

**IAS Distinguished Lecture Series**  
**Frontiers in Operations Research/Operations Management**

# Modeling and Analysis of Markov Processes with Non-stationary Transition Probabilities

## Professor Peter Glynn

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von Neumann Theory Prize winner

Date: 29 October 2018 (Monday)  
Time: 4:30pm – 6:00pm (*Light refreshments will be served from 4:00pm to 4:30pm*)  
Venue: Room 8-210, 8/F, Lau Ming Wai Academic Building, City University of Hong Kong



### Chair:

Professor Duan Li, Associate Provost (Strategic Planning) and Chair Professor, School of Data Science, City University of Hong Kong

### Discussants:

Professor Jeff Hong, Hong Yi Chair Professor, School of Management and School of Data Science, Fudan University  
Dr. Xiaowei Zhang, Visiting Assistant Professor, Department of Management Sciences, City University of Hong Kong

### Abstract

In many applied settings, the stochastic phenomenon of interest exhibits time-varying behavior. For example, in service engineering settings, it is common to encounter systems that exhibit time-of-day effects or seasonality effects. In this talk, we will discuss the equations that arise when one applies Markov models to the study of such time-varying systems. We will then describe some new limit theorems and approximations that can be applied to such Markov processes having non-stationary transition probabilities. These approximations are valid when the transition probabilities vary slowly over some model-specific time horizon, and supplement the “point wise stationary approximations” that have been historically applied in such settings. In addition, we will discuss a new class of numerical schemes for analyzing time-varying Markov chains and jump processes that exploits the “asymptotic loss of memory property” exhibited by such models. This work is joint with Harsha Honnappa, Alex Infanger, and Zeyu Zheng.

### Biography

Peter W. Glynn is the Thomas Ford Professor in the Department of Management Science and Engineering (MS&E) at Stanford University, and also holds a courtesy appointment in the Department of Electrical Engineering. He received his Ph.D in Operations Research from Stanford University in 1982.

Prof. Glynn joined the faculty of the University of Wisconsin at Madison, where he held a joint appointment between the Industrial Engineering Department and Mathematics Research Center, and courtesy appointments in Computer Science and Mathematics. In 1987, he returned to Stanford, where he joined the Department of Operations Research. From 1999 to 2005, he served as Deputy Chair of the Department of Management Science and Engineering, and was Director of Stanford's Institute for Computational and Mathematical Engineering from 2006 until 2010. He served as Chair of MS&E from 2011 through 2015.

He is a Fellow of INFORMS and a Fellow of the Institute of Mathematical Statistics, has been co-winner of Best Publication Awards from the INFORMS Simulation Society in 1993 and 2008, was a co-winner of the Best (Biannual) Publication Award from the INFORMS Applied Probability Society in 2009, and was the co-winner of the John von Neumann Theory Prize from INFORMS in 2010. In 2012, he was elected to the National Academy of Engineering.

His research interests lie in simulation, computational probability, queueing theory, statistical inference for stochastic processes, and stochastic modeling.



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