

## Image Analysis Challenges in Molecular Microscopy

**Monday January 28, 2008**

- 8:00–8:50 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:50–9:00 *Welcome and Opening Remarks*
- 9:00–9:45 **Sriram Subramaniam** (National Institutes of Health (NIH))  
*Towards visualizing the architectures of cells and viruses at molecular resolution.*
- 9:45–10:00 *Break*
- 10:00–10:45 **Frank Natterer** (Westfälische Wilhelms Universität Münster)  
*Imaging with the Helmholtz equation*
- 10:45–11:00 *Break*
- 11:00–11:45 **Chandrajit Bajaj** (University of Texas at Austin)  
*MOLECULAR ELECTRON MICROSCOPY TO BIO-PHYSICAL MODELING AND ANALYSIS*
- 11:45–1:45 *Lunch (on your own)*
- 1:45–2:30 **Martin Rumpf** (Rheinische Friedrich-Wilhelms-Universität Bonn)  
*Extracting grain boundaries and macroscopic deformations from images on atomic scale*
- 2:30–2:45 *Break*
- 2:45–3:30 **Hong Zhou** (University of California, Los Angeles (UCLA))  
*Toward atomic resolution structural determination by cryoEM*
- 3:30–3:45 *Break*
- 3:45–4:45 *Tour of UCLA's Electron Imaging Center*

**Tuesday January 29, 2008**

- 8:00–9:00 *Continental Breakfast*
- 9:00–9:45 **Alberto Bartesaghi** (National Institute of Health NCI)  
*Challenges in high throughput electron tomography applications*
- 9:45–10:00 *Break*
- 10:00–10:45 **Steven Ludtke** (Baylor College of Medicine)  
*Resolution and Dynamics in Single Particle Analysis*
- 10:45–11:00 *Break*

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- 11:00–11:45 **Paul French** (Imperial College)  
*Multidimensional fluorescence imaging*
- 11:45–1:45 *Lunch (on your own)*
- 1:45–2:30 **Jelena Kovacevic** (Carnegie-Mellon University)  
*Problems in Biological Imaging: Opportunities for Signal Processing*
- 2:30–2:45 *Break*
- 2:45–3:30 **Gregory Beylkin** (University of Colorado, Boulder)  
*Algorithms and challenges of electron microscope tomography*
- 3:30–3:45 *Break*
- 3:45–4:30 **Gabor Herman** (City University of New York (CUNY))  
*Combinatorial Classification of Heterogeneous Electron Microscopic Projection Images into Homogeneous Subsets (in collaboration with M. Kalinowski)*
- 4:30–6:00 *Reception (Location: IPAM Lobby)*

### Wednesday January 30, 2008

- 8:30–9:30 *Continental Breakfast*
- 9:30–10:15 **Jose Carazo** (Centro Nacional de Biotecnología (CSIS))  
*EXPLORING THE CONFORMATIONAL FLEXIBILITY OF MACROMOLECULAR NANOMACHINES*
- 10:15–10:30 *Break*
- 10:30–11:15 **Joachim Frank** (SUNY Albany)  
*Single-particle Reconstruction of the Ribosome – The Struggle to Get Toward Atomic Resolution*
- 11:15–11:30 *Break*
- 11:30–12:15 **Ronald DeVore** (University of South Carolina)  
*A Taste of Compressed Sensing*
- 12:15–2:00 *Lunch (on your own)*
- 2:00–2:45 **Robert Murphy** (Carnegie-Mellon University)  
*AUTOMATED PROTEOME-WIDE DETERMINATION AND MODELING OF SUBCELLULAR LOCATION FOR SYSTEMS BIOLOGY*
- 2:45–3:00 *Break*
- 3:00–3:45 **Hanspeter Winkler** (Florida State University)  
*COMPUTATIONAL METHODS IN ELECTRON TOMOGRAPHY AND VOLUME DATA ANALYSIS*
- 3:45–4:00 *Break*

## Thursday January 31, 2008

- 8:00–9:00 *Continental Breakfast*
- 9:00–9:45 **Pawel Penczek** (University of Texas at Houston - Medical School)  
*Molecules in motion - towards 4D cryo-EM*
- 9:45–10:00 *Break*
- 10:00–10:45 **Guillermo Sapiro** (University of Minnesota, Twin Cities)  
*Learning sparse image representations: Theory and applications in tomography*
- 10:45–11:00 *Break*
- 11:00–11:45 **Jerry Prince** (Johns Hopkins University)  
*Micro and Macro Structure from Diffusion Weighted MRI*
- 11:45–1:45 *Lunch (on your own)*
- 1:45–2:30 **Adel Faridani** (Oregon State University)  
*Numerical and theoretical explorations in helical and fan-beam tomography*
- 2:30–2:45 *Break*
- 2:45–3:30 **Yoel Shkolnisky** (Yale University)  
*Cryo-EM Structure Determination through Eigenvectors of Sparse Matrices*
- 3:30–3:45 *Break*
- 3:45–4:30 **John Kaufhold** (Science Applications International Corporation (SAIC))  
*Automated neuroanatomical microvessel segmentation, nuclei labeling, and geometric computations with 3D two photon laser scanning microscopy*

## Friday February 1, 2008

- 8:00–9:00 *Continental Breakfast*
- 9:00–9:45 **Frederick Sigworth** (Yale University)  
*Accelerating Maximum-Likelihood Estimation for Reconstruction from Cryo-EM Images*
- 9:45–10:00 *Break*
- 10:00–10:45 **Achilleas Frangakis** (EMBL (European Molecular Biology Laboratory))
- 10:45–11:00 *Break*
- 11:00–11:45 **Phoebe Stewart** (Vanderbilt University)  
*Challenges in Interpreting Subnanometer Resolution CryoEM Structures*

