

MGA Workshop III: Multiscale structures in the analysis of High-Dimensional Data

Monday October 25, 2004

- 8:30–9:15 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:15–9:30 *Welcome and Opening Remarks*
- 9:30 *Analysis and Learning of Manifolds in High Dimension*
- 9:30–10:30 **Ronald Coifman** (Yale University)
Geometric Diffusions as a tool for Harmonic Analysis and structure definition of data
- 10:30–11:00 *Break*
- 11:00–12:00 **Lawrence Saul** (University of Pennsylvania)
Unfolding a manifold by semidefinite programming
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Manifold Structures and Information in High Dimension*
- 2:00–3:00 **Guillermo Sapiro** (University of Minnesota)
Comparing Point Clouds
- 3:00–3:30 *Break*
- 3:30–4:30 **Alfred Hero** (University of Michigan)
Information divergence in high dimensions
- 4:30–5:00 *Break*
- 5:00–6:00 **Partha Niyogi** (University of Chicago)
Estimating Functional Maps on Riemannian Submanifolds from Sampled Data
- 6:00–7:30 *Wine/Cheese Reception (Hosted by IPAM)*
- 6:30–7:30 **Natalie Jeremijenko** (University of California at San Diego)
Seeing Stars: structures of participation and designing information exchange...

Tuesday October 26, 2004

- 8:30–9:30 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:30 *Mathematical Issues and Embeddings in High Dimension*
- 9:30–10:30 **Peter Jones** (Yale University)
Some Problems in the Geometry of Data Sets
- 10:30–11:00 *Break*

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- 11:00–12:00 **Yair Bartal** (Hebrew University, Jerusalem, Israel)
Embedding Metrics in Ultrametrics
- 12:00–2:00 *Lunch (on your own)*
- 2:00–3:00 **Assaf Naor** (Microsoft Research)
On the dimension of finite metric spaces
- 3:00–3:30 *Break*
- 3:30 *Sonification*
- 3:30–4:30 **Thomas Hermann** (Bielefeld University, Germany)
Multiscale Auditory Displays - Interacting with the complexity level in Model-based Sonification
- 4:30–4:45 *Break*
- 4:45–5:45 **Jonathan Berger** (Stanford University)
Sonification of data and data-clusters using 2-dimensional waveguide mesh

Wednesday October 27, 2004

- 8:30–9:30 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:30 *Classification and Simulation in High Dimension*
- 9:30–10:30 **Robert Nowak** ()
Minimax-Optimal Classification with Dyadic Decision Trees
- 10:30–11:00 *Break*
- 11:00–12:00 **Michael Kirby** (Colorado State University)
Dimensionality Reduction using Secant-based Projection Methods
- 12:00–2:00 *Lunch (on your own)*
- 2:00–3:00 **Werner Stuetzle** (University of Washington)
Estimation / Approximation Problems in 3D Photography
- 3:00–3:30 *Break*
- 3:30 *Dependencies and Conditionalities in High Dimension*
- 3:30–4:30 **Michael Jordan** (University of California at Berkeley)
Nonparametric characterizations of independence via reproducing kernel Hilbert spaces
- 4:30–4:45 *Break*

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- 4:45–5:45 **Carey Priebe** (Johns Hopkins University)
On the role of the conditionality principle in dimensionality reduction
- 5:45–7:30 *Dinner (Hosted by IPAM)*
- 6:30–7:30 **David Donoho** (Stanford University)

Thursday October 28, 2004

- 8:30–9:30 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:30 *Computational Applications in High Dimension*
- 9:30–10:30 **Leonidas Guibas** (Stanford University)
Multiresolution Proximity Maintenance for Moving Objects
- 10:30–11:00 *Break*
- 11:00–12:00 **Gerard Medioni** (University of Southern California)
Data-Driven, Non-Parametric Inference of Multiple Structures in N-D using Tensor Voting
- 12:00–2:00 *Lunch (on your own)*
- 2:00–3:00 **Michael Mahoney** (Yale University)
Fast Monte Carlo Algorithms for Matrix Operations and Massive Data Set Analysis
- 3:00 *Visualization*
- 3:00–3:30 *Break*
- 3:30–4:30 **Brad Paley** (Digital Image Design)
Visual and Cognitive Layering: using illustration/art techniques to differentiate
- 4:30–4:45 *Break*
- 4:45–5:45 **Leland Wilkinson** (SPSS and Northwestern)
Heatmaps

Friday October 29, 2004

- 8:30–9:30 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:30 *Computations and Simulations in High Dimension*
- 9:30–10:30 **Matthew Brand** (Mitsubishi ERL)
Extracting topology and exact isometry from the embedding graph
- 10:30–11:00 *Break*
- 11:00–12:00 **Alexander Gray** (Carnegie Mellon University)
High-Dimensional Integration by Statistical Inference
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Computational Topology and Manifold Learning*
- 2:00–3:00 **Vin de Silva** (Stanford University)
Multiscale parameters in computational topology
- 3:00–3:30 *Break*
- 3:30–4:30 **Hongyuan Zha** (Pennsylvania State University)
Tangent Space Alignment for Manifold Learning
- 4:30–4:45 *Conclusion*

