



Complex biomedical modeling efforts include predictive multiscale simulations consisting of different submodels at each scale, scalable parallelism for heterogeneous dynamical simulations, a data-rich environment with experimentally determined model parameters and, finally, distributed multidisciplinary research teams and resources. The goal of this workshop is to bring together researchers in biomedical field, biochemistry, bioengineering, biology, computational and mathematical biology and biophysics to discuss recent developments in biomedical modeling and experimental as well as current and possible future collaborations. Some of the topics to be discussed are: thrombus formation, bioimaging, study of osteoporosis.

The Interdisciplinary Center for the Study of Biocomplexity investigates the complex structures and behaviors that arise from the interaction of biological entities (molecules, cells, or organisms). While physical and chemical processes give rise to a great variety of spatial and temporal structures, the complexity of even the simplest biological phenomena is infinitely richer. The goal of the center is to meld physical, mathematical, and computational approaches with those of modern biology to understand this complexity in a quantitative and predictive way.

### Registration

There is no registration fee. However, registration is required. Registration includes all meeting materials, refreshments and most meals. Please register at [www.nd.edu/~icsb](http://www.nd.edu/~icsb). Information on hotel accommodations is listed there.

### Organizers

Mark Alber, University of Notre Dame  
Holly Goodson, University of Notre Dame  
Danny Chen, University of Notre Dame  
Glen Niebur, University of Notre Dame  
Elliot Rosen, Indiana University School of Medicine

### For Further Information

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# Workshop on Interdisciplinary Biomedical Research

March 1–3, 2009 (Sunday–Tuesday)  
University of Notre Dame



## Sunday March 1, 2009

### All Day Location – McKenna Hall Auditorium

11:30–12:30 Registration

12:30–1:00 **Victoria Ploplis**, Associate Director, W. M. Keck Center for Transgene Research, University of Notre Dame, “Hemostasis Proteins in Nonhemostasis-related Functions – Lessons Learned from Gene Knock-out Models”

1:00–1:30 **Vikas Tomar**, Department of Aerospace and Mechanical Engineering, “Hierarchy Correlations in Atomistic Mechanics of Collagen Hydroxyapatite Biomimetic Composites and Its Relation to Bone Modeling and Experiments”

1:30–2:00 **Jeffrey Peng**, Department of Chemistry and Biochemistry, University of Notre Dame, “TBA”

2:00–2:15 **Coffee Break**

2:15–2:45 **Shahriar Mobashery**, Department of Chemistry and Biochemistry, University of Notre Dame, “Bacterial Cell Wall”

2:45–3:15 **Elliot Rosen**, Division of Molecular Genetics and Gene Therapy, Department of Medical and Molecular Genetics, Indiana University School of Medicine, “High Resolution Multiphoton Microscopy of Developing Thrombi in Vivo.”

3:15–3:30 **Mark Suckow**, director of the Freimann Animal Care Facility, University of Notre Dame, “Animal Modeling and Resources at the University of Notre Dame”

3:30–4:00 **Mary Prorok**, Department of Chemistry and Biochemistry and the W.M. Keck Center for Transgene Research, University of Notre Dame, “The Structure and Activity of the Neuroactive Conantokin Peptides”

5:00pm **Public Lecture – Dr. Anantha Shekhar**, Director, Indiana Clinical and Translational Sciences Institute (CTSI); Associate Dean for Translational Research; Raymond E. Houk Professor of Psychiatry; Professor Pharmacology and Neurobiology; Indiana University School of Medicine; “Clinical and Translational Research Cycle: Complex Biomedical Modeling Approach to Human Diseases”

6:30pm **Reception, McKenna Hall**

## Monday March 2, 2009

### Morning Location – McKenna Hall Auditorium

8:00–8:30 Registration and Coffee

8:30–9:00 **Hsueh-Chia Chang**, Department of Chemical and Biomolecular Engineering, “The Biophysics of Blood Flow”

9:00–9:30 **Yunlong Huo**, Department of Biomedical Engineering, IUPUI, “Coronary Circulation in the Anatomically-Based Arterial Tree”

9:30–10:00 **Philippe Sucosky**, Department of Aerospace and Mechanical Engineering, University of Notre Dame, “Calcific Aortic Valve Stenosis: A Shear Stress-Dependent Mechanism?”

10:00–10:30 **Coffee Break**

10:30–11:00 **Danny Chen**, Department of Computer Science and Engineering, University of Notre Dame, “Segmentation, Reconstruction and Analysis of Blood Thrombi in 2-Photon Microscopy Images”

11:00–12:00 **Special Lecture – Milan Sonka**, Professor of Electrical and Computer Engineering, Ophthalmology and Visual Sciences and Radiation Oncology, Department of Electrical and Computer Engineering, The Iowa Institute of Biomedical Imaging, University of Iowa, “Medical Image Analysis – Methods and Applications”

12:00–1:30 **Lunch Buffet, Morris Inn Donor’s Room**

### Afternoon Location – Hesburgh Center Auditorium

1:30–2:00 **Alejandro Espinoza**, Department of Orthopaedic Surgery, Rush University Medical Center, “Medical Imaging for Spine Biomechanics”

2:00–2:30 **Eric Nauman** School of Mechanical Engineering, Weldon School of Biomedical Engineering, Department of Basic Medical Sciences, Purdue University, “TBA”

2:30–3:00 **Diane Wagner**, Department of Aerospace and Mechanical Engineering, University of Notre Dame, “Culture Conditions Determine the Differentiation Response of Adipose-derived Mesenchymal Cells to BMP-6”

3:00–3:15 **Coffee Break**

### Biomedical Technology and Interaction with Industry

3:15–3:50 **David Brenner**, President and CEO, Innovation Park at Notre Dame, “Transforming an Idea into a Marketable Innovation”

3:50–4:25 **Gregory Crawford**, Dean, College of Science, University of Notre Dame, “Starting a Biotech Company from a University Invention”

4:25–4:50 **Brooke Pyne**, Director, Indiana Economic Development Corporation, SBIR Initiative, “Understanding Indiana’s SBIR/STTR Initiative”

4:50–5:25 **Mayland Chang**, Assistant Director, Walther Cancer Research Center, University of Notre Dame, “From Bench to Bedside: How to Bring a Therapeutic to Commercialization in an Academic Setting”

5:45–6:30 **Panel Discussion on Biomedical Technology and Connection to Industry** David Brenner, Gregory Crawford, Brooke Pyne, Mayland Chang, Keith March

6:30pm **Workshop Dinner, Morris Inn Notre Dame Room**

## Tuesday March 3, 2009

### All Day Location – McKenna Hall Auditorium

8:00–8:30 Registration and Coffee

8:30–9:00 **Michael Ferdig**, Department of Biological Sciences, University of Notre Dame, “Dissecting the Complexity of Malaria Drug Resistance: Integrating Gene Expression Levels and Chromosome Structural Variation”

9:00–9:30 **Anthony Firulli**, Department of Pediatrics, Indiana University School of Medicine, “A Twist on Limb Development”

9:30–10:00 **Keith March**, Professor of Medicine, Physiology, and Biomedical Engineering; Director, Indiana Center for Vascular Biology and Medicine; Director, Vascular and Cardiac Center for Adult Stem Cell Therapy, “TBA”

10:00–10:15 **Coffee Break**

10:15–10:45 **Jawed Fareed**, Departments of Pathology and Pharmacology, Director, Special Coagulation Laboratory and the Hemostasis and Thrombosis Research Program, Loyola University Chicago, “Contaminants in Heparin. What was the Role the Chemical Expertise Played?”

10:45–11:15 **Paul Bohn**, Department of Chemistry and Biochemistry, University of Notre Dame, “TBA”

11:15–12:15 **Plenary Lecture – Kenneth Mann**, Department of Biochemistry, University of Vermont - Burlington, “Computational and Empirical Modeling of the Blood Coagulation System”

12:15–1:30 **Lunch Buffet, Morris Inn Donor’s Room**

1:30–2:00 **Nitesh Chawla**, Department of Computer Science and Engineering, University of Notre Dame, “CARE: Prospective Disease Prediction Based on Individual Disease Histories”

2:00–2:30 **Brian Baker**, Department of Chemistry and Biochemistry, University of Notre Dame, “T cell receptor binding solutions directed by peptide/MHC conformational dynamics”

2:30–3:00 **Sean Mooney**, Co-Director, School of Medicine Bioinformatics Core; Center for Computational Biology and Bioinformatics; Indiana University School of Medicine; “Enabling the Next Generation of Biomedical Research with Translational Informatics”

3:00–3:15 **Coffee Break**

3:15–3:45 **Scott Emrich**, Department of Computer Science and Engineering, University of Notre Dame, “Sequencing your favorite genome for \$1000”

3:45–4:15 **Greg Madey**, Department of Computer Science and Engineering, University of Notre Dame, “Modeling and Simulating the Transmission of Malaria”

4:15–4:45 **Steve Buechler**, Department of Mathematics, University of Notre Dame, “Low Expression of a Few Genes Indicates Good Prognosis in Estrogen Receptor Positive Breast Cancer”