Workshop and Short Course on
STOCHASTIC NETWORKS
June 15–26
University of Wisconsin–Madison

Principal Lecturer
Frank Kelly
Cambridge University

Modelling Random Flow in Networks

Additional Lecturers

Yaser Abu–Mostafa, Cal Tech
Peter Gacs, Boston University
Peter Glynn, University of Wisconsin
David Griffeath, University of Wisconsin
Bruce Hajek, University of Illinois
Thomas Kurtz, University of Wisconsin
Peter Ney, University of Wisconsin
Edward Posner, Cal Tech & JPL
Mary Vernon, University of Wisconsin
Ward Whitt, AT&T Bell Labs

Neural Networks
Reliable Computation
Generalized Semi-Markov Processes
Random Cellular Automata
Dynamic Routing in Networks
Counting Processes
Regeneration Methods
Neural Networks
Stochastic and Timed Petri Net Models
Queueing Network Approximations

The short course will be directed primarily at advanced graduate students and recent PhD's, and some funds provided by the National Science Foundation are available for travel and subsistence. For further information on the program, registration and housing, write:

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University of
Wisconsin–Madison
WORKSHOP AND SHORT COURSE ON STOCHASTIC NETWORKS

Tentative lecture program

Kelly: Modelling random flow in networks

Models of queuing networks and of circuit-switched networks (2 lectures)
Capacity allocation and routing strategies in queuing networks
One-dimensional networks
Approximations and asymptotics for circuit-switched networks (2 lectures)
Capacity allocation and routing strategies in circuit-switched networks
Random access schemes

Whitt: Approximation for queuing networks

Approximation by aggregation and decomposition
Heavy traffic and diffusion approximations
Superposition of arrival processes
Open and closed queuing networks and fixed point approximations

Glynn: Generalized semi-Markov processes

Structure and basic properties
Recurrence and ergodic behavior
Implications for Monte-Carlo simulation

Posner, Abu-Mostafa, Chöwer: Neural networks

Associative neural networks: Data retrieval and optimization (Posner)
Optimal computational problems for neural networks (Abu-Mostafa)
Fidelity and stability in small neural networks (Chöwer)

Kurtz: Systems of counting processes

Stochastic equations for systems of counting processes
Equations for Markov processes and queuing networks
Diffusion approximations
Gacs: **Reliable computation**

Reliable computation (2 lectures)

Griffeath: **Random cellular automata**

Random cellular automata (2 lectures)

Ney: **Regeneration methods**

Markov additive processes

Large deviations

Hajek: **Dynamic routing in networks**

Dynamic routing: Theory, practice, and potential applications

Dynamic routing in fluid models

Stochastic control approach to dynamic routing

Vernon: **Stochastic and timed Petri net models**

Structure and basic properties

Applications in computer systems performance analysis

Comparison with queuing network analysis