Tuesday, 6th September 2022

09:00	**Registration**	
10:00 - 13:00	**Workshop 1: Using CompuCell3D as a platform to construct multi-scale multicellular agent-based virtual-tissue simulations of development and disease** *James A. Glazier, Biocomplexity Institute and Department of Intelligent Systems Engineering, Indiana University, Bloomington, USA* Multi-scale, Multicellular Agent-Based Virtual-Tissue models built using modeling frameworks like CompuCell3D are versatile tools for exploring the complex interactions between intracellular signaling and gene-regulatory networks, inter-cellular signaling through contact and diffusible signals, and force generation, cell migration and shape change. Among other applications the open-source modeling environment CompuCell3D has been used successfully to build models of vascular tumor growth and therapy, embryonic development, liver and developmental toxicology, lung infection, immune response and anti-viral therapies. This workshop will explore how CompuCell3D can simplify the construction of complex, extensible and reusable Virtual Tissue models. Members of the audience will build and explore models by downloading the software from (www.compucell3d.org) or run it on-line at (https://nanohub.org/resources/cc3dbase4x; free with required registration).	*Room 4 (B032)*
14:00 - 16:00	**Workshop 2: SIMCARDIOTEST OPEN SOURCE SOFTWARE – DEMO on OASIS: Computational fluid dynamics solver & SOFA: Simulation Open Framework Architecture** *OASIS demo: Simulating Fluid-Structure Interaction in the Left Atrial Appendage, Kei Yamamoto, Simula* *SOFA demo: Simulation Open Framework Architecture, Camille Krewcun, Inria* *SimCardioTest short introduction; Michele Barbier, Inria* SimCardioTest is a collaborative project between 10 organizations from 6 European countries and United States funded by the European Commission (EU H2020). The aim of the project is to provide new insight into designing predictive tools in cardiac pathologies and to accelerate the uptake of computer simulations for testing medicines and medical devices. The aim of the workshop is hands on/demonstration of the open source OASIS and SOFA software.	*Room 4 (B032)*
14:00 - 17:00	**Workshop 3: Public and patient outreach and engagement for in silico medicine** *Co-organized by the VPH institute, the Avicenna-Alliance Public-Patient Involvement (PPI) task force* The importance of involving multiple stakeholders, and in particular patients and healthcare professionals, when innovative technologies are developed is recognised as best practice in health care research. Public (including healthcare professionals) and patient engagement (PE) is also at the heart of the European strategy for research and innovation and has become an essential requirement to receive funding. Nevertheless, very few prior initiatives or literature exist on that matter when it comes to *in silico* medicine and few documents exist to guide in silico experts in that endeavor. What is the role of PE for in silico research? **How** can we **apply it** while making the most of it? What are the **best practices**? How to effectively **communicate** about *in silico* medicine to the public? The workshop will address those questions by gathering actors and experts from the field. General PE role, principles and best practices will also be discussed from a patient perspective, with the participation of EUPATI (European Patients' Academy on Therapeutic Innovation). Since public and patient engagement goes hand in hand with outreach activities and good communication skills to large audiences, we propose a hands-on session on 'communicating your *in silico* research to a general audience' that will be held and moderated by a professional.	*Room 5 (Sala de Atos)*
19.30 - 21.30	**Students evening:** Rooftop Flores, Rua da Vitória 177, 4050-634 Porto, Portugal (metro station Sao Bento)	

Wednesday, 7th September 2022

07:30	**Registration**
08:30 - 09:00	**Opening session**; *Liesbet Geris, João Manuel R.S. Tavares* — *Auditorium (A101)*
09:00 - 9:45	**Plenary lecture 1**; *Chairs: Liesbet Geris, João Manuel R.S. Tavares* — *Auditorium (A101)* • Patient-specific models in tumor growth: integrating organoids and image-based biomarkers; *José Manuel García-Aznar*
9:45 - 10:15	Coffee break + Posters

Session 1: Cardiovascular 1; *Chairs: Sónia Pinto, Sara Bridio* — *Auditorium (A101)*
- A continuum model of a fibrin rich clot; *Mohammad Rezaeimoghaddam, Netherlands*
- Advancing the physics and performance of blood flow simulations towards exascale; *Jon McCullough, United Kingdom*
- Arterial flows as social networks: a novel approach to disentangle hemodynamic complexity; *Karol Calò, Italy*
- Computational models for hemodynamic management in critically ill patients: a systematic review; *Marijn Mulder, Netherlands*
- Evaluating the risk of myocardial ischemia in patients with Kawasaki Disease using patient-specific simulations of coronary hemodynamics; *Karthik Menon, United States*
- Impact of coronary artery stenting on the wall shear stress topological skeleton features; *Valentina Mazzi, Italy*
- Parametric aortic valve geometric modeling for subject-specific blood flow simulations using a resistive approach; *Giorgia Pase, Netherlands*
- Simulating the hemodynamic effect of an edge-to-edge repair of mitral valve regurgitation using a lumped parameter model; *Juliana Franz, Germany*

Session 2: Computational modeling in health and disease 1; *Chairs: Ilse Jonkers, Suranjana Gupta* — *Room 2 (B002)*
- The 12 Labours Project: Digital twins for personalised medicine; *Julie Choisne, New Zealand*
- Towards a patient-specific fetal cardiac growth model by using digital twin technology.; *Bettine van Willigen, Netherlands*
- Virtual cutaneous leishmaniasis patient: modeling the natural history of infection and preliminary assessment of drug efficacy using Universal Immune System Simulator (UISS); *Elena Crispino, Italy*
- Simulating radiation-induced pulmonary fibrosis through personalised in silico modelling; *Vasileios Vavourakis, Cyprus*
- Personalized, automatized brain stimulation modelling partly explains intersubject behavioral response variability.; *Melanie Steiner, Switzerland*
- Computational analysis of subject-specific muscle-driven ankle-foot kinematics; *Okan Avci, Germany*
- Subject-specific knee joint in musculoskeletal modelling: prediction of contact forces and moments during gait for two patients with total knee arthroplasty; *Sacha Guitteny, France*
- Towards automatic generation of patient-specific knee models for total knee arthroplasty; *Antoine Perrier, France*

Session 3: In silico clinical trials 1; *Chairs: Marco Viceconti, David Oks* — *Room 3 (B003)*
- A physiology-driven model for the generation of a virtual cohort of dyssynchronous heart failure patients; *Claudia Alessandra Manetti, Netherlands*
- A virtual population approach to support atopic dermatitis clinical trial design and biomarker identification; *Igor Faddeenkov, France*
- An in Silico clinical trial on coronary fractional flow reserve as a replacement for the original clinical trial: a feasibility study; *Pjotr Hilhorst, Netherlands*
- Hemodynamics of 1st stage Norwood patient through computer-generated statistical patient cohorts; *Canberk Yıldırım, Turkey*
- Identification of virtual patient cohorts for in silico clinical trials of cardiopulmonary devices from a database of 331 ECMO patients with diagnosed ARDS; *Micha Landoll, Germany*
- In silico clinical trials for treatment of acute ischemic stroke; *Raymond Padmos, Netherlands*
- In silico trial of baroreflex activation therapy for the treatment of diastolic heart failure; *John Clemmer, United States*

Session 4: Medical device modelling 1; *Chairs: Rossana Alessandrello, Marcos Loureiro-Ga* — *Room 4 (B032)*
- A computational investigation of the fluid dynamic in dialysis catheters for paediatric patients: towards the design optimization; *Claudia Bruno, United Kingdom*
- Computational Biomechanics as a tool to improve mesh anchoring technique in pelvic organ prolapse repair surgery; *Elisabete Silva, Portugal*
- Exploiting computational modelling to investigate the in-vitro performance of bioresorbable wire-braided stents; *Agnese Lucchetti, Germany*
- High-fidelity model of the TEVAR procedure: patient-specific cases; *Anna Ramella, Italy*
- On the credibility of finite element modelling of self-expanding nickel-titanium stents: verification and validation activities; *Martina Bernini, Ireland*
- Performance assessment of braided venous stent designs through computational modeling; *Rene Ubachs, Netherlands*
- TEE-based simulation study on the influence of transcatheter edge-to-edge device position on diastolic hemodynamic parameters; *Katharina Vellguth, Germany*
- Developing a SAPIEN-3 TAVI FEM/FSI model considering VVUQ frameworks to establish model credibility; *Nils Götzen, Netherlands*

10:15 - 12:15 (sessions above)

12:15 - 13:30	**Lunch with Meet the Mentor programme** — *Catering area*
13:30 - 14:30	**Poster session 1** *(Chair: Renato Natal Jorge)*, **Poster session 2** *(Chair: Claudio Capelli)* — *Poster area*

Industry session: Novadiscovery — *Room 3 (B003)*
- Jinkō: from knowledge to in silico clinical trials; Claudio Monteiro, Ph.D, Executive manager, Modeling & Simulation

14:30 - 16:00	**Session 5: Computational tools and simulation in biomechanics 1**; *Chairs: Silvia Budday, Mojtaba Barzegari*	*Auditorium (A101)*

- Definition of intended learning outcomes for in silico trials; *Els De Swerdt, Belgium*
- C4Bio: Community challenge towards consensus on characterization of biological tissue; *Nele Famaey, Belgium*
- Pressure estimation in physiological brain geometry from magnetic resonance elastography data; *Felipe Galarce, Germany*
- Agent-based digital twin simulations of denosumab treatment, discontinuation and placebo scenarios explore the role of osteomorphs; *Charles Ledoux, Switzerland*
- Neural network simulation based finite element modeling of heart mechanics; *Michael Sacks, United States*
- Validation of a synthetic cohort of aortic stenosis patients; *Jan Brüning, Germany*

Session 6: Computational modeling in health and disease 2; *Chairs: Jérôme Noailly, Matteo Italia*   *Room 2 (B002)*

- Analysis of functionally graded and uniform scaffolds based on mechano-biology and cell diffusion; *Mervenaz Sahin, Turkey*
- Inverse calculation of multiscale bone composition out of DXA images; *Javier Giráldez, Spain*
- Modelling the mechano-inflammatory regulation of chondrocyte in early osteoarthritis; *Jérôme Noailly, Spain*
- Nucleus pulposus cell network modelling in early intervertebral disc degeneration; *Sofia Tseranidou, Spain*
- Open source computational model to investigate patient-device interaction during extracorporeal life support; *Jan-Niklas Thiel, Germany*
- Use of a mechanistic model of chronic viral hepatitis B to investigate the dynamics and variability of serum viral markers in response to drug treatments; *Anne Schneider, France*

Session 7: Clinical imaging, Image-based in-vivo analysis, Imaging and visualization; *Chairs: Adriana Tavares, Ning Wang*   *Room 3 (B003)*

- Can a transformer architecture match convolutional neural networks for segmentation of anatomic structures in 3D computed tomography?; *Gonçalo Almeida, Portugal*
- Dynamic analysis of pelvic mobility using Magnetic Resonance Images; *Pauline Lecomte-Grosbras, France*
- iTwin4Face: A Digital Twin of the human face for enhancing facial paralysis grading and rehabilitation precision; *Tan-Nhu Nguyen, France*
- Modelling the fetal face growth from 3D US; *Raphael Sivera, United Kingdom*
- Super-resolution of 4D-Flow MRI in the left ventricle using physics-informed neural networks; *Fergus Shone, United Kingdom*
- Virtual Reality for teaching and treating congenital heart disease; *Endrit Pajaziti, United Kingdom*

Session 8: Medical device modeling 2; *Chairs: Marie-Christine Ho Ba Tho, Martina Bernini*   *Room 4 (B032)*

- Antibody engineering through machine learning approaches: case study on antibody anticancer drug trastuzumab; *Koushika R, India*
- Device induced deformation, damage, and puncture of arterial porcine tissue; *Mathieu Oude Vrielink, Netherlands*
- Digital twins of electrical stimulation devices for tissue engineering applications; *Julius Zimmermann, Germany*
- Hardware density reduction avoids T3 PJF in adult spine surgery: FE simulation; *Morteza Rasouligandomani, Spain*
- In silico modelling of cancer cell response to cold helium plasma jet and chemotherapy; *Vasileios Vavourakis, Cyprus*
- In silico rational design of Antibodies: from Molecular Modeling to Deep Learning approaches; *Anne Goupil, France*

16:00 - 16:15	Coffee break + Posters

| 16:15 - 18:15 | **Session 9: Digital applications to assist regulatory and clinical expertise** | *Auditorium (A101)* |

Session 9: Digital applications to assist regulatory and clinical expertise *Auditorium (A101)*
Chair: Thierry Marchal, Secretary General Avicenna Alliance

The Avicenna Alliance facilitates the Academic research from its VPHi members with the deployment activities targeted by its industry members. This healthcare ecosystem brings in silico technology to the regulator or the patients' bed to dramatically accelerate medical innovation without compromising with patient safety. Several concrete applications are reviewed while their future for multiplication and large scale deployment will be discussed with the entrepreneurs.

Session 10: Computational modeling in health and disease 3; *Chairs: Daniela Valdez-Jasso, Suranjana Gupta* *Room 2 (B002)*
- A cardiovascular modelling approach for non-invasive estimation of chamber pressure and diagnosis of heart disease; *Finbar Argus, New Zealand*
- A one-dimensional patient-specific model of the hemodynamics in the microvascular network of the retina using multimodal imaging; *Laureline Julien, France*
- ADAVN: An anatomically detailed arterial and venous network model; *Lucas Omar Müller, Italy*
- Blood flow simulations for understanding sickle cell disease across age; *Weiqiang Liu, France*
- Distinguishing hypertensive renal injury from diabetic nephropathy using MR imaging and computational modelling of renal blood flow; *Ning Wang, United Kingdom*
- High-rate atrial pacing to reduce left heart filling pressures: a combined computational-clinical study; *Tim van Loon, Netherlands*
- Impact of image segmentation variability on hemodynamic prediction of flow quantities in AAA; *Antonio Martínez, Italy*
- Sensitivity analysis on the modeling parameters of a cardiovascular model simulating partial hepatectomy; *Lorenzo Sala, France*

Session 11: In silico trials for medical product development; *Chairs: Flora Musuamba Tshinanu, Agnese Lucchetti* *Room 3 (B003)*
- A 3D finite-element analysis of residual limb biomechanics in transfemoral subjects; *Animesh Ranjan, Germany*
- A fully regulated hybrid in silico - in vitro cardiorespiratory simulator for comprehensive testing of cardiac assist devices; *Libera Fresiello, Netherlands*
- A paradigm shift in decomposing motor units: In silico trials show superiority of magnetomyography over electromyography; *Thomas Klotz, Germany*
- AI-powered modeling approaches to predict the efficacy of new therapies for autoimmune diseases; *Philippe Moingeon, France*
- Effect of flow diverter deployment variability on velocity reduction in intracranial aneurysms; *Benjamin Csippa, Hungary*
- Modelling endogenous tissue restoration using a homogenized constrained mixture theory; *Thibault Vervenne, Belgium*
- Pathway activation models for deep brain stimulation in rodents; *Jan Philipp Payonk, Germany*
- Towards in silico trials to assess the performance of thrombectomy devices; *Sara Bridio, Italy*

Session 12: Mathematical biomedical models 1; *Chairs: Irène Vignon-Clémentel, Laura Lafuente-Gracia* *Room 4 (B032)*
- A 1D co-axial model for coupled blood-CSF flow simulations in cerebral vascular-perivascular networks; *Beatrice Ghitti, Italy*
- A chemotaxis model of peritoneal adhesions; *Madge Martin, France*
- A mechanistic model of 3rd generation tyrosine kinase inhibitor on lung adenocarcinoma evolution; *Martin Bastien, France*
- Age and sex informed uncertainty quantification of a 1D-model of the common carotid artery; *Friederike Schäfer, Norway*
- Clinical testing of a non-invasive method for lung compliance estimation during pressure support ventilation; *Rob S.P. Warnaar, Netherlands*
- Combining machine learning and mathematical modeling in the estimation of T1 relaxation time from cardiac magnetic resonance imaging data; *Radek Galabov, Czech Republic*
- Computational insights on the roles of Dll4-Notch and uPARAP in lymphangiogenic sprouts; *Sophie Bekisz, Belgium*
- Model-based personalized anemia therapy: A clinical implementation; *Doris Helene Fuertinger, Germany*

| 18:15 - 19:15 | VPH Institute General Assembly |

| 19:30 - 21:00 | Welcome reception: |

Welcome reception:
- 19:30 Dancing Digital Twins performance; *Gunnar Cedersund, Julia Bengtsson (Auditorium)*
- 20:00 Welcome reception *(Garden)*

Thursday, 8th September 2022	
08:00	**Registration**
08:30 - 10:30	**Session 13: Cardiovascular 2**; *Chairs: Luisa Sousa, Agnese Lucchetti* *Auditorium (A101)* • A method for evaluating the performance of a novel percutaneous Left Ventricular Assist Device and optimizing it's design; *Chen Hajaj, Israel* • A newborn digital twin for cardiovascular modelling in early life; *Robyn May, New Zealand* • Deep learning framework for cardiac electrophysiology model error correction; *Victoriya Kashtanova, France* • Dynamic response of cerebrovascular networks to fluctuations in arterial blood pressure; *Stephen Payne, Taiwan* • Effect of septal and left bundle branch pacing on right ventricular function: a model study; *Roel Meiburg, Netherlands* • Extreme scale excitation-contraction modelling of the heart: from small molecule-protein interaction to full heart mechanics for drug testing in hypertrophic cardiomyopathy; *Jazmin Aguado-Sierra, Spain* • Generation of a digital aortic valve twin for transcatheter aortic valve implantation; *Marcos Loureiro-Ga, Spain* • Non-parametric statistical shape modelling for in silico trials of TAVI; *Sabine Verstraeten, Netherlands*
	Session 14: Multiscale modeling; *Chairs: Elisabete Silva, Satanik Mukherjee* *Room 2 (B002)* • A GPU-accelerated model of neuroblastoma to predict disease outcome and find drug targets; *Kenneth Wertheim, United Kingdom* • An interconnected multi-level mechanistic model of the human brain; *Nicolas Sundqvist, Sweden* • Assessing the accuracy and efficiency of a binning strategy on a multiscale tumours' growth model; *Vinicius Varella, Italy* • Calibration and validation of a multiscale model to study the role of mechanics and inflammation in osteoarthritis; *Satanik Mukherjee, Belgium* • Data-driven multiscale model of macaque auditory thalamocortical circuits; *Erica Griffith, United States* • Demand-driven multiscale modelling of myocardial perfusion in the (a)synchronous heart; *Anneloes Munneke, Netherlands* • Electromechanical remodelling during heart failure in dilated cardiomyopathy: a systematic in silico investigation; *Tobias Gerach, Germany* • Multiscale mathematical modelling of nanoparticle distribution in a realistic tumour following direct injection; *George Caddy, United Kingdom*
	Session 15: Mechanobiology; *Chairs: José Manuel García-Aznar* *Room 3 (B003)* • A computer modelling approach to investigate the role of extrinsic and intrinsic mechanical signals on sprouting angiogenesis; *Chiara Dazzi, Germany* • A mechanobiological approach of growth plate morphological evolution; *Diego Quexada, France* • Agent-based models for vocal fold regenerative biomaterials: a parameter optimization study; *Grace Yu, United States* • An in silico framework for virtual optimization of tissue engineering cartilage repair approaches; *Seyed Ali Elahi, Belgium* • Computational modelling of the mechanical competition within an epithelial cell monolayer under infection; *Raúl Aparicio-Yuste, Spain* • Design and manufacturing of 3D printed porous scaffolds for critical size bone defects: Three clinical cases; *Beat Schmutz, Australia* • In silico investigation of the mechanobiological influence of fixation devices on mandibular fracture healing; *Vincenzo Orassi, Germany* • Multiscale model based on cell populations to describe bone remodeling in a sheep tibia; *Lídia Carvalho, Portugal* • OMIBONE: OMIcs-driven computer model of BOne regeNEration for personalized medicene; *Mahdi Jaber, Germany*
	Session 16: Big data and machine learning; *Chairs: João Manuel R.S. Tavares, Hichem Hani* *Room 4 (B032)* • A correlation study between morphological parameters and hemodynamics indices: an integrated deep learning and statistical shape modeling approach; *Martino Andrea Scarpolini, Italy* • A framework of decision support system for facial rehabilitation based on reinforcement learning coupled with finite element model; *Duc-Phong Nguyen, France* • An image-based machine learning and morphometric pipeline for the prediction of liver resection complexity; *Omar Ali, France* • Artificial intelligence based in silico models for the prediction of resilience related psychological, psychiatric and functional trajectories in women with early breast cancer; *Georgios Stamatakos, Greece* • Automatic segmentation of the human pelvis organs using a generative adversarial network and MRI data; *Duyen Nguyen-Le, France* • Predicting miRNA-mRNA interactions with graph neural networks; *Maciej Malawski, Poland* • Towards the development of deep generative model for tree-structured geometries; *Rajarajeswari Ganesan, Netherlands* • An artificial neural network to predict 3D human posture during one- and two-handed load-handling tasks; *Mahdi Mohseni, Iran*
10:30 - 11:00	Coffee break + Posters
11:00 - 11:45	**Plenary lecture 2**; *Chair: Renato Natal Jorge* *Auditorium (A101)* • Microstructure-informed in silico modeling of the human brain; Silvia Budday
11:45 - 12:45	Lunch break
12:45 - 13:45	**Poster session 3** *(Chair: Nele Famey)*, **Poster session 4** *(Chair: Goncalo Almeida)* *Poster area*

13:45 - 15:00	**Session 17: Computational tools and simulation in biomechanics 2**; *Chairs: Marie-Christine Ho Ba Tho, Morteza Rasouligandomani* *Auditorium (A101)*
	• Validation of internal parameters of adolescent idiopathic scoliosis evaluated using ScolioSIM Solution - preliminary results; *Sasa Cukovic, Switzerland*
	• Development of a fully-parametric thoracolumbar spine model with articulated rib cage; *Luigi La Barbera, Italy*
	• A poro-aniso-hyperelastic model coupled with solute transfer model for in-silico study of intervertebral disc degeneration, a high-performance computing application; *Dimitrios Lialios, Spain*
	• The effect of tibiofemoral joint morphology on contact mechanics under simulated gait conditions: A finite element modelling study; *Rosti Readioff, United Kingdom*
	• Prevention of asymmetric maxillary expansion via simulation - evaluation of clinical outcome; *Jan Hertwig, Germany*
	Session 18: Reproductive and pregnancy modelling; *Chairs: David Elad, Robyn May* *Room 2 (B002)*
	• Cytokine profiling in cultured endometrial cells after hormonal treatment; *Mark Gavriel, Israel*
	• Effect of fetal membrane adhesion on stretch in the fetal membrane and cervix; *Erin Louwagie, United States*
	• Mechanobiology of a multi-cell co-culture model of the endometrium-myometrium interface; *Yael Shlomo, Israel*
	• Patient-specific simulation of childbirth - a parametric model linked to medical images; *Olivier Mayeur, France*
	• Pelvic organ prolapse: Pre-operative evaluation of surgical techniques thanks to Numerical Simulation; *Olivier Mayeur, France*
	Session 19: In silico clinical trials 2; *Chairs: Marco Viceconti, Sumit Kumar* *Room 3 (B003)*
	• Computer modelling and simulation in clinics: mapping usage and opinions for advancing in silico medicine; *Raphaëlle Lesage, Belgium*
	• Artificial retinal microvascular networks: Virtual populations for In Silico trials; *Wahbi El-Bouri, United Kingdom*
	• In silico clinical trials to investigate the effect of trunk morphology on lumbar belt efficacy using representative virtual patients; *Aicha Errabity, France*
	• Validation of a comprehensive in silico clinical trial for a humeral replacement; *Philippe Favre, Switzerland*
	• v-Patients: the web-based end-to-end virtual trial solution for medical device developers; *Simon Sonntag, Germany*
	Session 20: Cancer early detection and therapy; *Chair: Georgios Stamatakos* *Room 4 (B032)*
	• Machine self-semantic learning of cancer disease: a case study on brain tumour early progression; *Jose Sousa, Poland*
	• Model-based optimisation reveals evolutionary dynamics conducive to effective therapy for Neuroblastoma; *Matteo Italia, Italy*
	• Modeling tumor heterogeneity evolution in lung adenocarcinoma; *Claire Couty, France*
	• Novel antenna for regional microwave hyperthermia cancer treatment; *Matouš Brunát, Czech Republic*
	• Virtual instances or avatars of a nephroblastoma digital twin: creating a performance efficient architecture for the clinical adaptation of the Nephroblastoma Oncosimulator; *Georgios Stamatakos, Greece*
15:00 - 15:45	**Plenary lecture 3**; *Chair: Alfons Hoekstra* *Auditorium (A101)*
	• Contributions of myocardial hypertrophy and stiffening to right-ventricular remodeling in pulmonary arterial hypertension; *Daniela Valdez-Jasso*
15:45 - 16.15	Coffee break + Posters
16:15 - 18:15	**In Silico trials panel plenary /Ecosystem for Digital Twins** *Auditorium (A101)* organized by the VPH Institute
19:30	**Conference dinner at the Taylors winery** - Barao Fladgate restaurant: Rua do Choupelo 250, 4400-088 Vila Nova de Gaia, metro station Jardim do Morro (metro line D)

Friday, 9th September 2022

08:00	**Registration**	

08:45 - 10:15

Session 21: The role of exascale computing in Computational Biomedicine; *Chair: Marco Viceconti* *Auditorium (A101)*
- How exascale supercomputers can help with complex multiphysics models: virtual populations in cardiovascular therapies; *Mariano Vazquez, Spain*
- Phase III In Silico Trials of new treatments for osteoporosis using exascale supercomputers; *Marco Viceconti, Italy*
- A drop of blood at exascale: new answers that large-scale blood simulations can give in thrombotic and diabetic diseases; *Gabor Zavodszky, Netherlands*
- Finding new cures from old drugs: ensemble Molecular Dynamics with exascale supercomputers enables high-throughput binding affinity for drug repurposing; *Peter Coveney, UK*
- Panel discussion: Speakers discuss with the audience opportunities and challenges of using exascale computing in Computational Biomedicine, and the services the CompBioMed Centre of Excellence can offer to the research community

Session 22: Computational modeling in health and disease 4; *Chairs: Michael Sacks, Adelisa Avezzù* *Room 2 (B002)*
- Whole heart mesh reconstruction for in vitro numerical simulations; *André Mourato, Germany*
- Digital twin predicting diet response before and after long-term fasting; *Oscar Arrestam, Sweden*
- Prediction of thrombosis in the arteriovenous grafts; *Lotte Piek, Netherlands*
- Prediction of ventricular mechanics based on the degree of pre-operative ventricular outflow tract obstruction: in silico pulmonary valve replacement; *Maria Gusseva, France*
- The impact of capillary ageing on in silico brains: A stroke comparison; *Wahbi El-Bouri, United Kingdom*
- Let's talk about sex differences in diabetic kidney; *Sangita Swapnasrita, Netherlands*

Session 23: Computational tools and simulation in biomechanics 3; *Chairs: Andrew Narracott, Estefano Munoz-Moya* *Room 3 (B003)*
- Deep learning for fast 3D Aortic CFD simulations; *Endrit Pajaziti, United Kingdom*
- Development of a real-time numerical tool for endovascular navigation by active catheterization; *Arif Badrou, France*
- In-silico calibration of thrombosis models using clinical incidence rates of spontaneous thrombosis in intracranial aneurysms; *Qiongyao Liu, United Kingdom*
- In-silico flow diverter performance assessment in posterior communicating artery aneurysms; *Michael Macraild, United Kingdom*
- Uncertainty quantification of hemodynamic parameters for cerebral aneurysm rupture risk assessment; *Adriano Schlief, Germany*
- Coronary flow and ffr prediction: part 1 - numercial modelling and experimental validation; *Boris Chernyavsky, France*

Session 24: Musculoskeletal biomechanics; *Chairs: Saša Cukovic, Carlos Rodrigues* (09:30-10:15) *Room 4 (B032)*
- A quantitative imaging method for reconstruction of muscle architecture using 3D ultrasound; *Annika Sahrmann, Germany*
- The role of muscle pre-stretches in three-dimensional continuum-mechanical musculoskeletal system models; *Oliver Röhrle, Germany*
- Towards a digital paediatric twin: A statistical shape model for bone shape and clinical bone measurement prediction; *Laura Carman, New Zealand*

10:15 - 10:45	Coffee break + Posters	

10:45 - 11:30

Plenary lecture 4; *Chair: João Manuel R.S. Tavares* *Auditorium (A101)*
- Kinetic modelling and network analysis of total-body PET data; *Adriana Tavares*

11:30 - 12:30

Session 25: Computational tools and simulation in biomechanics 4; *Chairs: Nele Famey, Morteza Rasouligandomani* *Auditorium (A101)*
- M4-health: digital twins that follow you throughout your health journey; *Gunnar Cedersund, Sweden*
- Prediction of successful course of vaginal delivery in relation of bony pelvis anatomy and fetal head size using design of experiment; *Ludek Hyncik, Czech Republic*
- Simulation-based digital twin platform for abdominal aortic aneurysms; *Alexander Pugachev, Germany*
- Toward a deep learning-driven prediction of dynamic soft tissue deformations for a real-time mixed reality simulator of the childbirth processes; *Abbass Ballit, France*

Session 26: Computational modeling in health and disease 5; *Chairs: Renato Natal Jorge, Robyn May* *Room 2 (B002)*
- Multicellular model of effects of cell-to-cell heterogeneity on antiviral timing and potency in an infected patch of epithelial tissue; *James Glazier, United States*
- An image-based 3D electrophysiological torso model for simulating maternal and fetal ECG; *Lena Myklebust, Norway*
- Hybrid modelling to predict pregnancy complications; *Pascalle Wijntjes, Netherlands*
- Modeling a female pelvic floor and foresight biomechanical injuries during vaginal delivery; *Rita Moura, Portugal*

Session 27: Agent based models; *Chairs: Liesbet Geris, Qiyao Peng* *Room 3 (B003)*
- An agent-based model to simulate DIPG migration in microfluidic devices; *Daniel Camacho-Gómez, Spain*
- Calibrating a multiscale model of bone healing with immunofluorescent images; *Liesbet Geris, Belgium*
- Integrated spatial-temporal mathematical model for simulation of fibrotic scar formation; *Jieling Zhao, France*
- Quantitatively comparing tumor images to agent-based models for parameter fitting; *Colin Cess, United States*

Session 28: Mathematical biomedical models 2; *Chairs: Irène Vignon-Clémentel, Julius Zimmermann* *Room 4 (B032)*
- A 3D in silico model of fracture healing to investigate craniofacial bone defects; *Laura Lafuente-Gracia, Belgium*
- High-performance computational modeling of metallic biomaterials biodegradation; a case-study of a personalized biodegradable porous acetabular implant; *Mojtaba Barzegari, Belgium*
- Modeling osteoporosis to design and optimize pharmacologic therapies comprising multiple drug classes; *David Jörg, Germany*
- The PNt-Methodology: a novel high-level top-down network modelling approach applied to the intervertebral disc; *Laura Baumgartner, Spain*

Time	Session	Location
12:30 - 13:15	Lunch break	
13:15 - 14:15	**VPH Institute Awards**	*Auditorium (A101)*
14:15 - 14:45	**Closing ceremony**	*Auditorium (A101)*
15:00 - 19:00	**Workshop: ASME V&V 40 Training**	*Auditorium (A101)*

15:00 - 19:00 **Workshop: ASME V&V 40 Training** *Auditorium (A101)*
Instructors are the officers of the ASME VVUQ Subcommittee 40: Jeff Bischoff, Payman Afshari, Marc Horner, Angel Luis Guzman Rodriguez

Assessing Credibility of Computational Models through Verification and Validation: Application to Medical Devices
Entrance fee: 40 EUR (separate registration required)
Assessing Credibility of Computational Modeling and Simulation Results through Verification and Validation: Application to Medical Devices, was published in 2018 to support the credible use of modeling and simulation within the medical device industry. This standard was developed through close collaboration between medical device developers, regulatory agencies, and other device industry stakeholders, and provides modelers in the medical device industry with a framework for establishing model credibility requirements. This introductory course will provide an overview of the standard and highlight its key tenets through a few medical device examples and active discussions.