CMBBE2024

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

30 July - 1 August 2024, Vancouver, Canada

THE UNIVERSITY OF BRITISH COLUMBIA

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

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CMBBE 2024 Conference secretariat

The Codan Consulting team will be on-site to assist with any queries related to registration, the scientific program, the exhibition, and social events. Do not hesitate to stop by the Registration desk located in the Nest at Level 1 for any questions. Student assistants will be available in the meeting rooms and the poster area.
Questions prior to the event may be sent to info@cmbbe-symposium.com.
If you are looking for a conference organizer, reach out to our team on-site or contact us at info@codan-consulting.com!

CODAN
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PRACTICAL INFORMATION

Conference venue

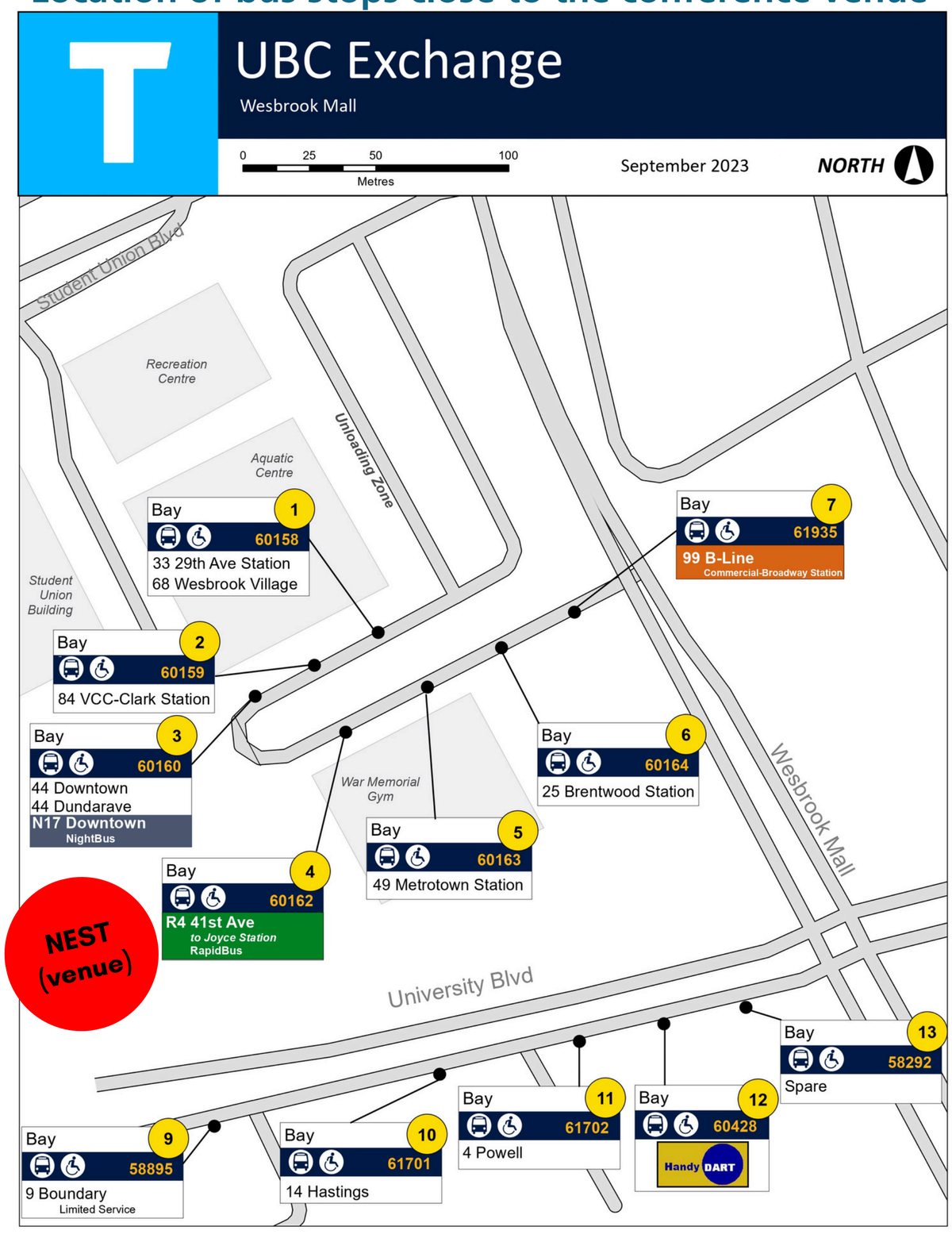
The Nest
6133 University Blvd
Vancouver, Canada

Tips for getting around

The Nest conferences (6133 University Blvd, Vancouver, BC) at UBC is easily accessible by public transit (buses R4, 44, 84 and 99 express).
Use the Trip Planning feature on the **Translink** website to find the most efficient routing.

- Fares are valid for 90 minutes regardless of the number of buses taken or the direction travelled.
- You can tap a contactless Visa, Mastercard, or American Express credit card or mobile wallet on card readers to pay an adult, cash fare.

Location of bus stops close to the conference venue



Conference app Whova

Browse the complete program of sessions directly from your phone or tablet and create your own agenda. Explore the professional profiles of event speakers and attendees, engage discussions and send in-app messages to other participants to exchange contact info. Get Whova from the App Store or Google Play. The event invitation code is: **Welcome2Vancouver**
To download, please visit whova.com/download

Coffee breaks & lunches

Coffee and lunch breaks are included in the registration fee and will be served according to the time schedule mainly in the Nest Atrium.

Internet access

Free wi-fi access is available in all areas of the venue.
Network: **UBC visitor**
No w-fi password required.

Certificates of attendance

Certificates of attendance will be available for download in the conference platform ConfTool after the symposium. All participants will be notified by email when the certificates are ready for download.

Abstract book

The abstracts are available in the online programme in the conference platform ConfTool. Go to **Browse conference agenda** and click on the title of the session you are looking for in order to access the list of all presentations with the complete list of pdf of their abstracts.
The abstracts are also available in the Whova conference app under “Recorded Video”
The abstract book will be available on the event web.

Registration opening

The registration desk is located on Level 1 in the Nest conference venue. The opening hours are as follows:
29 July 2024, 1:00 PM - 7:00 PM
30 July 2024, 7:30 AM - 8:00 PM
31 July 2024, 7:30 AM - 6:00 PM
1 August 2024, 8:00 AM - 4:30 PM

Set up & dismantling of posters

The following printing shops are available close to the conference venue at UBC campus: https://www.copysmart.ca/ and https://stores.staples.ca/bc/vancouver/office-supplies-ca-239.html

- Poster sessions will be held in the Great Hall North
- On-site you will find a posters overview with assigned poster board. Please place your poster only on your assigned board.
- The necessary materials to mount your poster will be provided by the organizers, and onsite assistance will be available to help you to display your poster.
- Posters should be mounted on **29 July 2024 between 1:00 PM and 7:00 PM** or on **30 July between 8:00 AM and 11:00 AM**.
- Posters should be removed on 1 July 2024, after the lunch break or right after the closing of the congress (by 5:00 PM).
- Please note that all posters not dismantled by 5:00 PM on 1 July will be removed and disposed by the congress staff.

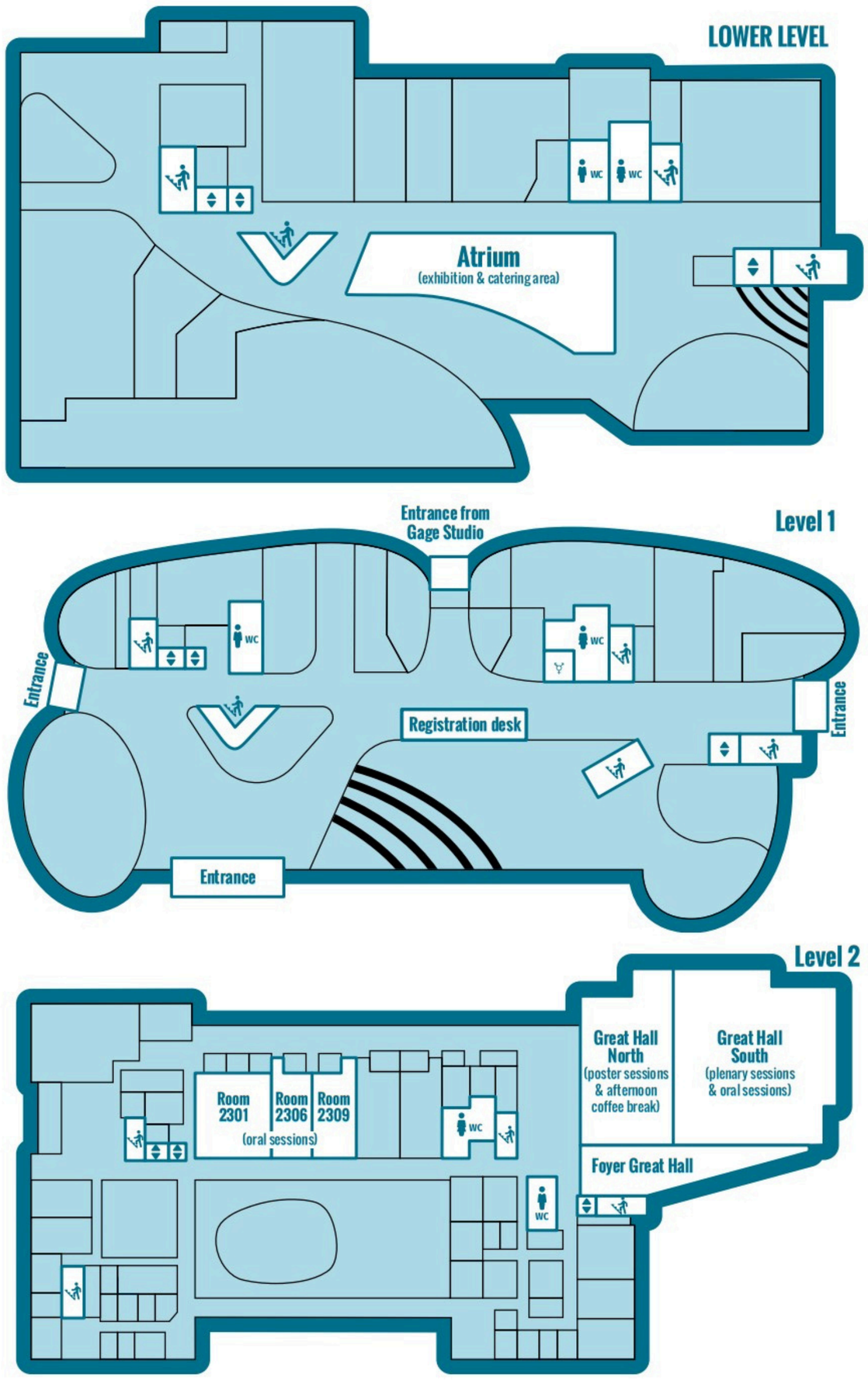
Presentations upload

If you haven't uploaded your presentation through the ConfTool platform, please upload it directly in the meeting room where your presentation will take place at the latest **2 hours prior to your session**.

UBC bookstore

The CMBBE 2024 delegates receive a 15% discount at the UBC bookstore. Show your badge and enjoy the discount! The bookstore also offers UBC-branded clothing made in collaboration with lululemon!

Venue plan



PRE-CONFERENCE DAY

UBC Outdoor Art Tour

Date: July 29, 2024, 3:00 PM
Meeting point: Registration desk, the Nest
Estimated duration: 1.5 hours over 2 km of walking

UBC Campus Tour

Date: July 29, 2024, 3:00 PM
Meeting point: Registration desk, the Nest
Estimated duration: 1.5 hours over 3.5 km of walking

SOCIAL EVENTS

Student evening hike

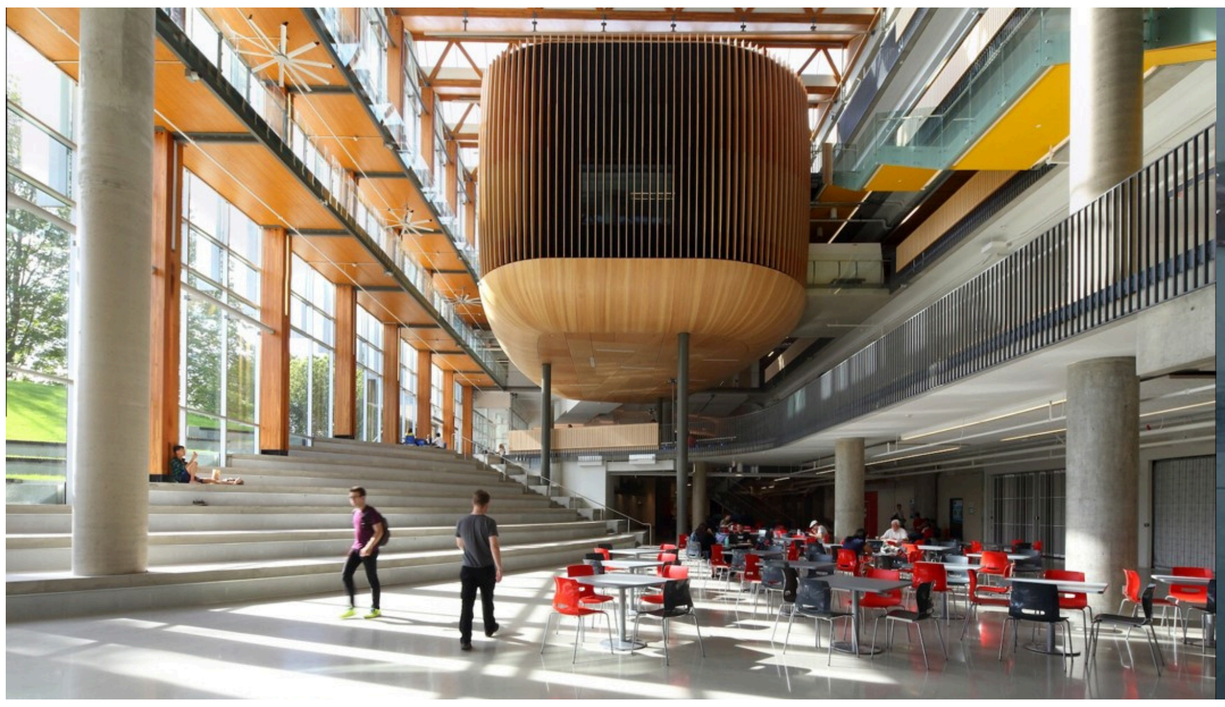
Event open exclusively to students.
Date: 29 July 2024, 5:00 PM
Meeting point: Registration desk, the Nest at 4:40 PM OR University Hill at 5:00 PM
Location: Spanish Trail, Pacific Spirit Regional park

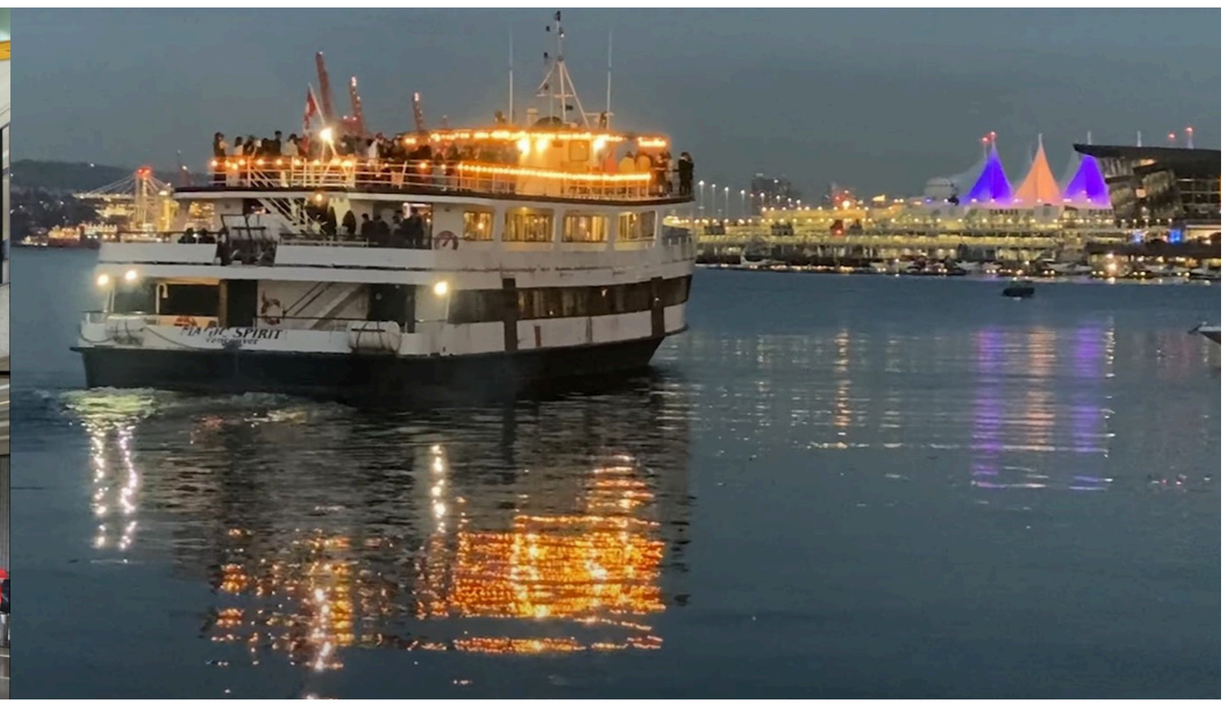
Welcome reception

Date: 30 July 2024, 6:30 PM
Location: Atrium of the Nest Conference Venue, UBC

Dinner cruise

Date: 31 July 2024, 7:30 PM
Meeting point: Buses will be leaving from the conference venue at 7:00 PM.
Location: Direct address of the pier if coming independently - 1601 Bayshore drive (gate located to the right hand side of the Lift Bar and Grill Restaurant).





SYMPOSIA AND SPECIAL SESSIONS

Wearable technologies for musculoskeletal health monitoring
30 July 2024, 8:45 AM - 10:15 AM
Britta Berg-Johansen, California Polytechnic State University, USA

Neck musculoskeletal models: challenges and solutions
30 July 2024, 8:45 AM - 10:15 AM
Anita Vasavada, Washington State University, USA

Soft tissue mechanics, damage and remodeling
30 July 2024, 8:45 AM – 12:00 PM
Anne Robertson, University of Pittsburgh, USA
Victor Barocas, University of Minnesota, USA

Biomechanical modeling for population-based assessment of fall and fracture risk
30 July 2024, 10:30 AM - 12:00 PM
Anitha D Praveen, Singapore-ETH Centre, Singapore
Benedikt Helgason, ETHZ, Switzerland

Recent advances in skin biomechanics
30 July 2024, 2:15 PM - 3:45 PM
Aisling Ni Annaidh, University College Dublin, Ireland
Adrian Buganza Tepole, Purdue University, USA

Spine Meets Clinic Symposium
30 July 2024, 2:15 PM – 6:15 PM
Thomas Oxland, ICORD, Canada
Sidney Fels, University of British Columbia, Canada
Jeff Barrett, University of British Columbia, Canada
Nima Ashjaee, University of British Columbia, Canada

Computation modeling of cardiac diastole
31 July 2024, 8:30 AM - 10:00 AM
Vicky Wang, Auckland Bioengineering Institute, New Zealand
Mark Ratcliffe, University of California San Francisco, USA

Cellular mechanobiology and morphogenesis
31 July 2024, 8:30 AM - 11:45 AM
Mattia Bacca, University of British Columbia, Canada
Alessio Gizzi, University Campus Bio-Medico, Rome, Italy

AI-Based Brain Biomechanics
31 July 2024, 10:15 AM - 11:45 AM
Yuan Feng, Shanghai Jiao Tong University, China
Songbai Ji, Shanghai Jiao Tong University, China; Worcester Polytechnic Institute, USA

Advancing personalized cardiovascular medicine: integrating machine learning and mechanistic modeling
31 July 2024, 2:00 PM - 3:30 PM
Simone Saitta, Politecnico di Milano, Italy
Francesco Sturla, IRCCS Policlinico San Donato, Italy

Multiscale modeling using combined multibody and finite element simulation
31 July 2024, 2:00 PM - 3:30 PM
Sidney Fels, University of British Columbia, Canada
Ian Stavness, University of Saskatchewan, Canada

Microscopic blood flows and blood cell dynamics
31 July 2024, 4:30 PM - 6:00 PM
Junfeng Zhang, Laurentian University, Canada

Using parametric finite element approaches to guide tissue engineering strategies and experimental protocols for orthopaedic applications
31 July 2024, 4:30 PM - 6:00 PM
Christian M. Puttlitz, Colorado State University, USA

From cells to systems: Computational modeling of soft tissues across scales
1 August 2024, 1:00 PM - 2:30 PM
Behrooz Fereidoonnezhad, Delft University of Technology, the Netherlands
Gerhard Holzapfel, Graz University of Technology, Austria & NTNU Trondheim, Norway

Biomechanical modeling in orthopaedics: Translational perspectives from clinician-scientists
1 August 2024, 2:45 PM - 3:45 PM
Cari Whyne, Sunnybrook Research Institute, Canada
Stewart McLachlin, University of Waterloo, Canada

Mechanical loading in bone-cancer cross talk
1 August 2024, 2:45 PM - 3:45 PM
Lidan You, University of Toronto, Canada

KEYNOTE TALKS

Prof Dr Michelle L. Oyen
Director, Center for Women's Health Engineering
Assoc. Prof., Department of Biomedical Engineering and
Assoc. Prof., Department of Obstetrics and Gynecology
Washington University in St. Louis, USA
Lecture: The Virtual Pregnancy: Using Computational Models to Probe Human Reproduction

Preterm birth affects approximately ten percent of pregnancies and rates of maternal mortality in the US are rising. Computational investigations of pregnancy have great potential to explore fundamental aspects of reproductive physiology that are otherwise difficult or even impossible to investigate in humans. There are few-to-no good animal models of human pregnancy, and the reasonable ethical restrictions on experimentation with pregnant women limit clinical research. This talk will discuss how image-based computational modeling techniques can be used across length-scales to study different aspects of human pregnancy. Examples considered will include maternal-fetal oxygen transport in the placenta, and stresses in C-section scar defects at risk of rupture in subsequent pregnancies. With the recent worldwide attention given to poor maternal and fetal outcomes, fundamental bioengineering research into the mechanisms of preterm birth is timely and necessary. Computational models—including even full 'digital twin' models of pregnant persons—present a unique opportunity to advance an under-studied branch of medicine with significant financial and societal implications.

Prof Steven Niederer
Chair in Biomedical Engineering at Imperial College London
Co-Director of the Turing Research and Innovation Cluster in Digital twins at the Alan Turing Institute, UK
Lecture: Scaling Cardiac Digital Twins

Cardiac digital twins, constrained by physics and physiology, offer a transformative framework for integrating patient data, predicting outcomes, and shaping therapy strategies. Despite promising early examples, the scalability of this technology remains a significant challenge, necessitating a shift from artisanal, bespoke solutions to a streamlined, automated workflow.
Scaling cardiac digital twins to reduce the computational and labour costs in their creation, will open the door to characterizing and studying patient cohorts and whole population variation providing new insight into cardiovascular physiology and health. Reducing manual steps in model creation will improve precision, allowing effective studies with smaller numbers of patients. Finally, scaling cardiac digital twins is needed to bring them into routine clinical care. As these tools and twins become more widely available there will be growing opportunities to use these in device development, drug discovery, education and in improving patient care.

KEYNOTE TALKS

Prof Scott L. Delp
James H. Clark Professor
Departments of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery
Stanford University, USA
Lecture: Advances in Computation for Understanding Human Movement Dynamics

Movement is essential for human health. Unfortunately, many conditions, including cerebral palsy, osteoarthritis, injuries, and stroke, limit the ability of many people to move, at a great cost to public health and personal well-being. The proliferation of devices monitoring human activity, including mobile phones and an ever-growing array of wearable sensors, is generating unprecedented quantities of data describing human movement. Movement data is also being collected daily by hundreds of clinical centres and research laboratories around the world. A focus of my laboratory is to overcome the data science challenges and advance the analysis of big data to improve human movement across the wide range of conditions that limit mobility. I will also share my views on how to best advance the field of computational biomechanics.

WORKSHOPS

FEBio
30 July 2024, 10:30 AM - 12:00 PM
Jeff Weiss (The University of Utah)
Gerard Ateshian (Columbia University)
Steve Maas (The University of Utah)

OpenSim: Tools for rapid, large-scale musculoskeletal simulations
31 July 2024, 2:00 PM - 3:30 PM
Nick Bianco (Stanford University)
Scott L. Delp (Stanford University)
Alberto Casas Ortiz (Stanford University)
Ayman Habib (Stanford University)
Carmichael Ong (Stanford University)

ArtiSynth: A simulation platform combining MultiBody and Finite Element Methods (FEM)
31 July 2024, 4:30 PM - 6:00 PM
John E. Lloyd (University of British Columbia)
Benedikt Sagl (Medical University of Vienna)
Ian Stavness (University of Saskatchewan)
Sidney Fels (University of British Columbia)

BETA CAE Systems Workshop: Biofidelic aortic vessel modelling: from MRI scan to fully hexahedral mesh
31 July 2024, 10:15 AM - 11:45 AM
Evangelos Karatsis (BETA CAE Systems)

Tuesday 30 July 2024

	Great Hall South	MR 2301	MR3 2306	MR 2309
8:00am–8:30am	Morning coffee			
8:30am – 8:45am	Opening Ceremony & Land Aknowledgement (Great Hall South)			
8:45am – 10:15am	**A.01 SOFT TISSUE MECHANICS, DAMAGE, AND REMODELING I** ■ CONTINUUM GROWTH MECHANICS: RECONCILING TWO COMMON FRAMEWORKS; *G. A Ateshian* ■ COUPLING SYSTEMS BIOLOGY AND KINEMATIC GROWTH IN OPEN-SOURCE FINITE ELEMENT SOFTWARE; *S. A. LaBelle* ■ FULL-FIELD MECHANICS METHODS DEFINE MULTIMODAL TISSUE INJURY CRITERIA; *C. Luetkemeyer* ■ A CHEMO-MECHANO-BIOLOGICAL FRAMEWORK FOR EVOLVING CARTILAGE: PREDICTING DEGENERATION USING 3-D BIPHASIC FINITE ELEMENTS; *D. M. Pierce* ■ MULTISCALE MECHANICS OF SOFT-TISSUE DAMAGE: A ROLE FOR MULTISCALE FINITE ELEMENT METHODS; *J. Merson* ■ HIGH-THROUGHPUT MANUFACTURING OF BIOMIMETIC FIBROUS SCAFFOLDS; *Q. Liu*	**B.01 WEARABLES TECHNOLOGIES FOR MUSCULOSKELETAL HEALTH MONITORING** ■ MAXIMIZING UTILITY OF FREE-LIVING INERTIAL SENSOR DATA; *R. D. Gurchiek* ■ DEVELOPMENT OF A MOBILE WEARABLE SENSOR-BASED BIOMECHANICS LAB FOR ASSESSING BALANCE AND GAIT; *B. Berg-Johansen* ■ DISTILLING FULLBODY 3D SKELETAL TRACKING DATA INTO MOVEMENT QUALITY SCORES FOR CLINICAL UTILITY; *E. Archibeck* ■ DISCOVERING BIOMECHANICAL DIGITAL BIOMARKERS FOR USE AS NOVEL ENDPOINTS IN DECENTRALIZED CLINICAL TRIALS; *R. S. McGinnis* ■ AN EXPLAINABLE, MULTI-FACTORIAL, GAIT THRESHOLDS-DRIVEN APPROACH TO ASSESS FALL-RISK IN OLDER ADULTS; *N. B. Singh* ■ ESTIMATING GROUND REACTION FORCES FROM VIDEO; *P. Kudzia*	**C.01 NECK MUSCULOSKELETAL MODELS: CHALLENGES AND SOLUTIONS** ■ PREDICTING INTERVERTEBRAL KINEMATICS IN NECK MUSCULOSKELETAL MODELS; *A. Vasavada* ■ ROLE OF MUSCLE AND COLUMN MORPHOMETRY ON INTRINSIC NECK LOADS IN MUSCULOSKELETAL INJURY MODELS: CHALLENGES AND OPPORTUNITIES; *N. Yoganandan* ■ PEDIATRIC NECK MODELS: OVERCOMING CHALLENGES IN DEVELOPING BIOFIDELIC AND VALIDATED MODELS; *J. F. Luck* ■ MODELLING AND SIMULATION OF CERVICAL SPINE RESPONSE DURING IMPACT EVENTS IN SPORTING SCENARIOS; *D. Cazzola* ■ EXPLORING CHRONIC INJURY PATHWAYS IN THE CERVICAL SPINE; *J. M Barrett* ■ ESTIMATING CERVICAL SPINE LOADS WITH VARIABLE SEGMENTAL CONTRIBUTIONS DURING DYNAMIC FLEXION; *K. Moglo*	**D.01 PATIENT-SPECIFIC MODELING I** ■ EXPLORING CROUCH GAITS IN INDIVIDUALS WITH WEAK PLANTARFLEXORS USING SYNERGY FEEDFORWARD CONTROL; *H. Li* ■ REPRODUCING LOWER LIMB MALALIGNMENT WITH SCALING AND EFFECT ON KNEE JOINT REACTION FORCE ESTIMATIONS; *S. P Herath* ■ DEVELOPMENT OF A NOVEL, OPEN-SOURCE PERSONALIZABLE MARKER-BASED CONSTRAINED KINEMATIC SHOULDER MODEL; *C. V. Hammond* ■ AUTOMATED FEM SIMULATION OF 396 MRI-BASED, PATIENT-SPECIFIC INTERVERTEBRAL DISCS; *K. Nispel* ■ USING AN ATLAS MODEL OF THE TONGUE TO SIMULATE SUBJECT SPECIFIC TONGUE DEFORMATIONS; *L. E. Bilston* ■ A SUBJECT-SPECIFIC FINITE ELEMENT WORKFLOW TO PREDICT LOCAL MECHANICS IN HEALING FEMORAL FRACTURES; *F. Muhib*
10:30am – 12:00pm	**A.02 SOFT TISSUE MECHANICS, DAMAGE, AND REMODELING II** ■ UNRAVELING THE ROLE OF MECHANICS IN GENETIC CARDIOMYOPATHIES USING BIOMECHANICAL MODELS OF ENGINEERED HEART TISSUES; *J. Jilberto* ■ MECHANICAL CONSEQUENCES OF GROWTH AND REMODELING ON UTERINE CONTRACTILE FUNCTION; *K. Yoshida* ■ EXPLORING THE BIOMECHANICAL CONSEQUENCES OF SUBSEQUENT CHILDBIRTH ON THE FEMALE PELVIC FLOOR; *D. Oliveira* ■ ARTIFICIAL INTELLIGENCE FRAMEWORK FOR PREDICTING PELVIC FLOOR MUSCLE BEHAVIOR DURING CHILDBIRTH; *R. Moura* ■ PREGNANCY BEFORE THE ONSET OF LABOR: A HOLISTIC BIOMECHANICAL ANALYSIS; *D. Fidalgo* ■ REACTIVE VISCOELASTIC MATERIAL MODEL OF THE ANNULUS FIBROSUS – APPLICATIONS FOR FATIGUE MODELING; *S. Shaffer*	**B.02 BIOMECHANICAL MODELING FOR POPULATION-BASED ASSESSMENT OF FALL AND FRACTURE RISK** ■ COUPLING AUTONOMOUS FINITE ELEMENT ANALYSIS AND MACHINE LEARNING FOR HIP FRACTURE PREDICTIONS – A CLINICAL STUDY; *Z. Yosibash* ■ ASSESING HIP FRACTURE RISK IN CLINICAL COHORTS USING DXA-DERIVED BIOFIDELIC FEMS; *D. Jha* ■ LEVERAGING WEARABLES TOWARDS DEVELOPING A COMPREHENSIVE, PERSONALISED AND SELF-LEARNING ASSESSMENT OF FALL RISK IN OLDER ADULTS; *N. B. Singh* ■ TOWARDS PATIENT-SPECIFIC PREDICTION OF REFRACTURES AND MORTALITY: A MULTI-STATE MODELLING APPROACH; *A. Praveen* ■ QUANTIFYING THE EFFICACY OF TREATMENTS FOR HIP FRACTURE PREVENTION USING A CRITICAL VELOCITY METRIC; *A. Fung* ■ PROPHYLACTIC USE OF THE GAMMA NAIL TO PREVENT HIP FRACTURE: AN EXPERIMENTAL-COMPUTATIONAL EVALUATION; *E. K Bliven*	**C.02 SPINE BIOMECHANICS I** ■ ESTIMATING SPINAL KINEMATICS USING A 3D SHAPE MODEL OF THE HUMAN BACK DURING DYNAMIC MOVEMENT; *M. Kaiser* ■ AUTOMATED CT-BASED GENERATION OF KINEMATIC MODELS FOR PATIENTS WITH SPINAL DEFORMITY; *B. Peeters* ■ VALIDATION OF 3D SCOLIOSIS ASSESSMENTS OBTAINED FROM SCOLIOSIM – A PILOT STUDY; *S. Cukovic* ■ EFFECTS OF THORACIC DISC STIFFNESS ON MUSCULOSKELETAL SPINE MODEL LOADING IN AXIAL ROTATION; *M. Abdullah* ■ A MOTION-CAPTURE-DRIVEN MODEL WITH A FULLY ARTICULATED SPINE FOR DYNAMIC SIMULATION OF SUBJECT-SPECIFIC SAGITTAL ALIGNMENT; *D. Ignasiak* ■ ACTIVE CONTRIBUTION OF TRUNK SOFT TISSUES ON SPINAL GEOMETRIC COMPENSATION; *M. Driscoll*	**D.02 FEBIO WORKSHOP** *Organized by: Jeffrey Weiss, Gerard A Ateshian, Anne-Sofie Madsen Staples* The FEBio workshop will offer participants an overview of the latest developments in FEBio and FEBio Studio. After a short introduction on the FEBio project, the presenters will demo several capabilities of the software. The topics covered will include basic features, such as geometry import, meshing, running FEBio, and post-processing. Then, more advanced topics will be discussed, such as setting up mixtures and generating fiber distributions, and contact. Finally, new developments will be demonstrated, including 3D image import and visualization, using Python with FEBio, and plugin generation. After the workshop, participants will have a good understanding of the capabilities of the FEBio software project, current development efforts, and future directions. Learning objectives: Basic understanding of the FEBio project, current status, and future directions
12:00pm – 1:00pm	Lunch			
1:00pm – 2:00pm	Plenary lecture I: **THE VIRTUAL PREGNANCY: USING COMPUTATIONAL MODELS TO PROBE HUMAN REPRODUCTION**; *Michelle L. Oyen*			
2:15pm – 3:45pm	**A.03 CARDIOVASCULAR FLUID DYNAMICS I** ■ IMPACT OF TEMPORAL VARIATION IN INLET WAVEFORM ON HEMODYNAMIC PREDICTION IN THE DESCENDING AORTA; *F. Tajeddini* ■ A FLUID-STRUCTURE INTERACTION APPROACH TO DISTINGUISH BETWEEN TRUE AND PSEUDO-SEVERE AORTIC STENOSIS; *S. C. F. P. M. Verstraeten* ■ EXPERIMENTAL VALIDATION FOR AORTIC VALVE FLUID-STRUCTURE INTERACTION NUMERICAL SIMULATION; N. Bueno ■ NUMERICAL SIMULATION OF THROMBUS FORMATION INDUCED BY A CENTRAL VENOUS CATHETER; *K. Manning* ■ COMPARISON OF FLOW AND WALL-SHEAR STRESS USING 4D FLOW MRI AND CFD IN CAROTID PHANTOMS WITH DIFFERENT STENOSIS LEVELS; *A. Mokhtari* ■ COMPUTATIONAL MODELING OF UTEROPLACENTAL HEMODYNAMICS; *N. Grande Gutierrez*	**B.03 MUSCULOSKELETAL DYNAMICS AND NEUROMUSCULAR CONTROL I** ■ REAL WORLD VALIDATION OF THE EFFICACY OF A PLACEMENT ADAPTABLE FALL AND NEAR-FALL DETECTION ALGORITHM; *R. A. Gumbe* ■ ADVANCING FALL RISK ASSESSMENT: DATA-DRIVEN MACHINE LEARNING FOR PREDICTING INJURIOUS FALLS; *P. Fahimi* ■ EVALUATING THE EFFECT OF STATURE AND SEX DIFFERENCES ON THE EFFECTIVENESS OF ENERGY ABSORBER LANYARDS; *F. Khorami* ■ PHYSIOLOGICAL SETPOINT OF STANDING BALANCE DESCRIBED BY A REINFORCEMENT LEARNING MODEL; *A. M Nasrabadi* ■ EXPLORING HABITUATION AND ADAPTATION STRATEGIES IN POSTURAL CONTROL; *F. Pescaglia* ■ PROFILING POSTURAL CONTROL USING BIOSIGNALS AND VIRTUAL REALITY; *L. Guerrini*	**C.03 SPINE MEETS CLINIC SYMPOSIUM I** ■ THE EMERGING ROLE OF NEW VARIABLES IN SPINAL OUTCOME RESEARCH; *C. Ames* ■ CLINICAL INSIGHTS THROUGH MUSCULOSKELETAL MODELING: UNDERSTANDING COMPLICATIONS IN ADULT SPINAL DEFORMITY SURGERY; *D. Ignasiak* ■ CHALLENGES AND CURRENT DIRECTIONS FOR CLINICAL MODELING OF ADULT SPINAL DEFORMITY IN OPENSIM; *D. E. Anderson* ■ Discussion	**D.03 RECENT ADVANCES IN SKIN BIOMECHANICS** ■ A MACHINE LEARNING APPROACH TO PREDICT IN VIVO SKIN GROWTH; *A. Ní Annaidh* ■ A BAYESIAN APPROACH TO CHARACTERIZING ANISOTROPIC PROPERTIES OF SKIN FROM SUCTION TESTS; *T. Lee* ■ THE APPLIED FORCE OF AUTOINJECTORS LEAD TO LARGE TISSUE DEFORMATION S AND SUBSEQUENT "LOCK UP"; *A.-S.M. Staples* ■ CALIBRATION AND VALIDATION OF PATIENT SPECIFIC MODELS OF POST-MASTECTOMY BREAST RECONSTRUCTION; *A. Buganza Tepole* ■ THE COMPUTATIONAL MODELLING OF MICRONEEDLE-SKIN INTERACTION WITH SKIN FOR THERAPEUTICS; *A. Ní Annaidh*
3:45pm – 4:45pm	**POSTER SESSION A**, Coffee break		**C.03B SPINE MEETS CLINIC SYMPOSIUM II** ■ LUMBAR SPINE MUSCLE ANATOMY, PHYSIOLOGY, AND PLASTICITY IN HEALTH AND DISEASE; *S. Ward* ■ FRAILTY AND SARCOPENIA IN SPINE SURGERY; *E. Moskven* ■ ESTIMATING SCOLIOTIC SPINAL CURVATURES FROM BACK SCANS: A DEEP LEARNING APPROACH; *M. Bertsch* ■ ENHANCING PROXIMAL JUNCTIONAL FAILURE PREDICTION THROUGH SUBJECT-SPECIFIC MUSCULOSKELETAL MODELING; *N. Ashjaee*	
4:45pm – 6:15pm	**A.04 CARDIOVASCULAR MECHANICS** ■ AN IMAGE-BASED COMPUTATIONAL FRAMEWORK TO EVALUATE MATERIAL PROPERTIES OF HUMAN CORONARY LESIONS; *Y. J. Wang* ■ REGIONAL VARIATIONS IN RADIODENSITY CORRELATE WITH STIFFENSS IN AN ATHEROSCLEROTIC HUMAN AORTA; *C. L. Donahue* ■ PHASE-FIELD FINITE ELEMENT APPROACH TO SIMULATE IN-VITRO EXPERIMENTAL VASCULAR TISSUE FRACTURE; *M. Alloisio* ■ VALIDATING A COMPUTATIONAL FRAMEWORK TO PREDICT THE 3D ARTERIAL MECHANICAL ENVIRONMENT; *C. C. Berggren* ■ OPTIMIZATION OF VASCULAR GRAFT MECHANICAL BEHAVIOR BASED ON COMPLIANCE AND BUCKLING-RESISTANCE; *D. Jiang* ■ PERSONALIZED INTERVENTION CARDIOLOGY FOR TAVR WITH A DOPPLER-EXCLUSIVE DIAGNOSTIC FRAMEWORK; *Z. K. Motamed*	**B.04 MUSCULOSKELETAL DYNAMICS AND NEUROMUSCULAR CONTROL II** ■ APPLICATION OF THE THREE COMPARTMENT FATIGUE MODEL TO NECK MUSCLE FATIGUE SIMULATION; *M. D. Yates* ■ MINIMIZATION OF MUSCLE FATIGUE INDUCED BY FUNCTIONAL ELECTRICAL STIMULATION: A PREDICTIVE SIMULATION; *K. CO* ■ PEDOBAROGRAPHY TO MEASURE CHANGE IN PLANTAR PRESSURE FOLLOWING MYOACTIVATION® THERAPY; *B. Gonzales* ■ PAIRWISE CORRELATION MAPPING FOR SURFACE ELECTROMYOGRAPHIC SHIFT QUANTIFICATION IN LOWER LIMBS; *F. Douglas* ■ MUSCLE ACTIVATION PATTERNS AMONG STROKE SURVIVORS DURING GAIT COMPARISON OF PREDICTED AND MEASURED EMG DATA; *A. A. V. A Hulleck* ■ EFFECTS OF MUSCLE MASS ON MUSCLE FORCE PREDICTIONS IN HUMAN DAILY ACTIVITIES; *I.-J. Chen*	**C.04 SPINE MEETS CLINIC SYMPOSIUM III** ■ PARASPINAL MUSCLE DYSFUNCTION IN SPINE DEGENERATION PATIENTS: IMPACTS ON SPINE MODEL OUTCOMES; *S. Brown* ■ CHALLENGES IN ADULT SPINAL DEFORMITY SURGERY; *J. T. Street* ■ Discussion	**D.04 BONE AND SOFT TISSUE BIOMECHANICS** ■ PUNCTURING SOFT SOLIDS WITH HOLLOW NEEDLES; *Y. Wu* ■ AN EFFICIENT ALGORITHM FOR APPLYING PRESTRESS TO COMPUTATIONAL MODELS OF LOADED GEOMETRY; *B. K. Zimmerman* ■ THE HYGRO-MECHANICAL RESPONSE OF SWELLING BONE IMPLANTS IN ARTIFICIAL BONES; *A. R. Najafi* ■ A VOXEL-BASED STOCHASTIC TOOL TO PREDICT VARIATION IN BONE MECHANICS IN PATIENT POPULATIONS; *S. Pouresmaeeli* ■ DEVELOPMENT OF A MESHLESS CONTINUUM-LEVEL FINITE ELEMENT MODEL TO REPRESENT UNCONSTRAINED INDENTATION OF TRABECULAR BONE ASSOCIATED WITH IMPLANT SUBSIDENCE; *R. Benais* ■ RELATIONSHIP BETWEEN THE CRITICAL SHOULDER ANGLE AND BIOMECHANICAL RISK FACTORS OF GLENOID LOOSENING; *D. Soyeux*
6:30pm – 8:00pm	Welcome reception (the NEST, UBC)			

Wednesday 31 July 2024

	Great Hall South	MR 2301	MR3 2306	MR 2309
6:30am – 7:30am	Morning run (Location: UBC campus)			
8:00am – 8:30am	Morning coffee			
8:30am – 10:00am	**A.05 COMPUTATION MODELING OF CARDIAC DIASTOLE** ■ COMPUTATIONAL MODELING OF PASSIVE BIOMECHANICS IN DESMOPLAKIN CARDIOMYOPATHY; *D. Nordsletten* ■ OPTIMIZATION OF DIASTOLIC MATERIAL PARAMETERS: SHAPE-BASED OF IN CONJUNCTION WITH A FEASIBILITY CLASSIFIER; *M. Ratcliffe* ■ THE EFFECT OF ELEMENT TYPE ON MODEL STIFFNESS AND COMPUTATIONAL TIME IN AN EXPLICIT BIVENTRICULAR MODEL OF THE HEART; *J. Shen Sampas* ■ IMPACT OF POSITIVE PRESSURE VENTILATION VIA A CARDIOPULMONARY MODEL INCORPORATING A NOVEL ALVEOLI OPENING MECHANISM; *M. Cabeleira* ■ IN-SILICO ANALYSIS OF AN EXTERNAL PERISTALTIC PUMP TO ASSIST FAILING FONTAN CIRCULATION: A PROOF-OF-CONCEPT; *Y. Pourmoghadam*	**B.05 MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE** ■ COMPARING AUTOMATED ANATOMICAL MEASUREMENTS USING A NOVEL DEEP LEARNING MODEL WITH SURGEON ANNOTATIONS; *A. Mohammadi Nasrabadi* ■ CHARACTERIZING ORGANIC AND INORGANIC CONTENTS IN BONES USING COMPUTER SIMULATED CT SCANS: A PRELIMINARY STUDY WITH CONVOLUTIONAL NEURAL NETWORK; *Y. Luo* ■ MACHINE LEARNING-BASED DECOMPOSITION OF AORTIC PRESSURE WAVE INTO FORWARD AND BACKWARD COMPONENT; *A. Sen* ■ MACHINE LEARNING BASED SLEEP STAGING IN HEALTHY AND SLEEP DISORDERED PEDIATRIC PATIENTS WITH EEG SIGNALS; *Y. Gao* ■ A NOISE SUPPRESSION FRAMEWORK USING DEEP NEURAL NETWORKS; *B. Bahmei* ■ EVALUATING COMPUTER VISION MODELS ON REAL-TIME ULTRASOUND IMAGING IN IDENTIFYING HIP FRACTURES; *N. J. Yee*	**C.05 CELLULAR MECHANOBIOLOGY AND MORPHOGENESIS I** ■ HOW DO FORCES TRANSMITTED FROM A CELL'S ENVIRONMENT AFFECT DNA ORGANIZATION?; *V. Shenoy* ■ COLLECTIVE CELL MIGRATION DRIVES GEOMETRY-MEDIATED WOUND HEALING; *K J. Hsia* ■ NUCLEAR ENVELOPE INVAGINATIONS AND THE MECHANICAL REGULATION OF TENSION; M. Bacca ■ OPTIMIZATION OF THERAPEUTIC T CELLS THROUGH BIOPHYSICAL MODELING; *R. Alonso-Matilla* ■ EXPLORING THE EFFECTS OF LOW INTENSITY ULTRASOUND STIMULATION ON NEURONAL MECHANORECEPTORS: A COMPUTER SIMULATION STUDY; *M. Mosayebi Samani*	**D.05 INVERSE PROBLEMS AND PARAMETER IDENTIFICATION** ■ STOCHASTIC MATERIAL PARAMETER IDENTIFICATION FROM BULGE INFLATION TESTS USING BAYESIAN INFERENCE; *P. Vandemaele* ■ JAX AUTOMATIC DIFFERENTIATION FOR INVERSE PARAMETER IDENTIFICATION OF IN-VIVO TISSUE COMPRESSION; *A. B. Mandel* ■ IDENTIFYING DYNAMIC MATERIAL PROPERTIES OF SOFT TISSUE USING WEARABLE INERTIAL MEASUREMENT UNIT SENSORS; *V. N. Aathresh* ■ MECHANICAL CHARACTERIZATION OF 3D PRINTABLE POLYMERS TO REPLICATE THE FAILURE OF METASTATIC VERTEBRA; *R. Forni* ■ CARTILAGE MECHANICAL CHARACTERIZATION: A COMBINED FINITE ELEMENT AND VIRTUAL FIELDS METHOD APPROACH; *I. Mohout* ■ VISCOELASTIC CHARACTERIZATION OF ARPE-19 CELLS BY MICROPIPETTE ASPIRATION TECHNIQUE; *E. Brito Jara*
10:15am – 11:45am	**A.06 PATIENT SPECIFIC MODELING II** ■ CONSTRUCTING SUBJECT-SPECIFIC MIDVENTRICULAR MODELS FROM DENSE MRI AND CDTI TO COMPUTE CARDIAC STRAINS; *L. E. Perotti* ■ AUTOMATED WORKFLOW FOR CONSTRUCTING VIRTUAL TWINS FOR HAEMODYNAMIC ANALYSIS OF STENOSED AORTIC VALVES; *C. Teleanu* ■ HEMODYNAMIC AND BIOMECHANICAL VALIDATION OF CUSTOM-MADE MITRAL VALVE: AN IN VITRO STUDY; *V. Stanova* ■ A PATIENT-SPECIFIC MITRAL VALVE DIGITIAL TWIN FOR TRANSCATHETER EDGE-TO-EDGE REPAIR OUTCOMES; *N. Simonian* ■ NEOINTIMAL HYPERPLASIA IN ARTERIOVENOUS GRAFTS: A NOVEL PATIENT-SPECIFIC MODELLING WORKFLOW; *F. Ninno* ■ LIVING LIVER: A MULTISCALE LIVER VIRTUAL TWIN FOR DRUG TOXICITY PREDICTION; *S. Camara Dit Pinto*	**B.06 AI-BASED BRAIN BIOMECHANICS** ■ COMBINING DATA-DRIVEN AND PHYSICS-BASED MODELING TO PREDICT THE BEHAVIOR OF HUMAN BRAIN TISSUE; *S. Budday* ■ DEEP LEARNING BASED INVERSION IN SHEAR WAVE ELASTOGRAPHY USING TRAVELING WAVE EXPANSION; *Y. Feng* ■ MULTISCALE MODELING OF AXONAL RESPONSES IN TRAUMATIC BRAIN INJURY: A DEEP LEARNING APPROACH; *S. Ji* ■ NEURAL NETWORK EFFICACY IN IDENTIFYING MS LESIONS; *A. C. Szekely – Kohn* ■ TOWARD PREDICTING TRAUMATIC BRAIN INJURY USING BRAIN MODEL WITH FUNCTIONAL REGIONS AND AXON TRACTS; *K. Bian*	**C.06 CELLULAR MECHANOBIOLOGY AND MORPHOGENESIS II** ■ FROM SINGLE TO COLLECTIVE CELL MIGRATION: AN GEOMETRIC-BULK-SURFACE PDE IMAGE-BASED MODELLING APPROACH; *F. Yang* ■ PERSISTENT RANDOM WALK MODEL OF CELL MIGRATION OVER CURVED SUBSTRATES; *G. Carlin* ■ CELL-MATRIX FEEDBACK CONTROLS STRETCH-INDUCED CELLULAR MEMORY AND FIBROBLAST ACTIVATION; *F. Alisafaei* ■ UNRAVELING CELL-CELL SIGNALING MECHANOREGULATION TO SPATIOTEMPORALLY CONTROL ANGIOGENIC SPROUTING; *T. Ristori* ■ HOW DO CELLULAR MECHANICS AND BIOCHEMICAL SIGNALLING CONTROL CELL FATE?; *H. Kaul* ■ HOW ANTIMICROBIAL PEPTIDES FROM THE IMMUNE SYSTEM MEDIATE CARDIOVASCULAR OUTCOMES; *H. Alimohamadi*	**D.06 BETA CAE SYSTEMS WORKSHOP** Speaker: Evangelos Karatsis Digital twins are proving to be valuable tools, capable to faithfully represent and investigate complex scenarios. During this workshop, we will explore one of the key prerequisite 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 the common as well as strategic task of how to accurate post-process the obtained results and communicate them in a clear and comprehensible way to clinicians.
11:45am – 12:45pm	Lunch			
12:45pm – 1:45pm	Plenary lecture II: **SCALING CARDIAC DIGITAL TWINS**; *Steven Niederer*			
2:00pm – 3:30pm	**A.07 ADVANCING PERSONALIZED CARDIOVASCULAR MEDICINE: INTEGRATING MACHINE LEARNING AND MECHANISTIC MODELING** ■ AUTOMATED CONSTITUTIVE MODEL DISCOVERY AND UNIVERSAL FEA MATERIAL MODELING OF SOFT MATTER; *M. Peirlinck* ■ HIGH-SPEED ANATOMICALLY REALISTIC CARDIAC MECHANICS SIMULATIONS USING A NEURAL NETWORK FINITE ELEMENT APPROACH; *M. S Sacks* ■ A DEEP-LEARNING AUTOMATED PIPELINE FOR CORONARY SEGMENTATION AND MORPHOMETRIC ANALYSIS; *A. Redaelli* ■ AN AUTOMATED WORKFLOW TO ASSESS PATIENT-SPECIFIC HEMODYNAMICS OF ATHEROSCLEROTIC CAROTID ARTERIES; *L. Iannetti* ■ BEYOND DIAMETER: AI-DRIVEN APPROACHES FOR IMPROVING THE ASCENDING AORTIC ANEURYSM RISK ASSESSMENT; *L. Geronzi* ■ A MACHINE LEARNING APPROACH TO PREDICTION OF PATIENT-SPECIFIC ARTERIAL WALL MECHANICAL PROPERTIES; *M. Jadidi*	**B.07 INJURY BIOMECHANICS** ■ LATE TRIGGER TAGGED MRI FOR EVALUATING IN VIVO BRAIN DEFORMATION DURING MILD HEAD IMPACTS; *Y.-C. Lu* ■ CHANGES IN BRAIN STRAIN PATTERNS FROM REPETITIVE SUBCONCUSSIVE HEAD IMPACTS AFTER ONE RUGBY SEASON; *V. Shim* ■ MULTIDOMAIN ASSESSMENTS OF MILD TRAUMATIC BRAIN INJURY: FROM BIOMECHANICS TO NEUROIMAGING; *L. Wu* ■ IMPLICATIONS OF CERVICAL MUSCLE ACTIVATION ON SIX-YEAR-OLD PEDIATRIC HEAD IMPACT RESPONSE; *S. T. Middleton* ■ NECK BIOMECHANICAL DYNAMIC SIMULATION FOR INJURY PREDICTION AND PREVENTION USING HIGH-G SLED TESTS; *A. Vasavada* ■ PARAMETRIC INVESTIGATION OF INJURY TO OPTIC PATHWAY; *S. Ji*	**C.07 MULTISCALE MODELING USING COMBINED MULTIBODY AND FINITE ELEMENT SIMULATION** ■ COMBINING FINITE ELEMENT AND MULITBODY MODELING TO SIMULATE JOINT STRESS DURING DYNAMIC TASKS; *B. Sagl* ■ PREDICTING TMJ DISC RESPONSE TO JAW RECONSTRUCTION SURGERY: A COMPUTER MODELING APPROACH; *H. Aftabi* ■ TOWARDS PATIENT SPECIFIC FEM SHOULDER MODELING; *E. C. Herbst* ■ PATIENT-SPECIFIC SIMULATION OF CARTILAGE SHEAR STRESS IN HIGHLY ASPHERICAL HIP JOINTS: A PILOT STUDY; *L. G. Johnson* ■ A MULTIBODY FINITE ELEMENT MODEL OF THE ANKLE JOINT; *Q. Yetman* ■ ANALYSIS OF THE LUMBAR SPINE L4-L5 DISC WITH A HYBRID FINITE ELEMENT AND RIGID BODY MUSCULOSKELETAL MODEL; *N. Ashjaee*	**D.07 OPENSIM WORKSHOP** *Organized by: Nicholas August Bianco, Scott L. Delp, Ayman Habib, Alberto Casas Ortiz, Carmichael Ong* Musculoskeletal simulations provide a way to gain deep insights into how movement is coordinated. New tools for rapidly developing musculoskeletal simulations are enabling more researchers to leverage simulations by reducing the barrier to entry. In this workshop, we will present how our ecosystem of OpenSim tools for rapidly creating simulations, including from smartphone videos using OpenCap, and new features we've added to our Python and Jupyter notebook interfaces make it easier to generate simulations. With a combination of didactic portions and hands-on examples, participants will learn about OpenSim's tools for creating simulations, and how to import movement data, create muscle-driven simulations, and analyze the results.
3:30pm – 4:30pm	**POSTER SESSION B**, Coffee break			
4:30pm – 6:00pm	**A.08 MICROSCOPIC BLOOD FLOWS AND BLOOD CELL DYNAMICS** ■ MEMBRANE VISCOUS EFFECTS ON RED BLOOD CELL DYNAMICS IN FLOW FIELD; *P. Li, J. Zhang* ■ MODELLING BLOOD CELL DISTRIBUTION AND THROMBUS FORMATION BASED ON SINGLE BLOOD CELL DYNAMICS; *K.-i. Tsubota* ■ DIFFUSE INTERFACE MODEL FOR CELL INTERACTION AND AGGREGATION WITH LENNARD-JONES TYPE POTENTIAL; *S. Xu* ■ THE INFLUENCE OF CLOT PERMEABILITY ON THROMBUS GROWTH IN VARYING HEMODYNAMIC SETTINGS; *N. Mohammadi Bagheri* ■ IN SILICO ANGIOGRAMS FOR OPTIMAL AVM PRE-INTERVENTIONAL PLANNING; *A. Blanch Granada*	**B.08 FINITE ELEMENT BIOMECHANICS** ■ MODELLING OF SUPERFICIAL CEREBRAL VEIN ON LATERAL HEMISPHERE OF THE BRAIN: A FEM STUDY; *S. Kumar* ■ INFLUENCE OF POSTMORTEM DEGRADATION ON MECHANICAL PROPERTIES OF HUMAN BRAIN TISSUE; *N. Reiter* ■ RELATIONSHIP BETWEEN HUMAN BRAIN STIFFNESS, MICROSTRUCTURAL INTEGRITY, BETA-AMYLOID ACCUMULATION; *M. Kurt* ■ BIOMECHANICS EXPLAINS FUNCTIONAL AND BRAIN SHAPE DIFFERENCES IN ADHD; *J. Fernandez* ■ CERVICAL SPINE INJURY IN LATERAL HEAD IMPACTS: FINITE ELEMENT ANALYSIS; *M. H. Beauséjour* ■ WHOLE BRAIN COMPUTATIONAL SIMULATION FOR EVALUATING CSF DYNAMICS AND BRAIN TISSUE COMPLIANCE; *P. Fillingham*	**C.08 USING PARAMETRIC FINITE ELEMENT APPROACHES TO GUIDE TISSUE ENGINEERING STRATEGIES AND EXPERIMENTAL PROTOCOLS FOR ORTHOPAEDIC APPLICATIONS II** ■ DIRECT ELECTROMAGNETIC COUPLING FOR FRACTURE OUTCOME PREDICTION; *K. McGilvray* ■ TEMPOROMANDIBULAR DISC REPLACEMENT; *K. Labus* ■ PARAMETRIC FINITE ELEMENT ANALYSIS OF EXTERNAL FIXATION CONSTRUCTS; *B. C. Gadomski* ■ PARAMETRIC FINITE ELEMENT ANALYSIS FOR THE DEVELOPMENT OF A GRADIENT SCAFFOLD; *K. McGilvray* ■ FRACTURE RISK PREDICTION OF PATIENTS WITH BONE TUMOURS OF THE KNEE JOINT: A FINITE ELEMENT ANALYSIS; *E. Cameron* ■ ASSESS CREDIBILITY OF DENTAL IMPLANT PRIMARY FIXATION FINITE ELEMENT MODEL AS PER ASME V&V 40; *B. Yang*	**D.08 ARTISYNTH WORKSHOP** *Organized by: John E Lloyd, Benedikt Sagl, Ian Stavness, Sidney Fels* We will show how to create and simulate combined multi-body/FEM models using, ArtiSynth, a free, open source, 3D biomechanical simulation platform that supports multibody and finite element methods (FEM), allowing users to model within a single application both large scale components (e.g., rigid bodies, point-to-point muscles) and fine scale components requiring stress/strain analysis. It provides a Java-based API for model creation, together with a highly interactive graphical interface, and has been used to simulate numerous human biomechanical structures, including head and neck, spine, lower limb, foot and shoulder. We will discuss new features including: An OpenSim importer that converts key components of an OpenSim multibody model into an ArtiSynth model, that can then be augmented with finite element models in areas of interest. Elastic foundation and impulse-based contact Implementations of Millard 2012 and Thelen 2003 equilibrium muscles available in OpenSim.
7:30pm – 11:00pm	Conference dinner cruise (Magic Yacht Charter)			

Thursday 01 Aug 2024

	Great Hall South	MR 2301	MR3 2306	MR 2309
8:30am – 9:00am	Morning coffee			
9:00am – 10:30am	**A.09 WEARABLE AND NEARABLES I** ■ EFFECT OF WALKING/RUNNING MODES ON PREDICTING JOINT ANGLE FROM IMU SENSOR USING A DEEP LEARNING MODEL; *V. Shah, P. C. Dixon* ■ IDENTIFYING MOVEMENTS ASSOCIATED WITH INJURY USING WEARABLE INERTIAL MEASUREMENT UNIT SENSORS; *S. Yakubu* ■ JOINT ANGLE ESTIMATION FOR TIMED UP-AND-GO TEST USING REGRESSION BASED MACHINE LEARNING; *M. T. Adil* ■ DEVELOPMENT AND VALIDATION OF A NEW IMU-BASED 2-SEGMENT FOOT MODEL FOR GAIT ANALYSIS; *L. Bauer* ■ WEARABLE SENSOR-BASED RULA FOR HEALTHCARE WORKERS DURING FLUOROSCOPIC PROCEDURES; *W. R Bonin* ■ WEARABLE-MEASURED PHYSICAL ACTIVITY AS A DIGITAL BIOMARKER FOR MENTAL WELLBEING IN COLLEGE STUDENTS; *G. Mascia*	**B.09 EMERGING TOPICS** ■ DEVELOPING A MULTIDOMAIN METRIC OF AROUSAL INSTABILITY TO QUANTIFY SLEEP DISRUPTION IN SLEEP APNEA PATIENTS; *R. Takagi* ■ HEART RATE ESTIMATION ACCURACY: PHOTOPLETHYSMOGRAM (PPG) MEASUREMENT ANALYSIS ON EIGHT ANATOMICAL SITES; *M. Khalili* ■ APPLICATION OF GENERALIZED EIGEN DECOMPOSITION FOR EE

UBC ATTRACTIONS

Museum of Anthropology

The Museum of Anthropology (MOA) focuses on the First Nations people of British Columbia.
Built on unceded land of the Musqueam people and designed by Arthur Erickson, MOA harmonizes with its landscape, resonating with seasons and diverse cultural collections.

Nitobe Memorial Garden

The Nitobe Memorial Garden is a traditional Japanese stroll garden featuring an authentic tea house. Considered one of the most authentic Japanese gardens outside of Japan, it commemorates Dr. Inazō Nitobe (1862-1933), and his goal to promote a better understanding of Japanese culture in the West.

Beaty Biodiversity Museum

Vancouver's natural history museum boasts over 500 exhibits showcasing species diversity.
The main attraction is the blue whale skeleton, the Earth's largest creature. Additionally, the museum offers 20,000 square feet of biological collections, featuring everything from insects to birds.

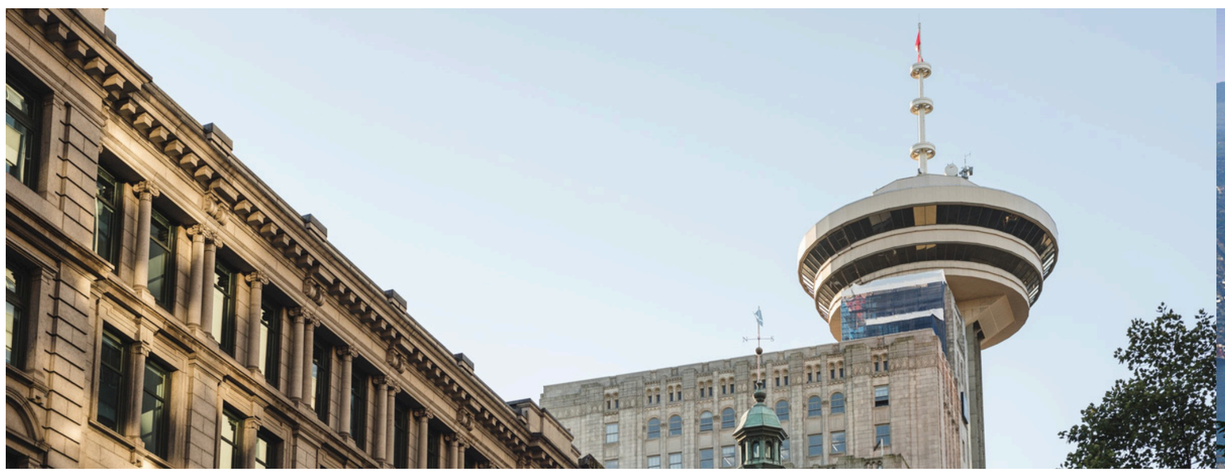
UBC Botanical Garden

Established in 1916 to research the native flora of British Columbia, the UBC Botanical Garden is Canada's oldest university botanic garden. Its mission has expanded to include education, research, conservation, community outreach, and the public display of temperate plants from around the world.

VANCOUVER ATTRACTIONS

Vancouver Lookout

Located at the top of one of Vancouver's iconic landmarks, the Vancouver Lookout offers a 360-degree view to the city. The 168 meters high tower has been an iconic part of the city since 1977.



Grouse Mountain

The Grouse Mountain is located just 15 minutes outside the downtown Vancouver. The iconic Red Skyride provides a unique opportunity to familiarize yourselves with the diverse nature.

Stanley Park

Vancouver's first and largest park with First Nations totem poles.

Capilano Suspension Bridge

Experience the stunning scenery, fascinating history and rich natural diversity at the Capilano Suspension Bridge Park.

English Bay

English Bay is a picturesque area with a great pathways to walk alongside the coast. Near the beach and nature you can find a number of restaurants and cafes.

False Creek

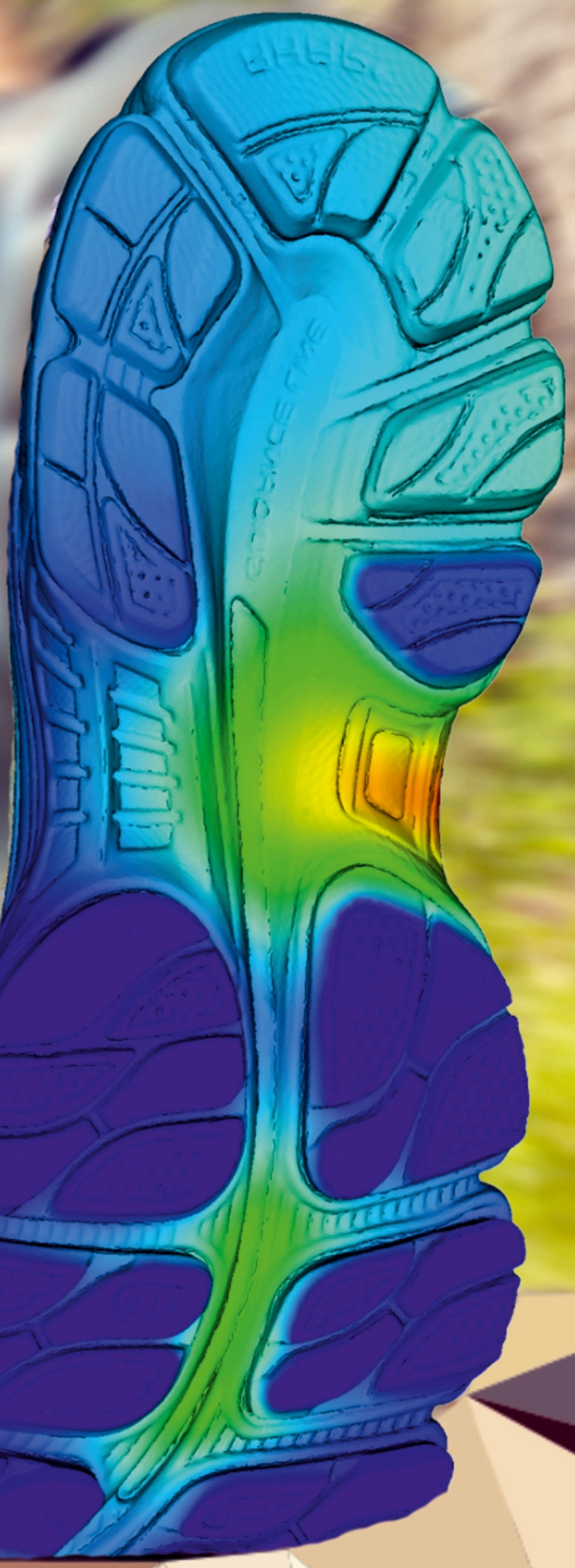
False Creek is an urban area offering a variety of things to explore including parks, tourist attractions, cafes & restaurants.

Achieve realism in Biomechanics simulations

Streamline your Biomechanics simulations through an advanced yet easy to use simulation tools-portfolio

BETA CAE Systems software delivers complete solutions for Engineering Simulation in Biomechanics. From building up analysis models through generating results reports, our software suite streamlines and helps you unleash the full benefits of simulation.

The multidisciplinary nature and the abundance of features and tools, allow you to achieve efficiently your simulation goals. The extended automation capabilities using Python increase productivity further, while the newly released Machine Learning algorithms accelerate and improve the accuracy of 3D model creation from CT Scan images.



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