Currently, Brian Staber is a postdoctoral fellow at Safran-Tech and Centre des Matériaux in France. His research interests include the broad fields of uncertainty quantification, computational mechanics and non-smooth mechanics.

For more details see: <https://guilleminot.pratt.duke.edu/people/brian-staber>

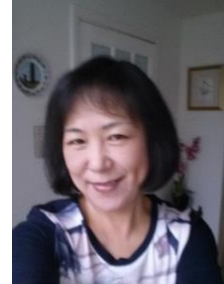
Xiao Yun Xu (Imperial College London, UK)

"Predicting false lumen thrombosis in type B aortic dissection"

Thursday, October 10, 16:30-17:30

"Towards the prediction of the outcome of aortic dissection following thoracic endovascular aortic repair"

Friday, October 11, 14:00-14:45



Xiao Yun Xu is full Professor of Biofluid Mechanics and Director of Postgraduate Studies of the Department of Chemical Engineering at Imperial College London, UK. After her masters' degree in Thermo-Fluids Engineering at the Dalian University of Science & Technology, China, she obtained her Ph.D. in Mechanical Engineering at the City University, London. Her research interests cover biomedical engineering and bioprocessing, with a special focus on transport processes in biological and physiological systems. Examples of her current research are imaging and computational analysis of cardiovascular fluid mechanics and mass transport, multi-scale modeling of drug delivery to solid tumor, nanoparticle-mediated drug delivery in cancer and thrombolytic therapies, rheological behavior of biomass suspensions and solid-liquid mixing in bioreactors for the production of fuels from energy crops. Xiao Yun Xu has published over 100 peer-reviewed journal papers, and supervised 36 Ph.D. students. These works received several awards.

For more details see: <https://www.imperial.ac.uk/people/yun.xu>

Gabriel Mistelbauer (Otto-von-Guericke University Magdeburg, Germany)

"Visual representations of aortic dissections"

Friday, October 11, 9:00-10:00



Gabriel Mistelbauer is postdoctoral researcher (habilitand) at the Otto-von-Guericke University Magdeburg, Germany since 2016. Previously, he was a postdoctoral researcher at TU Wien, where he received a Ph.D. (2013) in computer science and a master's degree (2010) in visual computing. His research focuses on the visual analysis of vascular structures, but he also conducts visualization research in other medical fields such as prenatal diagnostics, mammography and dentistry. He collaborates with various international research institutions, such as Stanford Radiology, Medical University of Vienna, and TU Graz. In 2014, Gabriel Mistelbauer was a visiting scholar at the Stanford 3DQ Laboratory for three months. In 2015 he received an honorable mention for his dissertation at the IEEE VGTC VPG doctoral dissertation award. He also received two best paper awards (2017, 2018) and two paper honorable mentions (2015, 2017) at international conferences.

For more details see: <https://isgwww.cs.uni-magdeburg.de/isg/mistelbauer.html.de>

Igor Karšaj (University of Zagreb, Croatia)

"Biochemomechanical role of intraluminal thrombus growth"

Friday, October 11, 11:00-12:00



Igor Karšaj studied Mechanical Engineering at the University of Zagreb. He finished his PhD Thesis in 2006 under the supervision of Prof. Jurica Sorić and Prof. Carlos Sansour from the University of Nottingham. In 2005 he received *The Young Researcher Fellowship Award for exemplary research in computational mechanics* from MIT, Cambridge, USA. In 2006 the Croatian Ministry of Science, Education and Sport awarded him as the best young researcher in 2005. In the same year, he received the *Annual Award of the Society of University Teachers and other Scientists of Zagreb for young researchers and artists*. In 2011 he received the *Vera Johanides Award* from the Croatian Academy of Engineering for young scientists. Since 2015, he is Associate Professor at the Faculty of Mechanical Engineering and Naval Architecture at the University of Zagreb. His research focuses on the biomechanical behavior of soft biological tissues, growth and remodeling of arterial wall, numerical modeling of large strain elastoplastic deformation processes for anisotropic materials, and the modeling and simulation of growth formation in abdominal aortic aneurysms and aortic dissections.

For more details see: <https://www.fsb.unizg.hr/lnm/staff/karsaj/>

Jeremi Mizerski (Otto-von-Guericke University Magdeburg, Germany)

"Aortic dissection: epidemiological enigma, clinical problem, mathematical disaster"
Friday, October 11, 16:30-17:30



Jeremi Mizerski holds an MD degree in cardio surgery and a PhD degree in medicine both from the Warsaw Medical University. Since 2007 he is Assistant Professor at the University of Warsaw, at the Interdisciplinary Center for Mathematical and Computational Modelling. His research interests include numerical mathematics, information technology and computational sciences, with the main focus on the modeling of flows and transport phenomena in circulatory system and tissues. Apart from his research activities, he also works as a senior surgeon at the Department of Cardio Surgery. Since October 1, 2019 he is a visitor at the Faculty of Mathematics, Physics and Geodesy, TU Graz, and he will provide a guest lecture on *"Mathematical Modelling in Medicine – The Medical Perspective"* during this winter semester.