



Institute for Pure and Applied Mathematics
University of California, Los Angeles presents

Cells and Materials IV: Systems Biology and Molecular Modeling

May 22 - 26, 2006

Members of the Organizing Committee include **James Glazier** (Indiana University, Biocomplexity Institute), **Dan Kamei** (UCLA, Bioengineering), **Douglas Lauffenburger** (Massachusetts Institute of Technology, Biological Engineering), **Ben Wu** (UCLA, Bioengineering and Weintraub Center for Reconstructive Biotechnology)

Scientific Background:

Systems biology involves the quantitative and simultaneous integration of different and multiple biological components and their relationships with one another. For example, the components may be proteins, while their relationships may be described by signal transduction pathways. Unlike systems biology, molecular modeling focuses on a single complex between biomolecules and computes the interactions that exist in the complex. Although the two fields appear dissimilar, they are both quantitative in nature and involve many components and relationships. In the case of molecular modeling, the components are the atoms and their partial charges, and their relationships are the different interactions between them. Therefore, it's no surprise that some molecular modeling methods are now being applied to systems biology. Moreover, there has been recent success in combining these two fields to rationally design effective therapeutics. In this program, we will bring together experts in these two fields of computational biology to discuss their frontier research.



Mathematical approaches: Differential equations, finite difference methods, Bayesian approaches, molecular dynamics, stochastic systems, clustering, nonlinear dynamics, Monte Carlo simulations, simulated annealing.

Program Schedule:

Tutorials. March 14 - 17, 2006.

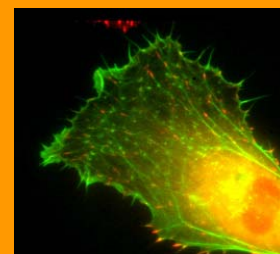
Workshop I: Membrane Protein Science and Engineering. March 27 - 31, 2006.

Workshop II: Microfluidic Flow in Nature and Microfluidic Technologies. April 18 - 22, 2006.

Workshop III: Angiogenesis, NeoVascularization and Morphogenesis. May 8 - 12, 2006.

Workshop IV: Systems Biology and Molecular Modeling. May 22 - 26, 2006.

Culminating Retreat at Lake Arrowhead. June 11 - 16, 2006.



Participation:

We have funding to support the attendance of recent PhD's, graduate students and researchers in the early stages of their career. Mathematicians and scientists at all levels who would like to learn more about this area are encouraged to apply for funding. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission and we welcome their applications.

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Or email questions to cmws4@ipam.ucla.edu

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