



**4th International  
Conference on Engineering Frontiers  
in Pediatric and Congenital Heart Disease**  
May 21–22, 2014  
Paris, France



Lucile Packard  
Children's Hospital  
**Stanford**

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## MAIN ORGANIZERS

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### **Irene Vignon-Clementel, PhD**

Permanent Research Scientist

REO Project-Team

INRIA Paris-Rocquencourt / Université Pierre-et-Marie-Curie

### **Jeffrey A. Feinstein, MD, MPH**

Department of Pediatrics (Cardiology) and Bioengineering

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## LOCAL ORGANIZERS

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### **Jessica M. Oakes, PhD**

REO project team

INRIA Paris Rocquencourt

### **Sanjay Pant, PhD**

REO project team

INRIA Paris Rocquencourt

**MAY 21, 2014**

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8:30 **Registration / Check-in**

9:00 **Welcome**

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**CARDIAC ELECTROPHYSIOLOGY**

**Session Chair: Anne Dubin, MD: Stanford, USA**

9:05 **Electrophysiology Device Therapy in Children and Patients with Congenital Heart Disease**  
*Scott Ceresnak, MD: Stanford, USA*

9:30 **Cardiac Electrophysiology Modeling from the Ion Channel to the Organ and Body Levels: Two Examples from Pharmacological and Clinical Studies**  
*Yvès Coudiere, PhD: INRIA, France*

9:55 **Simulating Venous Flow with Pacemaker/ICD Leads in Pediatric Patients**  
*Weiguang Yang, PhD: Stanford, USA*

10:20 **Pro-Arrhythmic Ventricular Remodeling in a Porcine Model of Repaired Tetralogy of Fallot**  
*Olivier Bernus, PhD: University Bordeaux Segalen, France*

10:45 **Forward and Inverse Problems in Computational Electrocardiology**  
*Jean-Frederic Gerbeau, PhD: INRIA, France*

11:10 **Coffee Break**

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**ANIMAL AND IN-VITRO EXPERIMENTS**

**Session Chair: Irene Vignon-Clementel, PhD: INRIA, France**

11:35 **Experimental Work on Right Ventricular Outflow Tract: From Clinical Issues to Animal Work And Back To Clinical Application**  
*Guiti Milani, MD: Necker-Enfants Malades Hospital, France*

12:00 **Distinct Roles of RhoA and Rac1 During Hemodynamic Remodeling of Embryonic Heart Valves**  
*Jonathan Butcher, PhD: Cornell University, USA*

12:25 **In Vitro Multi-Domain Modeling of the Univentricular Circulation**  
*Richard Figliola, PhD: Clemson University, USA*

12:50 **Analysis of Hemodynamic Stimuli, Persistent Vascular Changes and Gene Expression in a Rabbit Model of Human Aortic Coarctation and Repair**  
*John LaDisa, PhD: Marquette University, USA*

1:15 **Lunch**

2:15 **Direct in Vivo Imaging (Time-Lapse) of Cell to Organ Morphogenetic Coupling**  
*Vincent Fleury, PhD: Paris Diderot, France*

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**MAY 21, 2014** *Continued*

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**TETRALOGY OF FALLOT**

**Session chair: Silvia Schievano, PhD: UCL, UK**

- 2:40 **Tetralogy of Fallot: an Opportunity for Collaboration**  
*Adam Dorfman, MD: University of Michigan, USA*
- 3:05 **Efficient Blood Flow Simulations for the Design of Stented Valve Size Reducer  
in Enlarged Ventricular Outflow Tracts**  
*Alfonso Caiazzo, PhD: Weierstrass Institute, Germany*
- 3:30 **Coffee Break**
- 3:55 **Tetralogy of Fallot: Contribution of MRI and CT to Clinical Practice,  
Treatment Planning, and Research**  
*Frandics Chan, MD, PhD: Stanford, USA*
- 4:15 **Reduced-Order Statistical Models of Cardiac Growth and Motion in Tetralogy of Fallot Patients**  
*Maxime Sermesant, PhD: INRIA, France*

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**YOUNG INVESTIGATORS**

- 4:40 **Shape Atlas of the Surgically Reconstructed Aortic Arch in Patients  
with Hypoplastic Left Heart Syndrome**  
*Jan Bruse*
- 4:50 **Characterization of Avian Embryonic Cardiac Outflow Hemodynamics Through 3D-0D Coupling**  
*Stephanie Lindsey*
- 5:00 **Computational Modeling of First-Stage Shunt Hemodynamics:  
Novel Shunt Configurations, Diameter and Cerebral Great Vessels**  
*Senol Piskin*
- 5:10 **Poster Session-A**
- 5:40 **Poster Session-B**
- 6:10 **Poster Session-mingling**
- 6:30 **End of Day**

**MAY 22, 2014**

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8:30 **Registration / Check-in**

9:00 **Welcome**

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**RESPIRATORY AND CARDIOVASCULAR MODELING IN PRACTICE**

Session chair: Miguel Fernandez, PhD: INRIA, France

9:05 **An Analytical Formulation to Calculate Pressure Distributions of Gas Mixtures in an Infant Airway Morphology Model**

*Ira Katz, PhD: Air Liquide, France*

9:30 **Mathematical and Numerical Modelling of Some Aspects of Respiration**

*Celine Grandmont, PhD: INRIA, France*

9:55 **Unveiling the Mechanics of Healthy and Pathological Tracheobronchial Trees During Forced Expiration**

*Agnes Pradel, MD: AP-HP Groupe Hospitalier Pitié France*

10:20 **The Application of Computational Biomechanics in Clinical Science – Bicuspid Aortic Valve and Ross Procedure**

*Ryo Torii, PhD: UCL, England*

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**SINGLE VENTRICLE HEART**

Session chair: Francesco Migliavacca, PhD: Politecnico di Milano, Italy

10:45 **Leducq Transatlantic Network of Excellence in Multi-Scale Modeling of Single Ventricle Hearts for Clinical Decision Support**

*Tain-Yen Hsia, MD: Great Ormond Street Hospital, England*

11:10 **Coffee Break**

11:35 **Central and Modified Blalock-Taussig Shunts: CFD Patient-Specific Models**

*Giancarlo Pennati, PhD: Politecnico di Milano, Italy*

12:00 **Single Ventricle Heart Disease in the BME Laboratory**

*William DeCampli, MD: University of Central Florida, USA*

12:25 **Simulation of Assisted Bidirectional Glenn: Early Results and Future Directions**

*Alison Marsden, PhD: University of California, San Diego, USA*

12:50 **Patient-Specific Modeling-Based Assessment of Cardiovascular Function**

*Hao Liu, PhD: Chiba University, Japan*

1:15 **Lunch**

2:15 **Discussion/Prize-Giving Ceremony with Valérie Berthé, FSMP, France**

3:30 **Departure for Château de Versailles**

6:00 **Return of Shuttle from Château de Versailles**