

Mathematical Challenges in Scientific Data Mining

Monday January 14, 2002

- 8:30 *Chair: Chandrika Kamath (LLNL)*
- 8:30–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:15 *Welcome and Opening Remarks*
- 9:15–10:30 **Chandrika Kamath** (Lawrence Livermore National Laboratory)
Tutorial: Introduction to scientific data mining
- 10:30–11:00 *Break*
- 11:00–12:15 **Vipin Kumar** (University of Minnesota/AHPCRC)
Tutorial: Data mining algorithms
- 12:15–2:00 *Lunch (on your own)*
- 2:00 *Chair: Imola Fodor (LLNL)*
- 2:00–3:00 **Terrence Sejnowski** (Salk Institute)
Independent Component Analysis
- 3:00–3:30 *Break*
- 3:30–4:30 **Dennis Mock** (University of California at San Diego)
Mining High-Throughput Biological Microarray Data
- 4:30–5:15 **Stanley Osher** (IPAM)
Level sets and their role in image/data processing

Tuesday January 15, 2002

- 8:30 *Chair: Imola Fodor (LLNL)*
- 8:30–9:00 *Continental Breakfast*
- 9:00–10:00 **Padhraic Smyth** (University of California at Irvine)
Data Mining: the Interface of Statistics and Computer Science
- 10:00–10:45 **Douglas Nychka** (National Center for Atmospheric Research)
Extracting information and building models from large geophysical datasets
- 10:45–11:15 *Break*

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- 11:15–12:00 **Vipin Kumar** (University of Minnesota/AHPCRC)
Discovery of Patterns in the Global Climate System using Data Mining
- 12:00–12:30 **Imola Fodor** (Lawrence Livermore National Laboratory)
Mining the FIRST Astronomical Survey
- 12:30–2:00 *Lunch (hosted by IPAM)*
- 2:00 *Chair: Vipin Kumar (University of Minnesota)*
- 2:00–3:00 **Sara Graves** (U Alabama Huntsville)
Data Mining In Earth Sciences
- 3:00–3:30 **Amy Braverman** (Jet Propulsion Laboratory)
Reducing Size and Complexity of Large Geophysical Data Sets
- 3:30–4:00 *Break*
- 3:59 *Afternoon Session II*
- 4:00 *Chair: Padhraic Smyth (UC Irvine)*
- 4:00–5:00 **Paul Thompson** (UCLA)
Brain Image Analysis: Recent Advances and Current Mathematical/Computational Challenges
- 5:00–5:45 **Ivan Marusic** (University of Minnesota)
Mining Turbulence Data

Wednesday January 16, 2002

- 8:30 *Chair: Zoran Obradovic (Temple University)*
- 8:30–9:00 *Continental Breakfast*
- 9:00–10:00 **Mladen Wickerhauser** (Washington University)
Applications Of Wavelets In Image Analysis
- 10:00–10:30 *Break*

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- 10:30–11:30 **Bir Bhanu** (University of California at Riverside)
Learning In Computer Vision
- 11:30–12:15 **Mohammed Zaki** (Rensselaer Polytechnic Institute)
Data Mining for Protein Structure Prediction
- 12:15–2:00 *Lunch (on your own)*
- 2:00 *Chair: B.S. Manjunath (UCSB)*
- 2:00–3:00 **George Djorgovski** (California Institute of Technology)
Data Mining Challenges in Astronomy
- 3:00–3:30 **Shusaku Tsumoto** (Shimane Medical University)
Introduction to rough sets
- 3:30–3:45 *Break*
- 3:44 *Afternoon Session II*
- 3:45 *Chair: Chandrika Kamath (LLNL)*
- 3:45–4:15 **John Brence** (United States Military Academy)
Complexity challenges to the discovery corrosion relationships in Eddy current non-destructive test data
- 4:15 *Special session on Data Mining Systems
(Graves, Grossman, Kamath: 20 mins each)*
- 4:15–4:35 **Rahul Ramachandran** (University of Alabama in Huntsville)
ADaM System Architecture
- 4:15–4:55 **R. L. Grossman** (University of Illinois at Chicago)
Data Space: Protocols and Services for Distributed Data Mining and Remote Data Analysis
- 4:55–5:15 **Chandrika Kamath** (Lawrence Livermore National Laboratory)
Sapphire System Architecture
- 5:15–6:30 *Poster Session and Wine and Cheese Reception*

Thursday January 17, 2002

- 8:30 *Chair: Padhraic Smyth (UC Irvine)*
- 8:30–9:00 *Continental Breakfast*
- 9:00–10:00 **Dennis DeCoste** (Jet Propulsion Laboratory)
Support Vector Machines and Other Kernel Methods: Key Concepts, Recent Advances, and Applications
- 10:00–10:30 *Break*

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- 10:30–11:15 **Raghu Machiraju** (Ohio State University)
Data Mining To Complement Visualization For Analysis Of Simulation Data
- 11:15–12:00 **George Karypis** (University of Minnesota)
Frequent Subgraph Discovery - Finding Patterns in Structured and Relational Scientific Data Sets
- 12:00–2:00 *Lunch (hosted by IPAM)*
- 2:00 *Chair: Imola Fodor (LLNL)*
- 2:00–3:00 **Zoran Obradovic** (Temple University)
Commonness, Complexity, Flavors and Function of Intrinsic Protein Disorder: A Bioinformatic Study
- 3:00–3:45 **Padhraic Smyth** (University of California at Irvine)
Mixture models for data exploration and prediction
- 3:45–4:15 *Break*
- 4:14 *Afternoon Session II*
- 4:15 *Chair: Ananth Grama (Purdue University)*
- 4:15–4:45 **Tony Chan** (UCLA)
A scale dependent clustering model by direct maximization of homogeneity and separation
- 4:45–5:30 **Pierre Baldi** (University of California at Irvine)
Data Mining In Biological Sequences

Friday January 18, 2002

- 8:30 *Chair: Ananth Grama (Purdue University)*
- 8:30–9:00 *Continental Breakfast*
- 9:00–9:45 **Mike Turmon** (Jet Propulsion Laboratory)
Modeling Spatial Data: Challenges and Applications to Solar Imagery
- 9:45–10:15 **Zoran Obradovic** (Temple University)
Knowledge Discovery in Spatial and Temporal Databases
- 10:15–10:45 *Break*

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10:44 *Morning Session II*

10:45 *Chair: Chandrika Kamath (LLNL)*

10:45–11:45 **Leo Breiman** (University of California at Berkeley)
Prediction and Understanding

11:45–12:30 **Tony Chan** (UCLA)
Variational Level Set Techniques for mining objects in images

12:30–12:00 *Conclusion*

