

# COMPUTATIONAL PHYSIOLOGY: FROM GENOME TO PHYSIOME

## MONDAY, MARCH 28: *Reception*

Registration will be held in the Kon Tiki Foyer. The reception will be held in the Kon Tiki Ballroom.

- 5:30pm Registration *Kon Tiki Foyer*
- 6pm Reception *Kon Tiki Ballroom*
- 5:30pm 4'x8' Poster Setup *Toucan and Macaw room*

## TUESDAY, MARCH 29: *Scientific Session Day 1*

Tuesday's continental breakfast, breaks and poster viewing will be held in the Toucan and Macaw Room. General session will be held in the Kon Tiki Ballroom and Foyer.

- 8am Breakfast
- 8:45am Co-organizers Welcome

### SESSION I: SYSTEMS BIOLOGY Chair: Bernhard Palsson

- 9am Shankar Subramaniam (UCSD): *Cellular Physiology - Mapping Genotype to Phenotype in Mammalian Cells*
- 9:30 am Giovanni Paternostro (BURNHAM INST): *Systems Biology of Cardiac Aging*
- 10am Break

### SESSION II: GENETIC CIRCUITS Chair: Shankar Subramaniam

- 10:30am Jeffrey Hasty (UCSD): *Synthetic Molecular Biology: Bioengineering at the Genome Scale*
- 11am Jeremy Rice (IBM): *A Plausible Model for the Digital Response of p53 to DNA Damage: A Tale of Limiting Resources, Negative Feedback and Time Delays*
- 11:30am Trey Ideker (UCSD): *Modeling Cells with Protein Networks*
- 12noon Lunch and Posters *Box lunches will be served in the Beach North area (or—in the case of inclement weather—moved to the Macaw Room).*

### SESSION III: METABOLIC NETWORKS Chair: Giovanni Paternostro

- 1:30pm Bernhard Palsson (UCSD): *Reconstructing the Mitochondrial Metabolic Network in the Human Cardiac Myocyte and Determining its Functional States*
- 2pm James Bassingthwaight (UNIV OF WASHINGTON): *Linking Cell to System: Myocardial Metabolism to Cardiac Output Regulation*
- 2:30pm Satoshi Matsuoka (KYOTO UNIV): *Simulation of Cardiac Energy Metabolism Using an Integrated Mitochondria Model*
- 3pm Nicolas Smith (UNIV OF AUCKLAND): *Simulating Cardiac Acidosis Across Spatial Scales*
- 3:30pm Break



THE IUPS SATELLITE MEETING FOR THE PHYSIOME PROJECT

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## SESSION IV: MULTI-SCALE MODELING *Chair: Peter Hunter*

4pm Natalia Trayanova (TULANE): *Simulation of Cardiac Defibrillation*

4:30pm Chris Johnson (UNIV OF UTAH): *Multi-field Visualization*

5pm Posters *Toucan and Macaw room*

6:30pm Dinner Cruise *Boarding for the Bahia Belle Dinner Cruise will be at the boat dock by Mission Bay.*

## WEDNESDAY, MARCH 30: *Scientific Session Day 2*

*Wednesday's continental breakfast, breaks and poster viewing will be held in the Toucan and Macaw Room. General session will be held in the Kon Tiki Ballroom and Foyer.*

8am Breakfast

## SESSION V: FRAMEWORKS & ONTOLOGIES *Chair: Andrew McCulloch*

9am Peter Hunter (UNIV OF AUCKLAND): *An Update on the IUPS Physiome Project*

9:30am Dan Cook (FRED HUTCHINSON CANCER RESEARCH CENTER): *Ontology-Based Symbolic Models of Anatomy, Physiology and Pathology: Autogeneration of Mathematical Models*

10am Brian Athey (UNIV OF MICHIGAN): *TBA*

10:30am Break

## SESSION VI: MULTI-SCALE CELL MODELING *Chair: James Bassingthwaighe*

11am Leslie Loew (UNIV OF CONNECTICUT HEALTH CENTER): *The Virtual Cell Project*

11:30am Mary Ann Martone (UCSD): *Spatially Realistic Modeling of Cellular Microdomains*

12noon Tom Bartol (SALK): *Evidence for Ectopic Neurotransmitter Release in a Monte Carlo Model of a Nicotinic Synapse*

12:30pm Lunch and Posters *Box lunches will be served in the Beach North area (or—in the case of inclement weather—moved to the Macaw Room)*

## SESSION VII: CARDIAC CELL MODELING *Chair: Yoram Rudy*

2pm Denis Noble (OXFORD): *Applications of Heart Modelling to Problems of Arrhythmia*

2:30pm Donald Bers (LOYOLA UNIV, CHICAGO): *Local [Ca] and [Na] Gradients in Cardiac Excitation-Contraction Coupling*

3pm Jeffrey Saucerman (UCSD): *Modeling Neurohumoral Regulation of Cardiac Physiology*

3:30pm Break



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## SESSION VIII: MULTI-SCALE HEART MODELING *Chair: Brian Athey*

4pm Craig Henriquez (DUKE): *3D Microstructure Modeling of the Heart*

4:30pm Alan Garfinkel (UCLA): *Dynamics of Cardiac Fibrillation*

5pm Yoram Rudy (WASHINGTON UNIV, SAINT LOUIS): *Noninvasive Electrocardiographic Imaging (ECGI) of Human Cardiac Electrophysiology and Arrhythmias*

5:30pm Closing Remarks

## POSTERS

Mike Cooling, AUCKLAND UNIVERSITY

*Deadly Signal Transduction*

Edmund J. Crampin and Nicolas P. Smith, UNIVERSITY OF AUCKLAND

*A Dynamic Model of pH Regulation and Acidosis in the Myocyte*

Dennis Dean, HARVARD UNIVERSITY

*Using Domain Specific Information to Design Optimal Circadian Adjustment Schedules*

Sarah Healy, UNIVERSITY OF CALIFORNIA, SAN DIEGO

*Increased Arrhythmic Risk During Dynamic Phosphorylation Changes Following Beta-adrenergic Stimulation*

Robert Hester, UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

*A Multilevel, Integrative Model of Human Physiology*

Kenta Hori, KYOTO UNIVERSITY

*Distributed Biological Simulation Systems on DynaBioS*

Jiri Kofranek, CHARLES UNIVERSITY

*From Art to Industry: Experiences with the Design, Development and Exploitation of Educational Biomedical Simulators*

J. Lee, N. Smith, UNIVERSITY OF AUCKLAND

*An Anatomical Model of Rat Coronary Vasculature*

Chae Hun Leem, UNIVERSITY OF ULSAN COLLEGE OF MEDICINE

*Simulation of  $Ca^{[2+]}$ -activated  $Cl^{-}$  current of Cardiomyocytes in Rabbit Pulmonary Vein*

Shaoying Lu, Anushka Mihaylova, UNIVERSITY OF CALIFORNIA, SAN DIEGO

*3D Model of Synchronous Calcium Signals in Ventricular Myocyte*

John McCarthy, UNIVERSITY OF KENTUCKY

*Circadian Rhythms of the Mouse Skeletal Muscle Transcriptome*



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Alexander Moskvina, URAL STATE UNIVERSITY

*Electron-conformational Model of Cooperative Cardiac Ryanodine Receptors Gating*

Martyn Nash, UNIVERSITY OF AUCKLAND BIOENGINEERING INSTITUTE

*Re-entrant Waves in Contracting Excitable Ventricular Tissue to Study Mechano-electric Feedback and Arrhythmias*

S. Niederer, P. Hunter, N. Smith, UNIVERSITY OF AUCKLAND

*Length and Force Dependence of Cardiac Contraction*

D. Nordsletten, S. Blacket, M. Bentley, E. Ritman, N. Smith, UNIVERSITY OF AUCKLAND

*Anatomical Modeling of Renal Vasculature*

Anamika Sarkar, MEMORIAL SLOAN-KETTERING CANCER CENTER

*Mathematical Modeling of T-cell and Dendritic Cell Interaction: Signals from Very Low Number of Molecules*

Eun Bo Shim, KANWON NATIONAL UNIVERSITY

*A Cell-hemodynamics-autoregulation Coupled Modeling of Cardiovascular System*

Olga Solovyova, INSTITUTE OF IMMUNOLOGY AND PHYSIOLOGY

*Activation Sequence as a Key Mechanism of Functional Self-organization of Myocardium*

Ayako Takeuchi, KYOTO UNIVERSITY

*Relationship Between  $Na^{[+]}/K^{[+]}$  Pump Activity and Cell Volume Regulation in the Cardiac Cells: A Simulation Study*

Keisuke Terashima, KYOTO UNIVERSITY

*Role of  $Cl^{-}$  channels in the Cardiac Volume Regulation and the Membrane Excitation*

Deqiang Zhang, HOWARD HUGHES MEDICAL INSTITUTE, UNIVERSITY OF CALIFORNIA, SAN DIEGO

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*UCSD Whitaker Institute for Biomedical Engineering (WIBE)*

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## EDUCATIONAL GRANTS



## ORGANIZERS

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