

## Modelling the Cardiac Function

July 22-24, 2019

Varese - RISM - Villa Toeplitz



### July 22 - DAY 1

13.00 *Registration*

14.00 *Opening*

Angelo **Tagliabue**, Rector - Università degli Studi dell'Insubria

Attilio **Fontana**, President - Regione Lombardia

Davide **Galimberti**, Mayor - City of Varese

Renzo **Dionigi**, Professor Emeritus in General Surgery

Stefano **Serra Capizzano**, Vice Rector - Università degli Studi dell'Insubria

Daniele **Cassani**, Director of Riemann School of Mathematics - Univ. degli Studi dell'Insubria

Alfio **Quarteroni**, Director of the AdG ERC project iHEART - Politecnico di Milano

14.45

Natalia **Trayanova** - *Department of Biomedical Engineering and Institute for Computational Medicine - Johns Hopkins School of Medicine (USA)*

"Blending engineering and medicine"

15.35

David **Nordsletten** - *University of Michigan, King's College London (UK)*

"Viscoelastic model of human myocardium"

*16.25 Coffee break*

16.55

Ngoc Mai Monica **Huynh** - *Università degli Studi di Pavia (IT)*

"Non-linear scalable solvers for cardiac reaction-diffusion models"

17.15

Stefania **Fresca** - *MOX, Politecnico di Milano (IT)*

"Deep learning based model order reduction for cardiac electrophysiology"

17.35

Matteo **Salvador** - *MOX, Politecnico di Milano (IT)*

"Electromechanical modeling of the left ventricle in physiological and pathological conditions"

17.55 Poster biltz - 2 minutes presentation for each poster

**July 23 - DAY 2**

9.00

Dominique **Chapelle** - *INRIA Palaiseau (FR)*

“Multiscale description of chemical-mechanical coupling in cardiac modeling – Thermodynamics and numerics”

9.50

Francesco **Regazzoni** - *MOX, Politecnico di Milano (IT)*

“Multiscale numerical simulation of the cardiac function: exploiting machine learning for modeling active force generation”

10.10

Simone **di Gregorio** - *MOX, Politecnico di Milano (IT)*

“A computational multiscale approach for modeling myocardial perfusion”

10.30

Nicolas **Barnafi** - *MOX, Politecnico di Milano (IT)*

“Mathematical and numerical analysis of a general linearized poro-hyperelastic formulation”

*10.50 Coffee break*

11.20

Marco **Fedele** - *MOX, Politecnico di Milano (IT)*

“Image processing and mesh generation tools for the integrated heart project”

11.45

Rolf **Krause** - *Inst. of Computational Science, University of Italian Switzerland, (CH)*

“Coupled Scales and Coupled Physics in Cardiac Simulation”

*12.35 - 14.15 Lunch*

14.15

Antonio F. **Corno** - *East Midlands Congenital Heart Center, University of Leicester (UK)*

“Potential implications of the helical heart in congenital heart defects”

15.05

Antonio **Frontera** - *San Raffaele Hospital, Milan (IT)*

“New horizons in Electrophysiology. Math, simulation and prediction of arrhythmias”

*15.55 Coffee break*

16.25

Stefano **Pagani** - *MOX, Politecnico di Milano (IT)*

“Abnormal heart rhythm: a numerical study of electrophysiological substrate”

16.50

Philip **Trautmann** - *University of Graz (AT)*

“Optimization based estimation of activation sites in the heart”

17.15

Sehun **Chun** - *Yonsei University, Seoul, (KR)*

“Computing Riemannian curvature tensor for stopping conditions of cardiac electric flow in multidimensional anisotropic cardiac tissue”

17.40

Nagaiah **Chamakuri** - *University of Hohenheim, Stuttgart (DE)*

“An efficient and accurate numerical methods for the solution of bidomain equations”

18.05 *End*

20.15 *Social Dinner - Restaurant “Il Gestore”, Varese*

**July 24 - DAY 3**

9.00

Gernot **Plank** - *Medical University of Graz (AT)*

“Personalizing models of total heart function”

9.50

Stefano **Zonca** - *MOX, Politecnico di Milano (IT)*

“Numerical approximation of a fluid-structure interaction model for the aortic valve dynamics”

10.15

Barna **Becsek** - *University of Bern (CH)*

“Effect of valve tissue anisotropy on turbulent systolic blood flow past bioprosthetic heart valves”

10.35

Ivan **Fumagalli** - *MOX, Politecnico di Milano (IT)*

“Hemodynamics in a pathological left ventricle: from clinical data to numerical results”

*11.00 Coffee break*

11.30

Miguel **Fernandez** - *INRIA Paris (FR)*

“Cardiac hemodynamics simulations for implantable devices assessment”

*12.20 - 14.15 Lunch*

14.15

Nic **Smith** - *Faculty of Engineering, University of Auckland (NZ)*

“Multi-scale computational modelling of coronary blood flow”

15.05

Federica **Caforio** - *Medical University of Graz (AT)*

“Mathematical modelling and numerical simulation of transient shear wave elastography in the heart”

15.30

Jonathan **Froehlich** - *Karlsruhe Institute of Technology (DE)*

“A numerical study of fully coupled cardiac simulations on the human heart”

15.55

Joakim **Sundnes** - *Simula Research Laboratory (NO)*

“Parameter estimation and uncertainty quantification in patient-specific models of cardiac mechanics”

*15.50 Coffee and Closure*

## Poster Session

### Poster 1

Ekaterina **Kovacheva** - *Inst. of Biomedical Engineering, Karlsruhe Institute of Technology (DE)*

“A Method for Pressure-Volume-Based parameter Identification for a passive constitutive model of myocardium”

### Poster 2

Jessica **Manganotti** - *Politecnico di Milano (IT)*

“Energy-consistent discretisation for one-dimensional blood flow models”

### Poster 3

Javier **Saiz** - *Ci2B, Universitaria Politècnica de València (ES)*

“A realistic detailed 3D model of the human atria and torso for studying supraventricular arrhythmias”

### Poster 4

Jeremias **Garay** - *University of Groningen (DE)*

“Effect of MRI frequency-space undersampling in inverse problems in hemodynamics”

### Poster 5

Alessandro **Gianola** - *Free University of Bozen-Bolzano (IT)*

“A compositional model of the Heart-Pacemaker system in CospanSpan(Graph)”

### Poster 6

Chi **Zhang** - *Dept. of Mechanical Engineering, Technical Univ. of Munich, Garching, (DE)*

“A smoothed particle hydrodynamics approach for electrophysiology”

### Poster 7

Simone **Stella** - *MOX, Politecnico di Milano (IT)*

“Computational cardiac electrophysiology based on septal and epicardial mapping”

### Poster 8

Ludovica **Cicci** - *MOX, Politecnico di Milano (IT)*

“Local reduced order modeling for parameterized problems in cardiac mechanics”

### Poster 9

Alberto **Zingaro** - *MOX, Politecnico di Milano (IT)*

“Computational fluid dynamics of blood flows in the left heart”

Poster 10

Roberto **Piersanti** - *MOX, Politecnico di Milano (IT)*

“Influence of cardiac muscle fibers on the heart electrophysiology”

Poster 11

Silvia **Pozzi** - *MOX, Politecnico di Milano (IT)*

“An effective numerical model for fluid-structure interaction in carotid arteries based on CINE MRI images”