Modelling the Cardiac Function
Theory, Numerical Methods, Clinical Applications

Cetraro, Italy. 30th September - 2nd October, 2022

Friday, 30th September 2022

8:30-9:00 Registration

Legend - PL: Plenary Lecture, PS: talk in Parallel Session

		SALA CRATI (GROUND FLOOR)	
9:00–9:05		**Opening by Alfio Quarteroni**	
9:05–9:50	PL	**Alison Marsden** Stanford University	Patient specific modeling of flow and cardiac function in single ventricle physiology
9:50–10:35	PL	**Michael S. Sacks** University of Texas	High-speed cardiac mechanics simulations using a neural network finite element approach
10:35–11:05		**Coffee break**	
11:05–11:25	PS	**Martin Pfaller** Stanford University	A Computational Model for Cardiovascular Fluid-Solid-Growth Interaction
11:25–11:45	PS	**Lorenzo Bennati** Università di Verona	From cardiac cine-MRI to image-based computational blood simulations in presence of mitral regurgitation
11:45–12:05	PS	**Sara Bridio** Politecnico di Milano	A kernel optimization-based classification model for predictions of stroke treatment outcomes
12:05–12:25	PS	**Pasquale Claudio Africa** Politecnico di Milano	life$^{\text{x}}$: a friendly, high-performance framework for complex cardiac simulations
12:25–16:00		**Lunch break**	
16:00–16:20	PS	**Alireza Jafarinia** Graz University of Technology	Dominant morphological parameters impacting the false lumen thrombosis in type B aortic dissection
16:20–16:40	PS	**Francesca Renzi** Università di Verona	Patient Specific Image-Based Computational Fluid Dynamic Model of the Right Heart
16:40–17:00	PS	**Jochen Brenneisen** Karlsruhe Institute of Technology	Influence of pressure boundary condition definition on flow patterns in cardiac simulations
17:00–17:30		**Coffee break**	
17:30–18:15	PL	**Gerhard Holzapfel** Graz University of Technology	Viscoelastic modeling for the myocardium
18:15–19:00		**Poster blitz session**	

Friday, 30th September 2022

			SALA PUGLIESE (FIRST FLOOR)	
11:05–11:25	PS	**Vahid Badeli** Graz University of Technology		From automized geometry segmentation to the FEM simulation of thoracic impedance cardiography
11:25–11:45	PS	**Francisco Sahli Costabal** Pontificia Universidad Católica de Chile		Physics-informed neural networks for image registration: computing cardiac strain
11:45–12:05	PS	**Andrea Tonini** Politecnico di Milano		A mathematical model to assess the effects of COVID-19 on the cardiocirculatory system
12:25–16:00	Lunch break			
16:00–16:20	PS	**Mathias Peirlinck** Delft University of Technology		Towards precision medicine through multiscale and multiphysics human heart modeling
16:20–16:40	PS	**Christian Bilas** Technical University of Munich		Image Based Patient-Specific Pediatric Heart Growth
16:40–17:00	PS	**Tahar Arjoune** Technical University of Munich		Patient Specific Cardiovascular Modeling to Inform Pulmonary Valve Replacement in Tetralogy of Fallot Patients

Saturday, 1ˢᵗ October 2022

		SALA CRATI (GROUND FLOOR)	
9:00–9:45	PL	**Alfio Quarteroni** Politecnico di Milano	An integrated mathematical model for the simulation of the complete cardiac function
9:45–10:30	PL	**Gernot Plank** Medical University of Graz	Computational Models of Cardiac Electro-mechanical Function - Closing the Gaps between Virtual and Physical Reality
10:30–11:00		Coffee break	
11:00–11:20	PS	**Simone Pezzuto** Università della Svizzera italiana	Physics-informed neural networks to learn cardiac fiber orientation from multiple electroanatomical maps
11:20–11:40	PS	**Stefania Fresca** Politecnico di Milano	Deep learning-based reduced order models for the efficient solution of parametrized PDEs
11:40–12:00	PS	**Ludovica Cicci** Politecnico di Milano	Physics-based and data-driven reduced order models for parametrized PDEs in structural mechanics
12:00–16:00		Lunch break	
16:00–16:20	PS	**Cristiana Corsi** Università di Bologna	Hemodynamics in the left atrial appendage in atrial fibrillation patients: does its occlusion affect stroke risk?
16:20–16:40	PS	**Ivan Fumagalli** Politecnico di Milano	Computational hemodynamics and fluid-structure interaction of pathological and prosthetic valves
16:40–17:00	PS	**Sophia Bäck** Linköping University	Cardiac Blood Flow Simulations and Stasis Assessment in Patients with Atrial Fibrillation
17:00–17:20	PS	**Alberto Zingaro** Politecnico di Milano	A fluid dynamics model for the simulation of the whole human heart
17:20–17:50		Coffee break	
17:50-18:35	PL	**Charles Taylor** Heartflow, Inc.	Patient-specific Modeling of Blood Flow in the Coronary Arteries

20:00 Social dinner

Saturday, 1st October 2022

			SALA PUGLIESE (FIRST FLOOR)
11:00–11:20	PS	**Roberto Piersanti** Politecnico di Milano	Modeling a detailed whole heart myofiber architecture in cardiac electromechanical simulations
11:20–11:40	PS	**Gian Marco Melito** Graz University of Technology	Impact of false lumen thrombosis on blood flow dynamics and electrical conductivity in type B aortic dissection
11:40–12:00	PS	**Marco Fedele** Politecnico di Milano	Modeling the electromechanics of the entire human heart
12:00–16:00			Lunch break
16:00–16:20	PS	**Jose F. Rodriguez Matas** Politecnico di Milano	Cellular Heterogeneity in the Atria: Effect on Arrhythmic vulnerability and pharmacological cardioversion
16:20–16:40	PS	**Nicolas A. Barnafi** Università degli studi di Pavia	Scalable, efficient and robust parallel solvers for cardiac mechanics
16:40–17:00	PS	**Elena Zappon** Politecnico di Milano	An electromechanical heart-torso coupled model for the simulation of ECG
17:00–17:20	PS	**Matteo Salvador** Politecnico di Milano	High-order methods for cardiac electrophysiology

Sunday, 2nd October 2022

			SALA CRATI (GROUND FLOOR)	
9:00–9:20	PS	**Francesco Regazzoni** Politecnico di Milano	Stabilization of staggered schemes for 3D cardiac mechanics coupled with 0D blood dynamics	
9:20–9:40	PS	**Chi Zhang** Technical University of Munich	Unified meshfree algorithm for modeling cardiac function with the Purkinje network	
9:40–10:00	PS	**Michele Bucelli** Politecnico di Milano	Coupling electrophysiology, mechanics and hemodynamics in integrated multiphysics simulations of the human heart	
10:00–10:20	PS	**Silvia Caligari** Università degli studi di Pavia	An electro fluid structure model based on an embedded strategy with application to cardiac simulations	
10:20–10:50			Coffee break	
10:50-11:35	PL	**Roberto Verzicco** Università di Roma Tor Vergata	A high-fidelity computational model of the human heart	
11:35–12:20	PL	**Natalia Trayanova** Johns Hopkins University	AI-Powered Personalized Computational Cardiology	
12:20–12:40			Poster award & closure	
12:40–14:00			Lunch break	

Sunday, 2nd October 2022

		SALA PUGLIESE (FIRST FLOOR)	
9:00–9:20	PS	**Karli Gillette** Medical University of Graz	Generation of Cardiac Digital Twins of Whole Heart Electrophysiology
9:20–9:40	PS	**Stefano Pagani** Politecnico di Milano	Computational tools for the analysis and prediction of cardiac arrhythmias
9:40–10:00	PS	**Pierfrancesco Siena** SISSA	Machine learning-based reduced order method for cardiovascular flows with physical and geometrical parameters: application to coronary bypass graft
10:00–10:20	PS	**Caterina Balzotti** SISSA	Optimal control of hemodynamics in coronary artery bypass grafts through reduced order models based on neural networks