Multiscale Methods and Validation in Medicine and Biology I: Biomechanics and Mechanobiology	
Sunday, February 12	
4:00 pm - 7:00 pm	**Registration in Embassy Suites Lobby**
5:30 pm - 7:30 pm	**Reception - Lobby area**

	Monday, February 13	
7:00 am	**Registration in front of Marin and Contra Costa meeting rooms**	
	Marin	**Contra Costa**
Session M1	**Mechanobiology at the molecular, cellular, tissue and organ levels**	**Biomolecular motors and force generation**
7:30 - 7:50	**C-L. Guo,** M. Ouyang, J.-Y. Yu *Long-range Mechanical Force Enables Scaffold-free Self-assembly of Epithelial Tubule*	**S. Klumpp** *Tug-of-War: Mechanical Coordination of Molecular Motors*
7:50 - 8:10	**A. Sakuma** *Measurements of Mechanical Properties of Thin Soft-Tissue by Spherical Indentation imitating Palpation*	**J. Baker**, D. Jackson, M. Motarjemi *Multi-scale Models of Collective Force Generation by One and Many Myosin Molecules in Muscle*
8:10 - 8:30	**M. Haider** *Mixture Models for Cartilage Tissue Engineering in Biomaterial Scaffolds Seeded with Chondrocytes*	**M. Diehl**, J. Driver, K. Jamison *Predicting Cooperative Dynamics of Motor Proteins from Single-motor Measurements*
8:30 - 8:50	**H. Hatami-Marbini**, E. Etebu *Mechanical Response of Corneal Connective Tissue to External Loadings*	**S. Walcott** *Ensemble Myosin Behavior Emerges from Single Molecule Properties*
8:50 - 9:10	**S. Reese**, J. Weiss *Multiscale Micromechanical Model of a Collagen-based Composite: Development and Validation*	**H. Hess** *Modeling Nanodevices and Self-assembly Processes Driven by Biomolecular Motors*
9:10-9:40	*Round Table Discussion (Leaders: Hamed Matami-Marbini and Sandra Rugonyi)* Poster: T. Siegmund, **P. Bhattacharya**, J. Kelleher -Multiphysics and Multiscale Simulation of Phonation: Analyzing the Effects of Smoking on Phonation	*Round Table Discussion (Leaders: Jung-Chi Liao, Henry Hess)* Poster*:* **U. Shrestha,** C. Yu, S. Gross - Wall Effect in Axonal Transport: A TheoreticalSstudy; **Z. Jia**, S. Tripathy, S. Gross, C.Yu - Measurement of Binding Rates of Kinesin onto Microtubules at the Single Molecule Level
9:40 - 10:00	**Break**	
	Marin	**Contra Costa**
Session M2	**Mechanobiology at the molecular, cellular, tissue and organ levels**	**Biomolecular motors and force generation**
10:00-10:20	**E. Kuhl**, O. Abilez, J. Wong *Cardiac Optogenetics: Turning Light into Force*	**Zev Bryant** *Engineering Controllable Molecular Motors*
10:20-10:40	**S. Rugonyi**, K. Thornburg *Influence of Hemodynamic Conditions on Cardiac Development*	**C.-H. Kiang** *Single-Molecule Force Signature as a Probe for Dynamic States of DNA and Proteins*
10:40-11:00	**B. Cox** *Strain-cued Collective Response in Cell Populations during Organogenesis*	**J-W. Chu** *Protein Allostery at the Solid-liquid Interface*
11:00-11:20	**C.A. Figueroa**, J. Humphrey *Computer Simulations of Hemodynamic Alterations & Remodeling of the Upper Body Vascular Beds Following Distal Aortic Coarctation*	**B. Grant** *Biomolecular Motors and Switches: From Machines to Drugs*
11:20-11:40	**E. Budyn,** J. Jonvaux, T. Hoc *Analysis of Diffuse Damage Near Microcracks in Human Haversian Cortical Bone using Physical Imaging*	**G. Oster** *Mysterious Bacterial Motilities* (until 11:50)
11:40-12:10	*Round Table Discussion (Leaders: Sandra Rugonyi and Ellen Kuhl)*	*Round Table Discussion (Leaders: Zev Bryant, Chih-Wei Chu)*
12:10 pm - 1:20 pm	**Lunch Session** **Grace Peng, NIH**	

	Marin	Contra Costa
Session M3	**Mechanobiology at the molecular, cellular, tissue and organ levels**	**Biomolecular motors and force generation**
1:20-1:40	**T. Zohdi**, F. Kuypers, W.C. Lee *Computational Estimation of Red Blood Cell Volume Fraction from Overall Permittivity Measurements*	**W. Hwang**, S. Lakkaraju *Physical Mechanism for the Directionality of the Ncd Motor*
1:40-2:00	**H. Jiang,** S. Sun *Mechanical Control of Bacterial Cell Shape*	**C. Hyeon** *A Structural Perspective on the Dynamics of Kinesin Motors*
2:00-2:20	**S. Yamada** A. Uemura, T-N Nguyen, A. Steele *Traction Force-induced Recruitment of Zyxin*	**A. Kolomeisky** *Can we Understand Complex Dynamics of Motor Proteins using Simple Models?*
2:20-2:40	**D. Fletcher** *Mechanical Regulation of Actin Network Assembly*	**A. Vilfan** *Mechano-chemical Models for Motor Proteins*
2:40-3:00	**M. Hinds,** K. Vartanian, D. Anderson *The Role of Cytoskeletal Elongation on Endothelial Cell Extracellular Matrix Production and Immunogenicity*	R. Erickson, S. Gross, **C. Yu**, *Regulation of Switching Between Filaments in Intracellular Transport*
3:00-3:30	*Round Table Discussion (Leaders: Sean Sun and Dan Fletcher)*	*Round Table Discussion (Leaders: Wonmuk Hwang, Anatoly Kolomeisky)*
3:30 pm - 3:50 pm	**Break**	
	Marin	Contra Costa
Session M4	**Mechanobiology at the molecular, cellular, tissue and organ levels**	**Multiscale mechanics of biological membranes, films and filaments**
3:50 - 4:10	**F. Vernerey** *The Role of Mechanics in the Organization Stress-fiber like Structures in Contractile Cells*	**W. Hwang**, W. Leow *Ordered Assembly of Collagen on Mica Surfaces*
4:10 - 4:30	**S. Kumar** *Thinking locally: The importance of Physical Microenvironmental Heterogeneity in Governing Tumor Cell Motility*	**G. Grason,** A. Azadi, I. Bruss *Optimal Packing in Twisted Filament Bundles*
4:30 - 4:50	**R. Kaunas,** S. Deguchi *Tensional Homeostasis in a Dynamic Mechanical Environment*	**P. Purohit** *Entropic Elasticity of Fluctuating Filament Networks*
4:50 - 5:10	**G. Meacci,** S. Liu, T. Iskratsch, S. Ghassemi, P. Roca-Cusachs, A. Mathur, A.C. Chander, E. Tabdanov, N. Gauthier, J. Hone, M.P. Sheetz *Actomyosin Organization and Rigidity Sensing in Spreading Cells*	**H. Kim,** T. Le *Measuring Sequence-dependent DNA Looping Kinetics*
5:10 - 5:30	D. Fletcher, **K. Webster** *Response of Contractile Cells to Dynamic Mechanical Signals*	**Q. Cui** *Coarse-grained Models of Biomembranes and Their Interaction with Peptides/Proteins*
5:30 - 6:00	*Round Table Discussion (Leaders: Franck Vernerey and Roland Kaunas)* Poster - **Y. Zhang**, A. Sakuma, H. Nakadate, S.-Aomura-Study on Evaluation of Viscoelastic Properties and Young's Modulus of Cultered Nerve Cells	*Round Table Discussion (Leaders: Wonmuk Hwang, Sean Sun)*
7:00 pm	**Conference dinner - hotel restaurant**	

	Tuesday, February 14	
7:00 am	Registration in front of Marin and Contra Costa meeting rooms	
	Marin	**Contra Costa**
Session T1	**Mechanobiology at the molecular, cellular, tissue and organ levels**	**Multiscale biofluid mechanics and mass transport**
7:30 - 7:50	**C. Wolgemuth** *Modeling Cell Movements from Single Cells to Wound Healing*	**P. Decuzzi,** T.R. Lee, T. Novellino, A. van den Ven, G. Adriani, W.K. Liu *Nanoparticle Dynamics within the Microcirculation: Theory and Experiments*
7:50 - 8:10	**B. Alvarez-Gonzalez,** J. del Alamo, R. Meili, A.L Baldomero, R.A. Firtel, J.C. Lasheras *Three Dimensional Traction Forces Exerted by Migrating Amoeboid Cells*	**W.K. Liu,** T.R. Lee, A. Kopacz, H. Kim, Y. Li, P. Decuzzi, J.-H. Chung *Multiscale Framework for Biomedical Simulation by Molecular Dynamics and Immersed Molecular Electrokinetic Finite Element Method*
8:10 - 8:30	**A. Rowat** *Probing Cell Nucleus Shape and Effects on Whole Cell Deformability*	**T.R. Lee,** P. Decuzzi, W.K. Liu *Modeling the Vascular Behavior of Circulating Nanoparticles*
8:30 - 8:50	**A. Pathak,** S. Kumar *A Multiscale Model of Cell Adhesion and Migration on Extracellular Matrices of Defined Stiffness and Adhesivity*	**A. Kopacz,** J-H. Chung, W.K. Liu *Biosensor Analysis using the Immersed Molecular Electrokinetic Finite Element Method*
8:50 - 9:10	**K. Garikipati,** V. Jaguste, S.S. Rudraraju, M. Maraldi *Hierarchical Models for Cancer Cell Motility and Locomotion*	**S. Hossain,** T. Hughes, M. Ferrar, P. Decuzzi *Predicting Patient-specific Vascular Distribution for Nanoparticles*
9:10-9:40	*Round Table Discussion (Leaders: Krishna Garikipati and Roland Kaunas)*	*Round Table Discussion (Leaders J. Chung and A. Kopacz)*
9:40 - 10:00	**Break**	
	Marin	**Contra Costa**
Session T2	**Multiscale mechanics of biological macromolecules in health and disease**	**Multiscale biofluid mechanics and mass transport**
10:00-10:20	**M. Bathe** *Towards an Integrated Finite Element Framework for Proteins, Macromolecular Assemblies, and DNA Nanotechnology*	**J.-H. Kim**, W.H. Yeo, Z. Shu, S. Solberg, S. Inoue, D. Kalyanasundaram, J. Ludwig, K. Weigel, C. Furlong, J. Riley, G. Cangelosi, K. Oh, K-Y. Lee, D. Gao, J.-H. Chung *Microtip Based 3-dimensional Microfluidic System for Rapid TB Diagnosis*
10:20-10:40	**A. Aggarwal,** J.-S. Chen *Calculating Non-uniform Elastic Properties of Proteins using MD-continuum Single Step Homogenization*	**P. Weinberg,** V. Peiffer, S. Sherwin *Arterial Blood Flow and Macromolecular Transport Phenomena Across Scales*
10:40-11:00	S. Kumar, **J. Mackay** *Dissecting and Genetically Engineering Microscale Tensional Homeostasis in Living Cells*	**C. Misbah** *Vesicles and Red Blood Cells Dynamics in the Microvasculature*
11:00-11:20	**E. Rodrigues Ferreira,** S. Goenezen, P. Barbone, A. Oberai *Inferring Microstructural Tissue Properties in Healthy and Cancerous Tissues via Elasticity Imaging*	**A. Barakat,** G. Vilaplana *Flow Disturbance around Dynamically Interacting Aortic Junctions*
11:20-11:40	*Round Table Discussion (Leaders: M. Bathe and W. Klug)*	**D. Rumschitzki**, S. Joshi, K-M Jan *Interplay of Flow and Onotically Active Solute Transport Across the Arterial Endothelium: Hydraulic Conductivity Masking and Relevance to Atherogenesis*
11:40-12:10	Poster: S. Na, G. Yoon, K. Eom, J.I. Kim, **M-S. Lee** - Mechanical Characterization of Amyloid Protein using Mass-spring Network	*Round Table Discussion (Leaders D.Kim and S. Keten)* Poster: **H.-B. Lee -** Cilia-induced microfluidic device for biosensors and bioreactors
12:10 pm - 1:20 pm	**Lunch**	

	Marin	Contra Costa
Session T3	**Multiscale mechanics of biological macromolecules in health and disease**	**Multiscale biofluid mechanics and mass transport**
1:20-1:40	**E. Tuzel,** K. Lemoi, A. O'Neill, K.E. Daly, Z. Shen, Y.-C. Liu, L. Vidali *Coarse-grained Model of Cooperative Cargo Transport in Living Cells*	**E. Fried,** A. Embar, W. Jiang, J. Dolbow *Modeling the Evolution of Microdomains in Giant Unilamellar Vesicles with a Phase-field Approach*
1:40-2:00	**A. Spakowitz,** E. Koslover *Force Fluctuations Impact Genome Processing Kinetics*	**M. Gomez-Gonzalez,** J. del Alamo Dynamics of a Microsphere in an Anisotropic Gel: A Frontier in Intracellular Microrheology
2:00-2:20	**D. Vavylonis,** N. Ojkic, D. Laporte, J.-Q. Wu *Model of Condensation of an Actomyosin Network into a Contractile Ring for Fission Yeast Cell Division: The Effects of Actin Cross-Linkers Alpha-Actinin and Fimbrin*	**S. Han,** N. Sniadecki *Traction Forces During Cell Migration Predicted by the Multiphysics Model*
2:20-2:40	**W. Klug** *Elasticity Theory of Functional Macromolecular Aggregates*	**D.-H. Kim,** E. Lipke, P. Kim, R. Cheong, S. Thompson, M. Delannoy, K-Y Suh, L. Tung, A. Levchenko *Nanoscale Cues Regulate the Structure and Function of Macroscopic Cardiac Tissue*
2:40-3:00	*Round Table Discussion (Leaders: M. Bathe, W. Klug)*	**D. Kalyanasundaram** *Reversible Binding of DNA on a Nanotip for Rapid Preparation of Genomic DNA from Saliva*
3:00-3:30		*Round Table Discussion (Leaders: D. Kim and S. Ketan)* Poster - **W. Chen,** M. Lisowsk**i,** I. Sweet, A. She**n -** *Microencapsulated 3D O2 Sensor in Single Pancreatic Islets*
3:30 - 3:50	**Break**	
	Marin	**Contra Costa**
Session T4	**Multiscale mechanics of adhesion/Mechanics of bioanoporous mechanics**	**Multiscale biofluid mechanics and mass transport**
3:50 - 4:10	**E. Craig**, P. Forscher, M. Gardel, and A. Mogliner *Modeing and Experimental Investigatioin of Cytoskeleton Dynamics at the Leading Edge of Cells*	**S. Keten,** W. Stroberg, W.K. Liu *Probing the Dynamics of Functional Nanotubes in Nanochannels through Coarse-grained Molecular Dynamics Simulations*
4:10 - 4:30	**S. Li,** H. Fan *Simulations of Adhesion and Spreading of Cells*	**A. Shen,** D. Lu, G. Cao, J. Cardiel *Microfluidics Enhanced Enzyme Immobilization for Sensitive H202 Biosensing*
4:30 - 4:50	**S. De,** A. Zamiri *Modeling of nanoporous protein crystals*	**Y. Li** *Self-assembling of Hybrid Carbon Nanotube/Silicon Fibers under Electrical Field and Capillary Force*
4:50 - 5:10	**A. To,** J. Tao, D. Mohammadyani *Validation of an InteratomicPotential for Hexagonal Hydroxyapatite Crystal in Tooth Enamel*	**Y. Lian,** M. Zhang, C. Harnett, E. Brehob *Investigation of Hydrodynamic Focusing in a Microfluidic Coulter Counter Device*
5:10 - 5:30	*Round Table Discussion (Leader: Suvranu De, Shoafan Li)*	**B. Fu**, L. Zhang, J. Fan, P. Guo *Experimental and Theoretical Studies on Nanoparticle Transport Across the Blood Brain Barrier*
5:30 - 6:00		*Round Table Discussion (Leaders J. Chung and A. Kopacz)*
6:00 pm	**Closing**	