



Numerical Tools and Fast Algorithms For Massive Data Mining, Search Engines and Applications

October 22 – 26, 2007

ORGANIZING COMMITTEE: MING GU (BERKELEY), YANN LECUN (NYU), VLADIMIR ROKHLIN (YALE), ANDREW ZISSERMAN (OXFORD), PIOTR INDYK (MIT), SAM ROWEIS (UNIVERSITY OF TORONTO)

Scientific Overview

The rise of massive networks (e.g. the internet and world wide web) has led to a concomitant demand for new, fast algorithms for solutions of problems related to the page weight algorithm, webcrawlers, etc. Increasingly, large data sets are no longer restricted to classical scientific domains, but arise in virtually all fields, including finance, economics, social networks, law, and the humanities. The next generation of numerical algorithms can be used to sort, order, or otherwise extract knowledge in a wide variety of situations. As the information sciences expand and integrate with other disciplines, the need for these tools has become especially acute. All of the modern, numerical problems encountered have the common feature that they require scalable algorithms with robustness, i.e. good error estimates. The development of fast algorithms in the period 1980-2000 has laid the groundwork for today's challenges of numerical linear algebra, but new methods are now needed. This workshop will bring together researchers in various disciplines to discuss advances in the following topics: Deterministic and randomized algorithms for matrix approximation, Analysis of dense matrices, Fast algorithms for SVD solvers, Algorithms for l_0 and l_1 approximation, High precision randomized algorithms of linear algebra, Interior point methods, Relation of fast solvers to the Fast Multipole Method, Manifold approximation, and Band-limited functions on data sets.

Confirmed Speakers

Michael Berry (University of Tennessee), **Dan Boley** (University of Minnesota), **Leon Bottou** (NEC Research Institute), **Chris Burges** (Microsoft Research), **Oliver Chapelle** (Yahoo! Research), **Rob Fergus** (Massachusetts Institute of Technology), **Ming Gu** (UC Berkeley), **Thomas Hofmann** (Google Inc.), **Alfred Inselberg** (Tel Aviv University), **Peter Jones** (Yale University), **Tammy Kolda** (Sandia National Laboratories), **Till Quack** (Eidgenössische TH Zürich-Hönggerberg), **Yoram Sario** (Yahoo Research), **Sam Roweis** (University of Toronto), **Yoram Singer** (Hebrew University), **John Strain** (UC Berkeley), **Mark Tygert** (Yale University), **Santosh Vempala**, (Georgia Tech)

Long Program Schedule

- Tutorials, September 11 - 20, 2007
- Workshop 1: Dynamic Searches and Knowledge Building, October 1 - 5, 2007
- **Workshop 2: Numerical Tools and Fast Algorithms for Massive Data Mining Search Engines and Applications, October 22 - 26, 2007**
- Workshop 3: Social Data Mining and Knowledge Building, November 5 - 9, 2007
- Workshop 4: Search and Knowledge Building for Biological Datasets, November 26 - 30, 2007
- Culminating Workshop at Lake Arrowhead Conference Center, December 9 - 14, 2007

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

www.ipam.ucla.edu/programs/sews2



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