



Institute for Pure and Applied Mathematics
University of California, Los Angeles presents

Graduate Summer School: Intelligent Extraction of Information from Graphs and High Dimensional Data

July 11 - 29, 2005

Organizing Committee: **Kevin Vixie**, Chair (Los Alamos National Laboratory), **Edmond Chow** (D.E. Shaw), **Tina Eliassi-Rad** (Lawrence Livermore National Laboratory), **Yann LeCun** (New York University) and **Carey Priebe** (Johns Hopkins University)

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In recent years, there has been a rapidly increasing demand for targeted analysis of large data streams and large networks. One of the main goals has been identification of key features: face recognition in video streams and voice recognition in audio streams are two examples. Another goal has been inference of relationships: pattern discovery in large databases and determination of key links in social networks. At the same time, a number of scientific disciplines have come together to develop a theory for the analysis of high-dimensional data, as well as for the analysis of dynamic processes on massive graphs. The new techniques and new mathematics coming out of this line of research are ideally suited to a wide range of applications.

Topics:

- Dimensionality reduction and high-dimensional data modeling
- Unsupervised learning: image metrics, image reconstruction and kernel methods
- Supervised learning: image detection and recognition, speech recognition
- Structural discovery on graphs, link analysis, relational data mining
- Social networks and network dynamics

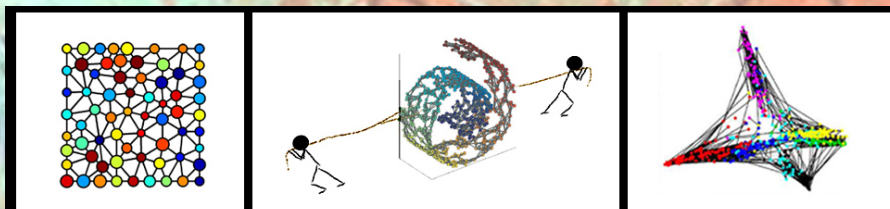
The summer school is intended for graduate students and postdocs, as well as more senior researchers interested in focusing their efforts on these mathematical challenges and crucial applications.

Tutorial Lecture Series:

Tutorial lecture series will be integrated with more focused single lectures emphasizing state-of-the-art techniques, application areas, and datasets. Applications and connections to current challenges will be drawn from: data fusion, automated feature extraction, face and shape recognition, spectral and hyperspectral image analysis, relational data mining, link analysis and discovery, graph mining, social and transactional networks, robust network design (making networks hard to break), optimal epidemic intervention (making networks easy to break), and hidden state inference.

Participation:

This summer school will provide a rare opportunity for the mathematical community, as well as mathematically oriented scientists and engineers, to learn about current research directions in this area. Because of the importance of training new people to do research in this area, funding has been made available to fund a wide range of participants from a variety of backgrounds. Graduate students, postdoctoral researchers, and others interested in undertaking research in this area are especially invited to apply. For application information please see: <http://www.ipam.ucla.edu/programs/gss2005>. Encouraging the careers of women and minority mathematicians and scientists is an important part of IPAM's mission and we welcome their applications.



<http://www.ipam.ucla.edu/programs/gss2005>

or email questions to gss2005@ipam.ucla.edu

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