

# CMBBE2021

7 - 9 September 2021, Bonn, Germany

17<sup>th</sup> International Symposium on Computer Methods  
in Biomechanics and Biomedical Engineering  
and 5<sup>th</sup> Conference on Imaging and Visualization

[www.cmbbe-symposium.com](http://www.cmbbe-symposium.com)

## Tuesday, 7 September 2021

8:45 am – 9:00 am	Opening session	
9:00 am – 10:30 am	<b>A - 01</b> Track A	<b>Advances in AI applications for biomechanics, biomedical engineering and biomedical imaging</b> Chairs: <i>Ahmed Kaboudan; Sameh Talaat</i>
	A-01.1	9:00 am – 9:15 am AI boosting the accuracy of Google and public web search engines in recognizing and classifying dental visual assets; <i>Ahmed Kaboudan (United States)</i>
	A-01.2	9:15 am – 9:30 am Testing the conformity of an AI application with the handicapping labio-lingual deviations index for the assessment of malocclusion severity from clinical images; <i>Christoph Bourauel (Germany)</i>
	A-01.3	9:30 am – 9:45 am Validity of an AI application for assessment of orthodontic treatment need from clinical images; <i>Sameh Talaat (Germany)</i>
	<b>B - 01</b> Track B	<b>Bioengineering in the fight against COVID-19</b> Chairs: <i>Daniela Iacoviello; Paolo Di Giamberardino</i>
	B-01.1	9:00 am – 9:15 am Modelling the spread of COVID; <i>Fred Vermolen (Belgium)</i>
	B-01.2	9:15 am – 9:30 am Analysis and simulation of the second wave of COVID19 in Italy through a time-varying SIRD model; <i>Tommaso Bradde (Italy)</i>
	B-01.3	9:30 am – 9:45 am The role of asymptomatic individuals on vaccination effectiveness; <i>Paolo Di Giamberardino (Italy)</i>
	<b>C - 01</b> Track C	<b>CARDIOSIM©: Numerical simulator of the cardiovascular system</b> Chair: <i>Massimo Capoccia</i>
		9:00 am – 10:00 am CARDIOSIM©: Numerical simulator of the cardiovascular system
	<b>D - 01</b> Track D	<b>Necessity and importance of high-performance computing to address the scalability issue of biomedical-related computational studies</b> Chairs: <i>Liesbet Geris; Mojtaba Barzegari</i>
	D-01.1	9:00 am – 9:15 am Taking blood flow simulation towards the exascale with HemeLB; <i>Jon McCullough (United Kingdom)</i>
	D-01.2	9:15 am – 9:30 am Current scaling limits of a large-scale cellular blood flow simulation; <i>Gabor Zavodszky (Netherlands)</i>
	D-01.3	9:30 am – 9:45 am Numerical models as regulatory evidence: gathering credibility evidence through VVUQ; <i>Alfonso Santiago (Spain)</i>
	D-01.4	9:45 am – 9:55 am A penalty contact implementation on a highly parallelisable cartesian mesh finite element solver; <i>Frederik Trommer (United Kingdom)</i>
<b>E - 01</b> Track E	<b>Numerical models of mechanobiology</b> Chair: <i>Ulrich Simon</i>	
E-01.1	9:00 am – 9:25 am Frontiers for innovation in fracture healing simulation; <i>Hannah Dailey (United States)</i>	
E-01.2	9:25 am – 9:40 am Modeles as microscopes: observations, provocations and opportunities for bone healing simulations; <i>Cameron J. Wilson (Australia)</i>	
E-01.3	9:40 am – 9:55 am Numerical multiscale modeling of bone mechanobiology; <i>José Manuel García-Aznar (Spain)</i>	
E-01.4	9:55 am – 10:10 am 3D fracture healing simulations of metaphyseal distal radius fractures; <i>Lucas Engelhardt (Germany)</i>	
E-01.5	10:10 am – 10:20 am Integrated spatial-temporal model for the prediction of interplay between biomechanics and cell kinetics in fibrotic wall formation; <i>Jieling Zhao (France)</i>	
10:30 am – 10:45 am	Break: Networking, community board, exhibition, debates	
10:45 am – 12:15 am	<b>A - 02</b> Track A	<b>Optimal control of human movement</b> Chairs: <i>Benjamin Michaud; Mickael Begon</i>
	A-02.1	10:45 am – 11:00 am Influence of the mechanics on 3D muscle-driven predictive simulations of human walking; <i>Antoine Falisse (United States)</i>
	A-02.2	11:00 am – 11:15 am Predictive simulations of movement to assess human gait neuromechanics; <i>Friedl De Groote (Belgium)</i>
	A-02.3	11:15 am – 11:30 am A generalizable stochastic optimal control framework to simulate control and movement of non-linear musculoskeletal systems; <i>Tom Van Wouwe (Belgium)</i>
	A-02.4	11:30 am – 11:45 am Estimating muscle forces and motion kinematics while calibrating muscle parameters: a forward optimization approach; <i>François Bailly (France)</i>
	A-02.5	11:45 am – 11:55 am Model-based estimation of muscle forces during carved turns in alpine skiing; <i>Dieter Heinrich (Austria)</i>

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10:45 am – 12:15 pm	<b>B - 02</b> Track B	<b>Tools for quantifying cell mechanics</b> Chairs: <i>Mar Córdor; Hans van Oosterwyck</i>	
	B-02.1	10:45 am – 11:10 am	Quantifying cellular forces: a FE-based algorithm for traction force microscopy; <i>José Manuel García-Aznar (Spain)</i>
	B-02.2	11:10 am – 11:25 am	Cell-based characterization of tissue rheology and mechanics: partical-based computational models; <i>Bart Smeets (Belgium)</i>
	B-02.3	11:25 am – 11:40 am	imMechanoType: imaged-based mechanophenotyping of single cells; <i>Anna Garcia-Sabaté (United Arab Emirates)</i>
	B-02.4	11:40 am – 11:55 am	On the calibration of vertex and FE models in cell mechanics and cytoskeletal reconstruction from TFM; <i>Jose Munoz (Spain)</i>
	B-02.5	11:55 am – 12:05 pm	Quantifying cellular forces in a 3D in vitro vascular model; <i>Jorge Barrasa Fano (Belgium)</i>
	<b>C - 02</b> Track C	<b>Bone biomechanics</b> Chair: <i>Ridha Hambli</i>	
	C-02.1	10:45 am – 10:55 am	Modelling osteochondral grafts within a human tibiofemoral joint; <i>Gavin Day (United Kingdom)</i>
	C-02.2	10:55 am – 11:05 am	Endochondral ossification of long bones; <i>Mahsa Sadeghian (United States)</i>
	C-02.3	11:05 am – 11:15 am	Effect of osteoporosis severity on the acetabular fracture during a sideways fall: a finite element study; <i>Shahab Khakpour (Finland)</i>
C-02.4	11:15 am – 11:25 am	Biomechanical characterization of bone marrow lesions using a combined experimental and computational approach; <i>Oluwasegun Kayode (United Kingdom)</i>	
C-02.5	11:25 am – 11:35 am	Assessment of local displacement predictions generated by microFEMs of trabecular bone cores retrieved from the shoulder; <i>Jonathan Kusins (Canada)</i>	
C-02.6	11:35 am – 11:45 am	Variations in the osteocyte lacuna morphology result in a nonuniform local bone tissue strain distribution; <i>Haniyeh Hemmatian (Germany)</i>	
C-02.7	11:45 am – 11:55 am	Comparison of patient femoral quantitative computed tomography measures calibrated at different distances to isocenter; <i>Carla Winsor (United States)</i>	
C-02.8	11:55 am – 12:05 pm	An automated approach for 3D reconstruction of femur from CT data via pixel clustering; <i>Dipannoy Das Gupta (Bangladesh)</i>	
<b>D - 02</b> Track D	<b>Cardiac mechanics and modelling</b> Chair: <i>Michale Sacks, Federica Caforio</i>		
D-02.1	10:45 am – 10:55 am	Efficient identification of myocardial material parameters and the stress-free reference configuration for patient-specific models; <i>Justyna Anna Niestrawska (Austria)</i>	
D-02.2	10:55 am – 11:05 am	Reconstructing cardiac action potential waves from tissue deformations using the ensemble transform Kalman filter; <i>Christopher Beam (United States)</i>	
D-02.3	11:05 am – 11:15 am	A coupling strategy for a 3D-1D model of the cardiovascular system to study the effects of pulse wave propagation on cardiac function; <i>Federica Caforio (Austria)</i>	
D-02.4	11:15 am – 11:25 am	Developing drugs that are safe for the female heart: a novel sex-specific torsadogenic risk classifier; <i>Mathias Peirlinck (United States)</i>	
D-02.5	11:25 am – 11:35 am	Hemodynamic modeling for mitral regurgitation; <i>Mia Bonini (United States)</i>	
D-02.6	11:35 am – 11:45 am	Computational modelling of subepicardial mechanics in desmoplakin cardiomyopathy; <i>Javiera Jilberto (United States)</i>	
D-02.7	11:45 am – 11:55 am	Preliminary results of bi-axial characterization of the left atrium; <i>Wendy Silva-Verissimo (France)</i>	
<b>E - 02</b> Track E	<b>Imaging and visualization 1</b> Chair: <i>Camille Pestiaux</i>		
E-02.1	10:45 am – 10:55 am	Optimization of microCT and contrast-enhanced microCT for cardiovascular applications; <i>Lisa Leyskens (Belgium)</i>	
E-02.2	10:55 am – 11:05 am	4D X-ray microfocus computed tomography for cardiovascular application; <i>Alice Coirbay (Belgium)</i>	
E-02.3	11:05 am – 11:15 am	High resolution microfocus computed tomography and POM-based contrast-enhanced computed tomography applied to the heart and its constituents; <i>Camille Pestiaux (Belgium)</i>	
E-02.5	11:15 am – 11:25 am	Development of an automated mass-customisation pipeline for knee replacement surgery using bi-planar X-rays: a critical evaluation; <i>Thomas Burge (United Kingdom)</i>	
12:15 pm – 1:15 pm	Break & Virtual exhibition		
	Poster session 1 (Track B)		
	Poster session 2 (Track C)		
1:15 pm – 2:15 pm	Track A		
	<b>Ellen Kuhl: Data-driven modelling of neurodegeneration</b>		
2:15 pm – 3:00 pm	Break: Networking, community board, exhibition, debates		
	<b>A - 03</b> Track A	<b>Finite element and finite volume method</b> Chairs:	
	A-03.1	3:00 pm – 3:10 pm	A continuum approach for the diffusion-compensated ETM model and its application on Neuroblastoma clinical data; <i>Diego Sainz-DeMena (Spain)</i>
	A-03.2	3:10 pm – 3:20 pm	Replicating the mechanical environment of an experimental natural knee simulator in specimen-specific tibiofemoral finite element models for the study of menisci; <i>Rosti Readioff (United Kingdom)</i>
	A-03.3	3:20 pm – 3:30 pm	A subject-specific FEM to predict deep tissue mechanical stresses when lying: a preliminary study of sensitivity to substrate stiffness; <i>Lionel Rayward (Australia)</i>
	A-03.4	3:30 pm – 3:40 pm	Finite element modelling of the human eye crystalline complex under healthy and diseased conditions; <i>Paulo Fernandes (Portugal)</i>
	A-03.5	3:40 pm – 3:50 pm	Biomechanical analysis of intra-articular stresses caused by the reconstruction of the ACL using a section of the patellar tendon in the heel strike phase; <i>Mónica Gantiva (Colombia)</i>
	A-03.6	3:50 pm – 4:00 pm	Finite element analysis of subchondral bone cysts in the tibiotalar joint; <i>Harriet Talbott (United Kingdom)</i>

03:00 pm – 04:00 pm	<b>B - 03</b> Track B	<b>Fluid biomechanics</b> Chairs:	
	B-03.1	3:00 pm – 3:10 pm	The role of fluid removal rates on the flow field of a surrogate system of an artificial kidney; <i>Michael Harasek (Austria)</i>
	B-03.2	3:10 pm – 3:20 pm	Development of CFD technique to simulate the hemodynamic effects of the Cardioband implantation; <i>Laura Iannetti (Italy)</i>
	B-03.3	3:20 pm – 3:30 pm	Hemodynamic effects of entry versus exit tear size and tissue stiffness in aortic dissection; <i>Kathrin Baeumler (United States)</i>
	B-03.4	3:30 pm – 3:40 pm	A fluid-structure interaction framework for the identification of factors triggering calcification in native and bioprosthetic heart valves; <i>Pascal Corso (Switzerland)</i>
	B-03.5	3:40 pm – 3:50 pm	Failure properties of abdominal aortic aneurysm tissue are orientation dependent; <i>Stanislav Polzer (Czech Republic)</i>
	B-03.6	3:50 pm – 4:00 pm	Fluid-structure interaction for the simulation of cerebral aneurysm with flow-diverter; <i>Elie Hachem (France)</i>
	<b>C - 03</b> Track C	<b>Mathematical modelling and simulation of tumours</b> Chairs: <i>Jose Antonio Sanz-Herrera; José M. Benítez; Jacobo Ayensa-Jiménez</i>	
	C-03.1	3:00 pm – 3:15 pm	Recent progress in mathematical modelling of tumour-induced angiogenesis; <i>Tomas Alarcon (Spain)</i>
	C-03.2	3:15 pm – 3:30 pm	Patient-specific tumor forecasting through imaging-based mathematical modeling; <i>Thomas Yankeelov (United States)</i>
	C-03.3	3:30 pm – 3:40 pm	Multiphysics modeling of tumoral spheroid evolution; <i>Ana Carrasco Mantis (Spain)</i>
	C-03.4	3:40 pm – 3:50 pm	The effect of a necrotic core on the interstitial fluid pressure in solid tumors; <i>Hooman Salavati (Belgium)</i>
	C-03.5	3:50 pm – 4:00 pm	Computational Epigenetics: simulating the acquisition of drug resistance in glioblastoma; <i>Marina Pérez-Aliacar (Spain)</i>
	<b>D - 03</b> Track D	<b>When biomechanics meets medical imaging for cardiac assessment</b> Chairs: <i>Damien Garcia; Valerie Deplano</i>	
D-03.1	3:00 pm – 3:15 pm	Myocardial stiffness assessment by ultrafast ultrasound imaging; <i>Olivier Villemain (Canada)</i>	
D-03.2	3:15 pm – 3:30 pm	Intracardiac 3-D vector flow imaging by triplane color Doppler echocardiography; <i>Damien Garcia (France)</i>	
D-03.3	3:30 pm – 3:45 pm	Myocardial perfusion simulation: an image-based coupled patient-specific multiscale model; <i>Irene Vignon-Clementel (France)</i>	
D-03.4	3:45 pm – 3:55 pm	In silico time-resolved 3D phase-contrast magnetic resonance imaging; <i>Franck Nicoud (France)</i>	
D-03.5	3:55 pm – 4:05 pm	Predicting rupture location in ascending aortic aneurysms using patient-specific finite element models: a preliminary analysis; <i>Dermot O'Rourke (Australia)</i>	
<b>E - 03</b> Track E	<b>Brain biomechanics</b> Chair: <i>Silvia Budday</i>		
E-03.1	3:00 pm – 3:10 pm	Simultaneous mechanical and microstructural analysis of brain tissue; <i>Nina Reiter (Germany)</i>	
E-03.2	3:10 pm – 3:20 pm	Exploring the role of the outer subventricular zone during cortical folding in the developing brain through a physics-based multifield model; <i>Mohammad Saeed Zarzor (Germany)</i>	
E-03.3	3:20 pm – 3:30 pm	Nonlocal wrinkling instabilities in bilayered systems using peridynamics; <i>Marie Laurien (Germany)</i>	
E-03.4	3:30 pm – 3:40 pm	Implementation of novel region-specific human brain material properties into state-of-the-art FE head models; <i>Thibault Verenne (Belgium)</i>	
E-03.5	3:40 pm – 3:50 pm	Uncertainty analysis of tissue-level injury metrics for cerebral contusion by means of machine learning surrogate model of the porcine brain undergoing controlled cortical impact; <i>Andrea Menichetti (Belgium)</i>	
E-03.6	3:50 pm – 4:00 pm	Using in-vivo surface morphological measurements of cerebral aneurysm blebs to predict aneurysm rupture risk; <i>Ronald Fortunato (United States)</i>	
4:15 pm – 4:45 pm	Break: Networking, community board, exhibition, debates		
4:45 pm – 5:45 pm	<b>A - 04</b> Track A	<b>Computational models in women's health</b> Chair: <i>Kristin Myers</i>	
	A-04.1	4:45 pm – 5:00 pm	Statistical shape modeling to evaluate alterations in female bony pelvis morphology with pregnancy and parturition; <i>Megan Routzong (United States)</i>
	A-04.2	5:00 pm – 5:15 pm	Novel application of a corresponding point algorithm for unbiased smoothing; <i>Liam Martin (United States)</i>
	A-04.3	5:15 pm – 5:25 pm	Ultrasound-derived finite element models of pregnant women at high- and low-risk for preterm birth; <i>Erin Louwagie (United States)</i>
	<b>B - 04</b> Track B	<b>Advances in brain mechanics</b> Chairs: <i>Philip Bayly; Silvia Budday; Gerhard A. Holzapfel</i>	
	B-04.1	4:45 pm – 5:00 pm	Multiscale modeling of traumatic brain injuries: From brains to atoms; <i>Svein Kleiven (Sweden)</i>
	B-04.2	5:00 pm – 5:15 pm	Viscosity reconciles seemingly disparate stiffness measurements under static and dynamic conditions, in vivo and ex vivo; <i>Ingolf Sack (Germany)</i>
	B-04.3	5:15 pm – 5:25 pm	Patient-specific modeling of Tau pathology in Alzheimer's disease; <i>Amelie Schaefer (United States)</i>
	B-04.4	5:25 pm – 5:35 pm	Regional characterization of the dynamic mechanical properties of human brain tissue by microindentation; <i>Andrea Menichetti (Belgium)</i>

4:45 pm – 5:45 pm

C - 04 Track C	Cardiovascular fluid dynamics 1 Chair:	
C-04.1	4:45 pm – 4:55 pm	Assessing the role of hemodynamics on tissue engineered vascular graft growth and remodeling: A tale of two scaffolds; <i>Stephanie Lindsey (United States)</i>
C-04.2	4:55 pm – 5:05 pm	Investigating biomechanic effects of rheumatic heart disease on the thoracic aorta; <i>Hannah Cebull (United States)</i>
C-04.3	5:05 pm – 5:15 pm	A pilot study with the National Children's Research Centre at Crumlin utilising computational fluid dynamics in the treatment of congenital heart disease; <i>Doireann Shaffrey (Ireland)</i>
C-04.4	5:15 pm – 5:25 pm	Development and case studies of a trans-Reynolds-number computational modeling approach for thrombosis and thromboembolism; <i>Keefe Manning (United States)</i>
D - 04 Track D	Recent progress in continuum bone modelling Chairs: <i>Areti Papastavrou; Paul Steinmann</i>	
D-04.1	4:45 pm – 5:00 pm	A computational framework for crack propagation in spatially heterogeneous materials; <i>Lukasz Kaczmarczyk (United Kingdom)</i>
D-04.2	5:00 pm – 5:15 pm	Recent advances in bone remodeling applications to clinical bone research; <i>Peter Pivonka (Australia)</i>
D-04.3	5:15 pm – 5:25 pm	A nonlocal formulation for bone remodelling using peridynamics; <i>Emely Schaller (Germany)</i>
D-04.4	5:25 pm – 5:35 pm	The impact of non-mechanical factors on bone remodelling; <i>Areti Papastavrou (Germany)</i>
E - 04 Track E	Imaging and visualization 2 Chairs: <i>Haniyeh Hemmatian; Tijana Šušteršič</i>	
E-04.1	4:45 pm – 4:55 pm	Creating your own TPMS-based functionally graded scaffolds for 3D-printing; <i>Fernando Perez-Boerema (Belgium)</i>
E-04.2	4:55 pm – 5:05 pm	Aeva: software suite for annotation and exchange of virtual anatomy; <i>Ahmet Erdemir (United States)</i>
E-04.3	5:05 pm – 5:15 pm	3D visualization and automated segmentation of osteocyte cellular components using focused ion beam-scanning electron microscopy (FIB-SEM) and deep learning neural networks; <i>Haniyeh Hemmatian (Germany)</i>
E-04.4	5:15 pm – 5:25 pm	Development of machine learning tool for segmentation and parameter extraction in cardiac left ventricle ultrasound images of patients with cardiomyopathy; <i>Tijana Šušteršič (Serbia)</i>
E-04.5	5:25 pm – 5:35 pm	Thermography as a nonionizing quantitative tool for diagnosing periapical inflammatory lesions; <i>Mohamed Aboushady (Germany)</i>
E-04.6	5:35 pm – 5:45 pm	Use of a 3D hand-held scanner to capture trochlear groove shape, a proof of concept study; <i>Jatin Mistry (United Kingdom)</i>

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## Wednesday, 8 September 2021

9:00 am – 10:00 am	<b>Merryn Tawhai: Linking imaging-based lung structure to patient respiratory system function using biophysically-based models</b>	
10:00 am – 10:30 am	Break: Networking, community board, exhibition, debates	
10:30 am – 12:00 pm	<b>A - 05</b> Track A	<b>Dental biomechanics 1</b> Chairs: <i>Christoph Bourauel; Ludger Keilig</i>
A-05.1	10:30 am – 10:55 am	Computational investigation of the effect of bolus stiffness on TMJ loading during chewing; <i>Benedikt Sagl (Austria)</i>
A-05.2	10:55 am – 11:10 am	Influence of different occlusal contact situations on stress in periimplant bone; <i>Andreas Greuling (Germany)</i>
A-05.3	11:10 am – 11:20 am	The effects on temporo-mandibular joint caused by orthodontic inter-arch elastics: a finite element study; <i>Yaqiu Zhang (Germany)</i>
A-05.4	11:20 am – 11:30 am	Numerical simulation of forces generated during different bodily teeth movements using an orthodontic aligner; <i>Tarek Elshazly (Germany)</i>
A-05.5	11:30 am – 11:40 am	Finite element estimation of orthodontic tooth movement using stimulus induced node motion; <i>Zumrat Usmanova (Turkey)</i>
	<b>B - 05</b> Track B	<b>Intelligent rehabilitation technologies</b> Chairs: <i>Fong-Chin Su; Hirokazu Kato</i>
B-05.1	10:30 am – 10:45 am	An innovative rehab robot with real time visual feedback & performance assessment; <i>Fong-Chin Su (Taiwan)</i>
B-05.2	10:45 am – 11:00 am	Intelligent home-based upper limb rehabilitation for patients with chronic stroke; <i>Li-Chieh Kuo (Taiwan)</i>
B-05.3	11:00 am – 11:15 am	Development of augmented reality system for supporting motor rehabilitation; <i>Hirokazu Kato (Japan)</i>
B-05.4	11:15 am – 11:30 am	Soft robot hand for stroke rehabilitation; <i>Raymond Kai-Yu Tong (Hong Kong)</i>
B-05.5	11:30 am – 11:40 am	Concept of a co-simulation model integrating a musculoskeletal human model and models of an exoskeleton and a power tool to identify design options for the technical systems; <i>Carla Molz (Germany)</i>
B-05.6	11:40 am – 11:50 am	A framework to quantify joint kinematics and moments using a subject-specific virtual simulator reproducing exoskeletal-assisted locomotion; <i>Vishnu Chandran (United States)</i>
	<b>C - 05</b> Track C	<b>Machine learning</b> Chairs: <i>Ahmed Kaboudan, Sameh Talaat</i>
C-05.1	10:30 am – 10:40 am	Random forest and wavelet for sleep scoring: a deeper analysis in age subjects and early-late sleep; <i>Eugenia Moris (Argentina)</i>
C-05.2	10:40 am – 10:50 am	Retinal nerve fiber layer as a biomarker of disability progression in multiple sclerosis patients using machine learning techniques; <i>Alberto Montolio (Spain)</i>
C-05.3	10:50 am – 11:00 am	Automated segmentation and landmarking of scapulae to assess the outcome of total shoulder arthroplasty using convolutional neural networks; <i>Osman Berk Satir (Switzerland)</i>
C-05.4	11:00 am – 11:10 am	Discovering cell behaviour using Physically-Guided Neural Networks. Application to the simulation of Glioblastoma invasion process; <i>Jacobo Ayensa-Jiménez (Spain)</i>
C-05.5	11:10 am – 11:20 am	Left ventricular elastance estimation from brachial pressure waveform; <i>Vasiliki Bikia (Switzerland)</i>
	<b>D - 05</b> Track D	<b>Musculoskeletal dynamics and neuromuscular control/Sports Biomechanics/Injury</b> Chairs:
D-05.1	10:30 am – 10:40 am	Modelling the functional heterogeneity of skeletal muscles: enriching continuum-mechanical models on a motor-unit level; <i>Harnoor Saini (Germany)</i>
D-05.2	10:40 am – 10:50 am	Biomechanical analysis of the lower-extremity during golf-swing: a comparative study of a healthy subject against patients with total knee arthroplasty and knee osteoarthritis; <i>Iman Soodmand (Germany)</i>
D-05.3	10:50 am – 11:00 am	Integrating clinical data and computational modeling to quantify knee mechanics in athletes at increased risk of noncontact ACL rupture; <i>Carl Imhauser (United States)</i>
D-05.4	11:00 am – 11:10 am	Application of an articulated statistical shape model of the hip to predict clinical measures of coverage; <i>Penny Atkins (United States)</i>
D-05.5	11:10 am – 11:20 am	An anatomically-realistic computational modeling framework for testing protective vests; <i>Maayan Lustig (Israel)</i>
D-05.6	11:20 am – 11:30 am	Incapacitation prediction for readiness in expeditionary domains: An integrated computational tool (I-PREDICT) - An update and preliminary results; <i>Lance Frazer (United States)</i>
	<b>E - 05</b> Track E	<b>Imaging and visualization 3</b> Chairs: <i>Gonçalo Almeida; Bethany Keenan</i>
E-05.1	10:30 am – 10:40 am	3D characterization of pelvic floor muscle fascicle orientation for biomechanical modeling; <i>Shaniel Bowen (United States)</i>
E-05.2	10:40 am – 10:50 am	Reconstructing 3D lungs from a single chest X-ray with statistical shape and appearance models; <i>Josh Williams (United Kingdom)</i>
E-05.3	10:50 am – 11:00 am	Measurement of soft tissue interactions with respiratory PPE using MRI and digital volume correlation; <i>Sam Evans (United Kingdom)</i>
E-05.4	11:00 am – 11:10 am	Automatic muscle segmentation through deformable image registration; <i>William Henson (United Kingdom)</i>
E-05.5	11:10 am – 11:20 am	Organ segmentation of male pelvic CTs with large artifacts caused by femoral bone prostheses; <i>Gonçalo Almeida (Portugal)</i>
E-05.6	11:20 am – 11:30 am	Statistical shape modelling of muscle fiber arrangement to characterize soleus muscle architecture in pediatric cerebral palsy; <i>Salim Bin Ghouth (New Zealand)</i>
12:00 pm – 1:00 pm	Break & Virtual exhibition	
	Poster session 3 (Track B)	
	Poster session 4 (Track C)	
2:00 pm – 2:15 pm	Break: Networking, community board, exhibition, debates	

2:15 pm – 3:00 pm	<b>A - 06</b> Track B	<b>Computational analysis of the bone-implant interface</b> Chairs: <i>G. Harry van Lenthe; Philippe Zysset</i>	
	A-06.1	2:15 pm – 2:40 pm	What metrics should we be using to assess implant fixation? <i>Mark Taylor (Australia)</i>
	A-06.2	2:40 pm – 2:55 pm	3D finite element modal analysis of a femoral stem under various bone-implant contact conditions; <i>Anne-Sophie Poudrel (France)</i>
	A-06.3	2:55 pm – 3:10 pm	Explicit finite element evaluation of uncemented total hip arthroplasty; <i>Marzieh Ovesy (Switzerland)</i>
	A-06.4	3:10 pm – 3:25 pm	Modelling bone-implant interaction in fracture fixation devices; <i>Pankaj Pankaj (United Kingdom)</i>
	A-06.5	3:25 pm – 3:40 pm	Efficient non-linear micro FE: results from trabecular biopsies and human radius sections; <i>Dieter Pahr (Austria)</i>
	A-06.6	3:40 pm – 3:50 pm	Bone-implant integration assessed using in-situ mechanical pull-out during synchrotron X-ray tomography; <i>Elin Törnquist (Sweden)</i>
	A-06.7	3:50 pm – 4:00 pm	Modeling the spatio-temporal evolution of bone-implant interface stiffness via a stochastic numerical approach; <i>J. XIE (China)</i>
	<b>B - 06</b> Track B	<b>Respiratory biomechanics</b> Chairs:	
	B-06.1	2:15 pm – 2:25 pm	Active contours modeling of respiratory airways using isogeometric analysis; <i>David Ortiz-Puerta (Chile)</i>
	B-06.2	2:25 pm – 2:35 pm	Whole-lung simulation of aerosol deposition using CFD; <i>Pantelis Koullapis (Cyprus)</i>
	B-06.3	2:35 pm – 2:45 pm	Inverse finite element modeling of the breathing organ-level lung using digital image correlation; <i>Mona Eskandari (United States)</i>
	<b>C - 06</b> Track C	<b>Skin biomechanics</b> Chairs:	
	C-06.1	2:15 pm – 2:25 pm	A microvessel near the sacral skin surface is closed by pressure but not shear of a polyurethane foam mattress: a plane-stress finite-element model study; <i>Hiroshi Yamada (Japan)</i>
	C-06.2	2:25 pm – 2:35 pm	An anisotropic hyperelastic model for human skin: finite element modelling, identification of parameters, mechanical tests; <i>Wael Alliliche (France)</i>
	C-06.3	2:35 pm – 2:45 pm	Peri-wound skin loads are considerably more sensitive to the pressure level than to the dressing stiffness in a negative pressure wound therapy; <i>Aleksei Orlov (Israel)</i>
	<b>D - 06</b> Track D	<b>Multiphysics and multiscale modeling</b> Chairs: <i>Paola Lecca; Angela Re</i>	
	D-06.1	2:15 pm – 2:30 pm	Multiphysics optimisation of plasmonic photoacoustic contrast agents; <i>Dmitry Chigrin (Germany)</i>
	D-06.2	2:30 pm – 2:40 pm	A multiscale model of restenosis for investigating the effects of tissue damage and hemodynamics on cellular activity after percutaneous transluminal angioplasty; <i>Anna Corti (Italy)</i>
	D-06.3	2:40 pm – 2:50 pm	Gyroid VS strut-like scaffolds for bone regeneration: AN in silico comparative analysis of healing in large bone defects; <i>Mahdi Jaber (Germany)</i>
	D-06.4	2:50 pm – 3:00 pm	Effect of muscle volume on Finite element-based predictions of femoral neck strain using a virtual population; <i>Zainab Altai (United Kingdom)</i>
D-06.5	3:00 pm – 3:10 pm	A micromechanical elasto-viscoplastic material model for cold-water coral skeletons; <i>Ewan Smith (United Kingdom)</i>	
D-06.6	3:10 pm – 3:20 pm	Multiscale modelling of advection-diffusion processes in perfused tissues; <i>Eduard Rohan (Czech Republic)</i>	
D-06.7	3:20 pm – 3:30 pm	Multiscale modeling of the knee joint pathophysiology: differential effect of mechanical loading on the cartilage zones; <i>Satanik Mukherjee (Belgium)</i>	
D-06.8	3:30 pm – 3:40 pm	Biomechanical modeling of soft tissue multiphysics using hybrid machine learning and finite element analysis; <i>Seyed Shayan Sajjadinia (Italy)</i>	
<b>E - 06</b> Track E	<b>Imaging and visualization 4: Image-based patient-specific modelling</b> Chairs: <i>Richard Lopata; Mirunalini Thirugnanasambandam</i>		
E-06.1	2:15 pm – 2:40 pm	Time-dependent constitutive description of collagenous soft biological tissue. Microstructurally-motivated bottom-up approaches; <i>T.Christian Gasser (Sweden)</i>	
E-06.2	2:40 pm – 2:55 pm	Patient-specific 3D strain field evaluation of abdominal aortic aneurysms using 4D ultrasound; <i>Mirunalini Thirugnanasambandam (Netherlands)</i>	
E-06.3	2:55 pm – 3:10 pm	Left ventricular strain mapping in murine models of hypertrophy and infarction from 4D ultrasound; <i>Craig Goergen (United States)</i>	
E-06.4	3:10 pm – 3:25 pm	Assessing rupture risk in ascending thoracic aortic aneurysms using MRI and biomechanics; <i>Stéphane Avril (France)</i>	
E-06.5	3:25 pm – 3:40 pm	A CFD and MRI arterial spin labeling modeling strategy to quantify patient-specific cerebral hemodynamics in cerebrovascular occlusive disease; <i>C. Alberto Figueroa (United States)</i>	
E-06.6	3:40 pm – 3:50 pm	Processing of ultrasound images by using convolutional neural networks for carotid artery detection and segmentation; <i>Smiljana Djorovic (Serbia)</i>	
3:00 pm – 4:00 pm	<b>Workshop</b> Track B	<b>GIBBON workshop</b> Chair: <i>Kevin Moerman</i>	
	<b>Workshop</b> Track C	<b>Hands-on SOFA: an open-source solution for physics simulation</b> Chair: <i>Hugo Talbot</i>	
4:15 pm – 4:45 pm	Break: Networking, community board, exhibition, debates		

# CMBBE2021

7 - 9 September 2021, Bonn, Germany

17<sup>th</sup> International Symposium on Computer Methods  
in Biomechanics and Biomedical Engineering  
and 5<sup>th</sup> Conference on Imaging and Visualization

[www.cmbbe-symposium.com](http://www.cmbbe-symposium.com)

4:45 pm – 5:50 pm

Workshop Track A	<b>FEBio Software Suite workshop</b> Chairs: <i>Gerard Ateshian; Steve Maas; Jeffrey Weiss</i>	
Workshop Track B	<b>Shape Works workshop</b> Chairs: <i>Shireen Y. Elhabian</i>	
Workshop Track C	<b>Bioptim - Biomechanical optimal control workshop</b> Chairs: <i>François Bailly; Benjamin Michaud</i>	
Workshop Track D	<b>SimVascular workshop and new user training</b> Chairs: <i>Alison Marden; Vijay Vedula; Nathan Wilson</i>	
<b>E - 07</b> Track E	<b>Cardiovascular growth and remodeling</b> Chairs: <i>Sandra Loerakker; Tommaso Ristori</i>	
E-07.1	4:45 pm – 5:10 pm	Immuno-mechanics: modeling soft tissue growth and remodeling; <i>Jay Humphrey (United States)</i>
E-07.2	5:10 pm – 5:25pm	Chemo-mechano-biological modelling of tissue growth and remodelling during healing induced by mechanical damage; <i>Michele Marino (Italy)</i>
E-07.3	5:25 pm – 5:40 pm	Personalized biomechanical models of abdominal aortic aneurysms based on advanced 3-D functional ultrasound imaging; <i>Richard Lopata (Netherlands)</i>
E-07.4	5:40 pm – 5:50 pm	A computational framework for growth and remodeling of thick-walled tissue-engineered vascular grafts; <i>Erica Schwarz (United States)</i>

## Thursday, 9 September 2021

9:00 am – 10:30 am	<b>A - 08</b> Track A	<b>Dental biomechanics 2</b> Chairs: <i>Ludger Keilig</i>	
	A-08.1	9:00 am – 9:15 am	Mechanical stability and clinical application of polyetherketonketon (PEKK) material; <i>Istabrak Dörsam (Germany)</i>
	A-08.2	9:15 am – 9:25 am	Adhesive layer defects and their impact on indirect dental restoration mechanical behavior; <i>Yannick Yasothan (France)</i>
	A-08.3	9:25 am – 9:35 am	Comparison of different augmentation techniques in maxillary implant placement; <i>Ludger Keilig (Germany)</i>
	A-08.4	9:35 am – 9:45 am	A dentin image-based model with 3D fan-like microstructure and curved orthotropic material: is tubule orientation naturally optimized with respect to chewing load?; <i>Elsa Vennat (France)</i>
	A-08.5	9:45 am – 9:55 am	Finite element analysis of endocrown-restored premolars with different designs; <i>Mostafa Aldesoki (Germany)</i>
	A-08.6	9:55 am – 10:05 am	Comparing the effect of dental implant-abutment connections on crestal bone: Three-dimensional finite element analysis; <i>Salih Celik (Germany)</i>
A-08.7	10:05 am – 10:15 am	Towards a reduced order model for the simulation of the periodontal ligament; <i>Albert Heinrich Kaiser (Germany)</i>	
B - 08	<b>Track B</b>	<b>Patient-specific modelling</b> Chairs: <i>Jos van der Sloten</i>	
	B-08.1	9:00 am – 9:10 am	Patient-specific loading for HR-pQCT based homogenized FE analysis of the distal radius; <i>Denis Elia Schenk (Switzerland)</i>
	B-08.2	9:10 am – 9:20 am	3D+t ultrasound-based fluid-structure interaction modeling for abdominal aortic aneurysm rupture risk analysis incorporating pre-stress; <i>Judith Fonken (Netherlands)</i>
	B-08.3	9:20 am – 9:30 am	Patient-specific electrophysiology simulations in single ventricle physiology; <i>Oguz Tikenogullari (United States)</i>
	B-08.4	9:30 am – 9:40 am	Bayesian parameter estimation of ligament properties based on tibio-femoral kinematics during squatting; <i>Laura Bartsoen (Belgium)</i>
	B-08.5	9:40 am – 9:50 am	Biomechanical simulation platform for patient-specific refractive interventions; <i>Malavika Nambiar (Switzerland)</i>
B-08.6	9:50 am – 10:00 am	Towards quasi-automatic and accurate 3D reconstruction of the scapula from biplanar X-rays; <i>Sandrine Bousigues (France)</i>	
C - 08	<b>Track C</b>	<b>Cardiovascular fluid dynamics 2</b> Chairs: <i>Eduardo Soudah</i>	
	C-08.1	9:00 am – 9:10 am	The Coupled Momentum Method revisited: Formulation, higher-order elements, solver technology, and verification; <i>Ingrid Lan (United States)</i>
	C-08.2	9:10 am – 9:20 am	Synchrotron imaging based computational models of blood flow dynamics in the ventral aorta of adult zebrafish; <i>Matthias Van Impe (Belgium)</i>
	C-08.3	9:20 am – 9:30 am	Pulsatility indices can inform on distal perfusion following ischaemic stroke; <i>Ivan Benemerito (United Kingdom)</i>
	C-08.4	9:30 am – 9:40 am	Leaflet fluttering and turbulent systolic blood flow after bioprosthetic heart valves; <i>Dominik Obrist (Switzerland)</i>
	C-08.5	9:40 am – 9:50 am	The effect of an aneurysm on particle paths in a 3D vessel geometry; <i>Dániel Gyürki (Hungary)</i>
	C-08.6	9:50 am – 10:00 am	Computational modeling for understanding cerebral vasculopathy during early childhood in sickle cell disease; <i>Lazaros Papamanolis (France)</i>
	C-08.7	10:00 am – 10:10 am	Dense-discrete phase simulations of blood flow in a stenotic coronary artery; <i>Violeta Carvalho (Portugal)</i>
C-08.8	10:10 am – 10:20 am	Towards a fast alternatives to optimise the implantation of left atrial appendage occluder devices; <i>Carlos Albars (Spain)</i>	
D - 08	<b>Track D</b>	<b>Biomechanics of movement and rehabilitation 2</b> Chairs:	
	D-08.1	9:00 am – 9:10 am	Including the subtalar joint within lower-limb skeletal models significantly affects ankle, knee, and hip joint kinematics; <i>Erica Montefiori (United Kingdom)</i>
	D-08.2	9:10 am – 9:20 am	EMG signals as a way to control soft actuators; <i>António André (Portugal)</i>
	D-08.3	9:20 am – 9:30 am	Movement optimization through musculoskeletal modeling and multidimensional surface interpolation; <i>Christopher Lamb (United States)</i>
	D-08.4	9:30 am – 9:40 am	Could an exoskeleton-driven rehabilitation treatment improve muscle forces generation in PD? A pilot study; <i>Marco Romanato (Italy)</i>
	D-08.5	9:40 am – 9:50 am	Simulating the dynamics of a human-exoskeleton system using kinematic data with misalignment between the human and exoskeleton joints; <i>Divyaksh Subhash Chander (Italy)</i>
D-08.6	9:50 am – 10:00 am	Computational analysis of the load's effect on deliveries cyclists, and the consequence of delivery backpack's design on the cyclist; <i>Nicolás Yanguma Muñoz (Colombia)</i>	
E - 08	<b>Track E</b>	<b>Imaging and visualization 5: Computational challenges in analyzing pediatric musculoskeletal medical imaging</b> Chairs: <i>Antonis Stylianou; Tinashe Mutsvangwa</i>	
	E-08.1	9:00 am – 9:25 am	Current concepts in pediatric computational anatomy: a medical imaging perspective; <i>Bhushan Borotikar (India)</i>
	E-08.2	9:25 am – 9:50 am	Novel approaches to skeletal maturation assessment through modern medical imaging; <i>Dana Duren (United States)</i>
	E-08.3	9:50 am – 10:05 am	Opportunities and challenges in computational modelling of the pediatric knee; <i>Trent Guess (United States)</i>
10:30 am – 10:45 am	Break: Networking, community board, exhibition, debates		

10:45 am – 12:00 pm	<b>A - 09</b> Track A	<b>Biomechanics of movement and rehabilitation 1</b> Chairs:	
	A-09.1	10:45 am – 10:55 am	A novel review of temporomandibular joint replacement options; <i>Christine Walck (United States)</i>
	A-09.2	10:55 am – 11:05 am	Uncertainty in muscle-tendon parameters can greatly influence the accuracy of knee contact force estimates of musculoskeletal models; <i>Seyyed Hamed Hosseini Nasab (Switzerland)</i>
	A-09.3	11:05 am – 11:15 am	Data-driven models for musculotendon length estimation in individuals with Parkinson's Disease - a statistical parametric mapping analysis; <i>Marco Romanato (Italy)</i>
	A-09.4	11:15 am – 11:25 am	An improved artificial neural network to predict three-dimensional position of body joints during various static load-handling activities; <i>Mahdi Mohseni (Iran)</i>
	<b>B - 09</b> Track B	<b>Cellular and molecular biomechanics</b> Chair:	
	B-09.1	10:45 am – 10:55 am	A formalism for modelling traction forces and cell shape evolution during cell migration in various biomedical processes; <i>Qiyao Peng (Netherlands)</i>
	B-09.2	10:55 am – 11:05 am	A combined continuum-tensegrity FE model to describe the mechanical behaviour of a chondrocyte cell: definition, identification and validation by means of AFM indentation and micropipette aspiration; <i>Alessandro Arduino (Italy)</i>
	B-09.3	11:05 am – 11:15 am	Axon model generated from ssTEM images predicts microstructural failure under mechanical loading; <i>Lucy Wang (United States)</i>
	B-09.4	11:15 am – 11:25 am	Temperature influence on the compression and breakage behaviour of yeast cells; <i>Achim Overbeck (Germany)</i>
	<b>C - 09</b> Track C	<b>Mechanobiology</b> Chair: Hans van Oosterwyck	
	C-09.1	10:45 am – 10:55 am	Monoaxial stretch of an edge-bound in-silico epithelial tissue by bubbly vertex model; <i>Yukitaka Ishimoto (Japan)</i>
	C-09.2	10:55 am – 11:05 am	Numerical approach for the in-silico modelization of the Endothelial Glycocalyx with Divergence-Conforming immersed boundary method; <i>Antonio Cerrato (Spain)</i>
	C-09.3	11:05 am – 11:15 am	An adaptive in silico cartilage model that predicts degenerative changes in articular cartilage including collagen degeneration and reorientation under multi-axial injurious loading; <i>Seyed Ali Elahi (Belgium)</i>
	C-09.4	11:15 am – 11:25 am	Cellular force generation during sprouting angiogenesis; <i>Mar Córdor (Belgium)</i>
	C-09.5	11:25 am – 11:35 am	Computational modelling to predict how fibroblast senses extracellular matrix stiffness and cell crosstalk in different mechanical environment; <i>Jinju Chen (United Kingdom)</i>
<b>D - 09</b> Track D	<b>Implants/orthotics/prosthetics/devices/biologics</b> Chair: Paulo Rui Fernandes		
D-09.1	10:45 am – 10:55 am	Insights from applying measured in vivo knee kinematics and contact forces as wear simulation boundary conditions; <i>Michael Dreyer (Switzerland)</i>	
D-09.2	10:55 am – 11:05 am	How does the absorption process influence the mechanical stability of a biodegradable MgYREZr screw? <i>Ludger Keilig (Germany)</i>	
D-09.3	11:05 am – 11:15 am	Evidence for the applicability of musculoskeletal human models to improve outcomes of total hip arthroplasty; <i>David Scherb (Germany)</i>	
D-09.4	11:15 am – 11:25 am	MRSNS: mixed reality guided surgical navigation system using an external electromagnetic tracker and a head-mounted display; <i>Puxun Tu (China)</i>	
<b>E - 09</b> Track E	<b>Imaging and visualization 6: Reconstruction algorithms on medical imaging</b> Chairs: Yuan Feng; Jun Zhao		
E-09.1	10:45 am – 11:10 am	Deep learning for CT metal artifact reduction; <i>Chuang Niu (United States)</i>	
E-09.2	11:10 am – 11:25 am	Recent advances in deep learning for CT imaging; <i>Yi Zhang (China)</i>	
E-09.3	11:25 am – 11:40 am	Learning-based reconstruction algorithm of radially sampled interventional MRI; <i>Yuan Feng (China)</i>	
E-09.4	11:40 am – 11:50 am	Impact of automatic versus manual calibration reference segmentation on CT-based finite element analyses; <i>Ashley Pernsteiner (United States)</i>	
E-09.5	11:50 am – 12:00 pm	Quantitative classification of calcifications in diseased tissues; <i>Mehdi Ramezanzpour (United States)</i>	
12:00 am – 1:00 pm	Break & Virtual exhibition		
	Poster session 5 (Track B)		
	Poster session 6 (Track C)		
1:00 pm – 2:00 pm	<b>Daniel Rueckert: How AI is changing the future of radiology</b>		
2:00 pm – 2:30 pm	Break: Networking, community board, exhibition, debates		

2:30 pm – 3:45 pm	<b>A - 10</b> Track A	<b>Tissue engineering and agent-based modelling</b> Chair: <i>Liesbet Geris</i>	
	A-10.1	2:30 pm – 2:40 pm	Exploring the jamming phase transition in a 3D epithelial layer using a deformable cell model; <i>Jef Vangheel (Belgium)</i>
	A-10.2	2:40 pm – 2:50 pm	Arrested coalescence in tissue spheroid fusion: from tissue rheology to individual cell properties; <i>Steven Ongenaes (Belgium)</i>
	A-10.3	2:50 pm – 3:00 pm	Simulations indicate that temporal dynamics differentiate Notch ligands controlling angiogenesis; <i>Tommaso Ristori (Netherlands)</i>
	A-10.4	3:00 pm – 3:10 pm	Tissue engineering a synthetic urinary bladder - steps towards developing a compliant artificial organ and degradable bio-active scaffold; <i>Virginia Monteiro (Brazil)</i>
	A-10.5	3:10 pm – 3:20 pm	The effect of stress and strain on tissue formation during in situ heart valve tissue engineering; <i>Elmer Middendorp (Netherlands)</i>
	<b>B - 10</b> Track B	<b>Spine biomechanics</b> Chairs:	
	B-10.1	2:30 pm – 2:40 pm	Dynamic analysis of the dissipative response of intervertebral discs about a nonlinear prestressed state; <i>Jean-Baptiste Garcher (France)</i>
	B-10.2	2:40 pm – 2:50 pm	Influence of indentation speed on the response of porcine spinal cord white and gray matters; <i>Yvan Petit (Canada)</i>
	B-10.3	2:50 pm – 3:00 pm	Relationship between the cross-sectional distribution of spinal cord gray and white matter mechanical properties and its microstructure; <i>Nicolas Bailly (France)</i>
	B-10.4	3:00 pm – 3:10 pm	Evaluation of the main spatial angles in adolescent idiopathic scoliosis optically diagnosed; <i>Sasa Cukovic (Switzerland)</i>
	B-10.5	3:10 pm – 3:20 pm	Identifying and assessing subject-specific lumbar spinal motion by finite helical axis evolution; <i>Robert Rockenfeller (Germany)</i>
	<b>C - 10</b> Track C	<b>Soft tissue mechanics, damage, remodeling</b> Chair: <i>Kristin Myers</i>	
	C-10.1	2:30 pm – 2:40 pm	Sensitivity of the shear wave speed-stress relationship in connective tissues to material properties and microstructure - A probabilistic finite element study; <i>Jonathon Blank (United States)</i>
	C-10.2	2:40 pm – 2:50 pm	A rat muscle finite-element model to account for transverse loading effects; <i>Mohamed Maamir (France)</i>
C-10.3	2:50 pm – 3:00 pm	Use of 3D ultrasound imaging with speckle tracking to identify calcified areas in abdominal aortic aneurysms; <i>Achim Hegner (Germany)</i>	
C-10.4	3:00 pm – 3:10 pm	Elastic properties of normal breast tissues using an indentation protocol - a preliminary study; <i>Ana Margarida Teixeira (Portugal)</i>	
C-10.5	3:10 pm – 3:20 pm	Maternal pushes during the second stage labor: A biomechanical study of fatigue damage accumulation; <i>Maria Vila Pouca (Portugal)</i>	
C-10.6	3:20 pm – 3:30 pm	Patient specific modelling of respiratory PPE interacting with the soft tissues of the face; <i>Sam Evans (United Kingdom)</i>	
<b>D - 10</b> Track D	<b>Growth and remodelling, inverse problems and parameter identification</b> Chairs:		
D-10.1	2:30 pm – 2:40 pm	On the role of force transmission between migrating endothelial agents in shunt formation during angiogenic remodelling; <i>Lowell Edgar (United Kingdom)</i>	
D-10.2	2:40 pm – 2:50 pm	Deformable ellipsoidal fibril distributions to predict microvascular guidance in response to 3D Matrix orientation and anisotropy; <i>Steven LaBelle (United States)</i>	
D-10.3	2:50 pm – 3:00 pm	Theoretical assessment of focused septal growth in hypertrophic cardiomyopathy; <i>Sandra Hager (United Kingdom)</i>	
D-10.4	3:00 pm – 3:10 pm	Computational modeling of trabecular bone micro-structure; <i>Mahtab Vafaefar (Ireland)</i>	
D-10.5	3:10 pm – 3:20 pm	Identification of constitutive material parameters of degenerative menisci using inverse finite element analysis; <i>Jonas Schwer (Germany)</i>	
D-10.6	3:20 pm – 3:30 pm	Reproducibility of in vivo constitutive parameter identification based on 4D ultrasound strain imaging; <i>Andreas Wittek (Germany)</i>	
4:45 pm – 5:45 pm	<b>E - 10</b> Track E	<b>Imaging and visualization 7</b> Chair: <i>Sebastian Bachmann</i>	
	E-10.1	2:30 pm – 2:40 pm	A novel method for quantitative and statistical comparison of local differences in bone morphometry; <i>Sebastian Bachmann (Austria)</i>
	E-10.2	2:40 pm – 2:50 pm	Feasibility of supervised machine learning for identification of plates and rods in human trabecular bone; <i>Annika vom Scheidt (Austria)</i>
	E-10.3	2:50 pm – 3:00 pm	Development of a numerical analysis applied to the bones of the forearm by means of a flexural load; <i>Daniel Maya Anaya (Mexico)</i>
	E-10.4	3:00 pm – 3:10 pm	Radiographic changes in the vertebral column with the practice of Yoga postures: A review; <i>Sandeep Mudgal (India)</i>
	E-10.5	3:10 pm – 3:20 pm	Comparison of male and female pelvic symmetry and shape; <i>Robyn de Wet (Canada)</i>
3:45 pm – 4:00 pm	Closing and farewell		