

5th Annual Women in Mathematics Day

Jean E. Rubin Memorial Lecture

Tuesday, November 1, 2011

4:30 p.m.

MATH 175

Refreshments will be served prior to the talk at 4 p.m. in the Math Library Lounge (3rd floor MATH).

Speaker:

Ruth Williams

University of California, San Diego

Professor Williams is the Charles Lee Powell Distinguished Professor of Mathematics at the University of California, San Diego. She is a world expert in probability and its applications to stochastic networks which arise in many areas of science and engineering. She is the recipient of a Guggenheim Fellowship, an Alfred P. Sloan Research Fellowship, and a Presidential Young Investigator's Award. She is a fellow of the American Association for the Advancement of Science, a fellow of the Institute of Mathematical Statistics, and a fellow of the Institute for Operations Research and the Management Sciences. In 2009, she was elected Fellow of the American Academy of Arts and Sciences. She was an invited speaker at the 1998 Congress of Mathematicians in Berlin. She is the current president of the Institute of Mathematical Statistics.



Resource Sharing in Stochastic Networks

Abstract

Stochastic networks are used as models for complex processing systems involving dynamic interactions subject to uncertainty. Application domains include manufacturing, the service industry, telecommunications, computer systems and bioengineering. Networks arising in modern applications are often highly complex and heterogeneous, with network features that transcend those of conventional queueing models. The control and analysis of such networks present challenging mathematical problems. In this talk, a concrete application will be used to illustrate a general approach to the study of stochastic processing networks using more tractable approximate models. Specifically, we will consider a connection-level model of Internet congestion control. Elegant fluid and diffusion approximations will be used to study the performance of this model and to reveal how entrainment of resources can occur through the use of fair bandwidth sharing policies. The talk will conclude with a summary of the current status and description of open problems associated with the further development of approximate models for general stochastic processing networks.



Jean E. Rubin was Professor of Mathematics at Purdue University from 1967 until her death in 2002. She received a B.S. from Queen's College in New York City in 1948, an M.A. from Columbia in 1949, and a Ph.D. from Stanford in 1955. She taught at Oregon and Michigan State before coming to Purdue.

Professor Rubin was the author of more than 40 papers and five books in set theory and questions related to the axiom of choice.