

MGA Workshop II: Multiscale Geometry in Scientific Computing

Tuesday October 19, 2004

- 8:30–9:15 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:15–9:30 *Welcome and Opening Remarks*
- 9:30–10:30 **Martin Mohlenkamp** (Ohio University)
Algorithms for Numerical Analysis in High Dimensions. Part I: Definitions, linear algebra and basic algorithms
- 10:30–11:00 *Break*
- 11:00–12:00 **Gregory Beylkin** (University of Colorado)
Algorithms for Numerical Analysis in High Dimensions Part II: Operators in high dimensions
- 12:00–1:30 *Lunch (on your own)*
- 1:30–2:30 **George Fann** (Oak Ridge National Laboratory)
Multiresolution Solvers in MADNESS
- 2:30–3:00 *Break*
- 3:00–4:00 **Nick Coult** ()
Multiresolution homogenization of operators in separated form
- 4:00–4:30 *Break*
- 4:30–5:30 **Robert Harrison** (Oak Ridge National Laboratory)
Chemistry in many dimensions

Wednesday October 20, 2004

- 8:30–9:30 *Continental Breakfast*
- 9:30–10:30 **Eric Michielssen** (University of Illinois at Urbana-Champaign)
Plane Wave Time Domain Accelerated Integral Equation Solvers: Multiscale Aspects
- 10:30–11:00 *Break*
- 11:00–12:00 **Richard Tsai** (Princeton University)
Visibility Optimizations
- 12:00–1:30 *Lunch (on your own)*
- 1:30–2:30 **Thomas Hou** (California Institute of Technology)
Multiscale computations for flow in strongly heterogeneous media
- 2:30–3:00 *Break*

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- 3:00–4:00 TBA
- 4:00–4:30 Break
- 4:30–5:30 **Achi Brandt** (Weizmann Institute of Science)
Multiscale Computation: From fast solvers to systematic upscaling
- 5:30–7:00 *Wine/Cheese Reception (Hosted by IPAM)*

Thursday October 21, 2004

- 8:30–9:30 *Continental Breakfast*
- 9:30–10:30 **Stanley Osher** (IPAM)
Computing Multivalued Physical Observables for the Semiclassical Limit of the Schrodinger Equation and for High Frequency Asymptotic Solutions to Symmetric Hyperbolic Systems (joint with S. Jin, H. Liu and R. Tsai)
- 10:30–11:00 Break
- 11:00–12:00 **Vladimir Rokhlin** (Yale University)
Moore's Law and "Fast" Numerical Techniques
- 12:00–1:30 *Lunch (hosted by IPAM)*
- 1:30–2:30 **Gilad Lerman** (University of Minnesota)
Multiscale Curve and Strip Constructions with Applications
- 2:30–3:00 Break
- 3:00–4:00 **Eric Vanden-Eijnden** (New York University)
Extracting low order stochastic models from large-sized dynamical data sets.
- 4:00–4:30 Break
- 4:30–5:30 **Lexing Ying** (New York University)
A kernel-independent adaptive fast multipole algorithm in two and three dimensions

Friday October 22, 2004

- 8:30–9:00 *Continental Breakfast*
- 9:00–10:00 **Peter Schröder** (California Institute of Technology)
Conforming hierarchical adaptive refinement methods (CHARMS) and their application in the context of thin-shell simulation with the subdivision element method.
- 10:00–10:15 Break

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- 10:15–11:15 **Yannis Kevrekides** (Princeton University)
Equation-Free Modeling for Complex Multiscale Systems
- 11:15–11:30 *Break*
- 11:30–12:30 **Yuval Rabani** (Technion, Haifa, Israel)
Quasisymmetric embeddings, the observable diameter, and expansion properties of graphs
- 12:30–2:00 *Lunch (on your own)*
- 2:00–3:00 **Nathan (Nati) Linial** (Hebrew University, Jerusalem, Israel)
Clustering - Can we tame the beast?
- 3:00–3:15 *Break*
- 3:15–4:15 **Anna Gilbert** (University of Michigan)
Beating the B^2 bottleneck in estimating B -term Fourier representations
- 4:15–4:30 *Break*
- 4:30–5:30 **Leonard Schulman** (California Institute of Technology)
Deterministic Clustering with Data Nets
- 5:30–6:30 **Santosh Vempala** (Massachusetts Institute of Technology)
Random Sampling for Matrix Projection and Approximation

Saturday October 23, 2004

- 8:30–9:30 *Continental Breakfast*
- 9:30–10:30 **Emmanuel Candes** (California Institute of Technology)
Near Optimal Signal Recovery From Random Projections: Universal Encoding Strategies?
- 10:30–11:00 *Break*
- 11:00–12:00 **Piotr Indyk** (Massachusetts Institute of Technology)
Near Neighbor Search in High Dimensions via Locality Sensitive Hashing
- 12:00–1:30 *Lunch (on your own)*
- 1:30–2:30 **Rafail Ostrovsky** (UCLA)
Dimension-Reductions in The Hamming Cube and its Applications

