

INSTITUTE FOR MATHEMATICS AND ITS APPLICATIONS

University of Minnesota

400 Lind Hall

207 Church Street S.E.

Minneapolis, Minnesota 55455

FAX (612) 626-7370

telephone (612) 624-6066

e-mail: ima-staff@ima.umn.edu

IMA Schedules via finger: finger_seminar@ima.umn.edu

Newsletters, Updates and preprints are available via

anonymous ftp: <ftp://www.ima.umn.edu>, [www: http://www.ima.umn.edu/](http://www.ima.umn.edu/)

The IMA was founded by and receives major support from the National Science Foundation.

IMA NEWSLETTER # 326

1-31 December 2003

2003-2004 Program

PROBABILITY AND STATISTICS IN COMPLEX SYSTEMS

See <http://www.ima.umn.edu/complex/> for a full description of the 2003-2004 program on Probability and Statistics in Complex Systems: Genomics, Networks, and Financial Engineering

IMA schedules are subject to revision, particularly during workshops. See

<http://www.ima.umn.edu/~seminar/sched> and

<http://www.ima.umn.edu/newsletters/> for the latest scheduling information.

PART I: NEWS AND NOTES

Rice joins the IMA

Rice University has just joined as a Participating Institution affiliated to the IMA. William W. Symes (Department of Computational and Applied Mathematics, Rice University), who just finished his three-year term on the Board of Governors will now be joining the Participating Institution Council as our contact at Rice. We welcome him back!

IMA Website

Comments or suggestions concerning the IMA website may be addressed to

webmaster@ima.umn.edu.

In particular, we appreciate any information about World-Wide Web links appropriate to current and upcoming IMA programs.

PARTICIPATING INSTITUTIONS: Consiglio Nazionale delle Ricerche (CNR), Georgia Institute of Technology, Indiana University, Iowa State University, Kent State University, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Michigan State University, Mississippi State University, Northern Illinois University, Ohio State University, Pennsylvania State University, Purdue University, Rice University, Sandia National Laboratories, Seoul National University (BK21 Math-SNU), Seoul National University (SRCCS), Texas A&M University, University of Chicago, University of Cincinnati, University of Delaware, University of Houston, University of Illinois (Urbana), University of Iowa, University of Kentucky, University of Maryland, University of Michigan, University of Minnesota, University of Notre Dame, University of Pittsburgh, University of Wisconsin, University of Wyoming, Wayne State University.

PARTICIPATING CORPORATIONS: ExxonMobil, Ford, General Electric Company, General Motors, Honeywell, IBM, Lockheed Martin, Lucent, Motorola, Schlumberger, Siemens, Telcordia Technologies, 3M.

Version of January 9, 2004

PART II: Schedule for 1–31 DECEMBER 2003

Monday, December 1

The 10:30 IMA break will be in Lind Hall 400.

Tuesday, December 2

The 10:30 IMA break will be in Lind Hall 400.

IMA POSTDOC SEMINAR, Lind Hall 409:

11:15-12:15 **Amir Niknejad** Missing Data Imputation for Gene Expression Arrays: An Algebraic Approach
U Chicago at Illinois and IMA

Abstract: We introduce an algebraic framework for missing data imputation through Fixed Rank Approximation Algorithm(FRAA). Preliminary test indicates that FRAA is Robust and might be a feasible alternative in cases when the number of columns are small in Genome-Wide Matrix.

The IMA Postdoc Seminar is organized by
Antar Bandyopadhyay and Balaji Gopalakrishnan.

12:45-2:15 pm **Random Matrices** This course (Math 8660) meets in Physics 133
G. Anderson and O. Zeitouni

Wednesday, December 3

The 10:30 IMA break will be in Lind Hall 400.

Thursday, December 4

The 10:30 IMA break will be in Lind Hall 400.

12:45-2:15 pm **Random Matrices** This course (Math 8660) meets in Physics 133
G. Anderson and O. Zeitouni

Friday, December 5

The 10:30 IMA break will be in Lind Hall 400.

IMA/MCIM INDUSTRIAL PROBLEM SEMINAR, 570 Vincent Hall:

1:25pm **Thomas Hoffend** Characterization, Modeling, and Donor Media Design for a Laser-Induced Thermal Imaging Process
3M Display and Graphics Research Lab

Abstract: A laser-induced thermal imaging (LITI) process has been developed by 3M as a patterning method for fabricating color filters for liquid crystal displays, organic electro-luminescent devices (OLEDs), and other articles requiring precise patterning of materials with order micron scale accuracy over areas which may exceed a square meter.

For the LITI process, the material to be patterned is coated on a layered donor sheet which consists typically of a backing film, a primer layer, a light-to-heat conversion layer (LTHC), and a protective interlayer between the LTHC and the transfer material layer. The primer layer aids adhesion of the LTHC to the backing film, the LTHC absorbs imaging laser light and converts it to heat, and the interlayer serves several purposes which may include promoting structural integrity of the LTHC during the imaging process and protecting the transfer material from particle absorbers dispersed in the LTHC. During the imaging process, the donor sheet coated with transfer material is pressed against the receiving surface and one or two laser beams are scanned progressively across the donor sheet. In one mode of transfer, the LTHC absorbs the laser light and converts it to heat, the heat diffuses to the transfer layer, and the transfer layer softens and sticks to the receptor surface in the scanned areas. The donor sheet is then peeled away from the receptor and the adhered regions of transfer material pull off the donor and remain as precisely regions of material on the receptor surface.

Monday, December 8

The 10:30 IMA break will be in Lind Hall 400.

Tuesday, December 9

The 10:30 IMA break will be in Lind Hall 400.

IMA POSTDOC SEMINAR, Lind Hall 409:

11:15-12:15	Soohan Ahn IMA	Transient Analysis of Fluid Flow Models via Stochastic Coupling to a Queue
-------------	--------------------------	--

Abstract: Markovian fluid flow models are used extensively in performance analysis of communication networks. They are also instances of Markov reward models that find applications in several areas like storage theory, insurance risk and financial models, and inventory control. This paper deals with the transient analysis of such models. Given a Markovian fluid flow, we construct on the same probability space a sequence of queues that are stochastically coupled to the fluid flow in the sense that at certain selected random epochs the distribution of the fluid level and the phase (the state of the modulating Markov chain) is identical to that of the work in the queue and the phase. The fluid flow is realized as a stochastic process limit of the processes of work in the system for the queues, and the latter are analyzed using the matrix-geometric method. These in turn provide the needed characterization of transient results for the fluid model.

Wednesday, December 10

The 10:30 IMA break will be in Lind Hall 400.

COMPLEX SYSTEMS SEMINAR, Lind Hall 409:

2:30 pm	Michael Newton U of Wisconsin and IMA	Topics in the Theory and Practice of Juggling
---------	---	---

Abstract: For information on topics in the theory and practice of juggling: The Gandini Project DVD, 'Madison Variations' is available at www.mediacircus.biz. Also, the stickman juggler is at jugglinglab.jugglinglab.sourceforge.net

Thursday, December 11

The 10:30 IMA break will be in Lind Hall 400.

Friday, December 12

The 10:30 IMA break will be in Lind Hall 400.

IMA/MCIM INDUSTRIAL PROBLEM SEMINAR, 570 Vincent Hall:

1:25pm

Scott Shald
Coherent Technologies, Inc.

Modeling of a Natural Gas Pipeline Leak Sensor

Abstract: Coherent Technologies (CTI) is building a sensor for airborne remote sensing of natural gas pipeline leaks. The sensor uses Differential Absorption Ladar (DIAL) techniques to measure the concentration of natural gas in the air. As the aircraft flies over a pipeline, multiple DIAL measurements are made to produce an image of the natural gas content in the pipeline corridor. Areas with high concentrations suggest the presence of a leak in the pipeline.

The decision to build this sensor was based upon extensive modeling of the performance of the sensor. The modeling determined requirements for the sensor, such as laser power, aperture size, operating wavelengths, and scan patterns. The issues that were examined and the trade-offs that were explored will be presented.

Monday, December 15

The 10:30 IMA break will be in Lind Hall 400.

Tuesday, December 16

The 10:30 IMA break will be in Lind Hall 400.

Wednesday, December 17

The 10:30 IMA break will be in Lind Hall 400.

Thursday, December 18

The 10:30 IMA break will be in Lind Hall 400.

Friday, December 19

The 10:30 IMA break will be in Lind Hall 400.

Monday, December 22

The 10:30 IMA break will be in Lind Hall 400.

Tuesday, December 23

The 10:30 IMA break will be in Lind Hall 400.

Wednesday, December 24

The 10:30 IMA break will be in Lind Hall 400.

Thursday, December 25

Christmas Day, a University of Minnesota holiday. IMA offices will be closed.

Friday, December 26

Floating Holiday, a University of Minnesota holiday. IMA offices will be closed.

Monday, December 29

The 10:30 IMA break will be in Lind Hall 400.

Tuesday, December 30

The 10:30 IMA break will be in Lind Hall 400.

Wednesday, December 31

The 10:30 IMA break will be in Lind Hall 400.

PART III: CURRENT IMA PARTICIPANTS

FIRST YEAR POSTDOCTORAL MEMBERS

NAME	PREVIOUS INSTITUTION
Gerard Awanou	University of Georgia
Karen Ball	Indiana University
Antar Bandyopadhyay	UC Berkeley
Tim Garoni	University of Melbourne
Chuan-Hsiang Han	North Carolina State University
Lea Popovic	UC Berkeley

SECOND YEAR POSTDOCTORAL MEMBERS

NAME	PREVIOUS INSTITUTION
Olga Brezhneva	Russian Academy of Sci.
Lisa Evans	Georgia Tech
Balaji Gopalakrishnan	Georgia Tech
Herve Kerivin	University Blaise Pascal-France
Tamon Stephen	University of Michigan
Jing Wang	University of Minnesota

POSTDOCTORAL MEMBERS IN INDUSTRIAL MATHEMATICS

NAME	PREVIOUS INSTITUTION	INDUSTRIAL AFFILIATION
Yusuf Altundas	University of Pittsburgh	Schlumberger
Lili Ju	Iowa State University	VA Hospital
Haewon Nam	Texas A & M University	GE
Jun Zhao	Texas A & M University	Schlumberger

LONG TERM VISITORS

NAME	HOME INSTITUTION
Soohan Ahn	Seoul National University (SRCCS)
Greg Anderson	University of Minnesota
Maury Bramson	University of Minnesota
Laura Chihara	Carleton College
Shmuel Friedland	University of Illinois - Chicago
Naresh Jain	University of Minnesota
Christina Kendziorski	University of Wisconsin - Madison
Mohammad Kazim Khan	Kent State University
Dohyun Kim	Seoul National University (SRCCS)
Thomas G. Kurtz	University of Wisconsin - Madison
Richard P. McGehee	University of Minnesota
Michael Newton	University of Wisconsin - Madison
Amir Niknejad	University of Illinois - Chicago
Greg Rempala	University of Louisville
Arnd Scheel	University of Minnesota
Stephen J. Willson	Iowa State University
Yuhong Yang	Iowa State University
Ofer Zeitouni	University of Minnesota

See also URL: <http://www.ima.umn.edu/people/>