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Workshop and Short Course on  
**STOCHASTIC  
NETWORKS**

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June 15–26  
University of Wisconsin–Madison

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Principal Lecturer

Frank Kelly  
Cambridge University

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**Modelling Random Flow in Networks**

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**Additional Lecturers**

<b>Yaser Abu–Mostafa</b> , Cal Tech	<b>Neural Networks</b>
<b>Peter Gacs</b> , Boston University	<b>Reliable Computation</b>
<b>Peter Glynn</b> , University of Wisconsin	<b>Generalized Semi-Markov Processes</b>
<b>David Griffeath</b> , University of Wisconsin	<b>Random Cellular Autometa</b>
<b>Bruce Hajek</b> , University of Illinois	<b>Dynamic Routing in Networks</b>
<b>Thomas Kurtz</b> , University of Wisconsin	<b>Counting Processes</b>
<b>Peter Ney</b> , University of Wisconsin	<b>Regeneration Methods</b>
<b>Edward Posner</b> , Cal Tech & JPL	<b>Neural Networks</b>
<b>Mary Vernon</b> , University of Wisconsin	<b>Stochastic and Timed Petri Net Models</b>
<b>Ward Whitt</b> , AT&T Bell Labs	<b>Queueing Network Approximations</b>

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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:

**Prof. T. Kurtz**  
Dept. of Mathematics  
Van Vleck Hall, Room 1000  
480 Lincoln Drive  
University of Wisconsin–Madison  
Madison, WI 53706



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Wisconsin-Madison

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WORKSHOP AND SHORT COURSE ON STOCHASTIC NETWORKS

Tentative lecture program

Schedule

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, Chover: 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 (Chover)

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