

Mathematical Challenges in Astronomical Imaging

Monday January 26, 2004

- 8:30–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:30 *Session I: New Types of Astronomical Data*
- 9:00–10:00 **Tim Cornwell** (National Radio Astronomical Observatory)
Mathematical challenges in radio interferometric imaging
- 10:00–11:00 **Alexandre Refregier** (CEA Saclay, France)
Weak Gravitational Lensing and Shapelets
- 11:00–11:30 *Break*
- 11:30–12:30 **Robert Lupton** (Princeton University)
Image Processing in the Sloan Digital Sky Survey
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:00 *Session II: Direct Imaging Techniques/Aperture Masking/*
- 2:30–3:00 *Imaging and Modelling with Sparse Interferometer Data*
- 2:30–3:30 **Michael Shao** (Jet Propulsion Laboratory)
Imaging with the Space Interferometer Project
- 3:30–4:00 *Break*
- 4:00–5:00 **Gene Serabyn** (Jet Propulsion Laboratory)
Nulling Interferometry
- 5:00–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Tuesday January 27, 2004

- 8:30–9:00 *Continental Breakfast*
- 9:00–9:30 *Session II: Direct Imaging Techniques/Aperture Masking/*
- 9:00–9:30 *Imaging and Modelling with Sparse Interferometer Data*
- 9:00–10:00 **Peter Tuthill** (University of Sydney)
Aperture masking and sparse-aperture image recovery
- 10:00–11:00 **Andrew Fruchter** (STScI)
The Best Undersampled Telescope in the Universe
- 11:00–11:30 *Break*

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- 11:30–12:30 **Thomas McGlynn** (NASA/GSFC)
A Practical Perspective on Image Resampling in Astronomy using Interpolation, Redistribution and Clipping
- 12:30–2:00 *Lunch (on your own)*
- 1:59–2:30 *Session III: Point Spread Function Extraction*
- 2:00–3:00 **Ken Mighell** (National Optical Astronomical Observatory)
Mathematical Challenges of using Point Spread Function Analysis Algorithms in Astronomical Imaging
- 3:00–4:00 **Emmanuel Bertin** (Institut d'Astrophysique de Paris)
PSFEx: a generic tool for extracting the Point Spread Function in astronomical images
- 4:00–4:30 *Break*
- 4:30–4:45 *Session IV: Deconvolution*
- 4:30–5:30 **Tony Chan** (UCLA)
Some blind deconvolution and super-resolution imaging algorithms

Wednesday January 28, 2004

- 8:30–9:00 *Continental Breakfast*
- 9:00–9:30 *Session IV: Deconvolution*
- 9:00–10:00 **Jean-Luc Starck** (CEA Saclay, France)
Image Restoration by Multiscale Methods
- 10:00–11:00 **Mark Green** (IPAM)
Differentially Laplacian Statistics, Natural Images and Denoising of Astronomical Images
- 11:00–11:30 *Break*
- 11:30–12:30 **Julian Christou** (University of California)
Deconvolution of Adaptive Optics Images
- 12:30–3:00 *Lunch (on your own)*
- 3:00–4:00 **C. Alex Young** (NASA)
Solar Image Analysis: A Multiscale View
- 4:00–4:30 *Break*
- 4:30–5:30 **Stanley Osher** (IPAM)
Using geometry and iterated refinement for inverse problems. (1) Total Variation Image Restoration

Thursday January 29, 2004

- 8:30–9:00 *Continental Breakfast*
- 9:00–9:30 *Session IV: Deconvolution*
- 9:00–10:00 **David van Dyk** (University of California at Irvine)
Model-Based Count-Limited Image Restoration
- 10:00–10:30 *Session V: Imaging with Photon-Limited Data*
- 10:00–11:00 **Jeff Scargle** (NASA Ames Research Center)
A Procedure and Algorithm for Segmented Signal Estimation in Time Series, Image, and Higher Dimensional Data
- 11:00–11:30 *Break*
- 11:30–12:30 **David Esch** (Harvard University, Smithsonian Astrophysical Observatory)
Evaluation of Uncertainty in Image Restorations
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:30 **Margarita Karovska** (Harvard University, Smithsonian Astrophysical Observatory)
Tools for Multiscale Analysis of Low-count Images
- 3:30–4:00 *Break*
- 4:00–5:00 **Seth Digel** (Stanford University)
Imaging the sky above 30 MeV with GLAST
- 5:30–7:00 *Dinner (Hosted by IPAM)*

Friday January 30, 2004

- 8:30–9:00 *Continental Breakfast*
- 9:00–9:30 *Session VI: Cosmic Microwave Background Imaging*
- 9:00–10:00 **Edward L. Wright** (UCLA)
Imaging the Universe with WMAP
- 10:00–11:00 **Kris Gorski** (Jet Propulsion Laboratory)
- 11:00–11:30 *Break*

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- 11:30–12:30 **Steven Myers** (National Radio Astronomical Observatory)
Interferometric Imaging and Analysis of the Cosmic Microwave Background
- 12:30–2:00 *Lunch (on your own)*
- 2:00–2:30 *Session VII: Time-Domain Imaging*
- 2:00–3:00 **Andrea M. Ghez** (UCLA)
High Angular Resolution Imaging of the Galactic Center
- 3:00–3:30 *Break*
- 3:30–4:30 **Maciej Konacki** (California Institute of Technology)
Imaging and Planet Searches

