
2023 Cardiac Physiome Workshop

Location: Edwards Lifesciences - 1 Edwards Way, Irvine CA 92614

Date: April 24th – 26th, 2023

Monday, April 24th 2023

Continental Breakfast & Check-in: 8:00-8:30

Welcome Session: 8:30-9:00

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
8:30-8:40	<u>Naomi Chesler</u> Director, Edwards Lifesciences Foundation Cardiovascular Innovation and Research Center, Department of Biomedical Engineering, University of California, Irvine	Welcome and introduction to the conference
8:40-8:55	<u>Andrew McCulloch</u> Director, Institute for Engineering in Medicine Distinguished Professor of Bioengineering and Shu Chien Chancellor's Endowed Chair in Engineering and Medicine, University of California, San Diego	The Cardiac Physiome – where we are today

Session 1: Sex Differences in Cardiovascular Function

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
9:00-9:40	<u>Plenary: Kristyn Masters</u> Vilas Distinguished Achievement Professor and Vice Chair of Biomedical Engineering University of Wisconsin, Madison	Tissue Engineered Platforms to Study Sexual Dimorphism in Aortic Stenosis
9:40-10:00	<u>Mukti Chowkale</u> University of Virginia	A Computational Model Predicts Mechanisms of Sex Dimorphism in Cardiac Fibroblasts
10:00-10:20	<u>Becky Hardie</u> University of California, San Diego	Right Ventricular Myocardium Remodeling in Pulmonary Arterial Hypertension is Sex Dependent

Coffee Break: 10:20-10:35

Session 2: Novel Experimental Approaches

<u>Time</u>	<u>Speaker</u>	Title
10:40-11:00	<u>Saiti Halder</u> Yale University	Altered Interactions with Troponin can lead to Divergent Trends in Functional and Transcriptomic Analysis of Isogenic HCM and DCM Engineered Heart Tissues
11:00-11:20	<u>Ilham Essafri</u> University of Colorado, Anschutz Medical Campus	Morphological and Hemodynamic Changes to the RV Microvascular Network in Response to Acute Pressure Overload
11:20-11:40	<u>Kyrah L. Turner</u> Washington State University	Myosin Regulatory Light Chain Phosphorylation Amplifies Ca ²⁺ -Sensitivity of Force in Myocardium from Cardiac Myosin Binding Protein-C Knockout Mice
11:40-12:00	<u>Javiera Jilberto</u> University of Michigan	A Data-Driven Computational Model of Engineered Heart Tissue

Lunch: 12:00-12:50

Session 3: Cardiac and Vascular Signaling

<u>Time</u>	<u>Speaker</u>	Title
1:00-1:20	<u>Kenneth Campbell</u> University of Kentucky	Cardiac Myosin Binding Protein C Reduces Power Output via Drag Forces and Myosin Binding Inhibition
1:20-1:40	<u>Peter Hunter</u> University of Auckland	Bond Graphs and CellML for Cardiac Cell modeling
1:40-2:00	<u>Filip Jezek</u> University of Michigan	Cardiac Muscle Dynamics Analysis with Regards to Low ATP Concentration
2:00-2:20	<u>Annabelle Fowler</u> University of California, San Diego	Network Model of Muscle Cell Signaling Successfully Predicts Responses to Resistance and Endurance Exercise

Poster session I: 2:20-3:50 PM

Session 4: Cardiovascular Health Disparities

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
4:00-4:40	<u>Plenary: Chastity Bradford</u> Chair and Professor, Department of Biology Tuskegee University	TBD
4:40 – 5:00	<u>Invited Speaker: Erika Moore</u> University of Florida	Considering Ancestry: Modeling Vasculitis in Lupus
5:00-5:20	<u>Naomi Chesler</u> University of California, Irvine	Getting to the Heart of Health Disparities
5:30-6:30	Round table discussion on health disparities with drinks and light hors d'oeuvres	

Tuesday, April 25th 2023

Continental Breakfast & Check-in: 7:30-8:20

Session 5: Digital Twin Technologies (Part 1)

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
8:30-9:10	<u>Plenary: Steven Kreuzer</u> Senior Managing Engineer Exponent Engineering & Scientific Consulting	The Living Heart Project and the FDA Mitral Valve Repair <i>In-Silico</i> Trial
9:10-9:30	<u>Michael Sacks</u> University of Texas at Austin	A Neural Network Finite Element Approach for High-Speed Cardiac Pressure-Volume Simulations
9:30-9:50	<u>Howard Lei</u> Children's Health of Orange County	Digital Twin Patient Modeling using Electronic Health Records data for Heart Failure Classification

Coffee Break: 9:50-10:05

Session 6: Digital Twin Technologies (Part 2)

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
10:10-10:30	<u>Zan Ahmad</u> Johns Hopkins University	Hemodynamic Indicators of Stroke Risk Identified by Personalized Fluid Dynamics Simulations
10:30-10:50	<u>Rosie Barrows</u> King's College London	Developing a Framework for Rapid Generation of Four-Chamber Heart Models
10:50-11:10	<u>Karli Gillette</u> Medical University of Graz, Austria	A Personalized Real-time Virtual Model of Whole Heart Electrophysiology
11:10-11:30	<u>Nick van Osta</u> CARIM School for Cardiovascular Diseases Maastricht University, the Netherlands	The Digital Twin for Tissue Substrate Monitoring in Arrhythmogenic Cardiomyopathy using the Fast, Modular, and Verified CircAdapt Framework

Lunch: 11:30-12:50

Session 7: Growth and Remodeling

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
1:00-1:20	<u>Invited Speaker: Colleen Witzenburg</u> University of Wisconsin, Madison	Predicting Ventricular Dimensions and Hemodynamics in Growing Infants
1:20-1:40	<u>Martin Pfaller</u> Stanford University	FSGe: A Computational Model for Equilibrated Cardiovascular Fluid-Solid-Growth Interaction
1:40-2:00	<u>Mathias Peirlinck</u> Delft University of Technology	Physics-based Modeling and Machine Learning Synergies in Human Heart Modeling
2:00-2:20	<u>Carolyna Yamamoto</u> Johns Hopkins University	Degree of Fibrosis Remodeling Alters Atrial Fibrillation Inducibility

Poster Session II: 2:20-3:50

Session 8: Heart Failure

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
4:00-4:20	<u>Michael Moulton</u> University of Nebraska Medical Center	Mathematical Model Simulations Predict Aging/Hypertensive Phenotype of Heart Failure with a Preserved Ejection Fraction (HFpEF) Has Impaired Exercise Capacity
4:20-4:40	<u>Edith Jones</u> University of California, Davis	Mechanisms of Cardiomyocyte Dysfunction in HFpEF Murine Models: Insight from Computational Models
4:40-5:00	<u>Hossein Sharifi</u> University of Kentucky	The Multiscale Model of Baroreflex Feedback Loop in Response to Myocardial Infarction
5:00-5:20	<u>Anneloes Munneke</u> CARIM School for Cardiovascular Diseases Maastricht University, the Netherlands	Myocardial Perfusion and Flow Reserve in the Asynchronous Heart: Mechanistic Insight from a Computational Model

Reception and Dinner: 5:30-7:30

Wednesday, April 26th 2023

Continental Breakfast & Check-in: 7:30-8:20

Session 9: Valve Mechanics

<u>Time</u>	<u>Speaker</u>	<u>Title</u>
8:30-9:10	<u>Plenary: Manuel Rausch</u> Associate Professor, Department of Biomedical Engineering University of Texas at Austin	A Computational study of Tricuspid Valve Disease and Treatment
9:10-9:30	<u>Robin Tuscher</u> University of Texas at Austin	Functional Differences in the Native Contractile Behavior of Aortic Valve Interstitial Cells from Patients with Varying Calcific Aortic Valve Disease
9:30-9:50	<u>Marshall Davey</u> University of North Carolina, Chapel Hill	Construction and Simulation with a Four-Chambered Fluid-Structure Interaction Model of the Human Heart

Coffee Break: 9:50-10:05

Session 10: Multiscale Modeling

<u>Time</u>	<u>Speaker</u>	Title
10:10-10:30	<u>Karim El Houari</u> Ansys, Lyon, France	Pyheart-lib: a Python Package for Generating Physiologically Accurate LS-DYNA Heart Models
10:30-10:50	<u>Lei Fan</u> Michigan State University	Computer Modeling of Myocardial Work Demand and Coronary Blood Supply Coupling during Physical Exercise
10:50-11:10	<u>Aurore Lyon</u> Maastricht University, the Netherlands	Unraveling the Cellular and Whole-Heart Consequences of Myosin-Binding Protein C and Titin Abnormalities using a Novel Calcium-Contraction Coupling Model
11:10-11:30	<u>Justen Geddes</u> North Carolina State University	Multiscale Model of Autoantibody contributions to Postural Orthostatic Tachycardia Syndrome

Lunch: 11:30-12:50

Session 11: Electrophysiology

<u>Time</u>	<u>Speaker</u>	Title
1:00-1:20	<u>Ludovica Cicci</u> King's College London	Sensitivity Analysis of Electrode Location on ECG Signals
1:20-1:40	<u>Lynn H. Jin</u> Georgia Tech University	Reproducing Experimentally Observed Alternans in Cardiac Tissue Using Fractional Diffusion
1:40-2:00	<u>Jiyue He</u> University of Pennsylvania	Tachycardia Activation Pattern Predictivity of a Fiber-Independent Left Atrium Model
2:00-2:20	<u>Chelsea E. Gibbs</u> University of Washington	Changes in Graft-Host Coupling Can Lead to Engraftment Arrhythmia: A Computational Study

**Poster Viewing, Networking, and
Poster Takedown: 2:20-3:50**

Closing Remarks

<u>Time</u>	<u>Speaker</u>	Title
4:00-4:30	<u>Dan Beard</u> University of Michigan	Dedication to Jim Bassingthwaighe
4:30-4:50	<u>Viviane Timmermann & Peter Kohl</u> Institute for Experimental Cardiovascular Medicine, University Hospital Freiburg, Freiburg, Germany	The 2025 Cardiac Physiome
4:50-5:30	Closing Remarks	

**Thursday, April 27th 2023: Pharmaceuticals Satellite
Meeting co-hosted with CiPA initiative.**

Sessions TBD