



UC Davis Cardiovascular Symposium

Systems Approach to Understanding Cardiac Excitation-Contraction Coupling

Time: **2010 February 25**

Location: **UC Davis GBSF auditorium (451 Health Science Dr.)**

Organizing Committee:

Donald M Bers (Chair)

Dept. of Pharmacology

Ye Chen-Izu (contact)

Depts. of Pharmacology, Biomedical Engineering, and Medicine

Nipavan Chiamvimonvat

Dept. of Internal Medicine / Div. of Cardiology

Scott Simon

Dept. of Biomedical Engineering

Agenda:

The heart is an amazing and robust organ that can beat about 3 billion times in one's life span. At the same time, heart diseases such as arrhythmias and heart failure also present the No.1 killer. To develop better and more effective new therapies to combat heart diseases, it is critically important for scientists and physicians to gain more accurate and deeper understanding of the inner works of the heart. In the recent several decades, researchers have made important conceptual advances and accumulated large amounts of experimental data in studying how the heart works at molecular, cellular and whole organ levels. Now, the time has come to make a big, and necessary, step forward to integrate the experimental data into quantitative models which will allow using mathematical tools and computational power to unravel the dynamic interactions of the molecules and cells in the heart during health and diseases.

The focus of this symposium is on a very important and expanding research field - Systems Approach to Understanding Cardiac Excitation-Contraction (E-C) Coupling. A key of using systems approach is to closely combine experimental studies with mathematical modeling iteratively to achieve in-depth quantitative understanding of the dynamic systems. We strive to understand the inner workings and the interactions between the electrical system, the Ca^{2+} signaling system, and the muscle contractile system, which work together to control the rhythm and the strength of the heart beat.

This symposium will gather internationally renowned researchers in the field to accomplishing several goals.

1. Summarize the recent advancements in the field, Discuss the critical issue and controversies, and identify the most important questions for further research.
2. Facilitate the collaboration among the researchers in this field.
3. Introduce the world-class work in this field to the UC Davis community.

Program

- 8:30 – 8:45 AM** Coffee at GBSF lobby
- 8:45 – 9:00 AM** Welcome (by Donald M Bers) at GBSF auditorium
- 9:00 – 10:30AM** ***Session-I: Cardiac Electrical Excitation: AP, Ionic Currents, and Arrhythmia Mechanisms.***
- 9:00 – 9:30 **Antonio Zaza** - Experimental studies of cardiac electrophysiology
- 9:30 – 10:00 **Colleen Clancy** – Modeling cardiac action potential
- 10:00 – 10:30 **Nipavan chivimonvat** – Panel discussion: Critical issues & Controversies
Mark Cannell **Ye Chen-Izu**
Eric Sobie **Stefano Severi**
- 10:30 – 12:00PM** ***Session-II: Cardiac Ca²⁺ Signaling: Local Ca²⁺ Events and global Ca²⁺ dynamics in health and diseases.***
- 10:30 – 11:00 **Sandor Gyorke** – Experimental studies of cardiac Ca²⁺ signaling
- 11:00 - 11:30 **Leighton T Izu** – Modeling Ca²⁺ sparks and Ca²⁺ waves
- 11:30 – 12:00 **Jon Lederer** - Panel discussion Leader: Critical issues & Controversies
Bjorn Knollmann **Isaac Pessah**
Martin Morad **Scott Simon**
Ernst Niggli **Paul Allen**
Christian Soeller
- 12:00 – 1:00 PM** **Lunch** catered at GBSF Lobby for all attendees
- 1:00 – 2:30PM** ***Session-III: Ca²⁺ -calmodulin (CaM) – CaMKII signaling***
- 1:00 - 1:30 **Donald M Bers** – Experimental study of Ca²⁺-CaM–CaMKII modulation of cardiac ion currents, action potential, and Ca²⁺ induced arrhythmias
- 1:30 - 2:00 **Jeffery J. Saucerman** – modeling study of Ca²⁺-CaM-CaMKII effects on cardiac ionic currents and action potential
- 2:00 – 2:30 **Xander Wehrens** - Panel discussion Leader: Critical issues & Controversies
Laszlo Csernoch **Huang Tian Yang**
Thomas Shannon
- 2:30 – 4:00 PM** ***Session-IV: Multi-scale Study of Arrhythmias in Whole Heart***
- 2:30 - 3:00 **Igor R. Efimov** – Biophotonic imaging of the whole heart excitation
- 3:00 – 3:30 **Natalia A. Trayanova** – multi-scale modeling of the heart
- 3:30 – 4:00 **James Weiss** - Panel discussion Leader: Critical issues & Controversies
Alain Karma **Kenneth Laurita**
Crystal Ripplinger

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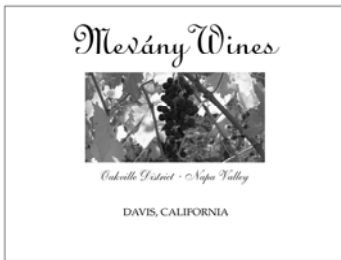
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