

Workshop IV: Systems Biology and Molecular Modeling

Monday May 22, 2006

- 8:00–8:45 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:45–9:00 *Welcome and Opening Remarks*
- 9:00–10:00 **David Stocum** (Indiana University - Purdue University)
Self-Organization of the Amphibian Limb Regeneration Blastema: Cellular and Molecular Mechanisms.
- 10:00–10:30 *Break*
- 10:30–11:30 **Armin Kaiser** (Stanford University)
Bacterial Cooperativity
- 11:30–2:00 *Lunch (on your own)*
- 2:00–3:00 **Hans Meinhardt** (Max-Planck-Institut für Entwicklungsbiologie (Developmental Biology))
Models of biological pattern formation: from elementary steps to the patterning of the main body axes
- 3:00–3:30 *Break*
- 3:30–4:30 **Jim McGrath** (University of Rochester)
From molecules to monolayers: solving sheet migration with models at every length scale
- 4:30–5:30 **Christoph Adami** (Keck Graduate Institute)
Digital Genetics: Unraveling the Genetic Basis of Evolution
- 5:30–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Tuesday May 23, 2006

- 8:00–9:00 *Continental Breakfast*
- 9:00–10:00 **Christopher Rao** (University of Illinois at Urbana-Champaign)
Modeling the developmental program for the flagellum and type III secretion apparatus in Salmonella typhimurium
- 10:00–10:30 *Break*
- 10:30–11:30 **Michael Samoilov** (Howard Hughes Medical Institute)
Quantitative Analysis of Genetic Regulation at Different Scales
- 11:30–2:00 *Lunch (on your own)*
- 2:00–3:00 **Joel Bader** (Johns Hopkins University)
Ab initio predictions of transcription factor binding
- 3:00–3:30 *Break*

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- 3:30–4:30 **Denise Wolf** (Lawrence Berkeley Laboratory)
Diversity in times of adversity: probabilistic strategies in microbial survival games
- 4:30–5:30 **Arthur Lander** (University of California, Irvine)
Exploring the performance objectives of morphogen gradient systems

Wednesday May 24, 2006

- 8:00–9:00 *Continental Breakfast*
- 9:00–10:00 **Reka Albert** (Pennsylvania State University)
Qualitative modeling of gene regulatory networks
- 10:00–10:30 *Break*
- 10:30–11:30 **Shayn Peirce-Cottler** (University of Virginia)
Using Agent-Based Models to Study Tissue Patterning Processes: Linking Molecular Pathways to Multi-Cell Behaviors in Tissues
- 11:30–2:00 *Lunch (on your own)*
- 2:00–3:00 **Claire Tomlin** (Stanford University)
Using the adjoint method for parameter identification of large scale protein regulatory networks. Application to planar cell polarity in Drosophila.
- 3:00–3:30 *Break*
- 3:30–4:30 **Hans Meinhardt** (Max-Planck-Institut für Entwicklungsbiologie (Developmental Biology))
Self-poisoning of just established signalling centers - a common mechanism in biology to generate highly dynamic patterns
- 4:30–5:30 **Armin Kaiser** (Stanford University)
Evolution of multicellular complexity
- 5:30–7:00 *Dinner (Hosted by IPAM)*

Thursday May 25, 2006

- 8:00–9:00 *Continental Breakfast*
- 9:00–10:00 **Drew Endy** (Massachusetts Institute of Technology)
Foundations for Engineering Biology
- 10:00–10:30 *Break*

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- 10:30–11:30 **Raymond Goldstein** (University of Arizona)
Physical Aspects of Evolutionary Transitions to Multicellularity
- 11:30–1:15 *Lunch (on your own)*
- 1:15–2:00 **William Smith** (UC Santa Barbara)
- 2:00–3:00 **Ivet Bahar** (University of Pittsburgh)
Network Models for Understanding Biomolecular Systems Dynamics and Allostery
- 3:00–3:30 *Break*
- 3:30–4:30 **Richard Dickinson** (University of Florida)
Models for Intracellular Particle Transport by Actin-Based Motility
- 4:30–5:30 **Sean Sun** (Johns Hopkins University)
Computational modeling of the cellular leading edge
- 5:30–6:30 **James Glazier** (Indiana University)
Demo of Cell Oriented Modeling Using Coppucell 3D

Friday May 26, 2006

- 8:00–9:00 *Continental Breakfast*
- 9:00–10:00 **Kevin Karplus** (UC Santa Cruz)
Protein prediction: not another optimization problem
- 10:00–10:30 *Break*
- 10:30–11:30 **David Stocum** (Indiana University - Purdue University)
Self Organization of the Limb Regeneration Blastema: Cellular and Molecular Mechanisms
- 11:30–2:00 *Lunch (on your own)*
- 2:00–3:00 **Gaudenz Danuser** (The Scripps Research Institute)
Microtubule regulation by kinetochores: Experimental and numerical challenges
- 3:00–3:30 *Break*
- 3:30–4:30 **Steven Gross** (University of California, Irvine)
- 4:30–5:30 **Daniel Kamei** (UCLA)
Engineering Therapeutic Proteins with Cell-Level Modeling

