Multiscale Methods and Validation in Medicine and Biology II: Biomechanics and Mechanobiology
February 13-14, 2014
Berkeley, California
Sutardja Dai Hall (CITRIS), Room 310, University of California-Berkeley Campus

Thursday, February 13

8:15-8:20 Welcome

8:20 - 8:40 Modeling dynamic reorganizations of lipid bilayers
Marino Arroyo

8:40 - 9:00 Investigation of potential hemodynamics factors influencing thrombus deposition in abdominal aortic aneurysms
Amirhossein Arzani, Ga Young Suh, Ronald L. Dalman, Shawn Shadden

9:00 - 9:20 Two-Layer Modeling of Red Blood Cells to Explore Hemolysis Pathways and Membrane Dynamics
Hussein Ezzeldin, Marcos Vanella, Elias Balaras

9:20 - 9:40 Model of Mechanical Signal Transmission via Actin Stress Fibers
Cecile Gouget, Youngyun Hwant, Abdul Barakat

9:40 - 10:00 A hierarchical multi-scale method to identify skin thermal microenvironment during cauterization
Elisa Budyn, Sagar Bhogle, Steve Lacey, J. Radosevich, M. Colvard

10:00 - 10:20 Combining Laser Nanosurgery and FRET to Measure the Tention Distribution of Single Stress Fibers at the Cell-Matrix Interface
Ching-Wei Chang, Sanjay Kumar

10:20 - 10:40 Break - Atrium

10:40 - 11:00 Cell-scale Strain fields as patterning factors in organogenesis
Brian Cox, Malcolm L. Snead, David Smith

11:00 - 11:20 Traction forces in cell mechanics: To 3D and beyond
Juan C. del Alamo

11:20 - 11:40 The Knowledgebase of Interatomic Models: An online source for standardized testing and long-term warehousing of interatomic models and data
Ryan Elliott, Eliad Tadmor, James Sethna, Trevor Wennblom, Alexander Alemi, Matthew Bierbaum, Adam Ludvik

11:40 - 12:00 The Mechanics of Chronic Airway Obstruction
Mona Eskandari, Martin Pfaller, Ellen Kuhl

12:00 - 1:00 Lunch - Atrum

1:00 - 1:20 Elasticity and the shape of prevascular tumors
K.L. Mills, S.S. Rudraraju, R. Kemkemer, Krishna Garikipati
1:20 - 1:40  
*Modeling invasive cellular growth*
Amir Sanati Nezhad, Ghanbari Mahmood, Mutukumaran Packirisamy, Anje Geitmann

1:40 - 2:00  
*MRI strain-based validation of patient-specific computational models of human hearts*
Martin Genet, Lik Chuan Lee, Rebecca Nguyen, Zhihong Zhang, Liang Ge, Julius Guccione

2:00 - 2:20  
*Changing Material Properties of the Remodeling Tree Scelera in Myopia*
Rafael Grytz, John T. Siegwart, Thomas Norton

2:20 - 2:40  
*Signatures of protein structure in the organization and cooperative function of mechanosensitive membrane proteins*
Osman Kahraman, William Klug, Christoph Haselwandter

2:40 - 3:00  
*Effects of Streaming and piezoelectric potential on electroviscous flow in a lacunar-canalicular channel*
Sungki Min, Hunhee Kim, Junghwa Hong

3:00 - 3:20  
Break - Atrium

3:20 - 3:40  
*Whole heart cardiac electromechanics: Verification and Validation Criteria*

3:40 – 4:00  
*A thermodynamically consistent finite deformation model for the coupled diffusion in double network gels at a swollen reference*
Andreas Krischok, Christian Lender

4:00 - 4:20  
*Force-Dependent Mechanical Properties of Dendritic Actin Networks*
Tai-De Li, Peter Bieling, Dyche Mullins, Daniel Fletcher

4:20 - 4:40  
*A non-equilibrium thermodynamic treatment of the mechano-chemistry governing cytoskeletal force generation*
Mirko Maraldi, Krishna Garikipati

4:40 - 5:00  
*Effect of protein-induced spontaneous curvature on membrane surface tension*
Kranthi Mandadapu, Padmini Rangamani, George Oster

5:30  
*Workshop Dinner – Berkeley Faculty Club*
Friday, February 14

8:00 - 8:20  **Multiscale Mechanobiology of the Nuclear Pore Complex**  

8:20 - 8:40  **Tensional homeostasis in single fibroblasts**  
Win Pin Ng, Kevin D. Webster, Daniel A. Fletcher

8:40 - 9:00  **Multiscale Mechanics of the Intervertebral Disc**  
Grace O’Connell

9:00 - 9:20  **The Dynamics of Trees: Growth and Stability**  
Oliver O’Reilly

9:20 - 9:40  **Biomechanical Imaging and its Applications in Biomechanics and Mechanobiology**  
Tengxiao Liu, Elizabete R. Ferreira, D. Thomas Seidl, Paul Barbone, and Assad A. Oberai

9:40 - 10:00  **Topology optimization for designing patient-specific macroscopic craniofacial implant and current effort in microstructure design**  
Jaejong Park, Alok Sutradhar, Michael Miller

10:00 - 10:20  **What drives conformational strain in viruses?**  
Luigi Perotti, William Klug, Ankush Aggarawal, J. Rudnick, R. Bruinsma

10:20 - 10:40  **Break - Atrium**

10:40 - 11:00  **A New Continuum Model Incorporating Patient-Specific Statistical Fiber Orientations Proides Insight on Structure-Function Relation**  
David Pierce, Michael Unterberger, Werner Trobin, T. Ricken, G.A. Holzapfel

11:00 - 11:20  **Electrostatic effects in the mechanics of cell membranes**  
Prashant Purohit

11:20 - 11:40  **Modeling flow-diverter stents with image-based CFD**  
Vitaliy Rayz, Gabriel Acevedo-Bolton, Van Halbach, David Saloner

11:40 - 12:00  **A Two-Scale Fully Coupled Function-Perfusion Model for Liver Lobules Including Anisotropic Perfusion and Hepatic Cell Metabolism**  
Tim Ricken, Daniel Werner, Hergo Holzhutter, M. König, U. Dahmen, O. Dirsch

12:00 - 1:00  **Lunch – Atrium**

1:00 – 1:20  **A computational multiscale modelig approach for fibrillar adhesives**  
Roger A. Sauer, Janine C. Mergel

1:20 – 1:40  **Flow physics in the human left ventricle**  
Shawn Shadden, Sahar Hendabadi, Juan Carlos del Alamo

1:40 – 2:00  **Physical Modeling of Chromosome Segregation in Bacteria Reveals Impact of Force and DNA Relaxation**  
Thomas Lampo, Nathan Kuwada, Paul Wiggins, Andrew Spakowitz
2:00 – 2:20  Cellular Pressure and Volume Regulation and Implications for Cell Mechanics and Cell Motility
Hongyuan Jiang, Kimberly Stroka, Konstantino Konstantopoulos, Sean Sun

2:20 – 2:40  Experimental and computational investigations into cooperative cargo transport by mixtures of kinesins from different families
Goker Arpag Shankar Shastry, William O. Hancock, Erkan Tuzel

2:40 – 3:00  Validation and Uncertainty Quantification for Macroscale Soft Tissue Constitutive Models
Kumar Vemaganti, Bhargava Sista, Sandeep Madireddy

3:00 – 3:20  Break - Atrium

3:20 – 3:40  Model of Aneurysmal Enlargement Based on Biomechanical Processes in Intraluminal Thrombus
Lana Virag, John Wilson, Vedran Vindis, Igor Karsaj, Jay D. Humphrey

3:40 – 4:00  Electromagnetic and biotissue across multiple frequency and intensity regimes
Tarek Zohdi