CMBBE 2023
SYMPOSIUM
3 - 5 May 2023, Paris, France

18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering

CHALLENGES IN COMPUTATIONAL BIOMECHANICS FOR TOMORROW'S HEALTHCARE SYSTEMS

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Arts et Métiers — Institute of Technology

CARDIFF UNIVERSITY — PRIFYSGOL CAERDYDD

société de BIOMECANIQUE

CONTENT

WELCOME TO CMBBE 2023

Dear colleagues,

We are thrilled to welcome you to the 18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering. Taking place on May 3-5, 2023 at the renowned ENSAM - Arts et Métiers Institute of Technology, Institut de Biomécanique Humaine Georges Charpak, in the beautiful city of Paris, CMBBE 2023 promises to be an exceptional event.

Arts et Métiers Institute of Technology has trained over 85,000 engineers since its foundation in 1780 by the Duke of La Rochefoucauld-Liancourt, and it remains a prestigious and selective French Grande Ecole. It includes 8 Education and Research Campuses and 3 Institutes across France. The Institut de Biomecanique Humaine Georges Charpak (IBHGC) of Arts et Métiers Institute of Technology, is a research structure in which researchers with various scientific profiles are involved (mechanical engineers, orthopedic surgeons, neurosurgeons, imaging specialists, functional rehabilitation physicians, physiologists, automation specialists, radiologists, and physicists). The scientific approach, centered on subject specific musculoskeletal modelling, in strong collaboration with clinicians and companies gives the institute an original scientific positioning at the national and international level.

The main theme of the symposia "Challenges in computational biomechanics for tomorrow's healthcare systems" is reflected in the main topics and addressed in different special sessions in the programme.

The first two plenary lectures give an in-depth view on the challenges and the innovations in the field, while third lecture brings the focus on the successful application of biomechanics in sports, connecting us to the 2024 Paris Olympic and Paralympic Games.

The CMBBE 2023 comprehensive scientific programme features three inspiring plenary lectures, 5 interactive workshops and 26 special sessions including keynote lectures, 330 oral and 154 poster presentations. The symposium covers a broad range of topics, such as clinical biomechanics and translational research, medical devices, sports and movement biomechanics, and many more.

CMBBE 2023 provides a unique opportunity for researchers, academics, industry professionals, and students to collaborate and exchange ideas about the latest innovations, research, and developments in the field of biomechanics and biomedical engineering. The symposium also offers excellent networking opportunities, allowing participants to connect with fellow professionals and engage in thought-provoking discussions about the future of the field. It is a great opportunity to meet again with old friends, or to make new friends, sharing the same passion for science and research!

We encourage you to take advantage of the opportunity to experience one of the most beautiful cities in the world while attending the symposium. Paris has also been regarded as a hub of cultural, historical and scientific innovation, the perfect place to debate on the future of computational biomechanics – the avant-garde field leading to innovation and development in our healthcare systems and quality of life in society.

We are confident that you will find the symposium insightful and rewarding, and we look forward to welcoming you in Paris.

Bienvenue à Paris!
On behalf of the organizing committee

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Paris, France*

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CMBBE 2023 PROGRAMME OVERVIEW

Wednesday, 3rd May 2023

Time	TRACK A – Grand Amphi	TRACK B – Amphi Bezier	TRACK C – Amphi Fournel	TRACK D – Salle des Conseils	TRACK E – Amphi A
7:00	Registration opens				
8:45 – 9:00	Welcome to CMBBE 2023; Wafa Skalli, Sébastien Laporte, Aurélie Benoit (Grand Amphi)				
9:10 – 10:40	**A-01** MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE *Chairs: Stéphane Avril, Nele Famaey*	**B-01** SPORTS BIOMECHANICS: INJURIES AND MANAGAMENT *Chairs: Floren Colloud, Sébastien Laporte*	**C-01** CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH I *Chairs: Nicola Hagemeister, Wafa Skalli*	**D-01** METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE I *Chairs: Sam Evans, Jeff Weiss*	**E-01** MECHANOBIOLOGY I *Chairs: Paulo Ruís Fernandes, Bert van Rietbergen*
10:40 – 11:10	Coffee break, Posters & exhibition viewing				
11:10 – 12:00	Plenary lecture: THE POTENTIAL OF MACHINE LEARNING ALGORITHMS TO ALLEVIATE THE LACK OF DATA IN MEDICAL SIMULATION; Stéphane Bordas, University of Luxembourg; Chairs: Pierre Yves Rohan, Gerard Ateshian – Meeting room: Grand Amphi				
12:10 – 13:10	**A-02** MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE *Chairs: Stéphane Avril, Nele Famaey*	**B-02** HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJUY MECHANISMS I *Chairs: Philippe Rouch, Laurent Gajny*	**C-02** CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH II *Chairs: Irene Vignon-Clementel, Lorenzo Sala*	**D-02** ENGINEERING INNOVATION IN WOMEN'S HEALTH *Chairs: Kristin Myers, Katrina Knight*	**E-02** MECHANOBIOLOGY II *Chairs: Sam Evans, Benjamin Wheatley*
13:10 – 14:10	Lunch break & Poster sessions				

Time	TRACK A – Grand Amphi	TRACK B – Amphi Bezier	TRACK C – Amphi Fournel	TRACK D – Salle des Conseils	TRACK E – Amphi A
14:10 – 15:40	**A-03** RECENT ADVANCES IN 3D MODELING, DIAGNOSIS AND TREATMENT OF SPINAL DEFORMITIES *Chairs: Saša Ćuković, Luigi La Barbera*	**B-03** HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS II *Chairs: Floren Colloud, Julie Choisne*	**C-03** STRUCTURES AND SYSTEMS BIOMECHANICS I *Chairs: Christian T. Gasser, Aline Bel-Brunon*	**D-03** STRUCTURES AND SYSTEMS BIOMECHANICS II *Chairs: Kristin Myers, Dulce Oliveira*	**E-03** MECHANOBIOLOGY III *Chairs: Mathias Peirlink, Heleen Fehervary*
15:50 – 16:50	**A-04** STRUCTURES AND SYSTEMS BIOMECHANICS III *Chairs: Harry van Lenthe, Bert van Rietbergen*	**B-04** HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS III *Chairs: Ilse Jonkers, Ayman Assi*	**C-04** MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE *Chairs: Stéphane Avril, Nele Famaey*	**D-04** ENGINEERING INNOVATION IN WOMEN'S HEALTH *Chairs: Kristin Myers, Katrina Knight*	**E-04** CANCER MECHANOBIOLOGY *Chairs: Valeria Panzetta, Sabato Fusco*
16:50 – 17:20	Coffee break, Posters & exhibition viewing				
17:20 – 18:50	**A-05** CLINICAL BIOMECHANICS & TRANSLATIONAL RESEARCH III *Chairs: Christoph Bourauel, Ayman Assi*	**B-05** PREDICTION OF HIP STRENGTH FROM CLINICAL DATA *Chairs: Philippe Zysset, Bert van Rietbergen*	**C-05** MECHANICAL CHARACTERIZATION OF MUSCLE ACROSS LENGTH SCALES *Chairs: Pierre-Yves Rohan, Benjamin Wheatley*	**D-05** SIMVASCULAR WORKSHOP *Chair: Shawn C. Shadden*	**E-05** GIBBON WORKSHOP *Chair: Kevin Moerman*
19:00	Welcome Reception, ENSAM (Conference Venue)				

Thursday, 4th May 2023

Time	TRACK A – Grand Amphi	TRACK B – Amphi Bezier	TRACK C – Amphi Fournel	TRACK D – Salle des Conseils	TRACK E – Amphi A
8:00	Registration opens				
9:00 – 10:30	**A-06** CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH IV *Chairs: Simona Celi, Heleen Fehervary*	**B-06** COMPUTATIONAL EVALUATION OF ORTHOPAEDIC DEVICES *Chair: Ruth Wilcox, Julie Choisne*	**C-06** HOW BIOMECHANICAL MODELS CAN IMPROVE DENTAL CLINICS? *Chair: Aurelie Benoit, Ludger Keilig*	**D-06** EXPLORING BRAIN MECHANICS *Chairs: Silvia Budday, Lynne Bilston*	**E-06** MULTISCALE MECHANOBIOLOGY *Chairs: Juan Mora-Macias, Jose Sanz-Herrera*
10:30 – 11:00	Coffee break, Posters & exhibition viewing				
11:00 – 12:45	**A-07** HEAD AND NECK BIOMECHANICS FOR COMPUTER ASSISTED MEDICAL INTERVENTIONS *Chairs: Yohan Payan, Georges Bettega*	**B-07** IMAGE ANALYSIS AND PROCESSING METHODS FOR BIOLOGY AND MEDICINE I *Chairs: Sébastien Laporte, Kevin Moerman*	**C-07** MECHANISTIC MULTIPHASE MODELING OF SOFT TISSUES: IN VITRO/IN VIVO/IN SILICO APPROACHES TOWARD CLINICAL APPLICATION *Chairs: Giuseppe Sciume, Stephane Urcun*	**D-07** DIGITAL TWIN OF DIFFERENT SCALES AND BIOLOGICAL PROCESSES: THE EXAMPLE OF LIVER *Chairs: Lorenzo Sala, Irene Vignon-Clementel*	**E07** MECHANOBIOLOGY IV *Chairs: Sophie Le Cann, Nicholas Bochud*
13:00 – 14:00	Lunch break & Poster sessions				
13:00 – 14:00	BETA CAE Industry workshop (Amphi Bezier)				
14:00 – 14:50	Plenary lecture: **ADVANCING THE USE OF CREDIBLE COMPUTER MODELLING AND SIMULATION FOR MEDICAL DEVICE REGULATORY DECISION MAKING: FROM PRECLINICAL TO IN SILICO CLINICAL TRIALS;** *Chairs: Wafa Skalli, Jos Vander Sloten* — Meeting room: Grand Amphi — Brent Craven, U.S. Food and Drug Administration;				
	TRACK A – Grand Amphi	TRACK B – Amphi Bezier	TRACK C – Amphi Fournel	TRACK D – Salle des Conseils	TRACK E – Amphi A
15:00 – 16:30	**A-08** VERIFICATION AND VALIDATION OF COMPUTATIONAL MODELS *Chairs: Nele Famaey, Sam Evans and Heleen Fehervary*	**B-08** METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE II *Chairs: Michael Sacks, Sophie Le Cann*	**C-08** STRUCTURES AND SYSTEMS BIOMECHANICS IV *Chairs: Mathieu Specklin, Jean-Louis Hébert*	**D-08** STRUCTURES AND SYSTEMS BIOMECHANICS V *Chairs: Pierre-Yves Rohan, Benjamin Wheatley*	**E-08** SOFA WORKSHOP *Chair: Hugo Talbot*
16:30 – 17:00	Coffee break + Poster sessions (coffee served in poster exhibition)				
17:00 – 18:30	**A-09** VERIFICATION AND VALIDATION OF COMPUTATIONAL MODELS *Chairs: Nele Famaey, Sam Evans and Heleen Fehervary*	**B-09** METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE III *Chairs: Lucas Timmins, Pierre Yves Rohan*	**C-09** HOW BIOMECHANICAL MODELS CAN IMPROVE DENTAL CLINICS? *Chairs: Aurelie Benoit, Ludger Keilig*	**D-09** FEBIO WORKSHOP *Chairs: Gerard Ateshian, Jeffrey Weiss*	**E-09** BIOPTIM WORKSHOP *Chairs: Francois Bailly, Amedeo Ceglia*
20:00	Conference dinner cruise on the legendary Bateau mouche boat (Departure of the boat: Pont de l'Alma — metro station Alma Marceau ; address: Bateaux-Mouches, Port de la Conférence/Pont de l'Alma.)				

Friday, 5th May 2023

	TRACK A – Grand Amphi	TRACK B – Amphi Bezier	TRACK C – Amphi Fournel	TRACK D – Salle des Conseils	TRACK E – Amphi A
8:00	Registration opens				
9:00 – 9:50	Plenary lecture: **CHALLENGES IN SPORT BIOMECHANICS;** *Christophe Baudot, Chief Medical Doctor, Paris Saint-Germain & Philippe Rouch, ENSAM; Chairs: Sébastien Laporte, Sam Evans — Meeting room: Grand Amphi*				
10:00 – 11:00	A-10 **CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH V** *Chairs: Philippe Zysset, Jos Vander Sloten*	B-10 **HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS IV** *Chairs: Sébastien Laporte, Maude Creze*	C-10 **BIOMECHANICS OF CARDIOVASCULAR SYSTEM: MODELLING, SIMULATION AND IMAGING** *Chairs: Simona Celi, Lorenza Petrini*	D-10 **METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE IV** *Chairs: Michael Sacks, Klaas Vander Linden*	E-10 **MECHANOBIOLOGY V** *Chairs: Aurélie Benoit, Areti Papastavrou*
11:00 – 11:30	Coffee break, Posters & exhibition viewing				
11:30 – 13:00	A-11 **CLINICAL APPLICATIONS OF HIGH RESOLUTION CT** *Chairs: Philippe Zysset, Bert van Rietbergen*	B-11 **COMPUTATIONAL PULMONOLOGY: RECENT ADVANCES & CHALLENGES** *Chairs: Martin Genet, Aline Bel-Brunon*	C-11 **METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE V** *Chairs: Kevin Moerman, Qiyao Peng*	D-11 **METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE VI** *Chairs: Sébastien Laporte, Yohan Payan*	E-11 **MODELLING AND SIMULATION OF MUSCULOSKELETAL MECHANOBIOLOGY** *Chair: Areti Papastavrou, Julie Choisne*
13:00 – 14:00	Lunch break & Poster sessions				
	TRACK A – Grand Amphi	**TRACK B – Amphi Bezier**	**TRACK C – Amphi Fournel**	**TRACK D – Salle des Conseils**	**TRACK E – Amphi A**
14:00 – 15:45	A-12 **CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH VI** *Chairs: Jean Marc Allain, Sam Evans*	B-12 **3D MOVEMENT ANALYSIS AND SUBJECT-SPECIFIC MUSCULOSKELETAL MODELING - ORGANIZED JOINTLY WITH ESMAC** *Chairs: Ayman Assi, Hans Kainz*	C-12 **IMAGE ANALYSIS AND PROCESSING METHODS FOR BIOLOGY AND MEDICINE II** *Chairs: Claudio Vergari, Heleen Fehervary*	D-12 **METHODS IN MECHANICS AND MEDICINE VII** *Chairs: Jose Munoz, Lorenza Petrini*	E-12 **CURRENT CHALLENGES OF IN VIVO SUBJECT-SPECIFIC CONSTITUTIVE MODELLING OF BIOLOGICAL SOFT TISSUES** *Chairs: Pierre-Yves Rohan, Gerard Ateshian*
16:00 – 17:30	A-13 **CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH VII** *Chair: Claudio Vergari*	B-13 **DIGITAL TWINS FOR PERSONALISED MEDICINE** *Chairs: Julie Choisne, Philippe Rouch*	C-13 **STRUCTURES AND SYSTEMS BIOMECHANICS VI** *Chairs: Silvia Budday, Lynne Bilston*	D-13 **METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE VIII** *Chairs: Mathieu Specklin, Cedric Laurent*	E-13 **MECHANOBIOLOGY VI** *Chairs: Juan Mora-Macías, Pierre Yves Rohan*
17:30	Closing session & CMBBE awards				

CMBBE 2023 DETAILED PROGRAM

Wednesday, 3rd May 2023

7:00	Registration opens
8:45 – 9:00	Welcome to CMBBE 2023; *Wafa Skalli, Sébastien Laporte, Aurélie Benoit* (Grand Amphi)

9:10 – 10:40	**A – 01** TRACK A – Grand Amphi	**MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE** *Chairs: Stéphane Avril, Nele Famaey*
	A-01.1 9:10 – 9:25	PHYSICS-BASED MODELING AND MACHINE LEARNING SYNERGIES IN HUMAN HEART MODELING; *Mathias Peirlinck (The Netherlands)* [D]
	A-01.2 9:25 – 9:40	PREDICTING AND UNDERSTANDING THE MECHANICAL BEHAVIOR OF SOFT TISSUE ACROSS THE SCALES BY DEEP LEARNING; *Christian J. Cyron (Germany)* [D]
	A-01.3 9:40 – 9:55	A DATA-DRIVEN COMPUTATIONAL MODEL OF ENGINEERED HEART TISSUES; *Javiera Jilberto (USA)* [S]
	A-01.4 9:55 – 10:10	MODELLING ARTERIAL RESPONSE TO MECHANO-BIOLOGICAL CUES: GETTING THROUGH OR BREAKING BAD?; *Michele Marino (Italy)* [D]
	A-01.5 10:10 – 10:25	CELLULAR RESPONSES TO SUBSTRATE TOPOGRAPHY: OPPORTUNITIES FOR COMPUTATIONAL MODELING; *Abdul I. Barakat (France)* [D]
	A-01.6 10:25 – 10:40	LAMELLAR UNDULATION, RESIDUAL STRESSES, AND HOMEOSTASIS: A MULTISCALE MATHEMATICAL APPROACH; *Claire Morin (France)* [D]
	B – 01 TRACK B – Amphi Bezier	**SPORTS BIOMECHANICS: INJURIES AND MANAGEMENT** *Chairs: Floren Colloud, Sébastien Laporte*
	B-01.1 9:10 – 9:25	IN SILICO OPTIMIZATION OF HELMET MATERIAL PROPERTIES FOR TRAUMATIC BRAIN INJURY MITIGATION; *Vincent Varanges (Switzerland)* [S]
	B-01.2 9:25 – 9:40	WHAT ARE THE INFLUENCE OF ANATOMICAL VARIABILITIES ON SKULL-BRAIN BEHAVIOR? A NUMERICAL APPROACH; *Sébastien Laporte (France)* [D]
	B-01.3 9:40 – 9:55	MUSCULOSKELETAL MODELING OF RUSSIAN BAR PORTER'S TO ASSESS THEIR SPINAL LOADS DURING A PERFORMANCE; *Pierre André Schmidt (Canada)* [S]
	B-01.4 9:55 – 10:10	BRAIN RESPONSES TO FOOTBALL IMPACTS IN REGIONS OF INTEREST: REFINEMENT OF A FINITE ELEMENT HEAD MODEL; *Véronique Bouvette (Canada)* [S]
	B-01.5 10:10 – 10:25	ANALYSIS OF THE EFFECTIVENESS OF FOAM HEADGUARDS TO PROTECT AGAINST MTBI IN RUGBY; *Lucia Perez Del Olmo (Ireland)* [D]
	B-01.6 10:25 – 10:40	PREDICTION OF BRAIN AND CERVICAL LOADING IN A SNOWBOARDING BACKWARD FALLS TO EVALUATE HELMETS; *Nicolas Bailly (France)* [D]
	C – 01 TRACK C – Amphi Fournel	**CLINICAL BIOMECHANICS & TRANSLATIONAL RESEARCH I** *Chairs: Nicola Hagemeister, Wafa Skalli*
	C-01.1 9:10 – 9:25	HOW DOES KNEE ORTHOSIS MODELLING INFLUENCE THE PREDICTION OF CONTACT FORCES?; *Sacha Guitteny (France)* [S]
	C-01.2 9:25 – 9:40	KNEE IMPLANT WEAR PREDICTION IS SENSITIVE TO CHOICE OF FORCE OR DISPLACEMENT CONTROL; *Michael J. Dreyer (Switzerland)* [S]
	C-01.3 9:40 – 9:55	GEOMETRIC MRI-DERIVED BIOMARKERS AS PREDICTORS OF JOINT MECHANICS CHANGES AFTER PARTIAL MENISCECTOMY; *Brett Steineman (USA)* [D]
	C-01.4 9:55 – 10:10	STATISTICAL SHAPE MODELING-BASED WORKFLOW FOR PATIENT-SPECIFIC PLANNING OF TIBIAL FRACTURE FIXATION; *Jet Zoë Moolenaar (The Netherlands)* [S]
	C-01.5 10:10 – 10:25	COMBINED SHAPE MODEL OF THE LOWER LIMB IN A PAEDIATRIC POPULATION PROVIDES ACCURATE BONE SHAPE ESTIMATION; *Julie Choisne (New Zealand)* [D]
	C-01.6 10:25 – 10:40	3D RECONSTRUCTION OF THE PAEDIATRIC HIP: A COMPARISON OF DIFFERENT METHODS; *Claudio Vergari (France)* [D]
	D – 01 TRACK D – Salle des Conseils	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE I** *Chairs: Sam Evans, Jeff Weiss*
	D-01.1 9:10 – 9:25	SMOOTHED FINITE ELEMENT METHODS IN MODELLING AND SIMULATION OF ACTIVE CARDIAC CONTRACTION; *Denisa Martonová (Germany)* [S]
	D-01.2 9:25 – 9:40	FASTER AND MORE RELIABLE SOLUTION ALGORITHMS FOR LARGE DEFORMATION FE MODELS; *Sam L Evans (United Kingdom)* [D]
	D-01.3 9:40 – 9:55	UNIFIED POSITION-BASED DYNAMICS SOLVER FOR SURGICAL SIMULATION; *Rachel B Clipp (USA)* [D]
	D-01.4 9:55 – 10:10	NUMERICAL SCHEME FOR DYNAMIC ELASTOGRAPHIC MEASUREMENTS ON THE CORNEA; *Giulia Merlini (France)* [S]
	D-01.5 10:10 – 10:25	ONE DIMENSIONAL MODEL OF THE MICROVASCULAR NETWORK OF THE RETINA : APPLICATION TO MULTIPLES STENOSES; *Laureline Julien (France)* [S]
	D-01.6 10:25 – 10:40	PRESTRESSING ALGORITHMS FOR ARTERIAL WALL MECHANICS: ANALYSIS OF THE ROBUSTNESS AND UNIQUENESS; *Klaas Vander Linden (Belgium)* [S]
	E – 01 TRACK E – Amphi A	**MECHANOBIOLOGY I** *Chairs: Paulo Ruis Fernandes, Bert van Rietbergen*
	E-01.1 9:10 – 9:25	CONSIDERING NONLOCALITY IN CONTINUUM BONE REMODELLING - A MICROMORPHIC APPROACH; *Anna Titlbach (Germany)* [S]
	E-01.2 9:25 – 9:40	REMODELING OF ISOTROPIC MATERIALS VIA THE HOMOGENIZED CONSTRAINED MIXTURE THEORY AND FINITE PLASTICITY; *Felipe Sempertegui (France)* [D]
	E-01.3 9:40 – 9:55	COUPLED CHEMO-MECHANO-BIOLOGICAL SIMULATIONS OF EVOLVING OSTEOARTHRITIS: THEORY AND 3-D SIMULATIONS; *David Michael Pierce (USA)* [D]
	E-01.4 9:55 – 10:10	EXTENSION OF BONE HEALING MODEL FROM 2D TO 3D USING FINITE ELEMENT ANALYSIS AND FUZZY LOGIC; *Pieter Ansoms (Belgium)* [S]
	E-01.5 10:10 – 10:25	GLIOBLASTOMA RESISTANCE TO TEMOZOLOMIDE: MATHEMATICAL MODELS TO DESIGN OPTIMAL TREATMENTS; *Marina Pérez-Aliacar (Spain)* [S]
	E-01.6 10:25 – 10:40	HYBRID APPROACH TO MODEL EPITHELIAL MONOLAYERS DURING INTRACELLULAR BACTERIAL INFECTION; *Raul Aparicio-Yuste (Spain)* [S]

Wednesday, 3rd May 2023

Time			
10:40 – 11:10	Coffee break, Posters & exhibition viewing		
11:10 – 12:00	Plenary lecture: THE POTENTIAL OF MACHINE LEARNING ALGORITHMS TO ALLEVIATE THE LACK OF DATA IN MEDICAL SIMULATION; *Stéphane Bordas* *Chairs: Pierre Yves Rohan, Gerard Ateshian (Meeting room: Grand Amphi)*		
12:10 – 13:10	**A – 02** TRACK A – Grand Amphi	**MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE** *Chairs: Stéphane Avril, Nele Famaey*	
	A-02.1	12:10 – 12:25	ECM MECHANICS FOR EARLY DETECTION OF DISEASES; *Yanhang {Katherine} Zhang (USA)* [D]
	A-02.2	12:25 – 12:40	A BOTTOM-UP APPROACH TO MODEL FAILURE IN SOFT COLLAGENOUS TISSUES; *Christian T. Gasser (Sweden)* [D]
	A-02.3	12:40 – 12:55	MECHANOSENSITIVE PROTEASE NETWORK MODELING FOR PATIENT-SPECIFIC HEART FAILURE PREDICTIONS; *Will Richardson (USA)* [D]
	A-02.4	12:55 – 13:10	EFFECT OF ATHEROMA PLAQUE ON DRUG TRANSPORT IN A CORONARY STENT; *Estefania Peña (Spain)* [D]
	B – 02 TRACK B – Amphi Bezier	**HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS I** *Chairs: Philippe Rouch, Laurent Gajny*	
	B-02.1	12:10 – 12:25	INVARIANT KINEMATIC CONSEQUENCES OF MUSCULAR ANTICIPATION DURING LANDING AND DROP-JUMPING; *Romain Bechet (France)* [S]
	B-02.2	12:25 – 12:40	CLUSTERING OF KNEE OSTEOARTHRITIS PATIENTS BASED ON KINEMATIC DATA USING K-MEANS ALGORITHM; *Zahra Bensaddek (Canada)* [D]
	B-02.3	12:40 – 12:55	DIGITAL SINGLE-LIMB STANCE ASSESSMENT BASED ON A 3-DIMENSIONAL KINEMATIC ALGORITHM; *Yu Yuan Lee (Germany)* [S]
	B-02.4	12:55 – 13:10	UNIQUE TIBIOFEMORAL GEOMETRIC FEATURES AFFECT SIMULATED KNEE MECHANICS IN YOUNG FEMALE ATHLETES; *Mitchell George Andrew Wheatley (USA)* [D]
	C – 02 TRACK C – Amphi Fournel	**CLINICAL BIOMECHANICS & TRANSLATIONAL RESEARCH II** *Chairs: Irene Vignon-Clementel, Lorenzo Sala*	
	C-02.1	12:10 – 12:25	SUBJECT SPECIFIC MODELING FOR SURGERY COMPLICATIONS ANALYSIS: A PRELIMINARY CASE REPORT; *Raphael Badaoui (France)* [S]
	C-02.2	12:25 – 12:40	FACET JOINT CAPSULAR LIGAMENT RESPONSE UNDER SIMPLE LOADING MODES FOR COMPUTATIONAL MODEL VALIDATION; *Stewart McLachlin (Canada)* [D]
	C-02.3	12:40 – 12:55	QUASI-AUTOMATIC GEOMETRIC AND STRUCTURAL QUANTITATIVE ANALYSIS OF FRACTURED VERTEBRAS; *Lucas Le Gallo (France)* [D]
	C-02.4	12:55 – 13:10	EXAMINING IMPLEMENTATION OF THE FACET JOINT CAPSULAR LIGAMENT IN A COMPUTATIONAL HUMAN BODY MODEL; *Gwennyth Alexandra Carroll (Canada)* [S]
	D – 02 TRACK D – Salle des Conseils	**ENGINEERING INNOVATION IN WOMEN'S HEALTH** *Chairs: Kristin Myers, Katrina Knight*	
	D-02.1	12:10 – 12:25	NUMERICAL SIMULATION OF THE ONSET OF SECOND STAGE OF LABOUR; *Antoine Jerusalem (United Kingdom)* [D]
	D-02.2	12:25 – 12:40	DEVELOPING A BIOMECHANICAL MODEL TO STUDY OASIS; *Dulce Oliveira (Portugal)* [D]
	D-02.3	12:40 – 12:55	FINITE ELEMENT MODELING OF CESAREAN SECTION SCARS; *Adrienne Kathleen Scott (USA)* [D]
	D-02.4	12:55 – 13:10	DEVELOPMENT AND CALIBRATION OF A BILAYER FETAL MEMBRANE MODEL USING EXPERIMENTAL DATA; *Daniel Fidalgo (Portugal)* [S]
	E – 02 TRACK E – Amphi A	**MECHANOBIOLOGY II** *Chairs: Sam Evans, Benjamin Wheatley*	
	E-02.1	12:10 – 12:25	MECHANO-BIOLOGICAL OPTIMIZATION OF SCAFFOLDS TOWARDS ENHANCED BONE REGENERATION; *Sara Checa (Germany)* [D]
	E-02.2	12:25 – 12:40	MSC MORPHOFUNCTIONAL PROGRAMMING FOR IMPROVED ORTHOPAEDIC IMPLANTATION OUTCOMES; *Francisca Melo-Fonseca (Portugal)* [S]
	E-02.3	12:40 – 12:55	REGULATING CHONDROCYTE BIOSYNTHESIS THROUGH HYPOXIA AND THERMOMECHANICAL STIMULATION; *Theofanis Stampoultzis (Switzerland)* [S]
	E-02.4	12:55 – 13:10	A BONE-ON-CHIP AS A 3D PLATFORM TO ASSESS THE EFFECT OF STEM AGE ON TISSUE FORMATION; *Elisa Reine Budyn (France)* [D]

Wednesday, 3rd May 2023

13:10 – 14:10	Lunch break & Poster sessions A and B

14:10 – 15:40	**A – 03** TRACK A – Grand Amphi	**RECENT ADVANCES IN 3D MODELING, DIAGNOSIS AND TREATMENT OF SPINAL DEFORMITIES** *Chairs: Saša Ćuković, Luigi La Barbera*
	A-03.1 14:10 – 14:25	AUTOMATIC SEGMENTATION OF VERTEBRAE AND INTERVERTEBRAL DISCS FROM SYNTHETIC CT IMAGES DERIVED FROM MR IMAGES; *Joeri Kok (The Netherlands)* [D]
	A-03.2 14:25 – 14:40	DEEP-LEARNING-BASED 3D RECONSTRUCTION OF THE SPINE FROM LOW-DOSE BIPLANAR RADIOGRAPHS; *Matteo Bovio (France)* [S]
	A-03.3 14:40 – 14:55	DEVELOPMENT OF A SUBJECT-SPECIFIC MUSCULOSKELETAL MODELING FRAMEWORK FOR SPINAL DEFORMITY PATIENTS; *Birgitt Peeters (Belgium)* [S]
	A-03.4 14:55 – 15:10	GENERATION OF SUBJECT-SPECIFIC NUMERICAL MODELS TO INVESTIGATE THE SURGICAL TREATMENT OF AIS; *Benedikt Schlager (Germany)* [D]
	A-03.5 15:10 – 15:25	CAN WE PREDICT THE RISK OF SURGERY REVISION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS USING AN ENERGY-BASED APPROACH; *Baptiste Brun-Cottan (France)* [D]
	A-03.6 15:25 – 15:40	3D INFERENCE OF THE SCOLIOTIC SPINE FROM DEPTH MAPS OF THE BACK; *Nicolas Comte (France)* [S]

	B – 03 TRACK B – Amphi Bezier	**HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS II** *Chairs: Floren Colloud, Julie Choisne*
	B-03.1 14:10 – 14:25	TOWARD A PHYSICAL HUMAN THORAX SURROGATE DEDICATED TO BLUNT BALLISTIC IMPACTS BASED ON FE SIMULATIONS; *Martin Chaufer (France)* [S]
	B-03.2 14:25 – 14:40	ROBUST AND TIME-EFFECTIVE MODELING OF CEREBROSPINAL FLUID FOR IMPACT BIOMECHANICS; *Claire Bruna-Rosso (France)* [D]
	B-03.3 14:40 – 14:55	THE BENEFITS OF AERO HANDLEBARS ON AERODYNAMIC IN CYCLISTS USING COMPUTATIONAL FLUID DYNAMICS METHODS; *Delphine Périé (Canada)* [D]
	B-03.4 14:55 – 15:10	ACTIVE NECK MUSCULAR REACTION DEPENDING ON THE SURROUNDING ENVIRONMENT; *María González-García (Germany)* [D]
	B-03.5 15:10 – 15:25	EFFECT OF SEATBELTS ON SEATED PEDESTRIAN IMPACTS; *Daniel Grindle (USA)* [S]
	B-03.6 15:25 – 15:40	ATHLETE 3D MOTION FROM VIDEO: APPLICATION TO INJURY PREVENTION IN ON-FIELD AND OFF-FIELD ENVIRONMENTS; *Ciaran Simms (Ireland)* [D]

	C – 03 TRACK C – Amphi Fournel	**STRUCTURES AND SYSTEMS BIOMECHANICS I** *Chairs: Christian T. Gasser, Aline Bel-Brunon*
	C-03.1 14:10 – 14:25	DO ASSUMED PROBABILITY DISTRIBUIONS OF ARTERY MODEL PARAMETERS MATTER DURING SENSITIVITY ANALYSIS?; *Friederike Schäfer (Norway)* [S]
	C-03.2 14:25 – 14:40	PRESCRIBED-MOTION AND QUASI-STEADY CFD OF HEART HEMODYNAMICS – VALIDATION STUDY WITH 4D FLOW MRI; *Florian Hellmeier (Germany)* [D]
	C-03.3 14:40 – 14:55	NON-INVASIVE LEFT VENTRICULAR HEMODYNAMICS ANALYSIS IN ALL SURVIVORS DURING EXERCISE; *Agathe Bedoux (Canada)* [S]
	C-03.4 14:55 – 15:10	HIGH RESOLUTION SIMULATION OF BASILAR ARTERY INFARCT AND FLOW WITHIN THE CIRCLE OF WILLIS; *Jon McCullough (United Kingdom)* [D]
	C-03.5 15:10 – 15:25	NUMERICAL INVESTIGATION OF RELATIONS BETWEEN TURBULENCE AND HEMOLYSIS IN VENTRICULAR ASSISTANCE DEVICE; *Louis Marcel (France)* [S]
	C-03.6 15:25 – 15:40	THE EFFECT OF BLOOD FLOW RATE ON ARTERIAL REFLECTIVE PHOTOPLETHYSMOGRAPHY; *Nikolaos Stergiopulos (Switzerland)* [D]

	D – 03 TRACK D – Salle des Conseils	**STRUCTURES AND SYSTEMS BIOMECHANICS II** *Chairs: Kristin Myers, Dulce Oliveira*
	D-03.1 14:10 – 14:25	IMPACT OF PERINEAL STRUCTURES IN THE BIOMECHANICAL ANALYSIS OF CHILDBIRTH; *Rita Moura (Portugal)* [S]
	D-03.2 14:25 – 14:40	A FINITE ELEMENT MODEL OF PROLAPSE MESH INCLUDING FILAMENT-LEVEL INTERACTIONS; *Madeline Preece Hackett (USA)* [S]
	D-03.3 14:40 – 14:55	COMPUTATIONAL HOMOGENIZATION OF HISTOLOGICAL MICROSTRUCTURES IN HUMAN PROSTATE AND CANCER; *Calum Anderson (United Kingdom)* [S]
	D-03.4 14:55 – 15:10	VISCOELASTIC MATERIAL MODELS FOR PESSARY PROSTHETIC MODELLING; *Kyra Megan Wanuch (Canada)* [S]
	D-03.5 15:10 – 15:25	AN IN-SILICO MECHANICAL TEST TO STUDY CERVICAL LOADING IN PATIENTS AT LOW- AND HIGH-RISK FOR PRETERM BIRTH; *Kristin Myers (USA)* [D]
	D-03.6 15:25 – 15:40	TOWARDS A NUMERICAL MODEL OF A TRAINING OBSTETRICAL DUMMY TO ENHANCE VACUUM ASSISTED DELIVERY; *Yves Vallet (France)* [S]

	E – 03 TRACK E – Amphi A	**MECHANOBIOLOGY III** *Chairs: Mathias Peirlink, Heleen Fehervary*
	E-03.1 14:10 – 14:25	AN IN SILICO MODEL TO INVESTIGATE STROMAL CELL-DRIVEN SPROUTING ANGIOGENESIS WITHIN AN ANISOTROPIC SCAFFOLD; *Chiara Dazzi (Germany)* [S]
	E-03.2 14:25 – 14:40	UNRAVELING THE PHYSICS OF EPITHELIAL JAMMING USING AN ACTIVE FOAM MODEL; *Jef Vangheel (Belgium)* [S]
	E-03.3 14:40 – 14:55	IMPROVING DRUG DELIVERY IN THE BRAIN USING MICROBUBBLES COMBINED WITH FOCUSED ULTRASOUND; *Qiyao Peng (The Netherlands)* [D]
	E-03.4 14:55 – 15:10	PHYSICS INFORMED TISSUE ARCHITECTURE RECONSTRUCTION; *Jiri Pesek (France)* [D]
	E-03.5 15:10 – 15:25	SPHEROID FUSION: ARRESTED COALESCENCE AND JAMMING; *Steven Ongenae (Belgium)* [S]
	E-03.6 15:25 – 15:40	NEURAL CREST CELL CONTRACTION CAN DIRECT COLLECTIVE MIGRATION; *Ian Manifacier (France)* [D]

S=student, K=keynote, D=delegate

Wednesday, 3ʳᵈ May 2023

15:50 – 16:50	**A – 04** TRACK C – Grand Amphi	**STRUCTURES AND SYSTEMS BIOMECHANICS III** *Chairs: Harry van Lenthe, Bert van Rietbergen*
	A-04.1 15:50 – 16:05	STORAGE DURATION EFFECTS ON THE PROPERTIES OF CORTICAL BONE - MODELLING IMPLICATIONS; *Nicholas Daras (South Africa)* [S]
	A-04.2 16:05 – 16:20	AN INTEGRATED FINITE ELEMENT APPROACH TO SIMULATE BONE STRAIN RESPONSE TO PHYSIOLOGICALLY REALISTIC LOADING CONDITIONS; *Timo van Leeuwen (Belgium)* [D]
	A-04.3 16:20 – 16:35	ANALYSIS OF THE INFLUENCE OF THE GEOMETRIC ANISOTROPY ON THE MECHANICAL BEHAVIOR OF TRABECULAR BONE USING A PARAMETRIC MODEL; *Nicolas Rogalski (France)* [S]
	A-04.4 16:35 – 16:50	IMPORTANCE OF FIBRIL DISTRIBUTION IN MODELING OF BENNINGHOFF ARCHES IN ARTICULAR CARTILAGE; *Courtney A. Petersen (USA)* [S]
	B – 04 TRACK B – Amphi Bezier	**HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS III** *Chairs: Ilse Jonkers, Ayman Assi*
	B-04.1 15:50 – 16:05	DETECTING MUSCLE FATIGUE IN SURFACE EMG DATA THROUGH TOPOLOGICAL DATA ANALYSIS; *Benjamin Wheatley (USA)* [D]
	B-04.2 16:05 – 16:20	SIMULATIONS OF DYSFUNCTIONAL NEURO-MUSCULAR MECHANISMS EXPLAIN GRADUAL SPASTIC GAIT CHANGES; *Daniel F.B. Haeufle (Germany)* [D]
	B-04.3 16:20 – 16:35	LEARNING WITH MUSCLES: BENEFITS OF MUSCLE-ACTUATED MOTION IN ROBOTICS AND BIOLOGY; *Isabell Wochner (Germany)* [S]
	B-04.4 16:35 – 16:50	EMG-DRIVEN ESTIMATION OF MUSCLE MOMENTS REVISITED THROUGH INTEGRATION OF INTERMUSCULAR COHERENCE; *Emilie Mathieu (France)* [D]
	C – 04 TRACK C – Amphi Fournel	**MULTI-SCALE MECHANICS AND MECHANOBIOLOGY FOR TOMORROW'S CARDIOVASCULAR MEDICINE** *Chairs: Stéphane Avril, Nele Famaey*
	C-04.1 15:50 – 16:05	TOWARDS THE COMPUTATIONAL DEVELOPMENT OF AN IDEAL EXTERNAL SUPPORT FOR THE ROSS PROCEDURE; *Thibault Vervenne (Belgium)* [S]
	C-04.2 16:05 – 16:20	A MATHEMATICAL MODEL OF HIPSC CARDIOMYOCYTES IN ISCHEMIA/REPERFUSION; *Jussi Koivumäki (Finland)* [S]
	C-04.3 16:20 – 16:35	DATA-DRIVEN COMPUTATION OF GROWTH PATTERNS. APPLICATION TO HEART MORPHOGENESIS.; *Jose Munoz (Spain)* [D]
	C-04.4 16:35 – 16:50	FLUID STRUCTURE INTERACTION MODELING OF AORTIC VALVES USING THE LATTICE BOLTZMANN AND FEM METHODS; *Adi Morany (Israel)* [S]
	D – 04 TRACK D – Salle des Conseils	**ENGINEERING INNOVATION IN WOMEN'S HEALTH** *Chairs: Kristin Myers, Katrina Knight*
	D-04.1 15:50 – 16:10	COMPUTATIONAL MODELING OF CERVICAL SUPPORT DURING HUMAN PREGNANCY: IMPLICATIONS FOR THE TREATMENT OF CERVICAL INSUFFICIENCY; *Michael House (USA)* [K]
	D-04.2 16:10 – 16:25	INNOVATING FOR PROLAPSE REPAIRS USING A COMPUTATIONAL MODELING AND EXPERIMENTAL APPROACH; *Katrina Marquita Knight (USA)* [D]
	D-04.3 16:25 – 16:40	ESTABLISHMENT OF THE IN VIVO BIOMECHANICAL PROPERTIES OF THE BLADDER OF CONTINENT AND INCONTINENT WOMEN; *Elisabete Silva (Portugal)* [D]
	D-04.4 16:40 – 16:55	EXPERIMENTAL AND COMPUTATIONAL CHARACTERISATION OF OVINE PELVIC TISSUES; *Katie Harte (United Kingdom)* [S]
	E – 04 TRACK E – Amphi A	**CANCER MECHANOBIOLOGY** *Chairs: Valeria Panzetta, Sabato Fusco*
	E-04.1 15:50 – 16:10	DIGITAL NUCLEAR MECHANOBIOLOGY AND CANCER DIAGNOSTICS; *G.V. Shivashankar (Switzerland)* [K]
	E-04.2 16:10 – 16:25	CELL DEFORMABILITY HETEROGENEITY RECOGNITION FROM IN-FLOW MOTION PARAMETERS; *Maria Isabella Maremonti (Italy)* [D]
	E-04.3 16:25 – 16:40	BIOMECHANICAL ANALYSIS OF BRAIN CANCER CELL INVASION BY KINEMATIC FIELD MEASUREMENTS; *Aurélie Gangneux (France)* [S]
	E-04.4 16:40 – 16:55	MODELLING OF FORCES EXERTED BY CELLS ON THEIR DIRECT ENVIRONMENT; *Fred Vermolen (Belgium)* [S]

Wednesday, 3rd May 2023

16:50 – 17:20	Coffee break, Posters & exhibition viewing	

17:20 – 18:50	**A – 05** TRACK A – Grand Amphi	**CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH III** *Chairs: Christoph Bourauel, Ayman Assi*
	A-05.1　17:20 – 17:35	A METHOD TO CARACTERIZE POSTURE AND THE SCAPULOTHORACIC JOINT USING BIPLANAR RADIOGRAPHY; *Sandrine Bousigues* (France) [S]
	A-05.2　17:35 – 17:50	MELT ELECTROWRITTEN GRADIENT SCAFFOLD DEVELOPMENT FOR ROTATOR CUFF REPAIR; *Kirk Charles McGilvray* (USA) [D]
	A-05.3　17:50 – 18:05	ON THE EVALUATION OF POSTOPERATIVE BIOMECHANICAL CONDITIONS IN RECONSTRUCTED HUMAN MANDIBLES: CAN WE PREDICT THE HEALING OUTCOME?; *Giorgio Biesso* (Germany) [S]
	A-05.4　18:05 – 18:20	PATIENT-SPECIFIC APPROACH FOR ORTHOGNATHIC SURGERY: IN-SILICO DESIGN AND OPTIMIZATION OF 3D-PRINTED PLATES; *Ilaria Rota* (Italy) [S]
	A-05.5　18:20 – 18:35	IN SILICO EVALUATION OF AN ARTIFICIAL TEMPOROMANDIBULAR JOINT DISC REPLACEMENT; *Christian Puttlitz* (USA) [D]
	A-05.6　18:35 – 18:50	ADVANCING VIRTUAL SURGICAL PLANNING OF MANDIBULAR RECONSTRUCTION USING GRADIENT-BASED OPTIMIZATION; *Atabak Eghbal* (Canada) [S]

	B – 05 TRACK B – Amphi Bezier	**PREDICTION OF HIP STRENGTH FROM CLINICAL DATA** *Chairs: Philippe Zysset, Bert van Rietbergen*
	B-05.1　17:20 – 17:40	FEMUR STRENGTH ASSESSMENT BY MERGING FE MODELING WITH CT IMAGES FOR HIP FRACTURE RISK PREDICTION; *Cristina Falcinelli* (Italy) [K]
	B-05.2　17:40 – 18:00	THE BONE STRENGTH (BOS) SCORE: PREDICTING FRACTURE RISK IN PATIENTS WITH FEMORAL METASTASES USING A PATIENT-SPECIFIC FINITE ELEMENT MODEL; *Esther Tanck* (The Netherlands) [D]
	B-05.3　18:00 – 18:20	PREDICTION OF HIP STRENGTH FROM CLINICAL DATA. WHAT IS NEXT?; *Benedikt Helgason* (Switzerland) [D]
	B-05.4　18:20 – 18:35	PRACTICAL CONSIDERATIONS FOR THE USE OF 3D DXA-BASED FE ANALYSIS FOR THE ESTIMATION OF FEMORAL STRENGTH; *Yvan Gugler* (Switzerland) [S]
	B-05.5　18:35 – 18:50	PHANTOMLESS CT CALIBRATION INCREASES STRATIFICATION ACCURACY IN A FEMORAL FRACTURE COHORT; *Carla Jane Winsor* (USA) [D]

	C – 05 TRACK C – Amphi Fournel	**MECHANICAL CHARACTERIZATION OF MUSCLE ACROSS LENGTH SCALES** *Chairs: Pierre-Yves Rohan, Benjamin Wheatley*
	C-05.1　17:20 – 17:35	AN OVERVIEW OF THE STRUCTURE AND MECHANICS OF PASSIVE MUSCLE ACROSS DIFFERENT LENGTH SCALES; *Ciaran Simms* (Ireland) [D]
	C-05.2　17:35 – 17:50	THE MECHANICAL ROLE OF EXTRACELLULAR MATRIX: FROM SKELETAL MUSCLE FIBER TO MUSCLE COMPARTMENTS; *Filiz Ates* (Germany) [D]
	C-05.3　17:50 – 18:05	MULTISCALE EXPERIMENTS AND MODELLING OF SKELETAL MUSCLES; *Markus Böl* (Germany) [D]
	C-05.4　18:05 – 18:20	A POROELASTIC FRAMEWORK TO REPRODUCE THE APPARENT VISCOELASTIC BEHAVIOUR OF MUSCLE UNDER COMPRESSION; *Pierre-Yves Rohan* (France) [D]
	C-05.5　18:20 – 18:35	ACTIVE RUPTURE MODELING OF THE MUSCULOTENDINOUS COMPLEX WITH DISCRETE ELEMENT METHOD.; *Sébastien Laporte* (France) [D]
	C-05.6　18:35 – 18:50	SKELETAL MUSCLE FINITE ELEMENT MODELING: ADAPTATION FROM CARDIAC TISSUE ACTIVATION LAWS; *Sonia Duprey* (France) [D]

	D – 05 TRACK D – Salle des Conseils	**SIMVASCULAR WORKSHOP** *Chairs: Shawn C. Shadden*
	E – 05 TRACK E – Amphi A	**GIBBON WORKSHOP** *Chair: Kevin Moerman*

19:00	Welcome reception, ENSAM (Conference Venue)	

S=student, K=keynote, D=delegate

Thursday, 4th May 2023

8:00	Registration opens

9:00 – 10:30	**A – 06** TRACK A – Grand Amphi	**CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH IV** *Chairs: Simona Celi, Heleen Fehervary*
	A-06.1 9:00 – 9:15	A FINITE ELEMENT PROCEDURE FOR OPTIMAL ANNULOPLASTY RING SIZE ESTIMATION IN MITRAL VALVES WITH BARLOW'S DISEASE; *Victorien Prot (Norway)* [D]
	A-06.2 9:15 – 9:30	CONTROLLED COMPARISON OF SIMULATED HEMODYNAMICS ACROSS TRICUSPID AND BICUSPID AORTIC VALVES; *Alexander Kaiser (USA)* [D]
	A-06.3 9:30 – 9:45	INTEGRATION OF UNCERTAINTY QUANTIFICATION TO ADVANCE COMPUTATIONAL MODELS IN VASCULAR BIOMECHANICS; *Lucas H. Timmins (USA)* [D]
	A-06.4 9:45 – 10:00	PATIENT-SPECIFIC SIMULATION OF MITRAL VALVE REPAIR IN HUMANS WITH MITRAL REGURGITATION; *Natalie T. Simonian (USA)* [S]
	A-06.5 10:00 – 10:15	PRE-OPERATIVE PLANNING OF PIPELINE™ EMBOLIZATION DEVICE SIZING USING FINITE ELEMENT METHOD; *Reza Abdollahi (Canada)* [S]
	A-06.6 10:15 – 10:30	A MODEL OF HEART FAILURE PATIENTS FOR THE GENERATION OF AN IN-SILICO COHORT; *Wouter Huberts (The Netherlands)* [D]

	B – 06 TRACK B – Amphi Bezier	**COMPUTATIONAL EVALUATION OF ORTHOPAEDIC DEVICES** *Chairs: Ruth Wilcox, Julie Choisne*
	B-06.1 9:00 – 9:20	ADVANCES IN EXPERIMENTAL AND COMPUTATIONAL SIMULATION OF TKA MECHANICS DURING ADLS; *Chadd W Clary (USA)* [K]
	B-06.2 9:20 – 9:35	ACETABULAR CUP ORIENTATION DURING GAIT: VARIATION AND IMPLICATIONS FOR HIP REPLACEMENT DEVICE TESTING; *Alison Claire Jones (United Kingdom)* [D]
	B-06.3 9:35 – 9:50	TESTING THA DESIGNS UNDER FEMORAL HEAD TO LINER RIM CONTACT CONDITIONS – USING COMPUTATIONAL MODELLING TO SUPPORT AND DEVELOP THE METHODOLOGY; *Lee Etchels (United Kingdom)* [D]
	B-06.4 9:50 – 10:05	IMPACT OF FEMORAL DEFECT SIZE ON PRIMARY STABILITY OF TAPERED SPLINED REVISION HIP STEM; *Lin Wang (United Kingdom)* [D]
	B-06.5 10:05 – 10:20	ON THE INFLUENCE OF INCORRECT IDEALIZED JOINT AXES TO THE DESIGN PROCESS OF ORTHOSES; *Patrick Steck (Germany)* [D]

	C – 06 TRACK C – Amphi Fournel	**HOW BIOMECHANICAL MODELS CAN IMPROVE DENTAL CLINICS?** *Chairs: Aurélie Benoit, Ludger Keilig*
	C-06.1 9:00 – 9:20	COMBINED EXPERIMENTAL AND NUMERICAL STUDIES IN DENTAL BIOMECHANICS; *Christoph Bourauel (Germany)* [K]
	C-06.2 9:20 – 9:35	CLINICAL AND NUMERICAL STUDY OF A LONG-TERM ORTHODONTIC TREATMENT; *Vittorio Sansalone (France)* [D], *Gauthier Dot (France)* [S]
	C-06.3 9:35 – 9:50	HOW THE TRIM LINE DESIGN OF ORTHODONTIC ALIGNERS AFFECTS THEIR BIOMECHANICAL BEHAVIOR; *Tarek Elshazly (Germany)* [S]
	C-06.4 9:50 – 10:05	FINITE ELEMENT MODELLING OF CANTILEVER SINGLE-RETAINER RESIN-BONDED FIXED DENTAL PROSTHESES; *Aurélie Benoit (France)* [D], *Philipppe Boitelle (France)*
	C-06.5 10:05 – 10:20	BIOMECHANICAL SIMULATION OF HAEMOSTATIC SPONGES USED FOR SINUS LIFT PROCEDURE; *Adrien Baldit (France)* [D]
	C-06.6 10:20 – 10:35	CALIBRATION OF TRACTION-SEPARATION LAWS FOR THE ADHESIVE LAYER OF INDIRECT DENTAL RESTORATIONS; *Yannick Yasothan (France)* [S]

	D – 06 TRACK D – Salle des Conseils	**EXPLORING BRAIN MECHANICS** *Chairs: Silvia Budday, Lynne Bilston*
	D-06.1 9:00 – 9:20	THE EFFECTS OF RESPIRATORY AND OTHER PHYSIOLOGICAL FACTORS ON CNS FLUID MECHANICS AND TRANSPORT; *Lynne Bilston (Australia)* [K]
	D-06.2 9:20 – 9:35	PERSONALIZATION FRAMEWORK – APPLICATIONS ON HUMAN BRAIN, BODY MODELS AND BEYOND; *Xiaogai Li (Sweden)* [D]
	D-06.3 9:35 – 9:50	THE IMPORTANCE OF USING REGION-DEPENDENT MATERIAL PARAMETERS FOR FULL-SCALE HUMAN BRAIN SIMULATIONS; *Emma Griffiths (Germany)* [D]
	D-06.4 9:50 – 10:05	MECHANICAL CHARACTERIZATION OF HUMAN AND PORCINE BRAIN TISSUE AND HUMAN BRAIN ORGANOIDS; *Nina Reiter (Germany)* [S]
	D-06.5 10:05 – 10:20	MORPHOMETRIC AND BIOMECHANICAL INDICATORS OF CHIARI MALFORMATION I; *Mehmet Kurt (USA)* [D]

	E – 06 TRACK E – Amphi A	**MULTISCALE MECHANOBIOLOGY** *Chairs: Juan Mora-Macias, José Sanz-Herrera*
	E-06.1 9:00 – 9:20	MULTISCALE MECHANOBIOLOGICAL ANALYSIS OF THE NEWLY REGENERATED BONE; *Esther Reina-Romo (Spain)* [K]
	E-06.2 9:20 – 9:35	BIOMECHANICAL DESIGN AND CHARACTERIZATION OF SCAFFOLDS FOR TISSUE ENGINEERING; *Paulo R. Fernandes (Portugal)* [D]
	E-06.3 9:35 – 9:50	MULTISCALE MODELLING OF CHONDROCYTE MECHANICAL STIMULATION, A NUMERICAL AND EXPERIMENTAL APPROACH; *Diego Alfredo Quexada Rodríguez (France)* [S]
	E-06.4 9:50 – 10:05	FINITE ELEMENTS OF MULTISCALE MIXTURES (FE2M): APPLICATIONS TO SOFT TISSUES; *David M. Pierce (USA)* [D]
	E-06.5 10:05 – 10:20	COMPUTATIONAL CHARACTERISATION OF MECHANICAL ENVIRONMENT WITHIN TISSUE ENGINEERING SCAFFOLDS; *Feihu Zhao (United Kingdom)* [D]
	E-06.6 10:20 – 10:35	INFLUENCE OF CANCER-INDUCED ECM DEGRADATION ON TRACTION FORCE MICROSCOPY: AN IN SILICO STUDY; *Alejandro Apolinar-Fernández (Spain)* [S]

Thursday, 4th May 2023

10:30 – 11:00	Coffee break, Posters & exhibition viewing

11:00 – 12:45	**A – 07** TRACK A – Grand Amphi	**HEAD AND NECK BIOMECHANICS FOR COMPUTER ASSISTED MEDICAL INTERVENTIONS** *Chairs: Yohan Payan, Geroges Bettega*
	A-07.1 11:00 – 11:15	FINITE ELEMENT MODELLING OF RESPIRATORS INTERACTING WITH THE SOFT TISSUES OF THE FACE; *Sam Evans (United Kingdom)* [D]
	A-07.2 11:15 – 11:30	MODEL-BASED SIMULATIONS OF THE INSERTION OF TENSOR THREADS IN PATIENT-SPECIFIC FACE: A PROOF OF CONCEPT; *Marie-Charlotte Picard (France)* [S]
	A-07.3 11:30 – 11:45	FACIAL BEHAVIOR RECOGNITION AND REHABILITATION USING 3D BIOMECHANICAL FEATURES AND DEEP LEARNING APPROACH; *Duc-Phong Nguyen (France)* [D]
	A-07.4 11:45 – 12:00	PREDICTING THE RISK OF FRACTURE OF OSTEOSYNTHESIS PLATES; *Yannick Tillier (France)* [D]
	A-07.5 12:00 – 12:15	SIMULATION OF THE MECHANICAL BEHAVIOUR OF DIFFERENT PLATING SYSTEMS BRIDGING A SEGMENTAL BONE DEFECT; *Guillaume Dubois (France)* [S]
	A-07.6 12:15 – 12:30	INFANT SKULL FRACTURE PREDICTION AND SUTURE MORPHOLOGY ANALYSIS; *Siyuan Chen (Sweden)* [S]
	A-07.7 12:30 – 12:45	PREDICTION OF REAL-LIFE SKULL FRACTURE PATTERNS USING SUBJECT-SPECIFIC FE HEAD MODELS; *Natalia Lindgren (Sweden)* [S]

	B – 07 TRACK B – Amphi Bezier	**IMAGE ANALYSIS AND PROCESSING METHODS FOR BIOLOGY AND MEDICINE I** *Chairs: Sébastien Laporte, Kevin Moerman*
	B-07.1 11:00 – 11:15	3D ULTRASOUND-BASED MECHANICAL AND GEOMETRICAL ANALYSIS OF ABDOMINAL AORTIC ANEURYSMS; *Esther Jorien Maas (The Netherlands)* [S]
	B-07.2 11:15 – 11:30	A 3D PREOPERATIVE PLANNING TOOL FOR SELECTIVE CLAMPING DURING PARTIAL NEPHRECTOMY; *Saar Vermijs (Belgium)* [S]
	B-07.3 11:30 – 11:45	TOWARDS AN IN-VIVO MRI-PATHOLOGY TOOL TO DECODE PLACENTAL ABNORMALITIES; *Romina Plitman Mayo (Israel)* [D]
	B-07.4 11:45 – 12:00	EFFECT OF YAWNING ON CSF AND BLOOD FLOW THROUGH THE NECK; *Adam Dejan Martinac (Australia)* [S]
	B-07.5 12:00 – 12:15	TOWARDS MECHANICAL CHARACTERIZATION OF BOTH AAA WALL AND INTRALUMINAL THROMBUS USING 3D+T ULTRASOUND; *Arjet H. M. Nievergeld (The Netherlands)* [S]
	B-07.6 12:15 – 12:30	A BETTER UNDERSTANDING OF ABDOMINAL WALL BEHAVIOUR IN VIVO USING DYNAMIC MRI AND PRESSURE MEASUREMENTS; *Victoria Joppin (France)* [S]
	B-07.7 12:30 – 12:45	NEW INSIGHTS INTO NANOSCALE ORGANIZATION OF DENTIN; *Margot C. Riou (France)* [S]

	C – 07 TRACK C – Amphi Fournel	**MECHANISTIC MULTIPHASE MODELING OF SOFT TISSUES: IN VITRO/IN VIVO/IN SILICO APPROACHES TOWARD CLINICAL APPLICATION** *Chairs: Giuseppe Sciumè, Stephane Urcun*
	C-07.1 11:00 – 11:15	MODELING TUMOUR HETEROGENEITY; *Martine Ben Amar (France)* [D]
	C-07.2 11:15 – 11:30	MICROMECHANICAL ANALYSIS OF THE EFFECTIVE STIFFNESS OF POROELASTIC COMPOSITES; *Raimondo Penta (United Kingdom)* [D]
	C-07.3 11:30 – 11:45	A 3D IMAGE-BASED MATHEMATICAL MODEL COUPLING TUMOUR GROWTH TO MICROCIRCULATION TRANSPORT; *Hani Cheikh Sleiman (United Kingdom)* [D]
	C-07.4 11:45 – 12:00	A FUNCTIONALLY GRADED ANISOTROPIC FRACTIONAL POROELASTIC MODEL TO SHADE LIGHT ON LUBRICATION MECHANISMS OF THE HUMAN MENISCUS DURING LOADING; *Olga Barrera (India)* [D]
	C-07.5 12:00 – 12:15	DIGITAL FUNCTIONAL IMAGING AT MICROSCALE: OSTEOSARCOMA MICROENVIRONMENT AND TREATMENT RESISTANCE; *Pauline Assemat (France)* [D]
	C-07.6 12:15 – 12:30	MALIGNANT TRANSFORMATION OF LOW GRADE ASTROCYTOMAS: IMAGING-INFORMED MODELLING; *Meryem Abbad Andaloussi (Luxembourg)* [S]
	C-07.7 12:30 – 12:45	DIGITAL TWINNING OF THE CELLULAR CAPSULE TECHNOLOGY: A POROMECHANICAL APPROACH; *Giuseppe Sciumè (France)* [D]

	D – 07 TRACK D – Salle des Conseils	**DIGITAL TWIN OF DIFFERENT SCALES AND BIOLOGICAL PROCESSES: THE EXAMPLE OF LIVER** *Chairs: Irène Vignon-Clementel, Lorenzo Sala*
	D-07.1 11:00 – 11:15	MULTISCALE MODELING OF LIVER METABOLIC PROCESSES: ACUTE AND CHRONIC DISEASES; *Jules Dichamp (France)* [D]
	D-07.2 11:15 – 11:30	PHYSIOLOGICALL-BASED MODELLING OF LIVER FUNCTIONS; *Lars Kuepfer (Germany)* [D]
	D-07.3 11:30 – 11:45	INTEGRATED SPATIAL-TEMPORAL AGENT-BASED MODEL FOR SIMULATION OF FIBROTIC SCAR FORMATION; *Jieling Zhao (France)* [D]
	D-07.4 11:45 – 12:00	A MULTISCALE AND MULTIPHASE DIGICAL TWIN OF FUNCTION-PERFUSION PROCESSES IN THE HUMAN LIVER; *Tim Ricken (Germany)* [D]
	D-07.5 12:00 – 12:15	HOMOGENIZATION OF THE PERFUSION AND CONTRAST FLUID TRANSPORT IN THE LIVER LOBULES; *Eduard Rohan (Czech Republic)* [D]
	D-07.6 12:15 – 12:30	MODELLING OF HEMODYNAMICS AND TRANSARTERIAL PARTICLE TRANSPORT IN THE LIVER AT DIFFERENT SCALES; *Charlotte Debbaut (Belgium)* [D]

	E – 07 TRACK E – Amphi A	**MECHANOBIOLOGY IV** *Chairs: Sophie Le Cann, Nicolas Bochud*
	E-07.1 11:00 – 11:20	A MULTIMODAL HIGH RESOLUTION STRUCTURE-PROPERTY INVESTIGATION OF MINERALIZED FIBROCARTILAGE; *Davide Ruffoni (Belgium)* [K]
	E-07.2 11:20 – 11:35	EVALUATION OF ABDOMINAL HERNIA REPAIR USING FINITE ELEMENT MODELLING INCLUDING TISSUE DAMAGE; *Baptiste Pillet (France)* [D]
	E-07.3 11:35 – 11:50	VALIDATION OF MAXIMUM SHEAR STRAIN AS FE MODEL-BASED PARAMETER FOR POST-TRAUMATIC CARTILAGE DEGENERATION UPON MECHANICAL LOADING; *Seyed Ali Elahi (Belgium)* [D]
	E-07.4 11:50 – 12:05	FLUID SHEAR STRESS ON OSTEOCYTE UNDER ULTRASOUND STIMULATION: FINITE-ELEMENT MODEL; *Cécile Baron (France)* [D]
	E-07.5 12:05 – 12:20	BIOMECHANICS OF VISCERAL PAIN: UNDERSTANDING AND MODELING PERITONEAL ADHESIONS.; *Madge Martin (France)* [D]
	E-07.6 12:20 – 12:35	SPATIAL AND TEMPORAL WALL SHEAR STRESS DYNAMICS IN EMBRYONIC CHICK HEART AND VASCULATURE ANATOMIES; *Kirsten Berlin Giesbrecht (USA)* [S]
	E-07.7 12:35 – 12:50	MATRIX DEPENDENT EMERGENCE OF BIOFILM STRUCTURE; *Tom Belpaire (Belgium)* [S]
	E-07.8 12:50 – 13:05	A MULTISCALE MODEL OF VASCULAR GROWTH AND REMODELING INCLUDING NOTCH SIGNALING; *Jordy van Asten (The Netherlands)* [S]

S=student, K=keynote, D=delegate

Content

Thursday, 4th May 2023

13:00 – 14:00	Lunch break & Poster sessions C and D
13:00 – 14:00	BETA CAE Industry workshop (Amphi Bezier)
14:00 – 14:50	Plenary lecture: ADVANCING THE USE OF CREDIBLE COMPUTER MODELLING AND SIMULATION FOR MEDICAL DEVICE REGULATORY DECISION MAKING: FROM PRECLINICAL TO IN SILICO CLINICAL TRIALS; *Brent Craven*; Chairs: *Wafa Skalli, Jos Vander Sloten* (Meeting room: Grand Amphi)

15:00 – 16:30	**A – 08** TRACK A – Grand Amphi	**VERIFICATION AND VALIDATION OF COMPUTATIONAL MODELS** *Chairs: Nele Famaey, Sam Evans and Heleen Fehervary*
	A-08.1 15:00 – 15:15	A TIERED VALIDATION APPROACH OF A PATIENT SPECIFIC HEART-VALVE MODEL; *Omar Zahalka (The Netherlands)* [D]
	A-08.2 15:15 – 15:30	VERIFICATION AND VALIDATION OF TRANSCATHETER HEART VALVE IMPLANTATION IN A VIRTUAL HUMAN COHORT; *Salvatore Pasta (Italy)* [D]
	A-08.3 15:30 – 15:45	HOW LARGE SHOULD A VESSEL WALL TEST SPECIMEN BE?; *Christian T. Gasser (Sweden)* [D]
	A-08.4 15:45 – 16:00	C4BIO IN DEPTH: PROPAGATION OF VARIABILITIES AND UNCERTAINTIES IN PORCINE AORTA UNIAXIAL TENSILE TESTING; *Heleen Fehervary (Belgium)* [D]
	A-08.5 16:00 – 16:15	VALIDATION OF FSI SIMULATIONS AGAINST A COMPLIANT AORTIC PHANTOM IN A HYBRID MOCK CIRCULATORY LOOP; *Simona Celi (Italy)* [D]
	A-08.6 16:15 – 16:30	MATERIAL CHARACTERIZATION OF HETEROGENEOUS ATHEROSCLEROTIC ARTERIES; *Ali Cagdas Akyildiz (The Netherlands)* [D]

	B – 08 TRACK B – Amphi Bezier	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE II** *Chairs: Michael Sacks, Sophie Le Cann*
	B-08.1 15:00 – 15:15	SENSITIVITY ANALYSIS AND PARAMETER IDENTIFICATION OF BLOOD FLOW MODELS; *Patricia Cathalifaud (France)* [D]
	B-08.2 15:15 – 15:30	IDENTIFICATION OF PATIENTS-PECIFIC LEFT VENTRICLE STIFFNESS USING INVERSE FRAMEWORK OF MRI-BASED FINITE ELEMENT MODELING AND VIRTUAL FIELD METHOD; *Mehdi Ghafarinatanzi (Canada)* [S]
	B-08.3 15:30 – 15:45	FROM AUTOMATED AND DATA-DRIVEN MODELLING TO MANUFACTURING OF MECHANO-ACCOUSTIC PHANTOM-TWINS; *Stefanie Feih (Australia)* [D]
	B-08.4 15:45 – 16:00	COMBINING 4D ULTRASOUND AND MODIFIED VIRTUAL FIELDS TO REGIONALLY CHARACTERIZE ABDOMINAL AORTIC ANEURYSMS; *Mirunalini Thirugnanasambandam (Germany)* [D]
	B-08.5 16:00 – 16:15	BIOMECHANICAL CHARACTERIZATION OF YOUNG HUMAN CORNEA USING CLEAR LENTICULES; *Philippe Büchler (Switzerland)* [D]
	B-08.6 16:15 – 16:30	MACHINE LEARNING-ASSISTED FINITE ELEMENT MODELING OF ADDITIVELY MANUFACTURED META-BIOMATERIALS; *Lennart Scheys (Belgium)* [D]

	C – 08 TRACK C – Amphi Fournel	**STRUCTURES AND SYSTEMS BIOMECHANICS IV** *Chairs: Mathieu Specklin, Jean-Louis Hébert and Mickael Lescroart*
	C-08.1 15:00 – 15:15	UNDERSTANDING HOW TRANSPORT IN ORGAN VASCULAR TREES REFLECT THEIR ARCHITECTURE; *Jérôme Kowalski (France)* [S]
	C-08.2 15:15 – 15:30	BIOMECHANICAL MODELLING OF FETAL HEART WITH AORTIC STENOSIS TO PREDICT INTERVENTION EFFECTIVENESS; *Laura Green (United Kingdom)* [D]
	C-08.3 15:30 – 15:45	CORRELATIVE ANALYSIS OF HIGHLY RESOLVED AAA WALL COMPOSITION AND STRAIN IN MICE; *Christopher Blase (Germany)* [D]
	C-08.4 15:45 – 16:00	THE RELATIONSHIP BETWEEN EMOTION AND INTERNET GAMING DISORDER:A MODEL MEDIATED BY HEART RATE VARIABILITY; *Tsai Chieh Lai (Taiwan)* [S]
	C-08.5 16:00 – 16:15	THE EFFECT OF DRIVING PRESSURE ON LUNG COMPLIANCE IN PRONE AND SUPINE POSITION IN PATIENTS WITH ARDS; *Sjeng Quicken (The Netherlands)* [D]
	C-08.6 16:15 – 16:30	IN SILICO PNEUMATIC SIMULATIONS OF PATIENTS VENTILATED WITH A NEW NON-INVASIVE CLOSED-LOOP BREATHING CIRCUIT; *Andrea Formaggio (Italy)* [S]

	D – 08 TRACK D – Salle des Conseils	**STRUCTURES AND SYSTEMS BIOMECHANICS V** *Chairs: Pierre-Yves Rohan, Benjamin Wheatley*
	D-08.1 15:00 – 15:15	HYDROMECHANICAL MODELING OF PLANT TISSUE MORPHOGENESIS USING A 3D DEFORMABLE CELL MODEL; *Hans Van Cauteren (Belgium)* [S]
	D-08.2 15:15 – 15:30	DIFFERENCES IN PROPHYLACTIC PERFORMANCE ACROSS WOUND DRESSING TYPES USED TO PROTECT FROM DEVICE-RELATED PRESSURE ULCERS CAUSED BY A CONTINUOUS POSITIVE AIRWAY PRESSURE MASK; *Aleksei Orlov (Israel)* [S]
	D-08.3 15:30 – 15:45	CHARACTERIZATION AND COMPUTATIONAL MODELLING OF SKIN TO BONE INTERACTION THROUGH PEELING TEST; *Cédric Laurent (France)* [D]
	D-08.4 15:45 – 16:00	COMPUTATIONAL MODELLING OF MICRONEEDLE INSERTION AND THERAPEUTIC DRUG DELIVERY; *Wenting Shu (Ireland)* [S]
	D-08.5 16:00 – 16:15	VISCOELASTIC PROPERTIES OF GREY MATTER IN PORCINE SPINAL CORD; *Eric Wagnac (Canada)* [D]
	D-08.6 16:15 – 16:30	IMPLEMENTATION OF THE PATELLAR TENDON REFLEX IN A MUSCLE-DRIVEN ROBOTIC LEG BASED ON BIOINSPIRED MOTOR CONTROL; *Tobias Nadler (Germany)* [S]

	E – 08 TRACK E – Amphi A	**SOFA WORKSHOP** *Chairs: Hugo Talbot*

Thursday, 4th May 2023

16:30 – 17:00	Coffee break + Poster sessions (coffee served in poster exhibition)

17:00 – 18:30	**A – 09** TRACK A – Grand Amphi	**VERIFICATION AND VALIDATION OF COMPUTATIONAL MODELS** *Chairs: Nele Famaey, Sam Evans and Heleen Fehervary*
	A-09.1 17:00 – 17:15	THE INFLUENCE OF GEOMETRICAL MEASUREMENTS ON MATERIAL PROPERTIES; *John J.E. Mulvihill (Ireland)* [D]
	A-09.2 17:15 – 17:30	VALIDATING THE MECHANICAL RESPONSE OF A MULTISCALE MODEL OF A KNITTED HERNIA IMPLANT; *Baptiste Pierrat (France)* [D]
	A-09.3 17:30 – 17:45	APPROACHING HUMAN GROUND RESIDUALS IN THE ANYBODY MODELING SYSTEM; *Simon Auer (Germany)* [D]
	A-09.4 17:45 – 18:00	COMPARISON OF TWO MODELS TO PREDICT VERTEBRAL FAILURE LOADS ON THE SAME EXPERIMENTAL DATASET; *Helene Follet (France)* [D]
	A-09.5 18:00 – 18:15	DEVELOPMENT OF A MODEL OF THE ABDOMINAL WALL: SENSITIVITY ANALYSIS AND EVALUATION OF ITS PERFORMANCE; *Arthur Jourdan (France)* [D]
	A-09.6 18:15 – 18:30	A VERIFICATION FRAMEWORK FOR FINITE ELEMENT MODELS TO PREDICT WEAR IN JOINT REPLACEMENTS; *Cristina Curreli (Italy)* [D]
	B – 09 TRACK B – Amphi Bezier	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE III** *Chairs: Lucas Timmins, Pierre Yves Rohan*
	B-09.1 17:00 – 17:15	A MACHINE LEARNING TO INVESTIGATE THE EFFECT OF STRUCTURE ON MECHANICAL BEHAVIOR OF OPTIC NERVE HEAD AXONS; *Thao {Vicky} Nguyen (USA)* [D]
	B-09.2 17:15 – 17:30	BRIDGING TISSUE-SCALE MULTI-PHYSICS TO ORGAN-SCALE BIOMECHANICS THROUGH MULTI-FIDELITY MACHINE LEARNING; *Seyed Shayan Sajjadinia (Italy)* [S]
	B-09.3 17:30 – 17:45	MACHINE LEARNING BASED DESIGN OF TRIPLY-PERIODIC MINIMAL SURFACE SCAFFOLDS FOR BONE TISSUE ENGINEERING; *Luca D'Andrea (Italy)* [S]
	B-09.4 17:45 – 18:00	EMG-BASED IDENTIFICATION OF ADL GRASP TYPES WITH A DEEP-LEARNING APPROACH FOR PROSTHETIC USE; *Marta C. Mora (Spain)* [D]
	B-09.5 18:00 – 18:15	COMPUTING TRANSVALVULAR PRESSURE GRADIENT USING DEEP-LEARNING FROM SEGMENTED IMAGE DATA; *Pavlo Yevtushenko (Germany)* [D]
	B-09.6 18:15 – 18:30	A HYBRID AGENT-BASED MODEL TO UNRAVEL THE MECHANISMS OF VISCERAL LEISHMANIASIS PROGRESSION AND RELAPSE; *Margaretha M. Passier (The Netherlands)* [S]
	C – 09 TRACK C – Amphi Fournel	**HOW BIOMECHANICAL MODELS CAN IMPROVE DENTAL CLINICS?** *Chairs: Aurelie Benoit, Ludger Keilig*
	C-09.1 17:00 – 17:15	MICROMOBILITY AND GAP OPENING IN THE IMPLANT/ABUTMENT INTERFACE FOR DENTAL IMPLANTS – A SYSTEMATIC ANALYSIS; *Ludger Keilig (Germany)* [D]
	C-09.2 17:15 – 17:30	REAL-TIME FINITE ELEMENT ASSESSMENT OF DENTAL IMPLANT REHABILITATION TREATMENT PERFORMANCE; *Mohsen Nakhaei (France)* [D]
	C-09.3 17:30 – 17:45	BIOMECHANICAL EVALUATION OF NARROW TMJ IMPLANT; *Rajdeep Ghosh (India)* [D]
	C-09.4 17:45 – 18:00	BIOMECHANICAL ASSESSMENT OF MULTI-ROOTED ROOT ANALOGUE IMPLANTS; *Mostafa Aldesoki (Germany)* [S]
	C-09.5 18:00 – 18:15	APPLICATION OF A NEW IMPLANT FOR DENTAL RESTORATION IN CASE OF STRONGLY DEGRADATED MANDIBULAR BONE; *Cynthia Dreistadt (France)* [D]
	C-09.6 18:15 – 18:30	FINITE ELEMENT MODELING OF THE MASTICATORY SYSTEM: APPLICATION TO BRUXISM; *Yannick Tillier (France)* [D]
	D – 09 TRACK D – Salle des Conseils	**FEBIO WORKSHOP** *Chairs: Gerard Ateshian, Steve Maas and Jeffrey Weiss*
	E – 09 TRACK E – Amphi A	**BIOPTIM WORKSHOP** *Chairs: Francois Bailly, Amedeo Ceglia*

20:00	Conference dinnner cruise on the legendary Bateau mouche boat (Pont de l'Alma): Bateaux-Mouches, Port de la Conférence, pier located under the Pont de l'Alma, closest metro station: Alma Marceau

S=student, K=keynote, D=delegate

Friday, 5th May 2023

8:00	Registration opens
9:00 – 9:50	Plenary lecture: CHALLENGES IN SPORT BIOMECHANICS; *Christophe Baudot & Philippe Rouch*; Chairs: Sébastien Laporte, Sam Evans (Meeting room: Grand Amphi)

10:00 – 11:00

A – 10
TRACK A – Grand Amphi
CLINICAL BIOMECHANICS AND TRANSLATIONAL RESEARCH V
Chairs: Philippe Zysset, Jos Vander Sloten

A-10.1	10:00 – 10:15	DESIGNING AND TESTING AN IMPLANTABLE SENSOR WITH IN-SILICO TECHNIQUES; *Axel Seeger* (Germany) [D]
A-10.2	10:15 – 10:30	ANALYSIS OF PATHOLOGICAL SKULL GROWTH PATTERNS; *Maya Geoffroy* (France) [S]
A-10.3	10:30 – 10:45	SPATIO-TEMPORAL ATLAS OF THE 3D BONE DENSITY DISTRIBUTION IN THE PROXIMAL FEMUR; *Alice Dudle* (Switzerland) [S]
A-10.4	10:45 – 11:00	EFFECT OF LABRUM SIZE ON CARTILAGE MECHANICS IN HIPS WITH CAM FEMOROACETABULAR IMPINGEMENT SYNDROME; *Luke Hudson* (USA) [S]

B – 10
TRACK B – Amphi Bezier
HUMAN MOVEMENT: GAIT ANALYSIS, SPORTS AND INJURY MECHANISMS IV
Chairs: Sébastien Laporte, Maude Creze

B-10.1	10:00 – 10:15	QUANTIFYING THE IMPACT OF SYNTHETIC DATA IN MARKERLESS MOTION CAPTURE; *Tylan Templin* (USA) [D]
B-10.2	10:15 – 10:30	TOWARDS BIOMECHANICAL ANALYSIS IN WORKPLACE ERGONOMICS USING MARKER-LESS MOTION CAPTURE; *Jindong Jiang* (France) [S]
B-10.3	10:30 – 10:45	ADAPTIVE ISOKINETICS AND MULTICHANNEL HIGH-DENSITY ELECTROMYOGRAPHY FOR TRANSTIBIAL AMPUTATION; *Usha Kuruganti* (Canada) [D]
B-10.4	10:45 – 11:00	BEST IMU SENSOR PLACEMENT TO PREDICT JOINT KINEMATICS AND KINETICS DURING GAIT USING A RANDOM FOREST MODEL; *Shima Mohammadi Moghadam* (New Zealand) [S]

C – 10
TRACK C – Amphi Fournel
BIOMECHANICS OF CARDIOVASCULAR SYSTEM: MODELLING, SIMULATION AND IMAGING
Chairs: Simona Celi; Lorenza Petrini

C-10.1	10:00 – 10:12	ANGIOGRAPHY-BASED COMPUTATIONAL FLUID DYNAMICS SIMULATIONS TO PREDICT MYOCARDIAL INFARCTION; *Claudio Chiastra* (Italy) [D]
C-10.2	10:12 – 10:24	A DISCUSSION ON STRATEGIES FOR THE IN SILICO DEPLOYMENT OF LEFT ATRIAL APPENDAGE OCCLUDERS; *Francesca Berti* (Italy) [D]
C-10.3	10:24 – 10:36	NUMERICAL SIMULATIONS TO EVALUATE THE DEVICE-RELATED EFFECTS IN ATRIAL FIBRILLATION PATIENTS; *Emanuele Gasparotti* (Italy) [D]
C-10.4	10:36 – 10:48	ON THE IMPORTANCE OF THOROUGH IN SILICO DRUG-COATED BALLOON REPLICAS TO SIMULATE COATING TRANSFER; *Efstathios Stratakos* (Italy) [S]
C-10.5	10:48 – 11:00	MACHINE LEARNING FOR FAST COMPUTATIONAL FLUID DYNAMICS CARDIOVASCULAR ASSESSMENT; *Endrit Pajaziti* (United Kingdom) [S]

D – 10
TRACK D – Salle des Conseils
METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE IV
Chairs: Michael Sacks, Klaas Vander Linden

D-10.1	10:00 – 10:15	TOWARDS A REAL-TIME SIMULATOR OF FLOW DIVERTERS DEPLOYMENT BASED ON MODEL ORDER REDUCTION; *Beatrice Bisighini* (France) [S]
D-10.2	10:15 – 10:30	GRAPH NEURAL NETWORKS TO PREDICT JUNCTION PRESSURE LOSSES IN REDUCED-ORDER CARDIOVASCULAR MODELLING; *Natalia L Rubio* (USA) [S]
D-10.3	10:30 – 10:45	LEARNING REDUCED-ORDER MODELS FOR BLOOD FLOW SIMULATIONS USING GRAPH NEURAL NETWORKS; *Luca Pegolotti* (USA) [D]
D-10.4	10:45 – 11:00	AN APPROACH FOR NEURAL NETWORK FINITE ELEMENT BASED CARDIAC SIMULATIONS; *Shruti Motiwale* (USA) [S]

E – 10
TRACK E – Amphi A
MECHANOBIOLOGY V
Chairs: Aurélie Benoit, Areti Papastavrou

E-10.1	10:00 – 10:15	INVESTIGATION OF THE MECHANOBIOLOGICAL REGULATION OF BONE REGENERATION WITHIN SCAFFOLDS IN LARGE BONE DEFECTS COMORBID WITH TYPE 2 DIABETES; *Mahdi Jaber* (Germany) [S]
E-10.2	10:15 – 10:30	MECHANOBIOLOGICAL INFLUENCE OF FIXATION DEVICES ON THE DYNAMIC MANDIBULAR BONE HEALING PROCESS; *Vincenzo Orassi* (Germany [S]
E-10.3	10:30 – 10:45	EXPERIMENTAL CALIBRATION OF AN IN SILICO MECHANO-BIOLOGICAL MODEL OF BONE HEALING INFLAMMATORY RESPONSE WITH THE SUPPORT OF GENETIC ALGORITHM; *Edoardo Borgiani* (Belgium) [D]
E-10.4	10:45 – 11:00	A HYBRID MODEL OF ORGANOIDS MORPHOGENESIS; *Daniel Camacho-Gomez* (Spain) [S]

Friday, 5th May 2023

11:00 – 11:30	Coffee break, Posters & exhibition viewing	

11:30 – 13:00	**A – 11** TRACK A – Grand Amphi	**CLINICAL APPLICATIONS OF HIGH RESOLUTION CT** *Chairs: Philippe Zysset, Bert van Rietbergen*
	A-11.1 11:30 – 11:50	QUANTIFICATION OF BONE MICROSTRUCTURE USING CLINICAL CT; *Harry van Lenthe (Belgium)* [K]
	A-11.2 11:50 – 12:10	THE APPLICATION OF HR-PQCT AND ADVANCED COMPUTATIONAL METHODS TO ASSESS PATIENT-SPECIFIC SKELETAL MECHANOBIOLOGY AND HEALTH; *Danielle Elizabeth Whittier (Switzerland)* [D]
	A-11.3 12:10 – 12:25	THINKING ABOUT BONE LOSS ON THE ISS - AN 18-MONTH PERSPECTIVE; *Peter Fernandez (France)* [S]
	A-11.4 12:25 – 12:40	CT-FREE NERF VOLUME RECONSTRUCTION FROM SPARSE INTRA-OPERATIVE FLUOROSCOPY FOR SURGICAL NAVIGATION; *Donald D. Anderson (USA)* [D]
	A-11.5 12:40 – 12:55	STRESS DISTRIBUTION ANALYSIS IN THE LUMBAR FACET JOINT AFTER AN ARTHRODESIS OR AN ARTHROPLASTY; *François Zot (France)* [S]
	B – 11 TRACK B – Amphi Bezier	**COMPUTATIONAL PULMONOLOGY: RECENT ADVANCES AND CHALLENGES** *Chairs: Martin Genet, Aline Bel-Brunon*
	B-11.1 11:30 – 11:45	MODELING THE BIAXIAL MECHANICAL BEHAVIOR OF THE BRONCHIAL TREE; *Mona Eskandari (USA)* [D]
	B-11.2 11:45 – 12:00	MULTISCALE RESPIRATORY MECHANICS: LUNG MODELING AND APPLICATIONS TO MECHANICAL VENTILATION; *Daniel Hurtado (Chile)* [D]
	B-11.3 12:00 – 12:15	MULTI-SCALE MODELING OF THE LUNG PARENCHYMA; *Mahdi Manoochehrtayebi (France)* [S]
	B-11.4 12:15 – 12:30	MATERIALS SIMPLIFICATION IN TRACHEO-STENT ANALYSIS; *Carlos A. Campos (Portugal)* [D]
	B-11.5 12:30 – 12:45	TREATMENT OF SUPRASYSTEMIC PULMONARY ARTERY HYPERTENSION: GEOMETRIC MULTISCALE AND REDUCED MODELS OF THE POTTS SHUNT; *Irène Vignon-Clementel (France)* [D]
	C – 11 TRACK C – Amphi Fournel	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE V** *Chairs: Kevin Moerman, Qiyao Peng*
	C-11.1 11:30 – 11:45	DAMAGE MECHANICS OF BIOLOGICAL TISSUES IN RELATION TO VISCOELASTICITY: COMPUTATIONAL IMPLEMENTATION; *Gerard Ateshian (USA)* [D]
	C-11.2 11:45 – 12:00	A MODULAR FRAMEWORK FOR STRONG 3D/0D COUPLING IN CARDIAC MECHANICS SIMULATIONS; *Aaron Lin Brown (USA)* [S]
	C-11.3 12:00 – 12:15	A SENSITIVITY-BASED STOCHASTIC FINITE ELEMENT FORMULATION FOR BIOLOGICAL SOFT MATTER MECHANICS; *Georges Limbert (United Kingdom)* [D]
	C-11.4 12:15 – 12:30	DIGITAL TWIN TO PREDICT VENTRICULAR TACHYCARDIA; *Carlijn Buck (The Netherlands)* [D]
	C-11.5 12:30 – 12:45	MECHANICAL BEHAVIOUR OF SOFT SPHERICAL TISSUE CONSTRUCTS IN MICROFLUIDIC CULTURE; *Willy V. Bonneuil (Sweden)* [D]
	C-11.6 12:45 – 13:00	THE APPARENT MODULUS OF TRABECULAR BONE: EXPERIMENTS VS MICROSTRUCTURAL FINITE ELEMENT MODELS; *Trevor John Cloete (South Africa)* [D]
	D – 11 TRACK D – Salle des Conseils	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE VI** *Chairs: Sébastien Laporte, Yohan Payan*
	D-11.1 11:30 – 11:45	A COHORT OF PATIENT-SPECIFIC AND VIRTUAL FINITE ELEMENT MODELS OF INTERVERTEBRAL DISCS; *Estefano Muñoz-Moya (Spain)* [S]
	D-11.2 11:45 – 12:00	FINITE ELEMENT MODELLING OF PRESS-FIT IMPLANT INSERTION; *Xiaoyi Min (United Kingdom)* [S]
	D-11.3 12:00 – 12:15	DEFINING A PROCESS FOR STRESS REDUCTION IN THE KEEL TRAY INTERFACE IN UNICOMPARTMENTAL KNEE REPLACEMENT TIBIAL COMPONENTS; *Laurence Marks (United Kingdom)* [D]
	D-11.4 12:15 – 12:30	IN SILICO CHARACTERIZATION OF MICRO-CT BASED BIOACTIVE GLASS-CERAMIC SCAFFOLDS; *Anna De Cet (Italy)* [S]
	D-11.5 12:30 – 12:45	A PIPELINE FOR IMAGE BASED MODELING OF FASCIA TISSUE IN THE LOWER LEG IN VIVO; *Meeghage Randika Perera (New Zealand)* [S]
	D-11.6 12:45 – 13:00	MODELLING MICRONEEDLE INDENTATION AND PENETRATION INTO A SKIN SUBSTITUTE USING A COHESIVE ZONE METHOD; *Rachael Joyce (United Kingdom)* [S]
	E – 11 TRACK E – Amphi A	**MODELLING AND SIMULATION OF MUSCULOSKELETAL MECHANOBIOLOGY** *Chairs: Areti Papastavrou, Julie Choisne*
	E-11.1 11:30 – 11:45	POTENTIAL APPLICATIONS FOR MUSCULOSKELETAL MODELLING IN PATIENT CARE; *Anna-Maria Liphardt (Germany)* [D]
	E-11.2 11:45 – 12:00	"IN THE WILD" MOVEMENT ANALYSIS OF ARBITRARY MOTIONS; *Anne D. Koelewijn (Germany)* [D]
	E-11.3 12:00 – 12:15	ON THE INCLUSION OF MOTION CAPTURE DATA IN OPTIMAL CONTROL SIMULATIONS OF THE HUMAN HAND; *Simon Heinrich (Germany)* [S]
	E-11.4 12:15 – 12:30	MODELING AND SIMULATION OF SURFACE BONE GROWTH BASED ON THERMODYNAMIC PRINCIPLES; *Jean-François Ganghoffer (France)* [D]
	E-11.5 12:30 – 12:45	OSTEOARTHRITIS PATIENTS CLASSIFICATION BASED ON SUPPORT VECTOR MACHINES; *Maria Segarra-Queralt (Spain)* [S]
	E-11.6 12:45 – 13:00	FEMORAL GROWTH PLATE STRESSES IN CHILDREN QUANTIFIED WITH A SEMI-AUTOMATED MULTI-SCALE MODELING WORKFLOW; *Willi Koller (Austria)* [S]

Friday, 5th May 2023

13:00 – 14:00	Lunch break & Poster sessions E and F

14:00 – 15:45	**A – 12** TRACK A – Grand Amphi	**CLINICAL BIOMECHANICS & TRANSLATIONAL RESEARCH VI** *Chairs: Jean Marc Allain, Sam Evans*

	A-12.1	14:00 – 14:15	COMBINED IMAGING, DEFORMATION AND REGISTRATION METHODOLOGY FOR PREDICTING RESPIRATOR FITTING; *Silvia Caggiari (United Kingdom)* [D]
	A-12.2	14:15 – 14:30	CORNEAL MECHANICS FOR THE EARLY DETECTION OF THE KERATOCONUS; *Jean-Marc Allain (France)* [D]
	A-12.3	14:30 – 14:45	COMPUTATIONAL MODELING FOR CEREBRAL VASCULOPATHY IN EARLY CHILDHOOD IN SICKLE CELL DISEASE.; *Weiqiang Liu (France)* [D]
	A-12.4	14:45 – 15:00	3D FE MODELING OF THE LATERAL SEMICIRCULAR CANAL OF THE INNER EAR; *Manon Blaise (France)* [S]
	A-12.5	15:00 – 15:15	TRANSVERSE FLOWS IN MODELS OF THE COCHLEAR DUCT VALIDATED BY 3D MICRO PARTICLE IMAGE VELOCIMETRY; *Noëlle Claudia Harte (Switzerland)* [S]
	A-12.6	15:15 – 15:30	A CORRECTED EJECTION FRACTION MEASURE CAN BETTER REPRESENT FUNCTION AND PREDICT OUTCOMES; *Choon Hwai Yap (United Kingdom)* [D]
	A-12.7	15:30 – 15:45	INLET ASYMMETRY IN ACOM ARTERY ANEURYSMS: COMPUTATIONAL VERSUS CLINICAL APPROACH; *Bhanu Jayanand Sudhir (India)* [D]

	B – 12 TRACK B – Amphi Bezier	**3D MOVEMENT ANALYSIS AND SUBJECT-SPECIFIC MUSCULOSKELETAL MODELING - ORGANIZED JOINTLY WITH ESMAC** *Chairs: Ayman Assi, Hans Kainz*

	B-12.1	14:00 – 14:10	TACKLING SUBJECT SPECIFICITY IN MSK DISORDERS ANALYSIS: METHODOLOGICAL CHALLENGES AND RECENT ADVANCES; *Wafa Skalli (France)* [K]
	B-12.2	14:10 – 14:25	QUANTITATIVE FUNCTIONAL ASSESSMENT IN THE SETTING OF ADULT SPINAL DEFORMITY USING SUBJECT-SPECIFC 3D MUSCULOSKELETAL DATA; *Ayman Assi (Lebanon)* [K]
	B-12.3	14:25 – 14:40	SUBJECT-SPECIFIC KINEMATIC MODELLING OF THE SPINE AND LOWER LIMBS BASED ON STANDING BIPLANAR RADIOGRAPHY FOR 3D MOVEMENT ANALYSIS; *Lennart Scheys (Belgium)* [D]
	B-12.4	14:40 – 14:55	PATIENT-SPECIFIC CERVICAL SPINE MUSCULOSKELETAL MODEL FROM REDUCED IMAGE ACQUISITION; *Christophe Muth-Seng (France)* [S]
	B-12.5	14:55 – 15:10	DETERMINANTS OF KNEE JOINT LOADING IN MEDIAL KNEE OA: INSIGHTS FROM POPULATION-BASED MODELING APPROACHES; *Ilse Jonkers (Belgium)* [D]
	B-12.6	15:10 – 15:25	A 3D SUBJECT-SPECIFIC MUSCULOSKELETAL MODEL TO CALCULATE MUSCLE LENGTHS DURING WALKING; *Guillaume Rebeyrat (France)* [D]
	B-12.7	15:25 – 15:40	DECREASING RECTUS FEMORIS ACTIVITY CAN DECREASE KNEE LOADS IN PEOPLE WITH INCREASED FEMORAL ANTEVERSION; *Basilio Goncalves (Austria)* [D]

	C – 12 TRACK C – Amphi Fournel	**IMAGE ANALYSIS AND PROCESSING METHODS FOR BIOLOGY AND MEDICINE II** *Chairs: Claudio Vergari, Heleen Fehervary*

	C-12.1	14:00 – 14:15	WEAKLY SUPERVISED CONVOLUTIONAL NEURAL NETWORKS-BASED 3D RECONSTRUCTION FROM MEDICAL IMAGES GUIDED BY PARAMETRIC GEOMETRIC MODELS; *Jean-Rassaire Fouefack (France)* [D]
	C-12.2	14:15 – 14:30	ADOLESCENT IDIOPATHIC SCOLIOSIS DETECTION USING SURFACE TOPOGRAPHY AND CONVOLUTIONAL NEURAL NETWORKS; *Nada Mohamed (Canada)* [S]
	C-12.3	14:30 – 14:45	PREDICTING THE PREMORBID ANATOMY OF THE SCAPULA USING AUTOENCODERS; *Osman Berk Satir (Switzerland)* [S]
	C-12.4	14:45 – 15:00	BAYESIAN NETWORK ANALYSIS OF ROTATOR CUFF MUSCLE DEGENERATIONS; *Pezhman Eghbali (Switzerland)* [S]
	C-12.5	15:00 – 15:15	DEEP LEARNING CARDIAC SEGMENTATION OF DUAL ULTRASOUND AND PHOTOACOUSTIC IMAGE DATA; *Pierre Sicard (France)* [D]
	C-12.6	15:15 – 15:30	AUTOMATIC INTERPRETATION OF POINT-OF-CARE LUNG ULTRASOUND USING DEEP LEARNING; *Sandro Queirós (Portugal)* [D]
	C-12.7	15:30 – 15:45	AUTOMATIC GENERATION OF MULTI-VIEW SYNTHETIC ECHOCARDIOGRAPHIC IMAGES; *João Pedro Freitas (Portugal)* [S]

	D – 12 TRACK D – Salle des Conseils	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE VII** *Chairs: Jose Munoz, Lorenza Petrini*

	D-12.1	14:00 – 14:15	A DATA-DRIVEN REDUCED ORDER MODEL TO SIMULATE LEFT ATRIUM FLOWS; *Caterina Balzotti (Italy)* [D]
	D-12.2	14:15 – 14:30	ASSESMENT OF IMMERSED BOUNDARY METHODS FOR THE DESIGN OF MEDICAL CIRCULATORY SUPPORT DEVICES; *Mathieu Specklin (France)* [D]
	D-12.3	14:30 – 14:45	PREOPERATIVE HEMODYNAMIC SIMULATION OF A PATIENT SPECIFIC EVAR PROCEDURE; *Francesco Bardi (France)* [S]
	D-12.4	14:45 – 15:00	A NOVEL MODEL FOR PASSIVE MYOCARDIUM THAT INCORPORATES COMPLETE DIFFUSION TENSOR INFORMATION; *Michael Sacks (USA)* [D]
	D-12.5	15:00 – 15:15	HEMOLYSIS PREDICTION IN BIOMICROFLUIDIC DEVICES USING RESOLVED CFD-DEM NUMERICAL SIMULATION; *Carmine Porcaro (Austria)* [S]

	E – 12 TRACK E – Amphi A	**CURRENT CHALLENGES OF IN VIVO SUBJECT-SPECIFIC CONSTITUTIVE MODELLING OF BIOLOGICAL SOFT TISSUES** *Chairs: Pierre-Yves Rohan, Gerard Ateshian*

	E-12.1	14:00 – 14:15	THEORETICAL CONSIDERATIONS FOR PATIENT-SPECIFIC MODELLING BASED ON OBSERVABLE STATE VARIABLES; *Gerard Ateshian (USA)* [D]
	E-12.2	14:15 – 14:30	VERTEBRAL BODY TETHERING FOR IDIOPATHIC SCOLIOSIS: A PARAMETRIC FEM STUDY OF IMPLANT AND PATIENT FACTORS; *Paige J. Little (Australia)* [D]
	E-12.3	14:30 – 14:45	PATIENT-SPECIFIC SIMULATION OF AORTIC ANEURYSM GROWTH FOLLOWING ENDOLEAKS; *Stéphane Avril (France)* [D]
	E-12.4	14:45 – 15:00	IN-VIVO BILAYER MATERIAL YOUNG MODULI IDENTIFICATION UNDER SMALL DEFORMATION USING ONLY SUCTION; *Nathanael Connesson (France)* [D]
	E-12.5	15:00 – 15:15	STIFFNESS MATTERS: AN IMPROVED IN VIVO FAILURE RISK ASSESSMENT OF ASCENDING THORACIC AORTIC ANEURYSMS; *Klaas Vander Linden (Belgium)* [S]
	E-12.6	15:15 – 15:30	BIOMECHANICAL MODELING OF ABDOMINAL AORTIC ANEURYSM TOWARDS OBJECTIVE CLINICAL DECISION MAKING; *Christian T. Gasser (Sweden)* [D]
	E-12.7	15:30 – 15:45	POROMECHANICAL MODELLING OF KNEE JOINT: SUBJECT-SPECIFIC VS GENERIC MODELS BASED ON 39 PATIENTS; *Le Ping Li (Canada)* [D]

Friday, 5ᵗʰ May 2023

16:00 – 17:30	**A – 13** TRACK A – Grand Amphi	**CLINICAL BIOMECHANICS & TRANSLATIONAL RESEARCH VII** *Chairs: Claudio Vergari*
	A-13.1 16:00 – 16:15	CLINICAL RISK ASSESSMENT AND MITIGATION OF POST-TAVR THROMBOGENICITY IN BAV USING IN SILICO MODELING; *Salwa Anam (USA)* [S]
	A-13.2 16:15 – 16:30	COMPLIANCE-MATCHING AORTIC GRAFT: COMPUTATIONAL MODELING AND MULTI-PARAMETER OPTIMIZATION; *Georgios Rovas (Switzerland)* [S]
	A-13.3 16:30 – 16:45	CT-BASED COMPUTATIONAL FLUID DYNAMICS ANALYSIS OF THE LEFT VENTRICLE ANEURYSM HEMODYNAMICS AFTER SURGERY; *Leonid Goubergrits (Germany)* [D]
	A-13.4 16:45 – 17:00	COMPUTED FFR BASED ON WINDKESSEL MODELS WITH DIFFERENT NUMBER OF ELEMENTS; *Sónia I. S. Pinto (Portugal)* [D]
	A-13.5 17:00 – 17:15	PARTIAL HEPATECTOMY HEMODYNAMICS DIGITAL TWIN: A SENSITIVITY ANALYSIS STUDY; *Lorenzo Sala (France)* [D]
	A-13.6 17:15 – 17:30	FINITE ELEMENT STUDY OF STRAINS AROUND SACRAL AND HEEL PRESSURE ULCERS WITH A NEW BI-LAYER DRESSING; *Nolwenn Fougeron (France)* [D]
	B – 13 TRACK B – Amphi Bezier	**DIGITAL TWINS FOR PERSONALIZED MEDICINE** *Chairs: Julie Choisne, Philippe Rouch*
	B-13.1 16:00 – 16:15	PIPELINES FOR MODEL AND DIGITAL TWIN PERSONALISATION IN PULMONARY HYPERTENSION; *Prashanna Khwaounjoo (New Zealand)* [D]
	B-13.2 16:15 – 16:30	TRUNCATION STRATEGIES FOR PERSONALIZED CFD MODELS OF SELECTIVE LIVER RADIOEMBOLIZATION; *Tim Bomberna (Belgium)* [S]
	B-13.3 16:30 – 16:45	PREDICTION OF RIGHT VENTRICLE PRESSURE FOLLOWING PULMONARY ENDARTERECTOMY USING A DIGITAL TWIN; *Finbar John Argus (New Zealand)* [D]
	B-13.4 16:45 – 17:00	EFFICIENT PARAMETER ESTIMATION IN CARDIAC MODELS BASED ON PHYSICS-INFORMED NEURAL NETWORKS; *Federica Caforio (Austria)* [D]
	B-13.5 17:00 – 17:15	HUMAN BODY IMAGING TOWARD THE DEVELOPMENT OF FULL BODY SCAFFOLDS FOR PERSONALISED DIGITAL TWINS; *Alexander William Dixon (New Zealand)* [D]
	C – 13 TRACK C – Amphi Fournel	**STRUCTURES AND SYSTEMS BIOMECHANICS VI** *Chairs: Silvia Budday, Lynne Bilston*
	C-13.1 16:00 – 16:15	IN VIVO MEASUREMENT OF HUMAN BRAIN MATERIAL PROPERTIES UNDER QUASI-STATIC LOADING.; *Nicholas Bennion (United Kingdom)* [D]
	C-13.2 16:15 – 16:30	NUMERICAL SIMULATION FOR BRAIN CHARACTERISATION: ISOTROPIC AND ANISOTROPIC HYPERELASTIC MATERIAL; *Wael Alliliche (France)* [S]
	C-13.3 16:30 – 16:45	QUANTIFYING BRAIN CONNECTIVITY DURING RESTRICTED KNEE MOVEMENT; *Fatimah Al-ani (United Arab Emirates)* [D]
	C-13.4 16:45 – 17:00	TRANSCRANIAL DIRECT CURRENT STIMULATION FOR OCD PATIENTS : A FINIT ELEMENTS STUDY USING PYANSYS; *Julien Gosez (France)* [D]
	C-13.5 17:00 – 17:15	A PHYSICAL MULTIFIELD COMPUTATIONAL MODEL EXPLAINS THE ROLE OF DIFFERENT CELL TYPES IN CORTICAL FOLDING.; *Mohammad Saeed Zarzor (Germany)* [D]
	C-13.6 17:15 – 17:30	COMPUTATIONAL MODELING OF THE CEREBROSPINAL FLUID FLOW: EFFECT OF CILIA-INDUCED VELOCITY; *Shunichi Ishida (Japan)* [D]
	D – 13 TRACK D – Salle des Conseils	**METHODS IN MECHANICS FOR BIOLOGY AND MEDICINE VIII** *Chairs: Mathieu Specklin, Cedric Laurent*
	D-13.1 16:00 – 16:15	ANALYSIS OF SKIN TENSION USING MACHINE LEARNING EMULATION TECHNIQUES; *Aisling Ní Annaidh (Ireland)* [D]
	D-13.2 16:15 – 16:30	CEREBROSPINAL FLUID FORMULATION AFFECTS THE SPINAL CORD DYNAMICS IN TRAUMATIC EVENTS; *Lucien Diotalevi (Canada)* [S]
	D-13.4 16:30 – 16:45	A UNIFIED FORMULATION FOR FLUID-STRUCTURE-CONTACT INTERACTION; *Fannie Maria Gerosa (USA)* [D]
	D-13.5 16:45 – 17:00	VISUALIZING MINERAL STRAIN IN HUMAN BONE BASED ON WIDE-ANGLE X-RAY SCATTERING (WAXS) WITH IN SITU INDENTATION; *Imke A. K. Fiedler (Germany)* [D]
	E – 13 TRACK E – Amphi A	**MECHANOBIOLOGY VI** *Chairs: Juan Mora-Macias, Pierre Yves Rohan*
	E-13.1 16:00 – 16:15	APONEUROSIS HETEROGENEOUS MATERIAL PROPERTIES: EVIDENCE AND IMPLICATIONS FOR MUSCLE STRAIN; *Benjamin Wheatley (USA)* [D]
	E-13.2 16:15 – 16:30	MECHANICAL CHARACTERIZATION OF NORMAL AND DECELLULARIZED BREAST TISSUES; *Ana Margarida Teixeira (Portugal)* [S]
	E-13.3 16:30 – 16:45	MYXOMATOUS DEGENERATION OF THE MITRAL VALVE; COLLAGEN STRUCTURE AND MECHANICAL BEHAVIOR; *Mohammad Javad Sadeghinia (Norway)* [S]
	E-13.4 16:45 – 17:00	IN SILICO AVATARS OF CELLS TO PREDICT CELL MIGRATION ON TRAVELLING WAVES; *Jean-Louis Milan (France)* [D]
	E-13.5 17:00 – 17:15	COMPUTED-TOMOGRAPHIC IMAGING FOR THE IN VIVO REGENERATION OF CRITICAL-SIZED CERAMIC SCAFFOLDS; *Juan Mora-Macías (Spain)* [D]
	E-13.6 17:15 – 17:30	BIOMECHANICS OF BACTERIA : THEORY AND EXPERIMENT; *Jinju Chen (United Kingdom)* [D]
17:30	Closing session & CMBBE awards (Grand Amphi)	

CMBBE 2023 PLENARY SPEAKERS

The potential of machine learning algorithms to alleviate the lack of data in medical simulation

Wednesday 3rd May 2023, 11:10 – 12:00
Grand Amphi

Stéphane Bordas
Professor in Computational Mechanics,
University of Luxembourg, Luxembourg

Stéphane Bordas is professor of Computational Mechanics at the University of Luxembourg (UL) with a joint appointment at Cardiff University. Named ISI Highly Cited Researcher in Computer Science by Thomson Reuters (2014-2019), he has h-index 54 (Scopus), 3.8 m-index, 10340 citations, and has published over 200 journal articles. He is Editor in Chief of Advances in Applied Mechanics (Elsevier), Executive Editor of Data-Centric Engineering (Cambridge). Prof. Bordas has acquired around 25M€ in funding, since 2006, for his interdisciplinary research on multiscale methods for fracture, error estimation, model reduction for non-linear problems and medical simulation. In 2011 he was awarded an ERC Starting Grant for RealTCut – Towards real-time multiscale simulation of cutting in nonlinear materials. With this funding he put together an expert team of promising young researchers (www.legato-team.eu) which led to a number of scientific firsts, including the first error-controlled surgical simulator. He supervised/co-supervised 13 PhD's & 14 post-docs. Presently, he is supervising 12 PhD's and 8 post-docs, including 3 ESRs in an ITN and 5 MSCA Fellows. He is the founder of http://www.ariana-tech.com, a start-up focusing on risk management in health care.

Abstract

In this talk, we will first focus on recent developments in the mathematical and computational arsenal that are essential to enable the patient-specific selection and parametric identification of mathematical models for soft tissues and single cell models. Contrarily to traditional engineering materials, structures and systems which have been traditionally designed building upon physical experiments made in the lab to support engineering decisions, with biological materials, we are not so fortunate. Direct experiments to understand structure-function relationships, design substitutes and support surgeons and clinicians cannot be made. This is even more critical that there exists a high variability and individual specificity of biological matter. We are, today, in a fortunate position to tackle those difficulties, thanks to in vivo imaging, which have greatly improved in terms of resolution and in terms of the types of observables. These improvements enable the online, real-time acquisition of data to feed mathematical models and their machine learning surrogates. This opens the possibility to Identify the best model given experimental data, Identify the best parameters associated with those models and build databases for bayesian updates of models and parameter estimates. Such progress will be illustrated based on past and ongoing research performed by the Legato Team (legato-team.eu) hand-in-hand with a dozen surgeons and supported by biologists, computer scientists, mathematicians and statisticians.

Advancing the use of credible computer modelling and simulation for medical device regulatory decision making: From preclinical to In silico trials

Thursday 4th May 2023, 14:00 – 14:50
Grand Amphi
This presentation will be livestreamed.

Brent Craven
Research Scientist & Program Manager
(acting), U.S. Food and Drug
Administration (FDA)

Brent Craven is a Research Scientist in the Office of Science and Engineering Laboratories, Center for Devices and Radiological Health (CDRH) at the U.S. Food and Drug Administration (FDA). He received his PhD in Mechanical Engineering from the Pennsylvania State University in 2008. His areas of expertise include computational fluid dynamics, fluid-structure interaction, multiphysics modeling, patient-specific modeling, and verification, validation, and uncertainty quantification (VVUQ) methods applied to medical devices such as mechanical circulatory support devices, artificial heart valves, intravascular blood clot filters, and inhalers. His research at the FDA primarily focuses on advancing computer modeling and VVUQ methods for medical devices. In addition to research, he regularly serves as a subject matter expert on medical device regulatory submissions. He has authored 55 refereed journal articles and more than 100 conference proceedings and abstracts. He is currently an Associate Editor for the Journal of Verification, Validation and Uncertainty Quantification and Frontiers in Physiology. He has received a number of awards for his research and regulatory contributions, including the 2022 FDA Scientific Achievement Award for Excellence in Analytical Science, the 2018 FDA CDRH Excellence in Scientific Research Award, and an FDA Commissioner's Special Citation Award in 2021 for his regulatory contributions in the technical review of emergency use ventilators.

Abstract

Computer modeling is widely used to design medical devices and to inform preclinical testing. In recent years, higher-risk uses of modeling and simulation (M&S) have emerged including using M&S to replace

physical bench testing and to perform in silico clinical trials. These uses of M&S have the potential to transform the evaluation of medical device safety and effectiveness, reducing time to market and expediting patient access to life-saving technology. Given the potential risk to patients, however, we must ensure that the M&S is credible. In this talk, I will describe our policy and research efforts at the U.S. FDA to advance the use of credible computer M&S for medical device regulatory decision making. I will begin by providing an overview of our regulatory policy initiatives for M&S. I will then summarize collaborative research in which we are advancing the use of M&S to reduce preclinical device testing and for in silico clinical trials. A common theme in this research is the use of verification, validation, and uncertainty quantification methods to demonstrate the credibility of computer modeling to ensure that it is trustworthy for making regulatory decisions.

Challenges in sports biomechanics

Friday 5th May 2023, 09:00 – 09:50
Grand Amphi

Christophe Baudot
Chief Medical Doctor,
Paris Saint Germain, Paris

Philippe Rouch
Professor of Biomechanics,
Arts et Métiers Institute of
Technology, Paris

Christophe Baudot is Chief Medical Doctor at PSG since 2019. He was Chief Medical Doctor at Olympique Lyonnais between 2016 and 2019 and Chief Medical Doctor at Olympique de Marseille from 2007 to 2016. He also has a huge experience in Rugby being Chief Medical Doctor of the French team from 2003 to 2007 and Chief Medical Doctor of Union Bègles Bordeaux from 1997 to 2006. He is also in charge of the Medical Stadium near Bordeaux, a very innovative structure offering a global charge around the concept of movement based on the latest technologies, with the objective of improving the better life of the patients and customers, whether they are top athletes or amateurs.

Philippe Rouch is a Professor at the Arts et Métiers in Biomechanics since 2010 and former Director of the IBHGC and the Ensam campus of Paris. He is very involved in Sport biomechanics and working with several professional clubs in both soccer and rugby. He's also working with several French sport federations in order to develop personalized model of the athlete to optimize performance and reduce the risk of an injury.

Abstract

Physical activity has major beneficial impacts on health. They can be as immediate as improving sleep quality, reducing feeling of anxiety or reducing blood pressure. In the same time physical activity provides important long-term health benefits for chronic disease prevention as reducing risks of developing dementia or risk of depression, lowering risk of heart disease, stroke and diabetes, lowering risks of dedicated cancers, improving bone health and reducing risks of weight gain and improving balance and coordination. However, at the same time, professional sport can involve a high rate of injuries with high impact on the player and the health care systems as knee ankle and foot injuries, concussion or hamstrings injuries to just cite a few of them. the purpose of this presentation is to start from the medical point of view coming from a world expert in sports medicine, Dr. Christophe Baudot who worked in the past at Olympique de Marseille, at Olympique Lyonnais and is now Chief Medical Doctor at PSG taking in charge of the best players in the world like Kylian Mbappé and Lionel Messi and to see what would be the needs in numerical simulation which would make it possible to bring elements of answers to the questions still open today. This presentation will therefore be an exchange between Dr. Christophe Baudot and Professor Philippe Rouch, a specialist in the biomechanics of sport and involved with a large number of professional clubs and numerous sports federations.

CMBBE 2023 SPECIAL SESSIONS

Multi-scale mechanics and mechanobiology for tomorrow's cardiovascular medicine

Stéphane Avril; *MINES Saint-Étienne, France*
Nele Famaey; *KU Leuven, Belgium*
3 May 2023, 09:10 – 10:40, 12:10 – 13:10 and 15:50 – 16:50

Engineering innovation in women's health

Kristin Myers; *Columbia University, New York, USA*
Katrina Knight; *University of Pittsburgh, USA*
3 May 2023, 12:10 – 13:10 and 15:50 – 16:50

Recent advances in 3D modelling, diagnosis, and treatment of spinal deformities

Saša Ćuković; *ETH Zurich, Switzerland*
Luigi La Barbera; *Politecnico di Milano, Italy*
3 May 2023, 14:10 – 15:40

Cancer mechanobiology

Valeria Panzetta; *University of Naples Federico II, Italy*
Sabato Fusco; *University of Molise, Italy*
3 May 2023, 15:50 – 16:50

Prediction of hip strength from clinical data

Philippe Zysset; *University of Bern, Switzerland*
Bert van Rietbergen; *Eindhoven University of Technology, The Netherlands*
3 May 2023, 17:20 – 18:50

Mechanical characterization of muscle across length scales

Pierre-Yves Rohan; *Arts et Métiers Institute of Technology, Paris, France*
Benjamin Wheatley; *Bucknell University, USA*
3 May 2023, 17:20 – 18:50

Computational evaluation of orthopaedic devices

Ruth Wilcox; *University of Leeds, United Kingdom*
4 May 2023, 09:00 – 10:30

How biomechanical models can improve dental clinics?

Aurélie Benoit; *Université Paris Cité, France*
Ludger Keilig; *University of Bonn, Germany*
4 May 2023, 09:00 – 10:30 and 17:00 – 18:30

Exploring brain mechanics

Silvia Budday; *Friedrich-Alexander Universitat, Germany*
4 May 2023, 09:00 – 10:30

Multiscale mechanobiology

Juan Mora - Macias; *University of Huelva, Spain*
José Sanz - Herrera; *University of Seville, Spain*
4 May 2023, 09:00 – 10:30

Head and neck biomechanics for computer assisted medical interventions

Yohan Payan; *CNRS & Univ. Grenoble Alpes, France*
Georges Bettega; *Annecy Genevois Hospital, France*
4 May 2023, 11:00 – 12:45

Mechanistic multiphase modelling of soft tissues: in vitro/in vivo/in silico approaches toward clinical application

Giuseppe Sciumè; *University of Bordeaux, France*
Stéphane Urcun; *University of Luxembourg, Luxembourg*
4 May 2023, 11:00 – 12:45

Digital twins of different scales and biological processes: The example of liver

Lorenzo Sala; *INRIA, France*
Irène Vignon - Clementel; *INRIA, France*
4 May 2023, 11:00 – 12:45

Verification and validation of computational models

Nele Famaey; *KU Leuven, Belgium*
Sam Evans; *Cardiff University, United Kingdom*
Heleen Feharvery; *KU Leuven, Belgium*
4 May 2023, 15:00 – 16:30 and 17:00 – 18:30

Clinical applications of high-resolution CT

Philippe Zysset; *University of Bern, Switzerland*
Bert van Rietbergen; *Eindhoven University of Technology, Netherlands*
5 May 2023, 11:30 – 13:00

Computational pulmonology: Recent advances and challenges

Martin Genet; *MƎDISIM Team, Solid Mechanics Laboratory/École Polytechnique/Institut Polytechnique de Paris/CNRS & INRIA, France*
Aline Bel-Brunon; *LaMCoS, INSA-Lyon/CNRS, France*
5 May 2023, 11:30 – 13:00

Modelling and simulation of musculoskeletal mechanobiology

Areti Papastavrou; *Technical University of Nuremberg, Germany*
Julie Choisne; *University of Auckland, New Zealand*
5 May 2023, 11:30 – 13:00

3D Movement analysis and subject - specific musculoskeletal modelling

Ayman Assi; *Faculty of Medicine USJ Beirut, Lebanon / Arts et Métiers Institute of Technology, Paris, France / ESMAC President*
Hans Kainz; *University of Vienna, Austria*
5 May 2023, 14:00 – 15:45

Current challenges of in vivo subject - specific constitutive modelling of biological soft tissues

Pierre-Yves Rohan; *Arts et Métiers Institute of Technology, Paris, France*
Gerard Ateshian; *Columbia University*
5 May 2023, 14:00 – 15:45

Digital twins for personalised medicine

Julie Choisne; *University of Auckland, New Zealand*
5 May 2023, 16:00 – 17:30

CMBBE 2023 WORKSHOPS

SimVascular workshop

Shawn C. Shadden, *University of California, USA*
Wednesday 3rd May 2023, 17:20 – 18:45
Meeting room: Salle des Conseils

SimVascular is a fully open-source software package providing a complete pipeline from medical image data to cardiovascular blood flow simulation results and analysis (www.simvascular.org). It offers capabilities for image segmentation, unstructured adaptive meshing, physiologic boundary conditions, and two Navier - Stokes finite element solvers with fluid structure interaction (FSI) capabilities. An accompanying vascular model repository (VMR, www.vascularmodel.com) provides over 150 freely available clinical data sets with image data and simulation results from different parts of the vascular anatomy.

GIBBON workshop

Kevin Moerman, *NUIG Galway, Ireland*
Wednesday 3rd May 2023, 17:20 – 18:45
Meeting room: Amphi A

Join this workshop to learn about GIBBON: a FREE and open-source MATLAB toolbox for segmentation, image-based modelling, visualization, meshing, and finite element analysis. GIBBON includes an array of image and geometry visualization and processing tools and is interfaced with free open-source software such as TetGen, for robust tetrahedral meshing, and FEBio (or Abaqus) for finite element analysis. The combination provides a highly flexible image-based modelling environment and enables advanced inverse finite element analysis.

Hands-on SOFA: An open-source solution for physics simulation

Hugo Talbot, *Inria, France*
Thursday 4th May 2023, 15:00 – 16:30
Meeting room: Amphi A

SOFA is an open-source framework for interactive physics simulation, with an emphasis on soft body dynamics. Further to 16 years of research and development, the framework is made up of a stable core providing state - of - the - art models and numerical methods. Its LGPL v2.1 open-source license (permissive and non - contaminating) and its plugin architecture foster the development of prototypes and products under any commercial license. Today, SOFA benefits from a large international community made up of research centers and companies.

Introducing FEBio Studio 2 and FEBio 4

Gerard A. Ateshian, *University of Columbia, USA*
Jeffrey A. Weiss, *University of Utah, USA*
Thursday 4th May 2023, 17:00 – 18:30
Meeting room: Salle des Conseils

In this workshop we will introduce the newest versions of the FEBio solver and FEBio Studio, the integrated graphical user interface (UI) for FEBio (www.febio.org). The FEBio project is an ongoing collaboration between Dr. Jeff Weiss' laboratory at the University of Utah and Dr. Gerard Ateshian's laboratory at Columbia University.

FEBio Studio 2.0 is now fully aware of all features in FEBio so that the UI is updated as new features are developed and implemented. New capabilities in FEBio Studio include the incorporation of image data throughout the analysis pipeline, including support for 2D, 3D and 4D image file import from DICOM formats supported by clinical scanners and microscopes, image filtering, image based strain measurement based on DIC, DVC and deformable image registration, volume rendering and image slicing, and the ability to extract model parameters form image data and interpolate to FE meshes. The UI now includes contextual help throughout, user selections of units and propagation to all fields, and options to stay up-to-date with release or development versions.

Workshop on optimal control of musculoskeletal systems: An introduction to BIOPTIM

François Bailly, *University de Montpellier, France*
Amedeo Ceglia, *University de Montpellier, France*
Thursday 4th May 2023, 17:00 – 18:30
Meeting room: Amphi A

Many approaches exist to discretize and solve optimal control problems. However, biomechanics dedicated tools are rare. Four interrelated components are implemented in Bioptim to make it an efficient optimal control software for biomechanics. 1) several discretization methods (direct multiple shooting and collocation) using explicit and implicit integrators, 2) the biorbd [2] backend, an efficient musculoskeletal modeling software that includes multibody kinematics and dynamics and muscle dynamics, which is fully compatible with, 3) CasADi, an algorithmic differentiation software that allows for an efficient and exact derivative estimation to solve the program in a reasonable time, and 4) the robust (Ipopt) and fast (ACADOS) nonlinear programming solvers.

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BETA
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BETA CAE Systems Workshop
Biofidelic aortic vessel modelling: from MRI scan to fully hexahedral mesh

Meeting room: Amphi Bezier
Thursday 4th May 2025, 13:00 – 14:00

Digital twins are proving to be valuable tools capable of faithfully representing and investigating complex scenarios. During this workshop, we will explore one of the key prerequisites for ensuring the definition of a reliable digital twin: the modelling procedure.

More precisely, we will focus on the definition of a patient-specific aortic arch model starting from an MRI scan. Throughout the live demonstration, we will deepen all the crucial stages which lead to the generation of high-quality hexahedral mesh and the definition of the study case in terms of material property and boundary conditions.

Finally, we will address an as common as well as strategic task: how to post-process the obtained result in an accurate and clear way so as to be easily understandable also by clinicians.

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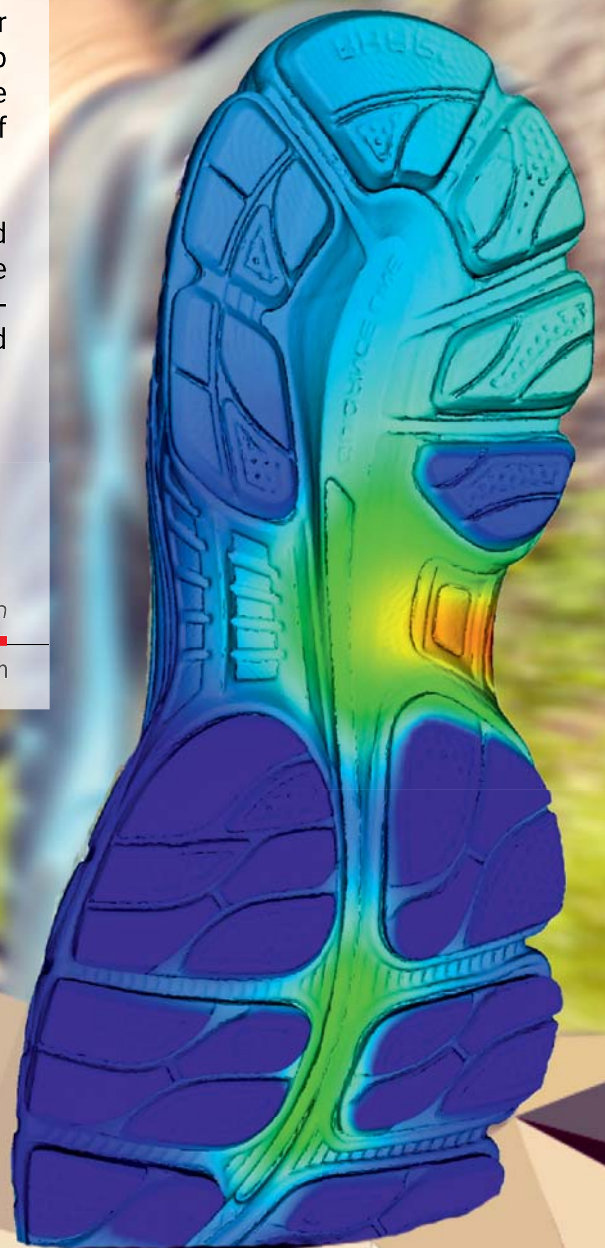
CMBBE 2023 POSTER SESSIONS OVERVIEW

Poster session A: Clinical biomechanics and translational research

Wednesday 3rd May, 13:10 – 14:10

A1 MORPHING THE LEFT ATRIUM TO COMPARE AND CLASIFFY THE LEFT ATRIAL APPENDAGE STASIS PATTERNS ACROSS PATIENTS
Jorge Dueñas Pamplona

A2 COMPARING THE SURFACE PROPERTIES OF THE TRAPEZOID METACARPAL JOINT WITH DIFFERENT TREATMENTS
Lin Fu

A3 DETERMINATION OF THE ACTIVITY LIMITATION PERIOD AFTER PLATE REMOVAL OF FOREARM DIAPHYSEAL FRACTURES: THE BONE STRENGTH EVALUATION USING PATIENT SPECIFIC CT BASED FINITE ELEMENT ANALYSIS
Yusuke Matsuura

A4 DEVELOPMENT OF A 3D STATISTICAL SHAPE MODEL OF THE HUMAN MANDIBLE
Giorgio Biesso

A5 MATHEMATICAL MODELING IN PROBLEMS OF OPTIMIZING THE PLACEMENT OF VASCULAR BYPASSES
Andrey V Dubovoy

A6 VIRTUAL COHORT GENERATION FOR IN SILICO TRIALS OF TRANSCATHETER AORTIC VALVE IMPLANTATION
Sabine Cornelia Francisca Petronella Maria Verstraeten

A7 PATIENT-SPECIFIC BOUNDARY CONDITIONS ADAPTATION FOR COMPUTATIONAL HEMODYNAMICS IN THE LEFT VENTRICLE USING THE CIRCADAPT MODEL
Agathe Bedoux

A8 ANALYSIS OF THE MECHANICS OF BIORESORBABLE WIRE-BRAIDED STENTS IN A PATIENT SPECIFIC SCENARIO
Agnese Lucchetti

A9 A WORKFLOW FOR GENERATING COMPUTATIONAL MODELS OF KNEE JOINT CONTACT USING INPUTS FROM LOADED MRI SCANS
Brett Steineman

A10 EVENT-RELATED CONTROL OF FUNCTIONAL ELECTRICAL STIMULATION USING OPEN-SOURCE PYTHON LIBRARIES
Amedeo Ceglia

A11 STANDARDISING FRAME ALIGNMENTS TO ALLOW FOR CONSISTENT KINEMATIC INTERPRETATION: PART I
Ariana Ortigas Vásquez

A12 STANDARDISING FRAME ALIGNMENTS TO ALLOW FOR CONSISTENT KINEMATIC INTERPRETATION: PART II
Adrian Sauer

A13 EXERCISE CAN IMPROVE CARDIAC DYSFUNCTIONS MEASURED BY ECHOCARDIOGRAPHY IN CHILDHOOD CANCER SURVIVORS
Delphine Périé

A14 IN SILICO ANALYSIS OF AUXETIC INSPIRED STENT GRAFTS FOR ENDOVASCULAR ANEURYSM REPAIR
Rahul Vellaparambil

A15 SIMULTANEOUS SIMULATION OF COLD FLOW AND IMPINGEMENT IN POLYETHYLENE LINER OF HIP PROSTHESIS
Changhee Cho

A16 A NEW CONCEPT FOR MONITORING PATIENT ACTIVITY USING AN ENERGY-AUTONOMOUS TOTAL HIP ENDOPROSTHESIS STEM
Franziska Geiger

A17 USE OF ELECTRICAL MUSCLE STIMULATION TO ENHANCE PROPULSION DURING WALKING IN ABLE-BODIED ADULTS
Thomas Aout

A18 A COMPARATIVE CLINICAL TRIAL TO EVALUATE THE EFFECT OF A LUMBAR BELT ON THE KINEMATICS OF THE SPINE
Aicha Errabity

A19 LOWER LIMB PROSTHESIS: COMPUTER METHODS FOR DESIGNING MATAMATERIAL LINER
Vasja Plesec

A20 HEAD LENGTH'S IMPACT ON TAPER JUNCTION STABILITY IN TOTAL HIP PROSTHESIS
Federico Andrea Bologna

A21 FRACTURE TOUGHNESS IN HUMAN CORTICAL BONE FROM INDIVIDUALS WITH AND WITHOUT TYPE 2 DIABETES MELLITU
Eva Maria Wölfel

A22 THEORETICAL DYNAMIC MODEL OF WRIST PROSTHESIS WITH OPTIMIZED MAGNETORHEOLOGICAL BRAKE
Rina Mariane Alves Dutra

A23 MECHANICAL IMPACT OF CAVITY DESIGN OPTIMIZATION (CDO) IN INLAY FABRICATION INLAY DESIGN: FINITE ELEMENT APPROACH
Bilal Balbzioui

A24 A DYNAMIC FINITE ELEMENT MODEL OF THE RECONSTRUCTED MANDIBLE WITH BODY AND RAMUS DEFECT FOR STRESS ANALYSIS DURING CHEWING
Hamidreza Aftabi

A25 AXIAL TENSION/COMPRESSION AND TORSIONAL LOADING OF LATTICE STRUCTURES: SIMULATION AND EXPERIMENT
Anatolie Timercan

A26   DEVELOPMENT AND CHARACTERIZATION OF 3D PRINTED BONE SUBSTITUTES MIMICKING TRABECULAR BONE ARCHITECTURE
Fanny LEBORGNE

A27   IDENTIFICATION OF A VISCO-HYPERELASTIC MODEL FOR THE MANDIBULAR PERIOSTEUM
Alexandre Hamma

A28   NUMERICAL SIMULATION OF ACOUSTIC WAVES IN A SIMULATED HUMAN TOOTH FOR ROOT FRACTURE DETECTION
Si Yen Ng

Poster session B: Image analysis and processing methods for biology and medicine
Wednesday 3rd May, 13:10 – 14:10

B29   IMAGING OF MUSCULOSKELETAL TISSUES BY ULTRASONIC TOMOGRAPHY - PROSPECTS FOR CHILDREN LIMB IMAGING
Philippe Lasaygues

B30   PREDICTING LIVER RESECTION COMPLEXITY FROM CT SCANS WITH A MACHINE LEARNING FRAMEWORK
Omar Ali

B31   AVERAGE 3D CORNEAL MODEL TO ANALYSE ENDOTHELIAL TRANSPLANT SURGERY
Jean Meunier

B32   MICROGROOVE SUBSTRATES AS A PLATFORM FOR CANCER CELL DEFORMATION
Bettina Roellinger

B33   A METHOD TO ASSESS CHANGES IN MECHANICS IN PROGRESSIVE ADOLESCENT IDIOPATHIC SCOLIOSIS PATIENTS
J Paige Little

B34   FEATURE EXTRACTION OF FMRI FOR AUTISM BY REINFORCEMENT LEARNING
Hung-Ming Chi

B35   FROM THE MICRO- TO THE MESOSCALE 3D RECONSTRUCTION OF THE HUMAN LIVER ARCHITECTURE
Mathieu de Langlard

B36   PLANNING SOLUTION FOR SEMI-AUTONOMOUS ASPIRATION OF POPLITEAL CYSTS
Grzegorz Milewski

B37   UNCERTAINTY QUANTIFICATION OF HEMODYNAMIC RUPTURE RISK PARAMETERS FOR INTRACRANIAL ANEURYSMS
Florian Hellmeier

B38   QUANTIFYING JOINT CONGRUENCE WITH AN ELASTIC FOUNDATION
Charles B. Burson-Thomas

B39   DEEP LEARNING AS A TOOL FOR AUTOMATICALLY CREATING PATIENT-SPECIFIC SPINE MODELS
Ivanna Kramer

B40   ON THE FEASIBILITY OF USING FE-BASED DIGITAL VOLUME CORRELATION TO MAP BREAST DEFORMATION
Thomas Lavigne

B41   POLYCHROMATIC POLARIZED LIGHT MICROSCOPY FOR DYNAMIC TENDON AND 3D PRINTED SCAFFOLD IMAGE ANALYSIS
Kirk McGilvray

B42   CORRESPONDENCE-BASED STATISTICAL ANALYSIS OF SUBJECT-SPECIFIC HIP BIOMECHANICS
Andrew E. Anderson

B43   CRYOGENIC CONTRAST-ENHANCED MICROCT ENABLES 3D HISTOPATHOLOGY OF SOFT BIOLOGICAL TISSUES
Arne Maes

B44   COMPARISON OF THE MORPHOLOGY AND HEMODYNAMICS OF THE HUMAN, PORCINE, AND OVINE PULMONARY ARTERY
Jan Brüning

B45   VALIDATION OF ABDOMINAL AORTIC ANEURYSM MOTION TRACKING WITH SIMULATED ULTRASOUND CINE-LOOPS
Marta Irene Bracco

B46   AUTOMATIC ESTIMATION OF CENTER OF MASS FROM MULTI-CAMERA VIDEO SYSTEM
Bhrigu Kumar Lahkar

B47   VIRTUAL REALITY AS A MEANS TO IMPROVE THE COMMUNICATION AMONG USERS AND ARTIFICIAL HANDS
Joaquín Cerdá-Boluda

B48   INTEGRATION OF IMAGE-BASED STRAIN MEASUREMENT IN THE FEBIO STUDIO ENVIRONMENT
Elana Lapins

B49   AUTOMATED LABEL-FREE CELL PHENOTYPING FOR DYNAMIC STUDY OF IMMUNE-CANCER CELL INTERACTIONS
Brian Chesney Quartey

B50   AI-BASED TRANSVAGINAL ULTRASOUND IMAGE SEGMENTATION ENABLES AUTOMATED CERVICAL LENGTH MEASUREMENT
Alicia Breanne Dagle

B51 PRELIMINARY RESULTS OF TRACKING CCTA CENTERLINE USING DDQN COMBINED WITH CNN
Wei-Yu Chiu

B52 COLORECTAL CANCER STAGE PREDICTION USING MACHINE LEARNING ALGORITHMS
Elçin Güveyi

B53 SYNTHETIC DATA AUGMENTATION STRATEGY FOR THE AORTIC SEGMENTATION FROM PC-MRI SMALL DATASET
Simone Garzia

B54 AUTOMATIC VIEW CLASSIFICATION OF FOCUSED CARDIAC ULTRASOUND VIDEOS
Sandro Queirós

B55 EFFECT OF THE REDUCTION OF CONE-BEAM CT ARTEFACTS BY CGAN ON THE DIAGNOSIS OF ENDODONTIC COMPLICATIONS
Amanda Pelegrin Candemil

B56 SPINOPEVIC ANATOMICAL PARAMETER EXTRACTION USING A NOVEL DEEP LEARNING PHYSICS-INFORMED MODEL (LAN-DET)
AliAsghar MohammadiNasrabadi

Poster session C: Human movement analysis
Thursday 4th May, 13:00 – 14.00

C57 EVALUATING ANTICIPATORY CONTROL FOR STEP DOWN PERTURBATIONS IN SIMULATIONS OF HUMAN WALKING
Daniel F B Haeufle

C58 REAL-TIME BIOFEEDBACK OF HUMAN KINEMATICS AND MUSCLE FORCES BASED ON EMG-MARKER DATA FUSION
Amedeo Ceglia

C59 MULTI-MODAL REGISTRATION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS SUBJECT SPECIFIC AVATAR CREATION
Nicolas Comte

C60 QUANTIFYING THE ROLE OF THE FORCE-VELOCITY RELATION IN SIMULATED PERTURBED HOPPING
Fabio Izzi

C61 MUSCLE FORCE RESPONSE TO PERTURBED LOCOMOTION: IN-VITRO EXPERIMENTS VS. HILL-TYPE MUSCLE MODEL
Matthew Araz

C62 THE INFLUENCE OF SENSORY FEEDBACK ON HUMAN WALKING
Elsa Katharina Bunz

C63 INTERACTION EFFECTS OF LIFTING TECHNIQUE AND LOAD POSITION/ASYMMETRY ON SPINAL AND KNEE LOADS
Sajjad Daroudi

C64 INTERACTIONS BETWEEN EEG AND EMG FREQUENCY BANDS ASSOCIATED WITH VISUAL PERTURBATIONS
Fatimah Al-ani

C65 PLANTAR FLEXOR MUSCLE WEAKNESS ALTERS CONTRIBUTION OF ACCELERATED BODY MASSES TO FORWARD PROGRESSION
Jérémie Begue

C66 PRECISION OF PHYSICS-INFORMED INTERVERTEBRAL DISC SURROGATE MODELS
Maria Hammer

C67 A POTENTIAL FIELD APPROACH TO DETERMINE THE JOINT KINEMATICS OF A HUMAN UPPER EXTREMITY
Iman Soodmand

C68 CLASSIFICATION OF AUTISM AND CONTROL GAIT IN CHILDREN USING JOINT KINETIC AND TEMPORAL-SPATIAL FEATURES
Victoria Louise Chester

C69 PREDICTIVE SIMULATIONS OF ADAPTIVE TREADMILL GAIT
Kayla Marie Pariser

C70 SOFT PIEZOELECTRIC ACTUATOR FOR HAPTIC FEEDBACK: A PRELIMINARY STUDY OF DISPLACEMENT
António Diogo André

C71 REAL-TIME CONTINUOUS AUDITORY FEEDBACK FOR GAIT RETRAINING FROM PRESSURE SHOE INSOLES
Ariane Pauline Lalles

C72 A LINKAGE-BASED PROSTHETIC ANKLE WITH MR-DAMPER
Sachin Kumar

C73 DAILY ACTIVITIES KINEMATICS AND KINETICS IN SUBJECTS WITH EXTERNAL FIXATOR: PRELIMINARY TESTS
Andrea Di Pietro

C74 EFFECTS OF JUMPING EXERCISES TO PREVENT OSTEOPOROSIS GAINED FROM ACCELERATION DATA
Lukas Reinker

C75 AERO HANDLEBAR POSITIONS EFFECTS ON MUSCLE ACTIVITY, KINEMATICS OF THE LOWER LIMB AND OXYGEN CONSUMPTION
Delphine Périé

C76 MODELLING GLENOHUMERAL LIGAMENT STRAIN PATTERNS IN OVERHAND AND UNDERHAND PITCHING
Andrew Kraszewski

C77   NUMERICAL ANALYSES FOR EVALUATING STRAIN LOCALIZATION IN THE BRAIN CAUSED BY EXTERNAL IMPACT
Atsushi Sakuma

C78   INFLUENCE OF HEAD-FLOOR COMBINED STIFFNESS IN STAIR FALL HEAD IMPACT: A MULTIBODY DYNAMICS STUDY
Kaushik Mukherjee

C79   FREE MOMENT VARIABILITY FOR MAXIMUM VERTICAL JUMP FALLING RISK ASSESSEMENT
Carlos Manuel Rodrigues

C80   THE USE OF MULTICHANNEL ELECTROMYOGRAPHY TO ASSESS MUSCLE ACTIVITY IN ERGONOMIC PUSHING TASKS
Usha Kuruganti

C81   INVESTIGATING JERSEY FINGER INJURY LOAD CASES USING A FINITE ELEMENT NEUROMUSCULAR HUMAN BODY MODEL
Lennart Vincent Nölle

C82   ANATOMICALLY-REALISTIC COMPUTATIONAL MODELING FOR TESTING THE EFFECTIVENESS OF PROTECTIVE PLATES
Maayan Lustig

C83   CO-CONTRACTION CAUSES HIGHER JOINT LOADS IN PEOPLE WITH INCREASED NECK-SHAFT AND ANTEVERSION ANGLES
Hans Kainz

Poster session D: Methods in mechanics for biology and medicine

Thursday 4th May, 13:00 – 14:00

D84   LASER PHOTOTHERMAL THERAPY SIMULATION FOR DESIGNING BREAST TUMOR TREATMENT PROTOCOL
Liang Zhu

D86   HEMODYNAMICS OF CIRCLE OF WILLIS HAVING HYPOPLASTIC ANTERIOR COMMUNICATING ARTERY
JAYANAND SUDHIR BHANU

D87   FINITE ELEMENT MODEL OF THE HUMAN BREAST FOR LARGE DEFORMATIONS APPLICATIONS
Mariana Carvalho

D88   LARGE-SCALE FINITE ELEMENT MODELING OF PRE-STRESS IN ARTICULAR CARTILAGE
Seyed Shayan Sajjadinia

D89   SIMULATING CARDIOVASCULAR DYNAMICS THROUGH DATA-DRIVEN REDUCED ORDER MODELS
Gianluigi Rozza

D90   PREDICTION ACCURACY OF COLLATERAL LIGAMENT STRAINS OF HOLZPFEL-GASSER-OGDEN-BASED POST-TKA KNEE MODEL
Lucas Milakovic

D91   OPEN SOURCE HEAD MODEL FOR SKELETAL INJURY ANALYSIS: DEVELOPMENT AND VALIDATION CATALOG
Jobin D. John

D92   ULTRASOUND-BASED MODELING OF ABDOMINAL AORTIC ANEURYSMS: MODEL COMPLEXITY AND PERSONALIZATION
Esther Maas

D93   ON THE ASSUMPTION OF RIGID WALLS IN ATRIAL FIBRILLATION PATIENTS IMPLICATIONS FOR PREDICTION OF HEMODYNAMICS AND THROMBOEMBOLIC INDICATORS
Henrik Aasen Kjeldsberg

D94   EFFECT OF THE THICKNESS OF PEG HYDROGEL PATCH ON THE DIFFUSION OF WOUND ANTIMICROBIALS
Pooja Vardhini Natesan

D95   MODELLING THE PLACENTA VASCULATURE FOR CLINICAL DECISION SUPPORT
Pascalle Wijntjes

D96   SENSITIVITY ANALYSIS OF MENISCAL TISSUE MATERIAL PARAMETERS TO ITS KINEMATICS AND CONTACT MECHANICS
Sherif Abubakari Zantiba

D97   ULTRASOUND-BASED AUTOMATIC 3D MODULOGRAPHY FOR ATHEROSCLEROTIC CAROTID ARTERY PLAQUES
Mirunalini Thirugnanasambandam

D98   MATERIAL PROPERTIES IDENTIFICATION OF PORCINE PERINEAL TISSUES
Tiguida Kadiakhé

D99   LOCAL MECHANICAL PROPERTIES IN BONE ALLOGRAFTS CORRELATE WITH ELLIPSOID FACTOR
Zhuang Xiong

D100   IDENTIFICATION OF MECHANICAL PROPERTIES OF HUMAN ABDOMINAL WALL BASED ON IN VIVO MEASUREMENTS
Katarzyna Szepietowska

D101   COMPARISON OF TWO MACHINE-LEARNING METHODS TO PREDICT INTERVERTEBRAL DISC PROPERTIES
Emily S. Kelly

D102   A MACHINE LEARNING APPROACH TO PREDICT CARDIOVASCULAR COLLAPSE IN HEMORRHAGE PATIENTS
Aaron Bray

D103 PREDICTING GREYHOUND SPEED IN THE RACE BY CREATING A HISTORICAL DATA PLANE OF RACE DATA
Md Imam Hossain

D104 MECHANICAL PERFORMANCE OF HUMAN ABDOMINAL WALL BASED ON IN VIVO TESTING AND ANN ANALYSIS
Izabela Lubowiecka

D105 FEATURE SELECTION APPLIED TO MICROBIOME FOR DRUG DISCOVERY
David Rojas-Velazquez

D106 GENERATION OF ANTHROPOMORPHIC GRASP HYPOTHESES FOR GRASPING SIMULATION
Immaculada Llop-Harillo

D107 COMPUTATIONAL EVALUATION OF EXOSKELETON CONTROLLERS WITH A SCALABLE BIOMECHATRONICS MODEL
Ali Nasr

Poster session E: Structures and systems biomechanics

Friday 5th May, 13:00 – 14:00

E108 DIGITAL TWINS FOR DECISION SUPPORT IN FONTAN-PALLIATED PATIENTS
Jan Brüning

E109 ARTERY WALL THICKNESS EFFECT ON VISCOELASTIC WALL MOTION USING A STANDARD LINEAR MODEL
Kyehan Rhee

E110 PARAMETRISATION-BASED QUANTIFICATION OF AAA EVOLUTION
Ludovica Saccaro

E111 PASSIVE LEFT VENTRICLE TISSUE BIAXIAL CHARACTERIZATION
Morgane Evin

E112 IMPACT OF PATIENT-SPECIFIC OCCLUDER CONFIGURATION IN DEVICE-RELATED THROMBUS: AN IN-SILICO ANALYSIS
Carlos Albors

E113 SYMMETRY-CONSTRAINED COMPACT TENSION TEST TO INVESTIGATE THE FRACTURE PROPERTIES OF VASCULAR TISSUE
Marta Alloisio

E114 SUBJECT-SPECIFIC SPINE MODELLING USING A BAYESIAN COHERENT POINT DRIFT ALGORITHM
Joeri Kok

E115 A COMPUTATIONAL FRAMEWORK TO STUDY THE EFFECTS OF SPINAL CORD STIMULATION (SCS)
Tom Le Tutour

E116 THE EFFECT OF SPINAL FUSION SURGERY ON GAIT IN ADOLESCENT IDIOPATHIC SCOLIOSIS PATIENTS
KAUSHIK MUKHERJEE

E117 BIOMECHANICAL ANALYSIS OF UNILATERAL PEDICLE SCREW FIXATION OF LUMBAR SPINE
Kuo-Chih Su

E118 EVALUATION OF BIOMECHANICAL CHARACTERISTIC CHANGES OF SPINE ACCORDING TO L4-5 LORDOSIS ANGLES IN POSTERIOR LUMBAR INTERBODY FUSION BASED ON FINITE ELEMENT ANALYSIS
Jun-Sung Park

E119 THE AGEING SPINAL/LUMBAR LORDOSIS - EFFECTS ON THE INTERVERTEBRAL DISCS
Sabine Bauer

E120 VALIDATION OF A NOVEL LUMBAR FUNCTIONAL SPINE UNIT
Saravana Kumar Gurunathan

E121 REVIEWING THEORETICAL AND EXPERIMENTAL METHODS FOR TIME-DELAY ESTIMATION IN BIOMECHANICAL STABILITY
Saravana Kumar Gurunathan

E122 BIOPHYSICAL HILL-TYPE MODEL OF THE MUSCLE SPINDLE
Pablo Filipe Santana Chacon

E123 CLASSIFICATION OF YOUNG AND OLDER ADULT GAIT USING SINGLE AND MULTISEGMENT FOOT KINEMATIC FEATURES
Victoria Louise Chester

E124 EMOTIONAL CHALLENGE AS AN EFFECTOR OF THE HUMAN GAIT CYCLE: A MULTI-SIGNAL STUDY
Fatimah Al-ani

E125 EXPLOITING OPEN SYSTEM PERIDYNAMICS FOR NONLOCAL BONE REMODELLING
Emely Schaller

E126 A COMPARISON OF INJURY RISK BETWEEN 44 MM AND 58 MM CLAY-DISPLACEMENT FOR BEHIND ARMOR BLUNT TRAUMA
Lance Frazer

E127 EXPERIMENT AND SIMULATION STUDY OF THE ENERGY ABSORBTION IN BIOMIMETIC SCAFFOLD LATTICES
Mahtab Vafaeefar

E128 NEGATIVE EFFECTS ON PEDIATRIC HEARING DUE TO TYMPANOSTOMY TUBES
Razvan Rusovici

E129 THE EFFECT OF CORTEX THICKNESS ON HUMERUS BIOMECHANICS: A FINITE ELEMENT ANALYSIS
Habiba Bougherara

E130 THE EFFECT OF VACUUM EXTRACTORS WITH DIFFERENT THICKNESS DURING DELIVERY
Kuo-Chih Su

Poster session F: Multiple topics and Mechanobiology

Friday 5th May, 13:00 – 14:00

F131 UNCERTAINTY QUANTIFICATION IN PERSONALIZED PULMONARY MECHANICS
Alice Peyraut

F132 PATIENT SPECIFIC SIMULATION OF UPPER AIRWAY COLLAPSE: GEOMETRY VS SOFT TISSUE STIFFNESS
Venkat Ayyalasomayajula

F133 EVALUATION OF AIRFLOW CHANGES IN TRACHEA ACCORDING TO LEFT UPPER LOBECTOMY TYPES BASED ON COMPUTATIONAL FLUID DYNAMICS
Minsu Kim

F134 DIGITAL TWINS OF BREAST TUMOURS FOR PREDICTING THE OUTCOME OF NEOADJUVANT CHEMOTHERAPY
Rose Mathilde Collet

F135 SYSTEM BIOLOGY MEETS SINGLE-CELL MECHANOBIOLOGY: THE CASE OF LAMIN-A TURNOVER INHIBITION IN SUSPENDED CELLS
Maria Isabella Maremonti

F136 SCAFFOLD PROPERTIES ON CELLULAR LOADING IN DENTAL RESTORATIONS: A MULTISCALE MODELLING APPROACH
Evangelos Karatsis

F137 CONTINUUM MECHANICS MODELING OF STIFFNESS SENSING BY SMOOTH MUSCLE CELLS
Ali Akbar Karkhaneh Yousefi

F138 FRACTIONAL DIFFUSION OF MEMBRANE RECEPTORS IN ENDOCYTOSIS PATHWAY
Gianmarco Nuzzo

F139 IMPLEMENTATION OF A GRADIENT ENHANCED BONE REMODELLING MODEL IN ABAQUS
Fynn Bensel

F140 GROWTH AND REMODELING STUDY OF MECHANO-IMMUNO-DRIVEN ENDOGENOUS TISSUE RESTORATION
Hadi Shirazi

F141 BIOFABRICATION OF 3D ELETROSUPN SCAFFOLDS WITH ZONAL FIBRE ALIGNMENT FOR CARTILAGE TE
António Completo

F142 A CELL-BASED MATHEMATICAL MODEL OF TISSUE REGENERATION AND ITS NUMERICAL TREATMENT
Elise Grosjean

F143 MECHANOBIOLOGY OF A MULTI-CELL UTERINE WALL MODEL
Yael Shlomo

F144 BIOMIMETICS OF STRUCTURAL MOTIFS IN SOFT FIBROUS TISSUES
Mirit Sharabi

F145 MORPHING IN PLANT TISSUES: BIOMIMETICS OF STRUCTURE AND FUNCTION
Mirit Sharabi

F146 BIOMIMETICS OF THE MENISCUS TISSUE: STRUCTURE AND FUNCTION RELATIONSHIP
Mirit Sharabi

F147 FROM POPULATION TO INDIVIDUAL. DERIVATION OF AN AGENT BASED MODEL FOR GLIOBLASTOMA EVOLUTION IN VITRIO
Raquel B. Arroyo-Vázquez

F148 SHIFT OF LOAD DISTRIBUTION WITH LUMBAR DISC REPLACEMENT-A SIMULATION STUDY
Regina Guth

F149 MEASURMENT OF BULK MODULUS OF SOFT TISSUES USING DIGITAL IMAGE CORRELATION IN TENSILE TEST
Mohammad Ali Nazari

F150 CLASSIFICATION OF COGNITIVELY NORMAL AND ALZHEIMER BRAIN MR IMAGES USING MULTISCALE TEXTURE AND EXTREME LEARNING MACHINE
Deboleena Sadhukhan

F151 MECHANICS OF AAA TISSUE FOR PERSONALIZED CALCULATION OF THE RISK OF ITS RUPTURE
Anna I Lipovka

F152 DIGITAL VOLUME CORRELATION ASSOCIATED WITH OPTICAL COHERENCE TOMOGRAPHY FOR SKELETAL MUSCLE MECHANICAL CHARACTERIZATION
Juan Felipe Escobar

F153 USING MACHINE LEARNING FOR DRUG DISCOVERY IN IBD
**David Rojas Velazquez**

CMBBE 2023 PRESENTERS GUIDELINES

Oral presentations

- Please check the time and lecture room of your presentation in the daily programme and in the conference app as some last minute changes might occur.

- Unless informed otherwise, all presenters are asked to respect the duration of presentations as follows. The chairs are requested to stop the presentation after the allotted time has passed.
  15 min. (including Q&A) for oral presentations,
  20 min. (including Q&A) for keynote lectures,
  50 min. (including Q&A) for plenary lectures.

- Onsite presentations upload might cause delays in conference programme and is strictly reserved to necessary last minute updates (if necessary). Those updates can be done in the meeting room directly during coffee breaks or lunch breaks at least 2 hours prior to the start of your session.

- Please note that the use of personal laptops for presentation is **not allowed**.

The oral sessions will take place in the following meeting rooms:
- Grand Amphi
- Amphi Bezier
- Amphi Fournel
- Salle des Conseils
- Amphi A

For orientation in the building, you can also use mapwize: https://maps.mapwize.io/#/v/artsetmetierscampusparis
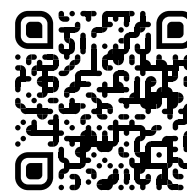
Posters

- The poster sessions are scheduled during lunch breaks as follows:
  Sessions A and B (in parallel) – Wednesday 3rd May, 13:10 – 14:10
  Sessions C and D (in parallel) – Thursday 4th May, 13:00 – 14:00
  Sessions E and F (in parallel) – Friday 5th of May, 13:00 – 14:00

- Poster sessions will be organised in the Library as well as in the IBHGC Lab space. Lunch and coffee break stations will be placed in these areas.
  Poster session A will be located in the Library (Bibliothèque).
  Poster sessions from B to F will be located in the IBHGC Lab area.

- **Poster presenters are asked to be present next to their posters during the above mentioned timeslots in order to answer the questions from both the audience and the Scientific committee (for evaluation purposes).**
  Each presenter should be ready to briefly present his/her poster and answer questions during the allocated session, beside this we encourage free individual discussions around posters.
  We also advise the presenters to be next to their posters during the poster sessions happening the other days if they are available, and during coffee breaks, as some participants will walk in the poster area by themselves and might have questions.

- **Posters should be mounted on Tuesday May 2nd between 15:00 and 19:00 or on Wednesday May 3rd between 07:30 – 11:00.**

- Posters should be removed **on Friday May 5th** after the lunch break or right after the closing of the congress (by 18:00). All posters not dismantled by 18:00 on May 5th will be removed and disposed by the congress staff.

Awards

The CMBBE 2023 **Best poster**, **Best oral** and **Best student oral presentation** will be awarded.

The winners will be announced during the **Closing ceremony on May 5th**.
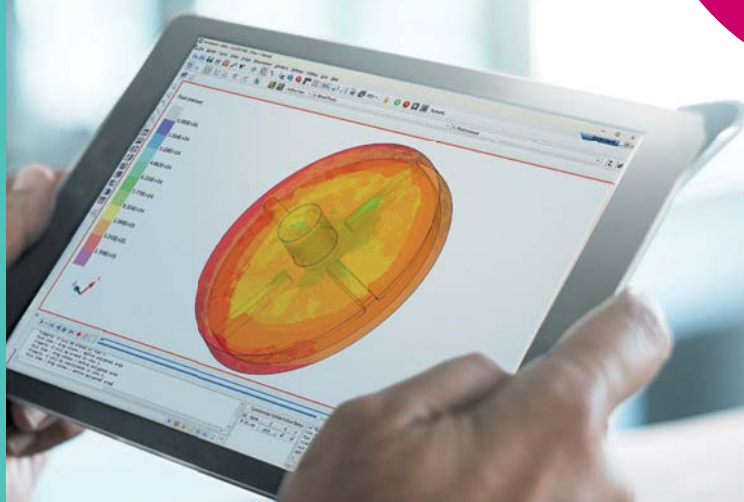
PRACTICAL INFORMATION

Conference venue

The beautiful **historical building of Arts et Métiers** is located **in the heart of the 13th district of Paris**, area known for both modern architecture (French National Library or Docks de Paris) and historical monuments like the Manufacture des Gobelins right next to the conference venue.

The popular 5th district with the university area around **Panthéon – Sorbonne**, the stunning parcs Jardin des Plantes or Jardin du Luxembourg and the lively **rue Mouffetard**, famous for street markets and places for eating out, are all within walking distance.

Venue address

155 boulevard de l'Hôpital 75013, Paris, France

How to get there

Ⓜ Closest metro stations:
Place d'Italie - lines 5, 6, 7
Campo-Formio - line 5
Nationale - line 6

Arriving from/to the airport

The conference venue is well accessible by public transport from both international airports **Charles de Gaulle** and **Orly**.

Arriving from the CDG Airport: RER train line B to Gare du Nord and change to metro line 5 to Place d'Italie (venue), cca 1 hour.

Arriving from the ORLY Airport: Orlyval train and RER train line B to Denfert - Rochereau and change to metro line 6 to Place d'Italie (venue), cca 45 minutes.

Taxi rates are around 55€ from the CDG airport and 35€ from the Orly airport to the 13th district of Paris where the venue is located.

Conference app Whova

The conference app Whova provides you with the most comfortable tool while planning your days at CMBBE 2023. You can browse the programme, create your agenda, reach out to all other participants and colleagues and find useful support materials (Abstract book etc). The app is available for Android and iOS.

Get Whova from the App Store or Google Play.
The event invitation code is: Welcome2Paris

To download, please visit.
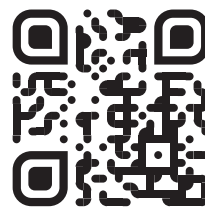
Internet access

There is a free wireless internet available in all areas of the venue. The internet network and password will be shared via the Whova app.

The Eduroam network is also available onsite.

Abstract book

The complete Abstract book is available for download in pdf on the conferece website (www.cmbbe - symposium.com/2023) and in the conference app Whova.

Registration information

For any queries, registration, and collection of congress materials, please visit the registration desk.

To avoid queues on Wednesday morning, we encourage you to come and register on the pre-conference day Tuesday May 2nd if you are already in Paris and attend one of the ENSAM lab tours!

Opening hours

Tuesday 2nd May, 12:00 – 19:00
Wednesday 3rd May, 07:30 – 19:00
Thursday 4th May, 08:00 – 17:30
Friday 5th May, 08:00 – 16:00

Name badge

The participants are kindly required to wear and display their name badge at all times and in order to enter the congress venue.

Payments

All onsite payments need to be made in cash EUR or by debit/credit card (VISA/Mastercard accepted only).

Certificates of attendance

The certificates of attendance will be available to download after the conference in the conference platform Conftool. For any specific requests related to the certificates of attendance please contact the conference secretariat by email (info@cmbbe-symposium.com).

Coffee breaks & lunches

Coffee break refreshments and lunches will be served in a catering tent in the Cour Pinel and in Poster and Exhibition areas (Library and the IBHGC lab area).

Exhibition

Exhibition is located in the Library next to the Cour Pinel (where the catering tent is located). Please follow the signs.

The Exhibition area is open throughout all conference days. You can also enjoy coffee breaks and lunches there.

Exhibition opening hours

Wednesday 3rd May, 08:00 – 19:00
Thursday 4th May, 08:00 – 17:30
Friday 5th May, 08:00 – 16:00

ENSAM Lab Tours

The Institut de biomécanique humaine Georges Charpak Lab Tour

The ENSAM Lab tours will be taking place in the afternoon on Tuesday May 2nd, the pre-conference day.

Reservation is required, numbers of places are limited.
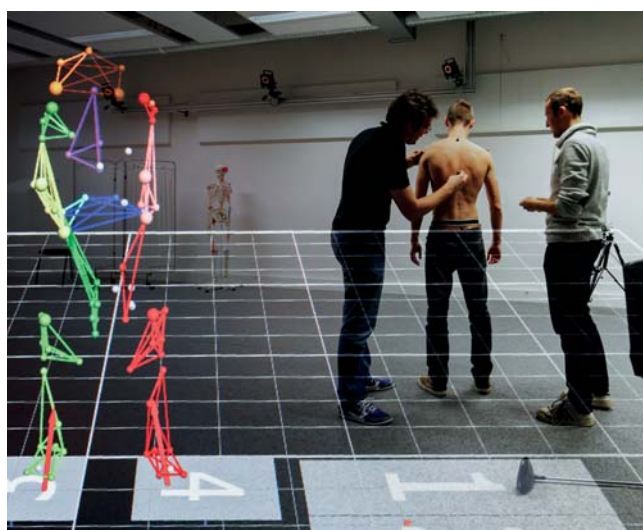
The main equipment and related research that will be presented during the visit is the EOS low-dose biplane radiography system (EOS Imaging, France), movement analysis facility, BMA high-resolution radiography system (experimental surgery room), Aixplorer Ultrasound Shearwave elastography system (Supersonic Imagine), Micro CT-scanner, Surface scanning system (Handiscan), High-speed cameras and various custom-made test benches.

LIFSE Laboratory - The Wind Tunnel Tour

The wind tunnel was built in 1952. It is the only one in the city of Paris. The facility is used for teaching and research activities, as well as missions of scientific mediation and dissemination.

The wind tunnel of the LIFSE laboratory at ENSAM Paris is referred to as a Prandtl wind tunnel, which is simply another term for a closed-wind tunnel.

NETWORKING AND SOCIAL EVENTS

Students evening

When: Tuesday 2nd May 2023, 19:00
Where: Café Oz, Denfert Rochereau (3, place Denfert - Rochereau),
             Metro lines 4 and 6, RER B (stop Denfert Rochereau)

Free, registration required!

Registered students will be offered a free drink when they arrive. More info at the registration desk during the pre-registration opening hours (Tuesday May 2nd, 12:00 – 19:00). Café 0z is a famous bar and its vibrant indoor terrace among the largest in the capital!

Welcome reception

When: Wednesday 3rd May 2023, 19:00
Where: Conference venue (ENSAM)

Great to reconnect again in person and enjoy some French refreshments in this beautiful Paris neighborhood. Come to conclude the first day together and network while enjoying the music by the Honeysuckle Quartet.

The **Honeysuckle Quartet** brings together 4 musicians who share the passion of jazz and offer varied repertoire based on the great era of swing, from Django Reinhardt to Duke Ellington, with particular emphasis on French jazz of the 30s and 40s. Arsène Charry (guitar), François Thouvenot (guitar), Maëva Tur (violin), Alain Gourdeau (bass). À bientôt!

Conference dinner: Cruise on the legendary Bateau mouche boat

When: Thursday 4th May 2023, 20:00 – 23:00
             departure of the boat at 20:30
Where: Departure of the boat: Pont de l'Alma (metro station Alma Marceau); address: Bateaux-Mouches, Port de la Conférence/Pont de l'Alma, 75008 Paris

The main networking event in rather iconic settings – with symbols of Paris appearing throughout the journey from the most known like Notre Dame, Louvre, Grand Palais or Académie de France to the marks of contemporary architecture like the Institut du Monde Arabe or the futurist dock Cité de la Mode et du Design.

Fantastic background while connecting with colleagues and enjoying French gastronomy. Do we even have to mention great wine and the Eiffel tower?

How to get there

Ⓜ **Metro station: Alma Marceau** (more possible metro ways, one of them is to take **Line 6** from Place d'Italie to Trocadéro, then change at Trocadéro to **line 9** and get off at **Alma Marceau**).

You will be given 2 metro tickets together with the dinner ticket at the registration desk. The pier and the boat are located under the bridge Pont de l'Alma.
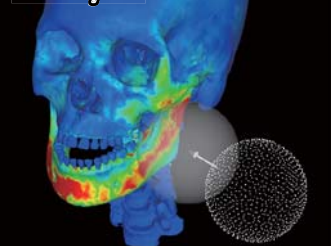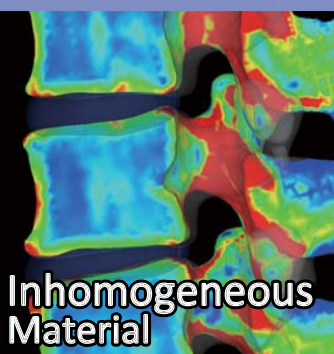
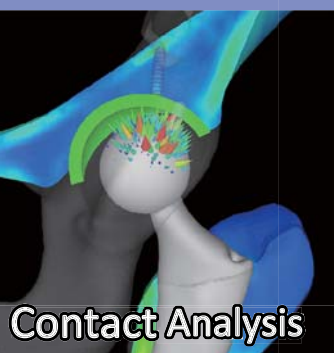# Quantitative CT-based Finite Element Analysis Software
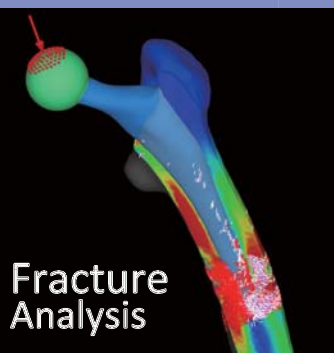# MECHANICAL FINDER
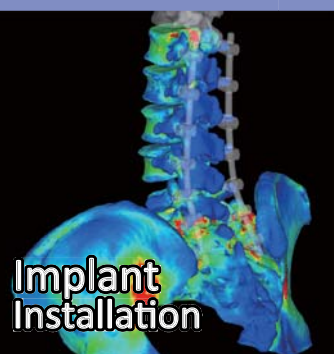
Dynamic Analysis

**Inhomogeneous Material**

Contact Analysis

Fracture Analysis

Implant Installation

Computer simulation has become indispensable in engineering because of its widespread use for analyses such as the strength of a structure or the flow of a fluid. For bone, mechanical research has been conducted since the 19th century, and in the 1990s, after the material properties of bone were obtained experimentally, quantitative CT-based finite element analysis (QCT/FEA), reflecting patient-specific bone geometry and density distribution, has became mainstream and many correlations with mechanical tests using cadavers were reported. On the other hand, general-purpose FEA software is difficult for busy doctors to handle, so finite element analysis of bone has been the domain of engineers. In addition, QCT/FEA is more difficult because it requires the combination of several software programs. MECHANICAL FINDER was developed to enable such doctors to perform QCT/FEA.
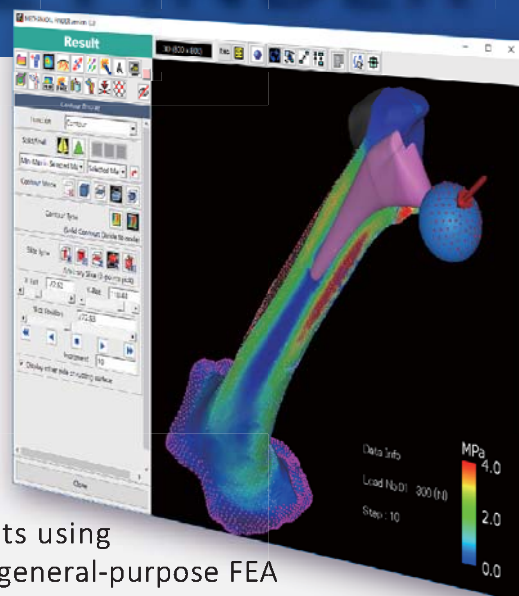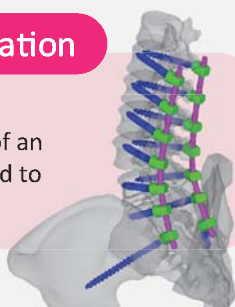
CT-based Modeing

CT-based modeling enables constructing model with patient-specific bone geometry and density.

Implant Installation

Owing to a computer simulation, a position of an implant can be modified to achieve optimum one.

Inhomogeneous Material

Bone has been modeled as homogeneous or 2-layered material in analysis. MECHANICAL FINDER can build it as an inhomogeneous material reflecting CT value.

2-layered

Inhomogeneous

Young's Modules   Equivalent Stress

Analysis

Contact, material nonlinear, and Geometrical nonlinear analysis can be performed.
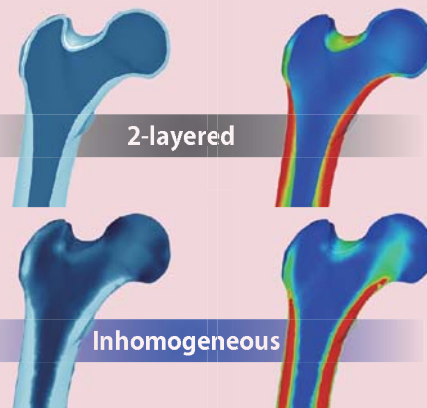
Technical Support

Technical staff support your analysis by responding your inquiry ranging from an operation procedure to a consultation of analysis.

All-in-one

MECHANICAL FINDER includes all functions needed for Quantitative CT-based Finite Element Analysis, that is, from loading DICOM data to analysis.

Distributor:

ČERVENKA CONSULTING
Concrete Engineering & Software Solutions

Červenka Consulting s.r.o.
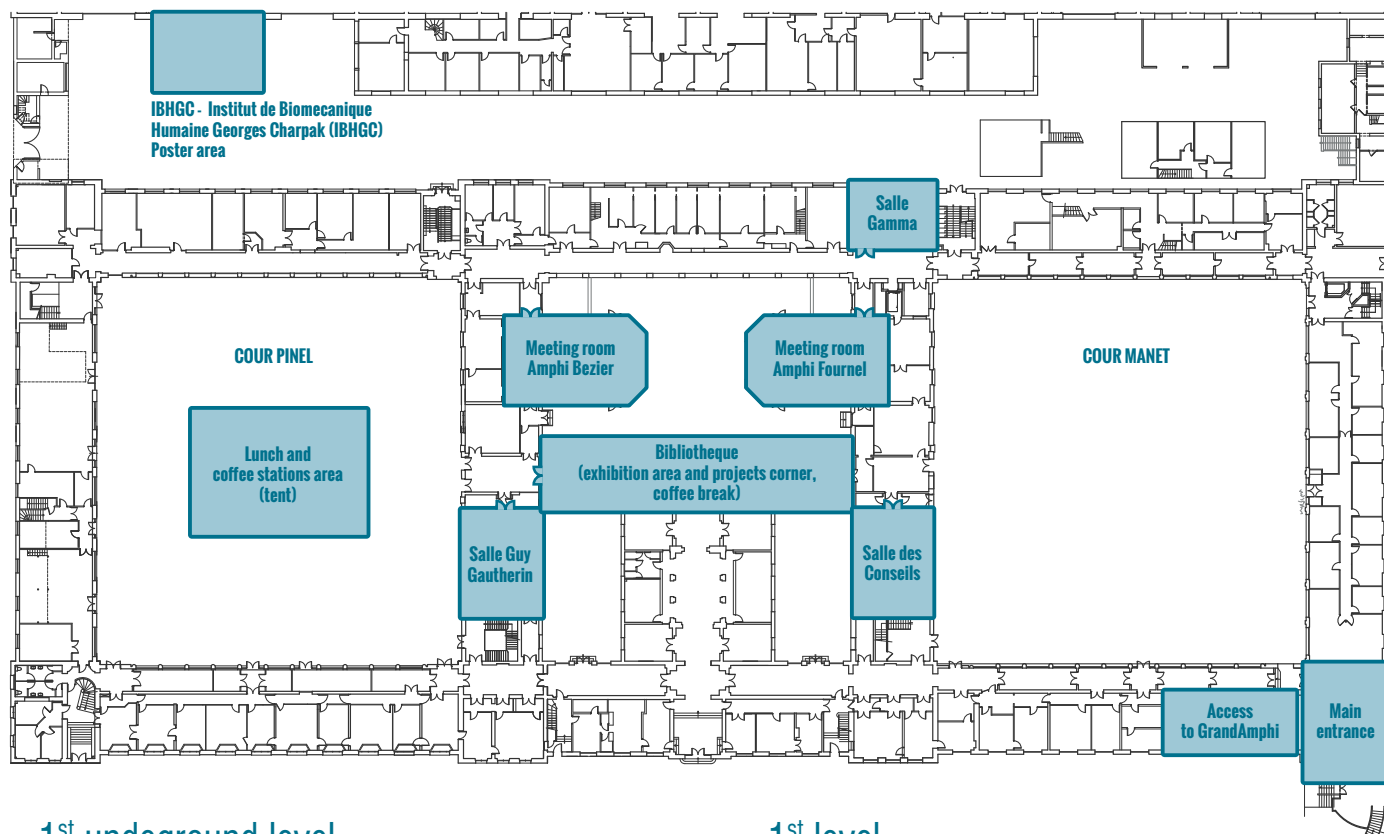Tel: +420 220 610 018
Email: mech@cervenka.cz
Na Hrebenkach, 150 00 Prague 5, Czech Republic

MECHANICAL FINDER
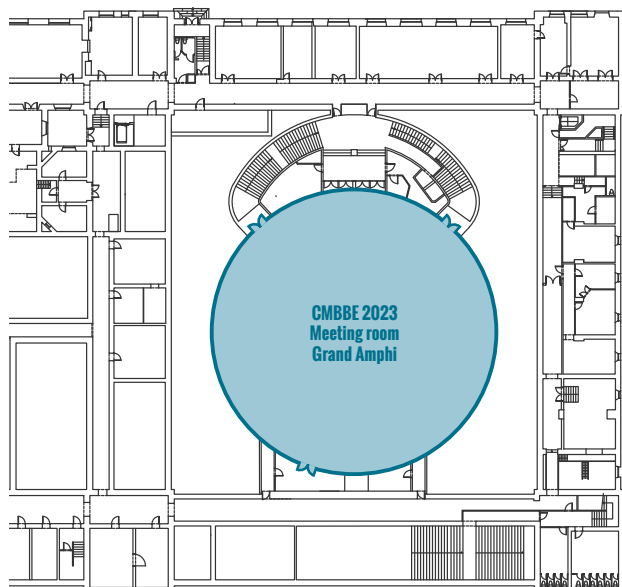sales@mechanical-finder.com
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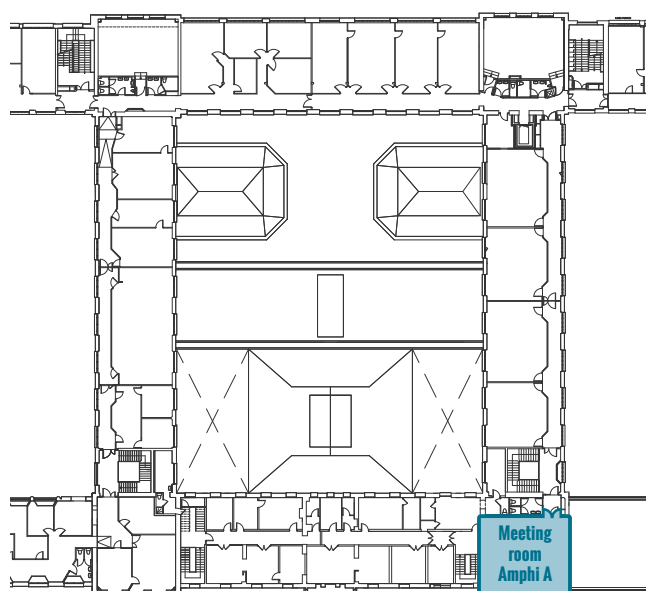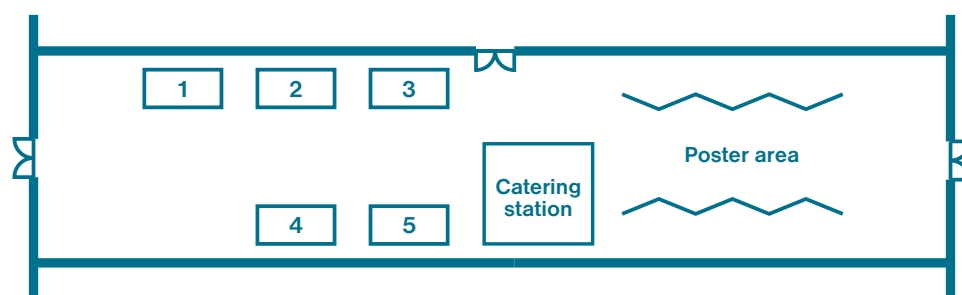
CMBBE 2023 FLOOR PLAN

Ground level

IBHGC - Institut de Biomecanique
Humaine Georges Charpak (IBHGC)
Poster area

Salle Gamma

COUR PINEL

Meeting room Amphi Bezier

Meeting room Amphi Fournel

COUR MANET

Lunch and coffee stations area (tent)

Bibliotheque (exhibition area and projects corner, coffee break)

Salle Guy Gautherin

Salle des Conseils

Access to GrandAmphi

Main entrance

1st undeground level

CMBBE 2023 Meeting room Grand Amphi

1st level

Meeting room Amphi A

Search for venue
Arts et Métiers
- Campus de Paris

CMBBE 2023 EXHIBITION PLAN

1 InSteps project
2 Mechanical Finder
3 BETA CAE Systems
4 Dassault Systemes
5 GNS mbH

CMBBE 2023 PROJECT CORNER

Project name: InSteps
www.vumc.nl

After the recent successful introduction of endovascular treatment for stroke, the most debilitating disease in the world, many stroke treatment devices are being developed. The trajectory of introducing treatments is sub-optimal resulting in huge capital wastes and delays in translation to clinical practice. Based on the research performed in (INSIST: https://www.insist-h2020.eu) an EU-funded Horizon 2020 project, we offer a validated in-silico stroke treatment modelling platform. We simulate stent-retriever-based thrombectomy to facilitate device optimization, clinical trial design, and regulatory supportive evidence.

CMBBE 2023 EXHIBITORS

BETA CAE Systems
www.beta-cae.com

BETA is an engineering simulation solutions provider, dedicated to the development of state-of-the-art software systems. For more than 30 years, we have been developing tools and delivering services for the front runners of numerous sectors by listening to their needs and taking up even the most demanding challenges.

Mechanical Finder
www.mechanical-finder.com

Mechanical Finder is a unique software for CT-based simulation of bones and implants. It provides all necessary tools in a single package with one user-friendly environment. Patient specific bone and implants models can be developed and analyzed for applications in Orthopedics, Dentistry, Engineering, Radiology, Sports, Neurosurgery and Veterinary.

Software is developed by RCCM (Japan,) and distributed in Europe by Cervenka Consulting.

Dassault Systemes
www.3ds.com

Dassault Systèmes, the 3DEXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our 3DEXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production. Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit www.3ds.com

GNS mbH
www.gns-mbh.com

GNS was founded by a group of engineering analysis experts in Germany at the end of 1994. Owing to the expertise and ambition of over 230 engineering analysis experts, located also in subsidiaries around the world. GNS is now providing services such as mesh generation for complex shell and solid structures, analysis using state-of-the-art finite element and boundary element codes, and development of customized software tools. GNS develops special material models, such as those used for foams and honeycomb structures. GNS also advises companies on how to integrate or optimize numerical analysis in their design process. GNS creates and supports advanced commercial software products such as ANIMATOR4, GENERATOR and OpenForm, tailored to meet the needs of its clients and industries toughest engineering problems. GNS software products are developed by engineering analysts and software specialists with a deep insight in the requirements of numerical simulation and years of practical experience in solving sophisticated engineering problems.

CMBBE 2024

19th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering

30 July - 1 August 2024, Vancouver, Canada

www.cmbbe-symposium.com/2024

CMBBE 2024 CHAIRS:

Lyndia Wu
University of British Columbia, Mechanical Engineering
Dr. Calvin Kuo
University of British Columbia, School of Biomedical Engineering

CONFERENCE VENUE

The Nest and P.A. Woodward Building at the University of British Columbia, Canada

IMPORTANT DATES

November 2023	**19 February 2024**
Abstract submission will open	Abstract submission deadline

4 April 2024	**26 April 2024**	**October 2023**
Review notification deadline	Early registration deadline	Special sessions & workshops proposals deadline

CMBBE 2024 MAIN TOPICS

- Agent-based modeling
- Bacterial and viral mechanics
- Big data and -omics
- Biofluid mechanics
- Bioinformatics
- Biomaterials
- Biomechanics of morphogenesis
- Biomechanics of movement and rehabilitation
- Biomechanics sensing and modeling
- Biomedical image analysis and processing
- Bone and cartilage biomechanics
- Brain biomechanics
- Brain computer interfaces
- Cardiovascular fluid dynamics
- Cardiovascular mechanics
- Cellular and molecular biomechanics
- Clinical translation and integration

- Computer-aided surgery
- Contact mechanics
- Dental biomechanics
- Education in CMBBE
- Elastography
- Emerging topics
- Epidemiology
- Ergonomics
- Experimental validation methods
- Finite element and finite volume methods
- Fluid-structure interaction
- Growth and remodeling
- Implants / orthotics / prosthetics / devices / biologics
- Injury biomechanics
- Internet of things
- Inverse problems and parameter identification

- Machine learning and artificial intelligence
- Mechanics in infections diseases
- Mechanobiology
- Meshless methods
- Multiphysics modeling
- Multiscale modeling
- Musculoskeletal dynamics and neuromuscular control
- Patient-specific modeling
- Plant biomechanics
- Respiratory biomechanics
- Soft tissue biomechanics
- Spine biomechanics
- Sports biomechanics
- Tissue engineering and bioprinting
- Wearables and nearables

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