

VCU/NHLBI Workshop on Computational Modeling and Simulation of Cardiovascular and Cardiopulmonary Dynamics

<http://www.vcu.edu/csbc/nhlbi/>

Saturday, 23 February 2008:

Students Arrive

- 05:00pm – 06:00pm
- 06:00pm – 09:00pm
- 06:30pm – 07:30pm

Registration: Lewis Ginter Botanical Garden

Dinner: Welcome, Administrivia

Presentation: *How a Simple Country Doctor Got Mixed Up With Computational Modeling* (Kevin Ward, VCU)

Sunday, 24 February 2008:

VCU Trani Life Sciences Bldg, Room 104 Teaching Room

- 07:00am – 08:00am
- 08:00am – 09:30am
- 09:30am – 10:00am
- 10:00am – 10:30am
- 10:30am - 12:00n
- 12:00n - 01:00pm
- 01:00pm - 02:30pm
- 02:30pm – 03:00pm
- 03:00pm – 04:30pm
- 04:30pm – 06:00pm
- 06:00pm – 09:00pm

Breakfast: Participant Introductions, Brief Overview

Lecture: *Understanding Modeling & Simulation, Classes & Types of Models* (Tarynn M. Witten, VCU)
Questions & Discussion

Coffee Break: Networking & Continued Discussion

Lecture: *The Development and Use of a Thoracic Model to Assess Cardio-pulmonary Functions Using Electrical Impedance Measures* – (Robert Patterson, U of Minnesota)

Lunch: *Catered Lunch*

Lecture and Lab: *Issues in Computational Cardiac Electrophysiology* (John Wesley Cain, VCU)

Coffee Break: Networking & Continued Discussion

Lecture and Lab: *Black Box Modeling* (David Primeaux, VCU)

Break: *Discussion, Decompression & Exploration* of the Center for the Study of Biological Complexity

Dinner: *The Role of Computer Modeling of Physiologic Systems in Modern Biomedical Research* – (Richard Summers, U of Mississippi)

Monday, 25 February 2008:

VCU Trani Life Sciences Bldg, Room 104 Teaching Room

- 07:00am – 08:00am
- 08:00am – 09:30am
- 09:30am – 10:00am
- 10:00am – 10:30am
- 10:30am - 12:00n
- 12:00n - 01:00pm
- 01:00pm - 02:30pm
- 02:30pm – 03:00pm
- 03:00pm – 04:30pm
- 04:30pm – 06:00pm
- 06:00pm – 09:00pm

Breakfast

Lecture: *Towards Patient-Specific Direct Numerical Simulations of Cardiovascular Hemodynamics* - (Fotis Sotiropoulos, U Minnesota)
Questions & Discussion

Coffee Break: Networking & Continued Discussion

Lecture: *Fluid Mechanics Fundamentals of the Cardiovascular and Pulmonary Systems: Transport Phenomena from the Macro-to the Micro-to the Nano Scales – 1* (Mohamed Gad el-Hak, VCU)

Lunch: *Catered Lunch*

Lecture and Lab: *Heart and Lung Tissue Modeling and Simulation* (Ramana Pidaparti, VCU)

Coffee Break: Networking & Continued Discussion

Lecture and Lab: *Networks: The Language of the Living Cell: Part 1*(Danail G. Bonchev, VCU)

Break: *Discussion, Decompression & Exploration*

Dinner: *Responsible Conduct of Research* (Francis Macrina, VCU)

Tuesday, 26 February 2008:	VCU Trani Life Sciences Bldg, Room 104 Teaching Room
<ul style="list-style-type: none">• 07:00am – 08:00am• 08:00am – 09:30am• 09:30am – 10:00am• 10:00am – 10:30am• 10:30am - 12:00n• 12:00n - 01:00pm• 01:00pm - 02:30pm• 02:30pm – 03:00pm• 03:00pm – 04:30pm• 04:30pm – 06:00pm• 06:00pm – 09:00pm	Breakfast Lecture: <i>Multi-scale Models of Cardiac Arrhythmias</i> (Zhilin Qu, UCLA Medical Center) Questions & Discussion Coffee Break: Networking & Continued Discussion Lecture: <i>Fluid Mechanics Fundamentals of the Cardiovascular and Pulmonary Systems: Transport Phenomena from the Macro-to the Micro-to the Nano Scales – 2</i> (Mohamed Gad el-Hak, VCU) Lunch: <i>Catered Lunch</i> Lecture and Lab: <i>Real-time Simulation of Protein-Protein & Peptide-Peptide Interactions</i> (Michael Peters, VCU) Coffee Break: Networking & Continued Discussion Lecture and Lab: <i>Introduction to Matlab</i> (Dianne Pawluk, VCU) Break: <i>Discussion, Decompression & Exploration</i> Dinner: <i>NIH/NHLBI Grant Opportunities</i> – (Jennifer Larkin, Program Director, Advanced Technologies & Surgery Branch, NIH/NHLBI)
Wednesday, 27 February 2008:	VCU Trani Life Sciences Bldg, Room 104 Teaching Room
<ul style="list-style-type: none">• 07:00am – 08:00am• 08:00am – 09:30am• 09:30am – 10:00am• 10:00am – 10:30am• 10:30am - 12:00n• 12:00n - 01:00pm• 01:00pm - 02:30pm• 02:30pm – 03:00pm• 03:00pm – 04:30pm• 04:30pm – 06:00pm• 06:00pm – 09:00pm	Administrivia, Breakfast Lecture: <i>Modeling Cardiovascular Dynamics and Patient Specific Model Validation</i> – (Mette Olufsen, NC State) Questions & Discussion Coffee Break: Networking & Continued Discussion Lecture: <i>Multi-Component Models with Fluid-Structure Interactions for Human Carotid Artherosclerotic Plaques Assessment and Rupture Predictions</i> – (Dalin Tang, Worcester Polytechnic Institute) Lunch: <i>Catered Lunch</i> Lecture and Lab: <i>Cellular Automata Modeling of Biological Systems</i> (Monty Kier, VCU) Coffee Break: Networking & Continued Discussion Lecture and Lab: <i>Compartmental & Physiological Pharmacokinetic & Phamacodynamic Modeling</i> (Jurgen Venitz, VCU) Break: <i>Discussion, Decompression & Exploration</i> Dinner: <i>TBI – Pending</i>
Thursday, 28 February 2008:	VCU Trani Life Sciences Bldg, Room 104 Teaching Room
<ul style="list-style-type: none">• 07:00am – 08:00am• 08:00am – 09:30am• 09:30am – 10:00am• 10:00am – 10:30am• 10:30am - 12:00n• 12:00n - 01:00pm	Breakfast Lecture: <i>Control of Local Dynamics in Cardiac Tissue</i> – (Robert F. Gilmour, Jr., Cornell University) Questions & Discussion Coffee Break: Networking & Continued Discussion Lecture: <i>Patient-Specific MRI-Based 3D FSI Anisotropic Multi-Layer RV/LV/Patch Models for Pulmonary Valve Replacement Surgery Optimization</i> – (Dalin Tang, Worcester Polytech) Lunch: <i>Catered Lunch</i>

- 01:00pm - 02:30pm **Lecture and Lab:** *Computational Fluid Dynamics Modeling of Cardiopulmonary Systems with Applications to Local Particle Deposition and Dose* (Worth Longest, VCU)
- 02:30pm – 03:00pm **Coffee Break:** Networking & Continued Discussion
- 03:00pm – 04:30pm **Lecture and Lab:** *Overview & Introduction to Mathematica – Correlation & Scaling in Cardiac Dynamics – 1* (Marilyn Bishop & Tom McMullen, VCU)
- 04:30pm – 06:00pm **Break:** *Discussion, Decompression & Exploration*
- 06:00pm – 09:00pm **Dinner:** *NSF Grant Opportunities* – (Mary Ann Horn, Director, Mathematical Biology, NSF)

Friday, 29 February 2008:

VCU Trani Life Sciences Bldg, Room 104 Teaching Room

- 07:00am – 08:00am **Breakfast**
- 08:00am – 09:30am **Lecture:** – Signal and Image Processing for Medicine and Biology (Kayvan Najarian, VCU)
Questions & Discussion
- 09:30am – 10:00am **Coffee Break:** Networking & Continued Discussion
- 10:00am – 10:30am **Lecture:** - *Heart Rate Variability* - (Malvin C. Teich, Boston University)
- 10:30am - 12:00n **Lunch:** *Catered lunch*
- 12:00n - 01:00pm **Lecture and Lab:** *Simulating Ordinary Differential Equations in Matlab* (Dianne Pawluk, VCU)
- 01:00pm - 02:30pm **Coffee Break:** Networking & Continued Discussion
- 02:30pm – 03:00pm **Lecture and Lab:** *Overview & Introduction to Mathematica – Correlation & Scaling in Cardiac Dynamics – 2* (Marilyn Bishop & Tom McMullen, VCU)
- 03:00pm – 04:30pm **Break:** *Discussion, Decompression & Exploration*
- 04:30pm – 06:00pm **Dinner:** *Surgical Simulation* – (Mark W. Bowyer, National Capitol Area Medical Simulation Center)
- 06:00pm – 09:00pm

Saturday, 1 March 2008:

VCU Trani Life Sciences Bldg, Room 104 Teaching Room

- 07:00am – 08:00am **Breakfast**
- 08:00am – 09:30am **Lecture:** – *Integrative Computer Modeling in Cardiac Electrophysiology* – (A.V. Panfilov, Utrecht University, The Netherlands)
Questions & Discussion
- 09:30am – 10:00am **Coffee Break:** Networking & Continued Discussion
- 10:00am – 10:30am **Lecture:** *TBD* – (Michael Sacks, U Pittsburgh)
- 10:30am - 12:00n **Lunch:** *Catered Lunch*
- 12:00n - 01:00pm **Lecture:** *Modeling Cardiac Mechanics: Surgical Interventions* – (Julius Guccione, UCSF)
- 01:00pm - 02:30pm **Coffee Break:** Networking & Continued Discussion
- 02:30pm – 03:00pm **Lecture and Lab:** *Networks: Language of the Living Cell – 2* (Danail G. Bonchev, VCU)
- 03:00pm – 04:30pm **Break:** *Discussion, Decompression & Exploration*
- 04:30pm – 06:00pm **Workshop Closing Banquet Dinner:** Stone Barn House, Maymont Park, *Cardiac Electrophysiology* – (Robert Macleod, U of Utah)
- 06:00pm – 09:00pm

Sunday, 2 March 2008:

Students Depart