

*Resumé*

**WARD WHITT**

*Current Employment*

Wai T. Chang Professor  
Department of Industrial Engineering and Operations Research  
Fu Foundation School of Engineering and Applied Science  
Columbia University  
Mail Code 4704, S. W. Mudd Building  
500 West 120th Street  
New York, NY 10027-6699  
Phone: (212) 854-7255  
Fax: (212) 854-8103  
Email: ww2040@columbia.edu  
URL: <http://www.columbia.edu/~ww2040>  
Citizenship: USA

*Education*

1969 Ph.D., Cornell University  
Major Field: Operations Research  
Minor Fields: Mathematics and Regional Planning  
Thesis: Weak Convergence Theorems for Queues in Heavy Traffic  
(Advisor: D. L. Iglehart; Committee Members: H. Kesten and N. U. Prabhu)  
1964 A.B., Dartmouth College  
Major: Mathematics  
(Senior Honors Thesis Advisor: J. G. Kemeny)

*Research, Consulting and Teaching Interests*

Queues: approximation techniques, limit theorems, heavy-traffic theory, model stability, bounds and inequalities, transient behavior, queues with time-varying arrival rates, numerical transform inversion, fundamental principles such as  $L = \lambda W$ , stochastic networks, applications to communication networks, manufacturing systems and service systems such as contact centers and healthcare systems

Probability and Stochastic Processes: limit theorems, weak convergence, diffusion processes, stochastic order relations, simulation, numerical transform inversion, stochastic models in operations research.

Telecommunication Systems: performance analysis, internet performance, IP networks, circuit-switched networks, wireless networks, high-speed communication networks, asynchronous transfer mode technology, traffic descriptors, traffic regulators, protection against overloads, staffing telephone call centers, real-time performance prediction and control

Operations Research: applied probability, stochastic models, queues, performance analysis, simulation, dynamic programming, game theory, decision analysis, approximation techniques, telecommunication, computer manufacturing and service systems.

## *Employment History*

### Columbia University in the City of New York

2002– Professor, Dept. of Industrial Engineering and Operations Research

### SeatLink, Inc., New York

2004-2007 Co-Founder, Advisor and Part-Time Consultant

### Avaya Labs Research

2003 Part-Time Consultant, Customer-Contact-Center Algorithms,  
Data Analysis Research Department, Basking Ridge, NJ

### AT&T (Bell Laboratories, 1977-1996; AT&T Laboratories, 1996-2002)

1996–2002 Technology Leader and AT&T Fellow,  
IP Network Management and Performance Department,  
Internet and Networking Systems Research Laboratory,  
Shannon Laboratory, Florham Park, NJ

1987–1996 Member of Technical Staff, Mathematical Sciences  
Research Center, Murray Hill, NJ

1977–1986 Member of Technical Staff, Operations Research Department,  
Holmdel, NJ

### Yale University

1973–1977 Associate Professor, Department of Administrative Sciences  
(joint appointment in Department of Statistics)

1969–1973 Assistant Professor, Department of Administrative Sciences  
(became Department of Operations Research)

### Stanford University

1968–1969 Assistant Professor, Department of Operations Research

### Cornell University

1965–1966 Instructor and Teaching Assistant, Department of Industrial  
Engineering and Operations Research

### New York Telephone Company

1961–1963 Management Training Program, Engineering (two summers)  
and Sales (one summer)

### Montana State University, Bozeman, Montana

1959–1960 Computer Programmer, Computer Center

### White's Pharmacy, Bozeman, Montana

1958–1959 Inventory Control Specialist (stockboy)

*Honors, Fellowships and Grants*

- 2016 NSF Research Grant, Data-Driven Queueing Models for Healthcare: Accounting for Stochastic Dependence and Time Dependence
- 2013 NSF Research Grant, Fitting Time-Varying Queueing Models to Service System Data
- 2012 Manufacturing and Service Operations Management Society Distinguished Fellow Award
- 2011 INFORMS Expository Writing Award
- 2011 NSF Research Grant, Many-Server Queues with Time-Varying Arrival Rates
- 2010 INFORMS Applied Probability Society Markov Lecture, INFORMS conference, Austin, Texas
- 2009 NSF Research Grant, Mathematical Models for Large-Scale Service Systems
- 2007 SEAS Alumni Association Distinguished Faculty Teaching Award
- 2007 Appointed Wai T. Chang Professor at Columbia University
- 2007 US-Israel Binational Science Foundation Grant with A. Mandelbaum and others
- 2005 NSF Research Grant, Stochastic Models of Customer Contact Centers
- 2003 INFORMS Lanchester Prize for best publication in OR and MS (for 2002 book)
- 2003 US-Israel Binational Science Foundation Grant with A. Mandelbaum and others
- 2003 IBM Faculty Award
- 2002 INFORMS Inaugural Fellow
- 2002 NSF Research Grant, Stochastic Models for the Design and Management of Customer Contact Centers
- 2001 INFORMS John von Neumann Theory Prize for fundamental, sustained contributions to theory in OR and MS
- 2001 Plenary Speaker, INFORMS Applied Probability Conference, July 25, 2001
- 2001 Harold Larnder Prize for distinguished achievement in operational research, Canadian Operational Research Society
- 2000 Fulkerson Lecturer, School of Operations Research and Industrial Engineering, Cornell University, October 16–20, 2000
- 1998 Honorable mention for the INFORMS Lanchester Prize for the best publication in operations research, for a collection of papers on numerical transform inversion (with J. Abate, G. L. Choudhury, K. K. Leung and D. M. Lucantoni)
- 1998 Member of AT&T Labs Fellowship Program Committee, sharing in the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring
- 1998 Marcel F. Neuts Best Paper Award, “Fluid and Diffusion Limits for Queues in Slowly Changing Random Environments,” *Stochastic Models*, 1997 (with Gagan L. Choudhury, Avi Mandelbaum and Martin I. Reiman).
- 1998 Plenary Speaker, INFORMS Telecommunications Conference, Boca Raton, FL, March 1998.
- 1997 Keynote Speaker, 1997 Winter Simulation Conference
- 1997 Selected to be an AT&T Fellow
- 1996 Elected to National Academy of Engineering
- 1993–1996 United States-Israel Binational Science Foundation Grant with Offer Kella of Hebrew University to study stochastic fluid networks
- 1993 Presented opening lecture at 22nd Conference on Stochastic Processes and Their Applications, Amsterdam, June 1993.
- 1992 Elected to be a member of the International Federation of Information Processing Working Group on System Modeling, Measurement and Evaluation (IFIP WG7.3)
- 1992 Presented Keynote Address, *Performance 92*, Newport, RI, June 1992.

*Honors, Fellowships and Grants, continued*

- 1991 Outstanding Publication Award, The Institute of Management Sciences College of Simulation for “Planning Queueing Simulations,” *Management Science*, vol. 35, pp. 1341–1366, 1989.
- 1990 A principal invited speaker, SIAM Conference on Applied Probability in Science and Engineering, New Orleans, March, 1990.
- 1984 Honorable Mention, Best Paper Award for 1983, *Bell System Technical Journal*, “The Queueing Network Analyzer,” vol. 62, pp. 2779–2815.
- 1982 Distinguished Member of Technical Staff Award, Bell Laboratories
- 1973–1976 NSF Grant GK-38149, Yale University: Applied Probability in OR (Principal Investigator)
- 1972–1973 Yale University Junior Faculty Fellowship in Social Sciences (year doing research)
- 1971–1972 NSF Engr. Res. Initiation Grant GK-27866, Yale University (Principal Investigator)
- 1967–1968 NSF Graduate Fellowship, Cornell University (year spent at Stanford University)
- 1964–1967 Ford Foundation Engineering Fellowship, Cornell University

*Professional Activities*

Refereeing manuscripts for research journals and research grant proposals

Advisory Editor:

Mathematics of Operations Research, 1990–  
Operations Research, 2006–

Area Editor:

Mathematics of Operations Research, 1987–1990

Associate Editor:

Operations Research, 1974-1976  
Mathematics of Operations Research, 1978-1986  
Journal of Stochastic Processes and Their Applications, 1979-1984  
Queueing Systems: Theory and Applications, 1985-2012  
Journal of Applied Probability, 1989-2012  
Advances in Applied Probability, 1989-2012  
Discrete Event Dynamic Systems: Theory and Applications, 1990–1999  
Telecommunications Systems 1992–1994  
Journal of the Operations Research Society of Japan 1997–1999

Participation in the activities of the Institute for Operations Research and Management Science (INFORMS), formerly the Operations Research Society of America, and in the Applied Probability Special Interest Group: presentations, session chairman and session organizing. Vice Chairman of Special Interest Group 1986, Chairman 1987.

Member of Search Committee for new Editor of Operations Research, 1981

Chairman of Search Committee for new Editor of Mathematics of Operations Research, 1992; member 2008

Lanchester Prize Committee, 1979, 1985

von Neumann Prize Committee, 1988–1991

Chairman of Nicholson Prize Committee, 1994

Member of the Committee for Conference on Stochastic Processes, the Bernoulli Society, 1979–1983

Co-organizer of Conference on Applied Stochastic Processes, Oberwolfach, W. Germany, 1982, 1985

External Review Committee for Department of Operations Research, Stanford University, 1989, 1993

External Review Committee for Department of Mathematical Sciences, Carnegie-Mellon University, 2002, 2005, 2008

External Review Committee for Department of Operations Research and Statistics, University of North Carolina at Chapel Hill, 2008

*Doctoral Dissertations Advised (not always as principal advisor, but significant participation).*

*Yale University:*

Dirickx, Yvo. Dynamic Programming Models with Discount Factor Greater Than One, 1971.

Goodman, David. Modified Sectioning Search Approach to Aggregate Planning, 1972.

Sanghvi, Arun. The Asymptotic Behavior of Some Sequential Games, 1973.

Roth, Carl. A Multiperson Theory of Organizational Decision-Making, 1974.

Winston, Wayne. Optimal Operation of Congestion Systems with Heterogeneous Arrivals and Servers, 1975.

Pomarede, Jean-Michel. A Unified Approach Via Graphs to Skorohod's Topologies on the Function Space  $D$ , 1976.

Thomas, Annie. Approximation Procedures for Capacity Expansion Models, 1977.

Sonderman, David. Comparison Results for Stochastic Processes Arising in Queueing Systems, 1978.

Green, Linda. Queues Which Allow a Random Number of Servers Per Customer, 1978.

*New York University:*

Burman, David. An Analytic Approach to Diffusion Approximations in Queueing, 1979.

*George Washington University:*

Wallace, Rodney B. Performance Modelling and Design of Call Centers with Skill-Based Routing, 2004.

*Columbia University:*

- Albin, Susan. Approximations for Queues with Superposition Arrival Processes, 1981. (while at Bell Laboratories)
- Gurvich, Itay. Staffing and Control of Many-Server Service Systems, 2008.
- Talreja, Rishi. Essays on Heavy-Traffic Approximations for Many-Server Queueing Systems, 2010.
- Park, Kun Soo. Applications of Stochastic Modeling to Quantitative Finance and Operations Management, 2010.
- Perry, Ohad. Heavy-Traffic Limits via an Averaging principle for Service Systems Responding to Unexpected Overloads, 2010.
- Ibrahim, Rouba. Delay Estimation in Many-Server Queues, 2010.
- Pang, Guodong. Heavy-Traffic Limits for Many-Server Service Systems with Interruptions and Feedback, 2010.
- Liu, Yunan. Many-Server Queues with Time-Varying Arrivals, Customer Abandonment and Non-Exponential Distributions, 2011.
- Kim, Song-Hee. Data-Driven Decisions in Service Systems, 2014.

*Patents*

- Efficient, Rate-Based Multiaccess Control, U.S. Patent 5,274,644 issued December 12, 1993 (with Arthur W. Berger and Rodolfo A. Milito).
- Efficiently Providing Multiple Grades of Service with Protection Against Overloads in Shared Resources, U.S. patent 5,719,854 issued February 17, 1998 (with Gagan L. Choudhury and Kin K. Leung).
- Systems and Methods for Estimating a Blocking Probability, U.S. Patent 5,805,681 issued September 8, 1998 (with Rayadurgam Srikant).
- Resource Sharing for Book-Ahead and Instantaneous-Request Calls, U.S. Patent 5,878,026 issued March 2, 1999 (with Albert Greenberg and Rayadurgam Srikant).
- Method for Determining Server Staffing in Management of Finite Server Queueing Systems, U.S. Patent 5,923,873 issued July 13, 1999 (with William A. Massey).
- Method and Apparatus for Predicting Queueing Delays, U.S. Patent 6,023,681 issued February 8, 2000.
- Traffic Management in Packet Communication Networks Having Service Priorities and Employing Effective Bandwidths, U.S. Patent 6,160,818 issued December 12, 2000 (with Arthur W. Berger).
- Dynamic Staffing of Telephone Call Centers to Provide Substantially Zero-Delay Service, U.S. Patent 6,330,326 issued December 11, 2001.

Method for Preventing Overload Condition in a Circuit Switched Arrangement, U.S. Patent 6,987,848 issued January 17, 2006 (with Gagan L. Choudhury, Alan E. Kaplan and Vaidyanathan Ramaswami).

Contact-Center Routing Based on Incentives and/or Agent Preferences, filed January 14, 2005 (with Michael E. Sisselman).

Contact-Center Routing Based on Games or Contests Involving the Agents, filed February 15, 2005 (with Michael E. Sisselman).

## I. Publications

- 1948 Train Trip, *Jack and Jill*, July 1948, p. 62. (poem)
- 1961 Hotel Services – Automatic Recording of Guests’ Local and Toll Telephone Charges, *New York Telephone Company General Engineering Bulletin*, vol. 11, No. 4, Winter 1961, pp. 29–32. (paper based on summer project)
- 1969 Weak Convergence Theorems for Queues in Heavy Traffic, Ph.D. Thesis, Cornell University January 1969.
- 1970 Weak Convergence of Probability Measures on the Function Space  $C[0, \infty)$ , *Annals of Mathematical Statistics*, vol. 41, No. 3, June 1970, pp. 939–944.
- Multiple Channel Queues in Heavy Traffic I, *Advances in Applied Probability*, vol. 2, No. 1, Spring 1970, pp. 150–177 (with Donald Iglehart).
- Multiple Channel Queues in Heavy Traffic II: Sequences, Networks, and Batches, *Advances in Applied Probability*, vol. 2, No. 2, Autumn 1970, pp. 355–369 (with Donald Iglehart).
- Multiple Channel Queues in Heavy Traffic III: Random Server Selection, *Advances in Applied Probability*, vol. 2, No. 2, Autumn 1970, pp. 370–375.
- A Guide to the Application of Limit Theorems for Sequences of Stochastic Processes, *Operations Research*, vol. 18, No. 6, November–December 1970, pp. 1207–1213.
- 1971 Weak Convergence Theorems for Priority Queues: Preemptive-Resume Discipline, *Journal of Applied Probability*, vol. 8, No. 1, March 1971, pp. 74–94.
- Weak Convergence of First Passage Time Processes, *Journal of Applied Probability*, vol. 8, No. 2, June 1971, pp. 417–422.
- The Equivalence of Functional Central Limit Theorems for Counting Processes and Associated Partial Sums, *Annals of Mathematical Statistics*, vol. 42, No. 4, August 1971, pp. 1372–1378 (with Donald Iglehart).
- 1972 Complements to Heavy Traffic Limit Theorems for the GI/G/1 Queue, *Journal of Applied Probability*, vol. 9, No. 1, March 1972, pp. 185–191.
- Stochastic Abelian and Tauberian Theorems, *Zeitschrift für Wahrscheinlichkeitstheorie und verw. Gebiete*, vol. 22, 1972, pp. 251–267.
- Limits for the Superposition of m-dimensional Point Processes, *Journal of Applied Probability*, vol. 9, No. 2, June 1972, pp. 462–465.
- Embedded Renewal Processes in the GI/G/s Queue, *Journal of Applied Probability*, vol. 9, No. 3, September 1972, pp. 650–658.



- 1973 Fiat Money in an Economy with one Nondurable Good and No Credit (A Noncooperative Sequential Game), *Topics in Differential Games*, A. Blaquiere (Editor), North-Holland Publishing Co., 1973, pp. 401–448 (with Martin Shubik).
- On the Quality of Poisson Approximations, *Zeitschrift für Wahrscheinlichkeitstheorie und verw. Gebiete*, vol. 28, 1973, pp. 23–36.
- 1974 The Continuity of Queues, *Advances in Applied Probability*, vol. 6, No. 1, March 1974, pp. 175–183.
- Preservation of Rates of Convergence under Mappings, *Zeitschrift für Wahrscheinlichkeitstheorie und verw. Gebiete*, vol. 29, 1974, pp. 39–44.
- Heavy Traffic Limit Theorems for Queues: A Survey, *Mathematical Methods in Queueing Theory*, Proceedings of a Conference at Western Michigan University, Lecture Notes in Economics and Mathematical Systems, No. 98, Springer-Verlag, New York, 1974, pp. 307–350.
- 1976 Bivariate Distributions with Given Marginals, *Annals of Statistics*, vol. 4, No. 6, September 1976, pp. 1280–1289.
- 1978 Approximations of Dynamic Programs, I, *Mathematics of Operations Research*, vol. 3, No. 2, May 1978, pp. 231–243.
- 1979 Approximations of Dynamic Programs, II, *Mathematics of Operations Research*, vol. 4, No. 2, May 1979, pp. 179–185.
- Comparing Probability Measures on a Set with an Intransitive Preference Relation, *Management Science*, vol. 25, No. 6, June 1979, pp. 535–511.
- A Note on the Influence of the Sample on the Posterior Distribution, *Journal of the American Statistical Association*, vol. 74, No. 366, June 1979, pp. 424–426.
- A Priori Bounds for Approximations of Markov Programs, *Journal of Mathematical Analysis and Applications*, vol. 71, No. 1, September 1979, pp. 297–302.
- 1980 Representation and Approximation of Noncooperative Sequential Games, *SIAM Journal on Control and Optimization*, vol. 18, No. 1, January 1980, pp. 33–48.
- Some Useful Functions for Functional Limit Theorems, *Mathematics of Operations Research*, vol. 5, No. 1, February 1980, pp. 67–85.
- Uniform Conditional Stochastic Order, *Journal of Applied Probability*, vol. 17, No. 1, March 1980, pp. 112–123.
- Approximating the Admissible Set in Stochastic Dominance, *Journal of Economic Theory*, vol. 23, No. 2, October 1980, pp. 218–235 (with Daniel Goroff).
- Continuity of Generalized Semi-Markov Processes, *Mathematics of Operations Research*, vol. 5, No. 4, November 1980, pp. 494–501.

- The Effect of Variability in the GI/G/s Queue, *Journal of Applied Probability*, vol. 17, No. 4, December 1980, pp. 1062-1071. (Correction Note, *Journal of Applied Probability*, vol. 21, No. 2, June 1984, pp. 445-446.)
- 1981 Resource Sharing for Efficiency in Traffic Systems, *Bell System Technical Journal*, vol. 60, No. 1, January 1981, pp. 39-55 (with D. R. Smith).
- Comparing Counting Processes and Queues, *Advances in Applied Probability*, vol. 13, No. 1, March 1981, pp. 207-220.
- The Stationary Distribution of a Stochastic Clearing Process, *Operations Research*, vol. 29, No. 2, March-April 1981, pp. 294-308.
- On Stochastic Bounds for the Delay Distribution in the GI/G/s Queue, *Operations Research*, vol. 29, No. 3, May-June 1981, pp. 604-608.
- Approximating a Point Process by a Renewal Process: The View Through a Queue, An Indirect Approach *Management Science*, vol. 27, No. 6, June 1981, pp. 619-636.
- Heavy-Traffic Limits for Queues with Many Exponential Servers, *Operations Research*, vol. 29, No. 3, May-June 1981, pp. 567-588 (with Shlomo Halfin).
- 1982 Approximating a Point Process by a Renewal Process: Two Basic Methods, *Operations Research*, vol. 30, No. 1, January-February 1982, pp. 125-147.
- Existence of Limiting Distributions in the GI/G/s Queue, *Mathematics of Operations Research*, vol. 7, No. 1, February 1982, pp. 88-94. (Erratum Note, *Mathematics of Operations Research*, vol. 9, No. 4, November 1984, p. 634.)
- On the Heavy-Traffic Limit Theorem For GI/G/ $\infty$  Queues, *Advances in Applied Probability*, vol. 14, No. 1, March 1982, pp. 171-190.
- Multivariate Monotone Likelihood Ratio and Uniform Conditional Stochastic Order, *Journal of Applied Probability*, vol. 19, No. 3, September 1982, pp. 695-701.
- Refining Diffusion Approximations for Queues, *Operations Research Letters*, vol. 1, No. 5, November 1982, pp. 165-169.
- The Marshall and Stoyan Bounds for IMRL/G/1 Queues Are Tight, *Operations Research Letters*, vol. 1, No. 6, December 1982, pp. 209-213.
- 1983 Queue Tests for Renewal Processes, *Operations Research Letters*, vol. 2, No. 1, April 1983, pp. 7-12.
- Untold Horrors of the Waiting Room. What the Equilibrium Distribution Will Never Tell About the Queue-Length Process, *Management Science*, vol. 29, No. 4, April 1983, pp. 395-408.
- Approximations for Networks of Queues, *Proceedings of the Tenth International Teletraffic Congress*, Montreal, June 1983, 4.1.1.

- Book Review: *Stochastic Monotonicity and Queueing Applications of Birth-Death Processes* by Erik van Doorn, Lecture Notes in Statistics 4, Springer-Verlag, New York, 1981. *Journal of the American Statistical Association*, vol. 72, No. 382, June 1983, pp. 501–502.
- Comparing Batch Delays and Customer Delays, *Bell System Technical Journal*, vol. 62, No. 7, September 1983, pp. 2001–2009.
- Toward an Approximation Theory for Point Processes and Networks of Queues, *Newsletter of the ORSA/TIMS Applied Probability Group*, Fall 1983, pp. 2–4.
- The Queueing Network Analyzer, *Bell System Technical Journal*, vol. 62, No. 9, November 1983, pp. 2779–2815.
- Performance of the Queueing Network Analyzer, *Bell System Technical Journal*, vol. 62, No. 9, November 1983, pp. 2817–2843.
- Comparison Conjectures about the M/G/s Queue, *Operations Research Letters*, vol. 2, No. 5, December 1983, pp. 203–209.
- 1984 On Approximations for Queues, I: Extremal Distributions, *AT&T Bell Laboratories Technical Journal*, vol. 63, No. 1, January 1984, pp. 115–138.
- On Approximations for Queues, II: Shape Constraints, *AT&T Bell Laboratories Technical Journal*, vol. 63, No. 1, January 1984, pp. 139–161 (with John G. Klinecicz).
- On Approximations for Queues, III: Mixtures of Exponential Distributions, *AT&T Bell Laboratories Technical Journal*, vol. 63, No. 1, January 1984, pp. 163–175.
- Book Review: *Queues and Point Processes*, by P. Franken, D. König, U. Arndt and V. Schmidt, Wiley, 1982. *American Scientist*, vol. 72, No. 1, January–February 1984, p. 91.
- Minimizing Delays in the GI/G/1 Queue, *Operations Research*, vol. 32, No. 1, January–February 1984, pp. 41–51.
- The Asymptotic Behavior of Queues with Time-Varying Arrival Rates, *Journal of Applied Probability*, vol. 21, No. 1, March 1984, pp. 143–156 (with Daniel P. Heyman).
- Heavy Traffic Approximations for Service Systems with Blocking, *AT&T Bell Laboratories Technical Journal*, vol. 63, No. 4, May–June 1984, pp. 689–708.
- The Amount of Overtaking in a Network of Queues, *Networks*, vol. 14, No. 3, Fall 1984, pp. 411–426.
- Open and Closed Models for Networks of Queues, *AT&T Bell Laboratories Technical Journal*, vol. 63, No. 9, November 1984, pp. 1911–1979.
- Departures from a Queue with Many Busy Servers, *Mathematics of Operations Research*, Vol. 9, No. 4, November 1984, pp. 534–544.

- Approximations for Departure Processes and Queues in Series, *Naval Research Logistics Quarterly*, vol. 31, No. 4, December 1984, pp. 499–521.
- 1985 The Renewal-Process Stationary-Excess Operator, *Journal of Applied Probability*, vol. 22, No. 1, March 1985, pp. 156–167.
- The Best Order for Queues in Series, *Management Science*, vol. 31, No. 4, April 1985, pp. 475–487.
- Uniform Conditional Variability Ordering of Probability Distributions, *Journal of Applied Probability*, vol. 22, No. 3, September 1985, pp. 619–633.
- Blocking When Service is Required from Several Facilities Simultaneously, *AT&T Technical Journal*, vol. 64, No. 8, October 1985, pp. 1807–1856.
- Characterizing Superposition Arrival Processes and the Performance of Multiplexers for Voice and Data, *Proceedings of IEEE Global Telecommunications Conference*, New Orleans, December 1985, vol. 2, pp. 25.4.1–7 (with K. Sriram).
- Queues with Superposition Arrival Processes in Heavy Traffic, *Stochastic Processes and Their Applications*, vol. 21, No. 1, December 1985, pp. 81–91.
- 1986 Deciding Which Queue to Join: Some Counterexamples, *Operations Research*, vol. 34, No. 1, January–February 1986, pp. 55–62.
- Book Review: *Comparison Methods for Queues and Other Stochastic Models*, by D. Stoyan (ed. D. J. Daley), Wiley, 1983. *Journal of American Statistical Association*, vol. 81, No. 393, March 1986, p. 266.
- Partial Solution to Problem 6482. *The American Mathematical Monthly*, vol. 93, No. 6, June–July 1986, pp. 488–489 (with D. R. Smith).
- Characterizing Superposition Arrival Processes in Packet Multiplexers for Voice and Data. *IEEE Journal on Selected Areas in Communications*, vol. SAC-4, No. 6, September 1986, pp. 833–846 (with K. Sriram).
- The Influence of Service-Time Variability in a Closed Network of Queues. *Performance Evaluation*, vol. 6, September 1986, pp. 219–234 (with André B. Bondi).
- A Central-Limit-Theorem Version of  $L = \lambda W$ . *Queueing Systems: Theory and Applications*, vol. 1, No. 2, September 1986, pp. 191–215 (with Peter W. Glynn).
- Stochastic Comparisons for Non-Markov Processes. *Mathematics of Operations Research*, vol. 11, No. 4, November 1986, pp. 608–618.
- 1987 Book Review: *Asymptotic Methods in Queueing Theory* by A. A. Borovkov (translated by D. Newton), Wiley, 1984. *American Scientist*, vol. 75, No. 2, March–April 1987, pp. 210–211.
- Sufficient Conditions for Functional Limit Theorem Versions of  $L = \lambda W$ . *Queueing Systems: Theory and Applications*, vol. 1, No. 3, 1987, pp. 279–287 (with Peter W. Glynn).

- Transient Behavior of the M/M/1 Queue: Starting at the Origin. *Queueing Systems: Theory and Applications*, vol. 2, No. 1, 1987, pp. 41–65 (with Joseph Abate).
- Transient Behavior of Regulated Brownian Motion I: Starting at the Origin. *Advances in Applied Probability*, vol. 19, No. 3, September 1987, pp. 560–598 (with Joseph Abate).
- Transient Behavior of Regulated Brownian Motion, II: Non-Zero Initial Conditions. *Advances in Applied Probability*, vol. 19, No. 3, September 1987, pp. 599–631 (with Joseph Abate).
- 1988 Stochastic Ordering, *Encyclopedia of the Statistical Sciences*, vol. 8, S. Kotz and N. L. Johnson eds., Wiley, New York, 1988, pp. 832–836.
- Transient Behavior of the M/M/1 Queue Via Laplace Transforms. *Advances in Applied Probability*, vol. 20, No. 1, March 1988, pp. 145–178 (with Joseph Abate).
- Estimating Average Production Intervals Using Inventory Measurements: Little’s Law for Partially Observable Processes. *Operations Research*, vol. 36, No. 2, March-April 1988, pp. 208–223 (with Ardavan Nozari).
- The Correlation Functions of RBM and M/M/1. *Stochastic Models*, vol. 4, No. 2, 1988, pp. 315–359 (with Joseph Abate).
- Approximations for the M/M/1 Busy Period. *Queueing Theory and its Applications, Liber Amicorum for J. W. Cohen* North-Holland, Amsterdam, 1988, pp. 149–191 (with Joseph Abate).
- Simple Spectral Representations for the M/M/1 Queue. *Queueing Systems*, vol. 3, No. 4, 1988, pp. 321–346 (with Joseph Abate).
- Ordinary CLT and WLLN Versions of  $L = \lambda W$ . *Mathematics of Operations Research*, vol. 13, No. 4, 1988, pp. 674–692 (with Peter W. Glynn).
- An LIL Version of  $L = \lambda W$ . *Mathematics of Operations Research*, vol. 13, No. 4, 1988, pp. 693–710 (with Peter W. Glynn).
- A Light-Traffic Approximation for Single-Class Departure Processes From Multi-Class Queues. *Management Science*, vol. 34, No. 11, 1988, pp. 1333–1346.
- 1989 Indirect Estimation Via  $L = \lambda W$ . *Operations Research*, vol. 37, No. 1, 1989, pp. 82–103 (with Peter W. Glynn).
- Spectral Theory for Skip-Free Markov Chains. *Probability in the Engineering and Information Sciences*, vol. 3, No. 1, 1989, pp. 77–88 (with Joseph Abate).
- A Queueing Network Analyzer for Manufacturing. *Teletraffic Science for New Cost-Effective Systems, Networks and Services, ITC 12* (ed. M. Bonatti), North-Holland, Amsterdam, 1989, pp. 1146–1152 (with Moshe Segal).
- Dependence in Packet Queues: A Multi-Class Batch-Poisson Model. *Teletraffic Science for New Cost-Effective Systems, Networks and Services, ITC 12*, (ed. M. Bonatti), North-Holland, Amsterdam, 1989, pp. 1450–1454 (with Kerry W. Fendick and Vikram R. Saksena).

- Measurements and Approximations to Describe the Offered Traffic and Predict the Average Workload in a Single-Server Queue. *Proceedings of the IEEE*, vol. 77, No. 1, 1989, pp. 171-194, (with Kerry W. Fendick). (Reprinted in *Stochastic Analysis of Computer and Communication Systems* (ed. H. Takagi), North-Holland, Amsterdam, 1990, pp. 3-56.)
- Extensions of the Queueing Relations  $L = \lambda W$  and  $H = \lambda G$ . *Operations Research*, vol. 37, No. 4, 1989, pp. 634-644 (with Peter W. Glynn).
- An Extremal Property of the FIFO Discipline Via An Ordinal Version of  $L = \lambda W$ . *Stochastic, em Models*, vol. 5, No. 3, 1989, pp. 515-529 (with Shlomo Halfin).
- On Reinforcement-Depletion Compartmental Urn Models. *Journal of Applied Probability*, vol. 26, No. 3, 1989, pp. 477-489 (with Peter Donnelly).
- Calculating Time-Dependent Performance Measures for the M/M/1 Queue. *IEEE Transactions on Communications*, vol. 37, No. 10, 1989, pp. 1102-1104 (with Joseph Abate).
- Dependence in Packet Queues. *IEEE Transactions on Communications*, vol. 37, No. 11, 1989, pp. 1173-1183 (with Kerry W. Fendick and Vikram R. Saksena).
- Planning Queueing Simulations. *Management Science*, vol. 35, No. 11, 1989, pp. 1341-1366.
- Simulation Run Length Planning. *1989 Winter Simulation Conference Proceedings*, pp. 106-112.
- On Averages Seen By Arrivals in Discrete Time. *Proceedings of the 28th IEEE Conference on Decision and Control*, December 1989, pp. 1084-1086 (with Armand Makowski and Benjamin Melamed).
- An Interpolation Approximation for the Mean Workload in a GI/G/1 Queue. *Operations Research*, vol. 37, No. 6, 1989, pp. 936-952.
- Limits for Queues as the Waiting Room Grows. *Queueing Systems*, vol. 5, No. 4, 1989, pp. 381-392 (with Daniel P. Heyman).
- 1990 On Arrivals That See Time Averages. *Operations Research*, vol. 38, No. 1, 1990, pp. 156-172 (with Benjamin Melamed).
- Queues with Service Times and Interarrival Times Depending Linearly and Randomly Upon Waiting Times. *Queueing Systems*, vol. 6, No. 4, 1990, pp. 335-351.
- On Arrivals That See Time Averages: A Martingale Approach. *Journal of Applied Probability* vol. 27, No. 2, 1990, pp. 376-384 (with Benjamin Melamed).
- Arranging Queues in Series: A Simulation Experiment. *Management Science*, vol. 36, No. 2, 1990, pp. 1080-1091 (with S. Suresh).
- Diffusion Approximations for Queues with Server Vacations. *Advances in Applied Probability*, vol. 22, No. 3, 1990, pp. 706-729 (with Offer Kella).

- The Heavy-Traffic Bottleneck Phenomenon in Open Queueing Networks. *Operations Research Letters*, vol. 9, No. 6, 1990, pp. 355–362 (with S. Suresh).
- A Multi-Class Input Regulation Throttle. *Proceedings of the 29th IEEE Conference on Decision, Control and Control*, December 1990, pp. 2106–2111 (with Arthur Berger).
- 1991 Queues with Server Vacations and Lévy Processes with Secondary Jump Input. *Annals of Applied Probability*, vol. 1, No. 1, 1991, pp. 104–117 (with Offer Kella).
- A New View of the Heavy-Traffic Limit for Infinite-Server Queues. *Advances in Applied Probability*, vol. 23, No. 1, 1991, pp. 188–209 (with Peter W. Glynn).
- The Pointwise Stationary Approximation for  $M_t/M_t/s$  Queues is Asymptotically Correct as the Rates Increase. *Management Science*, vol. 37, No. 3, 1991, pp. 307–314.
- The Efficiency of One Long Run Versus Independent Replications in Steady-State Simulation. *Management Science*, vol. 37, No. 6, 1991, 645–666.
- Two Fundamental Principles of Queueing Theory. *Queueing, Performance and Control in ATM, Proceedings of 13th International Teletraffic Congress*, J. W. Cohen and C. D. Pack (eds.), Elsevier, Amsterdam, pp. 151–156, 1991.
- Investigating Dependence in Packet Queues with the Index of Dispersion for Work. *IEEE Transactions on Communications*, vol. 39, No. 8, 1991, pp. 1231–1244 (with Kerry W. Fendick and Vikram R. Saksena).
- A Review of  $L = \lambda W$  and Extensions. *Queueing Systems*, vol. 9, No. 3, 1991, pp. 235–268. (Correction Note on  $L = \lambda W$ . *Queueing Systems*, vol. 12, No. 4, 1992, pp. 431–432.)
- Decompositions of the M/M/1 Transition Function. *Queueing Systems*, vol. 9, No. 3, 1991, pp. 323–336 (with Joseph Abate and Masaaki Kijima).
- Departures from Many Queues in Series. *Annals of Applied Probability*, vol. 1, No. 4, 1991, pp. 546–572 (with Peter W. Glynn).
- Queueing Theory. *McGraw-Hill Yearbook of Science and Technology*, McGraw-Hill, New York, 1991, pp. 377–383 (with R. C. Larson, M. A. Wortman and R. L. Disney).
- Estimating the Asymptotic Variance with Batch Means. *Operations Research Letters*, vol. 10, 1991, pp. 431–435 (with Peter W. Glynn).
- 1992 The Fourier-Series Method for Inverting Transforms of Probability Distributions. *Queueing Systems*, vol. 10, No. 1, 1992, pp. 5–88 (with Joseph Abate).
- Counterexamples for Comparisons of Queues with Finite Waiting Rooms. *Queueing Systems*, vol. 10, No. 3, 1992, pp. 271–278.
- The Asymptotic Validity of Sequential Stopping Rules in Stochastic Simulations. *Annals of Applied Probability*, vol. 2, No. 1, 1992, pp. 180–198 (with Peter W. Glynn).

- Asymptotic Formulas for Markov Processes with Applications to Simulation. *Operations Research*, vol. 40, No. 2, 1992, pp. 279–291.
- Understanding the Efficiency of Multi-Server Service Systems. *Management Science*, vol. 38, No. 5, 1992, pp. 708–723.
- The Asymptotic Efficiency of Simulation Estimators. *Operations Research*, vol. 40, No. 3, 1992, pp. 505–520 (with Peter W. Glynn).
- A Storage Model with a Two-State Random Environment. *Operations Research*, vol. 40, Supplement 2, 1992, pp. S257–S262 (with Offer Kella).
- Useful Martingales for Stochastic Storage Processes with Lévy Input. *Journal of Applied Probability*, vol. 29, No. 2, 1992, pp. 396–403 (with Offer Kella).
- The Brownian Approximation for Rate-Control Throttles and the G/G/1/C Queue. *Journal of Discrete Event Dynamic Systems*, vol. 2, No. 1, 1992, pp. 7–60 (with Arthur W. Berger).
- $H = \lambda G$  and the Palm Transformation. *Advances in Applied Probability*, vol. 24, 1992, pp. 755–758.
- A Tandem Fluid Network with Lévy Input. *Queueing and Related Models*, I. Basawa and U. N. Bhat eds., Oxford University Press, 1992, pp. 112–128 (with Offer Kella).
- Comparisons of Multi-Server Queues with Finite Waiting Rooms. *Stochastic Models*, vol. 8, No. 4, 1992, pp. 719–732 (with Arthur W. Berger).
- The Impact of a Job Buffer in a Token-Bank Rate-Control Throttle. *Stochastic Models*, vol. 8, No. 4, 1992, pp. 685–717 (with Arthur W. Berger).
- Numerical Inversion of Probability Generating Functions. *Operations Research Letters*, vol. 12, No. 4, 1992, pp. 245–251 (with Joseph Abate).
- Solving Probability Transform Functional Equations for Numerical Inversion. *Operations Research Letters*, vol. 12, 1992, pp. 275–281 (with Joseph Abate).
- 1993 A Probabilistic Generalization of Taylor’s Theorem. *Statistics and Probability Letters*, vol. 16, No. 1, 1993, pp. 51–54 (with William A. Massey).
- Estimating Customer and Time Averages. *Operations Research*, vol. 41, No. 2, 1993, pp. 400–408 (with Peter W. Glynn and Benjamin Melamed).
- $M_t/G/\infty$  Queues with Sinusoidal Arrival Rates. *Management Science*, vol. 39, No. 2, 1993, pp. 241–252 (with Stephen G. Eick and William A. Massey).
- Networks of Infinite-Server Queues with Nonstationary Poisson Input. *Queueing Systems*, vol. 13, No. 1, 1993, pp. 183–250 (with William A. Massey).



- Using Distributed-Event Parallel Simulation to Study Many Queues in Series. *Probability in the Engineering and Informational Sciences*, vol. 7, No. 2, 1993, pp. 159–186 (with Albert G. Greenberg and Otmar Schlunk).
- The Physics of The  $M_t/G/\infty$  Queue. *Operations Research*, vol. 41, No. 4, 1993, pp. 731–742 (with Stephen G. Eick and William A. Massey).
- Diffusion Approximations for Open Queueing Networks with Service Interruptions. *Queueing Systems*, vol. 13, No. 4, 1993, pp. 335–359 (with Hong Chen).
- Large Fluctuations in a Deterministic Multiclass Network of Queues, *Management Science*, vol. 39, No. 8, 1993, pp. 1020–1028.
- Limit Theorems for Cumulative Processes. *Stochastic Processes and Their Applications*, vol. 47, 1993, pp. 299–314 (with Petyer W. Glynn).
- Calculation of the  $GI/G/1$  steady-State Waiting-Time Distribution and its Cumulants from Pollaczek’s Formula. *Archiv für Elektronik und Übertragungstechnik*, vol. 47, No. 5/6, 1993, pp. 311–321 (with Joseph Abate and Gagan L. Choudhury).
- Heavy-Traffic Asymptotic Expansions for the Asymptotic Decay Rates in the  $BMAP/G/1$  Queue. *Proceedings of the ITC Seminar on Teletraffic Analysis Methods for Current and Future Telecom Networks*, Bangalore, India, November 1993, pp. 129–136. (with Gagan L. Choudhury).
- Computing Transient Distributions in General Single-Server Queues. *Proceedings of IEEE Globecom 93*, No. 29.1, 1993, pp. 1045–1050 (with Gagan L. Choudhury and David M. Lucantoni).
- The Highway PALM: A Stochastic Model to Capture Space and Time Dynamics in Wireless Communication Systems, *Proceedings of the Thirty-First Annual Allerton Conference on Communication, Control and Computing*, University of Illinois, September 1993, pp. 859–867 (with William A. Massey).
- Tail Probabilities with Statistical Multiplexing and Effective Bandwidths in Multiclass Queues. *Telecommunication Systems*, vol. 2, 1993, pp. 71–107.
- Approximations for the  $GI/G/m$  Queue. *Production and Operations Management*, vol. 2, No. 2, 1993, pp. 114–161.
- 1994 Asymptotics for Steady-State Tail Probabilities in Structured Markov Queueing Models. *Stochastic Models*, vol. 10, No. 1, 1994, pp. 99–143 (with Joseph Abate and Gagan L. Choudhury).
- The Transient  $BMAP/G/1$  Queue. *Stochastic Models*, vol. 10, No. 1, 1994, pp. 145–182 (with Gagan L. Choudhury and David M. Lucantoni).
- Towards Better Multi-Class Parametric-Decomposition Approximations for Open Queueing Networks, *Annals of Operations Research*, vol. 48, 1994, pp. 221–248.

Heavy-Traffic Asymptotic Expansions for the Asymptotic Decay Rates in the BMAP/G/1 Queue. *Stochastic Models*, vol. 10, No. 2, 1994, pp. 453–498 (with Gagan L. Choudhury).

Unstable Asymptotics for Nonstationary Queues. *Mathematics of Operations Research*, vol. 19, No. 2, 1994, pp. 267–291 (with William A. Massey).

The Pros and Cons of a Job Buffer in a Token-Bank Rate-Control Throttle. *IEEE Transactions on Communications*, vol. 42, No. 3, 1994, pp. 857–861 (with Arthur W. Berger).

On the Modified-Offered-Load Approximation for the Nonstationary Erlang Loss Model. *The Fundamental Role of Teletraffic in the Evolution of Telecommunications Networks, Proceedings of the 14th International Teletraffic Congress*, J. Labetoulle and J. W. Roberts (eds.), Elsevier, Amsterdam, vol. 1a, 1994, pp. 145–154. (with William A. Massey).

On the Effectiveness of Effective Bandwidths for Admission Control in ATM Networks. *The Fundamental Role of Teletraffic in the Evolution of Telecommunications Networks, Proceedings of the 14th International Teletraffic Congress*, J. Labetoulle and J. W. Roberts (eds.), Elsevier, Amsterdam, vol. 1a, 1994, pp. 411–420 (with Gagan L. Choudhury and David M. Lucantoni).

The Highway PALM: A Stochastic Model to Capture Space and Time Dynamics in Wireless Communication Systems. *The Fundamental Role of Teletraffic in the Evolution of Telecommunications Networks, Proceedings of the 14th International Teletraffic Congress*, J. Labetoulle and J. W. Roberts (eds.), Elsevier, Amsterdam, vol. 1a, 1994, pp. 503–512 (with William A. Massey).

Numerical Transform Inversion to Analyze Teletraffic Models. *The Fundamental Role of Teletraffic in the Evolution of Telecommunications Networks, Proceedings of the 14th International Teletraffic Congress*, J. Labetoulle and J. W. Roberts (eds.), Elsevier, Amsterdam, vol. 1b, 1994, 1043–1052 (with Gagan L. Choudhury and David M. Lucantoni).

Traffic Models for Wireless Communication Networks. *IEEE Infocom '94 Proceedings*, IEEE Computer Society Press, 1994, pp. 1029–1037 (with Kin K. Leung and William A. Massey).

Waiting-Time Tail Probabilities in Queues with Long-Tail Service-Time Distributions. *Queueing Systems*, vol. 16, 1994, pp. 311–338 (with Joseph Abate and Gagan L. Choudhury).

Logarithmic Asymptotics for Steady-State Tail Probabilities in a Single-Server Queue. *Studies in Applied Probability, Papers in Honour of Lajos Takács*, J. Galambos and J. Gani (eds.), Applied Probability Trust, Sheffield, England, 1994, pp. 131–156 (with Peter W. Glynn).

Transient Behavior of the M/G/1 Workload Process. *Operations Research*, vol. 42, No. 4, 1994, pp. 750–764 (with Joseph Abate).

Multi-Dimensional Transform Inversion with Applications to the Transient M/G/1 Queue. *Annals of Applied Probability* vol. 4, 1994, pp. 719–740 (with Gagan L. Choudhury and David M. Lucantoni).

- Large Deviations Behavior of Counting Processes and Their Inverses. *Queueing Systems*, vol. 17, 1994, pp. 107–128 (with Peter W. Glynn).
- An Algorithm for Closed Queueing Networks Based on Numerical Transform Inversion. *Proceedings of the 1994 Conference on Information Science and Systems*, ed. H. Kobayashi, Department of Electrical Engineering, Princeton University, pp. 7–11 (with Gagan L. Choudhury and Kin K. Leung).
- Traffic Models for Wireless Communication Networks. *IEEE Journal on Selected Areas in Communication*, vol. 12, No. 8, 1994, pp. 1353–1364 (with Kin K. Leung and William A. Massey).
- A Heavy-Traffic Expansion for the Asymptotic Decay Rates of Tail Probabilities in Multi-Channel Queues. *Operations Research Letters*, vol. 15, 1994, pp. 223–230 (with Joseph Abate).
- Asymptotics for Open-Loop Window Flow Control. *Journal of Applied Mathematics and Stochastic Analysis*, special issue honoring L. Takács, vol. 7, 1994, pp. 337–356 (with Arthur W. Berger).
- An Algorithm for Product-Form Loss Networks Based on Numerical Inversion of Generating Functions. *Proceedings IEEE Globecom '94*, 1994, pp. 1123–1128 (with Gagan L. Choudhury and Kin K. Leung).
- A Stochastic Model to Capture Space and Time Dynamics in Wireless Communication Systems. *Probability in the Engineering and Informational Sciences*, vol. 8, 1994, pp. 541–569 (with William A. Massey).
- An Analysis of the Modified Offered Load Approximation for the Nonstationary Erlang Loss Model. *Annals of Applied Probability*, vol. 4, 1994, pp. 1145–1160 (with William A. Massey).
- 1995 Resource-Sharing Models with State-Dependent Arrivals of Batches. *Computations with Markov Chains*, W. J. Stewart, ed., Kluwer, Boston, 1995, pp. 255–282 (with Gagan L. Choudhury and Kin K. Leung).
- $Q^2$ : A New Performance Analysis Tool Exploiting Numerical Transform Inversion. *Proceedings of Third International Workshop on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, (MASCOTS '95), Durham, NC, January 1995, pp. 411–415 (with Gagan L. Choudhury).
- Numerical Inversion of Laplace Transforms of Probability Distributions. *ORSA Journal on Computing*, vol. 7, 1995, pp. 36–43 (with Joseph Abate).
- An Inversion Algorithm for Loss Networks with State Dependent Rates. *Proceedings of IEEE Infocom '95*, 1995, pp. 513–521 (with Gagan L. Choudhury and Kin K. Leung).
- Computing Transient and Steady-State Distributions in Polling Models by Numerical Transform Inversion. *IEEE International Conference on Communications*, Seattle, WA, June 1995, pp. 803–809 (with Gagan L. Choudhury).

- Calculating Normalization Constants of Closed Queueing Networks by Numerically Inverting Their Generating Functions. *Journal of the Association for Computing Machinery*, vol. 42, 1995, pp. 935–970 (with Gagan L. Choudhury and Kin K. Leung).
- Efficiently Providing Multiple Grades of Service with Protection Against Overloads in Shared Resources. *AT&T Technical Journal*, vol. 74, No. 4, 1995, pp. 50–63. (with Gagan L. Choudhury and Kin K. Leung).
- Recent Asymptotic Results in the Probabilistic Analysis of Schedule Makespans. *Scheduling Theory and its Applications*, P. Chrétienne, E. G. Coffman, Jr., J. K. Lenstra and Z. Liu (eds.), Wiley, New York, 1995, pp. 15–31 (with E. G. Coffman, Jr.).
- Piecewise-Linear Diffusion Processes. *Advances in Queueing*, J. Dshalalow, ed., CRC Press, Boca Raton, FL, 1995, pp. 463–480 (with Sid Browne).
- Sensitivity to the Service-Time Distribution in the Nonstationary Erlang Loss Model. *Management Science*, vol. 41, No. 6, 1995, pp. 1107–1116. (with Jimmie L. Davis and William A. Massey).
- An Inversion Algorithm to Calculate Blocking Probabilities in Loss Networks with State-Dependent Rates. *IEEE/ACM Transactions on Networking*, vol. 3, No. 5, 1995, pp. 585–601 (with Gagan L. Choudhury and Kin K. Leung).
- A Comparison of the Sliding Window and the Leaky Bucket. *Queueing Systems*, vol. 20, 1995, pp. 117–138 (with Arthur W. Berger).
- Exponential Approximations for Tail Probabilities in Queues, I: Waiting Times. *Operations Research*, vol. 43, 1995, pp. 885–901 (with Joseph Abate and Gagan L. Choudhury).
- Maximum Values in Queueing Processes. *Probability in the Engineering and Informational Sciences*, vol. 9, 1995, pp. 375–409 (with Arthur W. Berger).
- Simulation Run Length Planning for Stochastic Loss Models. *Proceedings of 1995 Winter Simulation Conference*, C. Alexopoulos, K. Kang, W. R. Lilegdon and D. Goldsman eds., 1995, pp. 1384–1391 (with Rayadurgam Srikant).
- An Algorithm to Calculate Blocking Probabilities in Multi-Rate Multi-Class Multi-Resource Loss Models. *Advances in Applied Probability*, vol. 27, 1995, pp. 1104–1143 (with Gagan L. Choudhury and Kin K. Leung).
- Variability Functions for Parametric-Decomposition Approximations of Queueing Networks. *Management Science*, vol. 41, No. 10, 1995, pp. 1704–1715.
- Heavy-Traffic Extreme-Value Limits for Queues. *Operations Research Letters*, vol. 18, 1995, pp. 107–111 (with Peter W. Glynn).
- Calculating the M/G/1 Busy-Period Density and the LIFO Waiting-Time Distribution by Direct Numerical Transform Inversion. *Operations Research Letters*, vol. 18, 1995, pp. 113–119 (with Joseph Abate and Gagan L. Choudhury).

- Limits and Approximations for the Busy-Period Distribution in Single-Server Queues. *Probability in the Engineering and Informational Sciences*, vol. 9, 1995, pp. 581–602 (with Joseph Abate).
- Asymptotic Analysis of Tail Probabilities Based on the Computation of Moments. *Annals of Applied Probability*, vol. 5, 1995, pp. 983–1007 (with Joseph Abate, Gagan L. Choudhury and David M. Lucantoni).
- 1996 Squeezing the Most Out of ATM. *IEEE Transactions on Communications*, vol. 44, No. 2, 1996, pp. 203–217 (with Gagan L. Choudhury and David M. Lucantoni).
- An Operational Calculus for Probability Distributions Via Laplace Transforms. *Advances in Applied Probability*, vol. 28, 1996, pp. 75–113 (with Joseph Abate).
- Stochastic Limit Laws for Schedule Makespans. *Stochastic Models*, vol. 12, No. 2, 1996, pp. 215–243 (with E. G. Coffman, Jr. and Leopold Flatto).
- Simulation Run Lengths to Estimate Blocking Probabilities. *ACM Transactions on Modeling and Computer Simulation*, vol. 6, No. 1, January 1996, pp. 7–52 (with Rayadurgam Srikant).
- Computing Distributions and Moments in Polling Models by Numerical Transform Inversion. *Performance Evaluation*, vol. 25, No. 4, 1996, pp. 267–292 (with Gagan L. Choudhury).
- Estimating the Parameters of a Nonhomogeneous Poisson Process with Linear Rate. *Telecommunication Systems*, vol. 5, 1996, pp. 361–388 (with William A. Massey and Geraldine A. Parker).
- Server Staffing to Meet Time-Varying Demand. *Management Science*, vol. 42, No. 10, 1996, pp. 1383–1394 (with Otis B. Jennings, Avishai Mandelbaum and William A. Massey).
- Exponential Approximations for Tail Probabilities in Queues, II: Sojourn Time and Workload. *Operations Research*, vol. 44, 1996, pp. 758–763 (with Joseph Abate and Gagan L. Choudhury).
- Stationary-Process Approximations for the Nonstationary Erlang Loss Model. *Operations Research*, vol. 44, 1996, pp. 976–983 (with William A. Massey).
- On the Laguerre Method for Numerically Inverting Laplace Transforms. *INFORMS Journal on Computing*, vol. 8, 1996, pp. 413–427 (with Joseph Abate and Gagan L. Choudhury).
- Portfolio Choice and The Bayesian Kelly Criterion. *Journal of Applied Probability*, vol. 28, 1996, pp. 1145–1176 (with Sid Browne).
- Stability and Structural Properties of Stochastic Fluid Networks. *Journal of Applied Probability*, vol. 33, 1996, pp. 1169–1180 (with Offer Kella).
- Functional Large Deviation Principles for Queues. *Proceedings of 34th Allerton Conference on Communication, Control and Computing*, S. P. Meyn and W. K. Jenkins (eds.), 1996, pp. 722–731. (with Anatolii A. Puhalskii).

- Asymptotics for M/G/1 Low-Priority Waiting-Time Tail Probabilities. *Proceedings of 34th Allerton Conference on Communication, Control and Computing*, S. P. Meyn and W. K. Jenkins (eds.) 1996, pp. 923–931 (with Joseph Abate).
- 1997 Fluid and Diffusion Limits for Queues in Slowly Changing Random Environments. *Stochastic Models*, vol. 13, No. 1, 1997, pp. 121–146 (with Gagan L. Choudhury, Avi Mandelbaum and Martin I. Reiman).
- Fitting Mixtures of Exponentials to Long-Tail Distributions to Analyze Network Performance Models. *IEEE Infocom '97*, 1997, pp. 1098–1106 (with Anja Feldmann).
- Functional Large Deviations Principles for First-Passage-Time Processes. *Annals of Applied Probability*, vol. 7, No. 2, 1997, pp. 362–381 (with Anatolii Puhalskii).
- The Time-Dependent Erlang Loss Model with Retrials. *Proceedings of INFORMS Telecommunications Conference, Telecommunications Systems*, R. B. Cooper and R. Doverspike (eds.), vol. 7, 1997, pp. 253–265 (with Nathaniel Grier, William A. Massey and Tyrone McKoy).
- Numerical Solution of  $M_t/G_t/1$  Queues. *Operations Research*, vol. 45, No. 3, 1997, pp. 451–463, (with Gagan L. Choudhury and David M. Lucantoni).
- Resource Sharing for Book-Ahead and Instantaneous-Request Calls. *Teletraffic Contributions for the Information Age, Proceedings of ITC 15*, V. Ramaswami and P. E. Wirth (eds.), Elsevier, Amsterdam, 1997, pp. 539–548 (with Albert G. Greenberg and Rayadurgam Srikant).
- Recovery from Congestion in a Large Multi-Server System. *Teletraffic Contributions for the Information Age, Proceedings of ITC 15*, V. Ramaswami and P. E. Wirth (eds.), Elsevier, Amsterdam, 1997, pp. 371–380 (with Nicholas G. Duffield).
- Scaling for Numerical Transform Inversion to Analyze Teletraffic Models. *Teletraffic Contributions for the Information Age, Proceedings of ITC 15*, V. Ramaswami and P. E. Wirth (eds.), Elsevier, Amsterdam, 1997, pp. 933–942 (with Gagan L. Choudhury).
- Probabilistic Scaling for the Numerical Inversion of Non-Probability Transforms. *INFORMS Journal on Computing*, vol. 9, No. 2, 1997, pp. 175–184 (with Gagan L. Choudhury).
- Peak Congestion in Multi-Server Service Systems with Slowly Varying Arrival Rates. *Queueing Systems*, vol. 25, 1997, pp. 157–172 (with William A. Massey).
- Asymptotics for M/G/1 Low-Priority Waiting-Time Tail Probabilities. *Queueing Systems*, vol. 25, 1997, pp. 173–223 (with Joseph Abate).
- Limits and Approximations for the M/G/1 LIFO Waiting-Time Distribution. *Operations Research Letters*, vol. 20, 1997, pp. 199–206 (with Joseph Abate).
- Long-Tail Buffer-Content Distributions in Broadband Networks. *Performance Evaluation*, Vol. 30, 1997, pp. 177–190 (with Gagan L. Choudhury).

- Applications of the Infinite-Server Queue to the Management of Private Line Services. *Proceedings of 1997 AT&T Services and Infrastructure Symposium (SIPS-97)*, Middletown, NJ, November 18–19, 1997, pp. 132–141 (with William A. Massey and Clement McCalla).
- Control and Recovery from Rare Congestion Events in a Large Multi-Server System. *Queueing Systems*, vol. 26, 1997, pp. 69–104 (with Nicholas G. Duffield).
- 1998 Numerical Inversion of Multidimensional Laplace Transforms by the Laguerre Method. *Performance Evaluation*, vol. 31, 1998, pp. 229–243 (with Joseph Abate and Gagan L. Choudhury).
- Fitting Mixtures of Exponentials to Long-Tail Distributions to Analyze Network Performance Models. *Performance Evaluation*, vol. 31, 1998, pp. 245–279 (with Anja Feldmann).
- A Source Traffic Model and its Transient Analysis for Network Control. *Stochastic Models*, vol. 14, Nos. 1 and 2, 1998, pp. 51–78 (with Nicholas G. Duffield).
- Calculating Transient Characteristics of the Erlang Loss Model by Numerical Transform Inversion. *Stochastic Models*, vol. 14, No. 3, 1998, pp. 663–680 (with Joseph Abate).
- Extending the Effective-Bandwidth Concept to Networks with Priority Classes. *IEEE Communications Magazine*, vol. 36, No 8, August 1998, pp. 78–84 (with Arthur W. Berger).
- Effective Bandwidths with Priorities. *IEEE/ACM Transactions on Networking*, vol. 6, No. 4, August 1998, pp. 447–460 (with Arthur W. Berger).
- Functional Large Deviation Principles for Waiting and Departure Processes. *Probability in the Engineering and Informational Sciences*, vol. 12, 1998, pp. 479–507 (with Anatolii Puhalskii).
- Verifying Cell Loss Requirements in High-Speed Communication Networks. *Journal of Applied Mathematics and Stochastic Analysis*, special issue dedicated to R. Syski, vol. 11, No. 3, Fall 1998, pp. 319–338 (with Kerry W. Fendick).
- Large Deviations for Inverse Processes with Nonlinear Scalings. *Annals of Applied Probability*, vol. 8, No. 4, 1998, pp. 995–1026 (with Nicholas G. Duffield).
- Uniform Acceleration Expansions for Markov Chains with Time-Varying Rates. *Annals of Applied Probability*, vol. 8, No. 4, 1998, pp. 1130–1155 (with William A. Massey).
- Periodic Load Balancing. *Queueing Systems*, vol. 30, Nos. 1–2, 1998, pp. 203–250 (with Gisli Hjálmtýsson).
- Approximations for Periodic Load Balancing, *37th IEEE Conference on Decision and Control*, Tampa, Florida (with Gísli Hjálmtýsson).
- 1999 Improving Service By Informing Customers About Anticipated Delays. *Management Science*, vol. 45, No. 2, February 1999, pp. 192–207.
- Resource Sharing for Book-Ahead and Instantaneous-Request Calls. *IEEE/ACM Transactions on Networking*, vol. 7, No. 1, February 1999, pp. 10–22 (with Albert G. Greenberg and Rayadurgam Srikant).

- Using Different Response-Time Requirements to Smooth Time-Varying Demand for Service. *Operations Research Letters*, vol. 24, Nos. 1–2, February–March 1999, pp. 1–10.
- Modeling Service-Time Distributions with Non-Exponential Tails: Beta Mixtures of Exponentials. *Stochastic Models*, vol. 15, No. 3, 1999, pp. 517–546 (with Joseph Abate).
- Predicting Queueing Delays. *Management Science*, vol. 45, No. 6, June 1999, pp. 870–888.
- Decomposition Approximations for Time-Dependent Markovian Queueing Networks. *Operations Research Letters*, vol. 24, April 1999, pp. 97–103.
- Dynamic Staffing in a Telephone Call Center Aiming to Immediately Answer All Calls. *Operations Research Letters*, vol. 24, June 1999, pp. 205–212.
- Linear Stochastic Fluid Networks. *Journal of Applied Probability*, vol. 36, No. 1, March 1999, pp. 244–260 (with Offer Kella).
- Explicit M/G/1 Waiting-Time Distributions for a Class of Long-Tail Service-Time Distributions. *Operations Research Letters*, vol. 25, No. 1, August 1999, pp. 25–31 (with Joseph Abate).
- Variance Reduction in Simulations of Loss Models. *Operations Research*, vol. 47, No. 4, July–August 1999, pp. 509–523 (with Rayadurgam Srikant).
- An Introduction to Numerical Transform Inversion and its Application to Probability Models, in *Computational Probability*, W. Grassman (ed.), Kluwer, Boston, 1999, pp. 257–323 (with Joseph Abate and Gagan Choudhury).
- Infinite-Series Representations of Laplace Transforms of Probability Density Functions for Numerical Inversion. *Journal of Operations Research Society of Japan*, vol. 42, No. 3, September 1999, pp. 268–285 (with Joseph Abate).
- Winning the Hand of the Princess Saralinda. Chapter 16, pp. 231–246 in *Applied Probability and Stochastic Processes, Festschrift for Julian Keilson*, J. G. Shanthikumar and U. Sumita (eds.), Kluwer, Boston (with Peter W. Glynn).
- Computing Laplace Transforms for Numerical Inversion Via Continued Fractions. *INFORMS Journal on Computing*, vol. 11, No. 4, Fall 1999, pp. 394–405 (with Joseph Abate).
- Partitioning Customers into Service Groups. *Management Science*, vol. 45, No. 11, November 1999, pp. 1579–1592.
- 2000 Limits for Cumulative Input Processes to Queues. *Probability in the Engineering and Information Sciences*, vol. 14, 2000, pp. 123–150.
- Workload Bounds in Fluid Models with Priorities. *Performance Evaluation*, vol. 41, 2000, pp. 249–267 (with Arthur W. Berger).



- Predicting Response Times in Processor-Sharing Queues. In *Analysis of Communication Networks: Call Centres, Traffic and Performance*, D. J. McDonald and S. R. E. Turner (eds.), Fields Institute Communications, American Mathematical Society, Providence, RI, 2000, pp. 1–29 (with Amy R. Ward).
- Network Design and Control Using On-Off and Multi-Level Source Traffic Models with Heavy-Tailed Distributions. Chapter 17 in *Self-Similar Network Traffic and Performance Evaluation*, Kihong Park and Walter Willinger, eds., Wiley, New York, 2000, pp. 421–445. (with Nicholas G. Duffield).
- An Overview of Brownian and Non-Brownian FCLTs for Single-Server Queues. *Queueing Systems*, vol. 36, November 2000, pp. 39–70.
- The Impact of a Heavy-Tailed Service-Time Distribution Upon the M/GI/s Waiting-Time Distribution. *Queueing Systems*, vol. 36, November 2000, pp. 71–87.
- 2001 Resource Sharing for Book-Ahead and Instantaneous-Request Calls Using a CLT Approximation. *Telecommunication Systems*, vol. 16, Nos. 3,4, March-April 2001, pp. 233–253 (with Riyadurgam Srikant).
- A Nonstationary Offered-Load Model for Packet Networks. *Telecommunication Systems*, vol. 13, Nos. 3,4, March-April 2001, pp. 271–296. (with Nicholas G. Duffield and William A. Massey).
- The Reflection Map with Discontinuities. *Mathematics of Operations Research*, vol. 26, No. 3, August 2001, pp. 447–484.
- 2002 *Stochastic-Process Limits*, Springer, New York, 602 pages. (<http://www.columbia.edu/~ww2040/book.html>).
- Internet Supplement to Stochastic-Process Limits*, <http://www.columbia.edu/~ww2040/supplement.html>, 325 pages.
- A Time-Dependent Queueing-Network Model to Describe the Life-Cycle Dynamics of Private-Line Telecommunication Services. *Telecommunication Systems*, vol. 17, No. 1, 2002, pp. 9–38 (with Clement McCalla).
- Necessary Conditions in Limit Theorems for Cumulative Processes. *Stochastic Processes and Their Applications*, vol. 98, 2002, pp. 199–209 (with Peter W. Glynn).
- 2003 How Multiserver Queues Scale with Growing Congestion-Dependent Demand. *Operations Research*, vol. 51, No. 4, 2003, pp. 531–542.
- 2004 Heavy-Traffic Limits for Loss Proportions in Single-Server Queues. *Queueing Systems*, vol. 46, 2004, pp. 507–536.
- A Diffusion Approximation for the G/GI/n/m Queue. *Operations Research*, vol. 52, No. 6, November-December 2004, pp. 922-941.
- Efficiency-Driven Heavy-Traffic Approximations for Many-Server Queues with Abandonments. *Management Science*, vol. 50, No. 10, October 2004, pp. 1449-1461.

- 2005 Heavy-Traffic Limits for the G/H2\*/n/m Queue. *Mathematics of Operations Research*, vol. 30, No. 1, February 2005, pp. 1-27.
- Engineering Solution of a Basic Call-Center Model. *Management Science*, vol. 51, No. 2, February 2005, pp. 221-235.
- Two Fluid Approximations for Multi-Server Queues with Abandonments. *Operations Research Letters*, vol. 33, 2005, pp. 363-372.
- A Staffing Algorithm for Call Centers with Skill-Based Routing. *Manufacturing and Service Operations Management (M&SOM)*, vol. 7, 2005, pp. 276-294 (with Rodney B. Wallace).
- 2006 Fluid Models for Multiserver Queues with Abandonments. *Operations Research* vol. 54, No. 1, January-February 2006, pp. 37-54.
- A Multi-Class Fluid Model for a Contact Center with Skill-Based Routing. *International Journal of Electronics and Communications (AEU)*, vol. 60, No. 2, 2006, pp. 95-102.
- Sensitivity of Performance in the Erlang A Model to Changes in the Model Parameters. *Operations Research*, vol. 54, No. 2, 2006, pp. 247-260.
- Staffing a Call Center with Uncertain Arrival Rate and Absenteeism. *Production and Operations Management (POMS)*, vol. 15, No. 1, 2006, pp. 88-102.
- The Impact of Increased Employee Retention Upon Performance in a Customer Contact Center. *Manufacturing and Service Operations Management (M&SOM)*, vol. 8, No. 3, Summer 2006, pp. 221-234.
- Analysis for the Design of Simulation Experiments. Chapter 13 in *Simulation* in the Elsevier series of *Handbooks in Operations Research and Management Science*, edited by Shane Henderson and Barry Nelson, pp. 381-413.
- A Unified Framework for Numerically Inverting Laplace Transforms. *INFORMS Journal of Computing*, vol. 18, No. 4, Fall 2006, pp. 408-421 (with Joseph Abate).
- 2007 Coping with Time-Varying Demand when Setting Staffing Requirements for a Service System. *Production and Operations Management (POMS)*, vol. 16, No. 1, January-February 2007, pp. 13-39. (with Linda V. Green and Peter J. Kolesar).
- Exploiting Regenerative Structure to Estimate Finite Time Averages Via Simulation. *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, special issue honoring Perwez Shabuddin, vol. 17, No. 2, April 2007, Article 8, pp. 1-38 (with Wanmo Kang and Perwez Shahabuddin).
- Two-Moment Approximations for Maxima. *Operations Research*, vol. 55, No. 3, May-June 2007, pp. 532-548. (with Charles Crow, IV, and David A. Goldberg).

- Value-Based Routing and Preference-Based Routing in Customer Contact Centers. *Production and Operations Management*, vol. 16, No. 3, May-June 2007, pp. 277-291. (with Michael E. Sisselman).
- What You Should Know About Queueing Models to Set Staffing Requirements in Service Systems. *Naval Research Logistics*, vol. 54, No. 5, August 2007, pp. 476-484.
- Power Algorithms for Inverting Laplace Transforms. *Informs Journal on Computing*, vol. 19, No. 3, Summer 2007, pp. 341-355. (with Efstathios Avdis).
- Analysis of Join-the-Shortest-Queue Routing for Web Server Farms. *Performance Evaluation*, vol. 64, October 2007, pp. 1062-1081. IFIP 7.3 International Symposium on Computer Performance, Modeling, Measurements and Evaluation (Performance 2007), Cologne, Germany, October 2007. (with Varun Gupta, Mor Harchol-Balter and Karl Sigman).
- Martingale Proofs of Many-Server Heavy-Traffic Limits for Markovian Queues. *Probability Surveys*, vol. 4, 2007, pp. 193-267. (with Guodong Pang and Rishi Talreja)
- Proofs of the Martingale FCLT. *Probability Surveys*, vol. 4, 2007, pp. 268-302.
- 2008 Staffing of Time-Varying Queues to Achieve Time-Stable Performance. *Management Science*, vol. 54, No.2, February 2008, pp. 324-338. (with Zohar Feldman, Avishai Mandelbaum and William A. Massey).
- The Last Departure Time from an  $Mt/G/\infty$  Queue with a Terminating Arrival Process. *Queueing Systems*, vol. 58, 2008, pp. 77-104. (with David Goldberg).
- Fluid Models for Overloaded Multi-Class Many-Server Queueing Systems with FCFS Routing. *Management Science*, vol. 54, No. 8, 2008, pp. 1513-1527. (with Rishi Talreja).
- 2009 The Impact of Delay Announcements in Many-Server Queues with Abandonment. *Operations Research*, vol. 57, No. 1, January-February 2009, pp. 66-81. (with Mor Armony and Nahum Shimkin).
- Heavy-Traffic Limits for Many-Server Queues with Service Interruptions. *Queueing Systems*, vol. 61, pp. 167-202. (with Guodong Pang).
- Real-Time Delay Estimation in Call Centers. *Proceedings of the 2008 Winter Simulation Conference*, Miami, FL, December 7-10, 2008, S. J. Mason, R. R. Hill, L. Moench, O. Rose (editors), vol. I, 2009, pp. 2876-2883 (with Rouba Ibrahim).
- Scheduling Flexible Servers with Convex Delay Costs in Many-Server Service Systems. *Manufacturing and Service Operations Management*, vol. 11, No. 2, Spring 2009, pp. 237-253 (with Itay Gurvich).
- Real-Time Delay Estimation Based on Delay History. *Manufacturing and Service Operations Management*, vol. 11, No. 3, Summer 2009, pp. 397-415. (with Rouba Ibrahim).

- Queue-and-Idleness-Ratio Controls in Many-Server Service Systems. *Mathematics of Operations Research*, vol. 34, No. 2, May 2009, pp. 363-396. (with Itay Gurvich).
- Heavy-Traffic Extreme-Value Limits for Erlang Models. *Queueing Systems*, vol. 63, 2009, pp. 13-32. (with Guodong Pang).
- Responding to Unexpected Overloads in Large-Scale Service Systems. *Management Science*, vol. 55, No. 8, August 2009, pp. 1353-1367. (with Ohad Perry).
- Real-Time Delay Estimation in Overloaded Multiserver Queues with Abandonment. *Management Science*, vol. 55, No. 10, October 2009, pp. 1729-1742. (with Rouba Ibrahim).
- Service Interruptions in Large-Scale Service Systems. *Management Science*, vol. 55, No. 9, September 2009, pp. 1499-1512. (with Guodong Pang).
- Markov Chain Models to Estimate the Premium for Extended Hedge Fund Lockups. *Wilmott Journal*, vol. 1, No. 5-6, October-December 2009, pp. 263-293. (with Emanuel Derman and Kunsoo Park).
- Heavy-Traffic Limits for Waiting Times in Many-Server Queues with Abandonments. *Annals of Applied Probability*, vol. 19, No. 6, December 2009, pp. 2137-2175. (with Rishi Talreja).
- 2010 Continuity of a Queueing Integral Representation in the  $M_1$  Topology, *Annals of Applied Probability*, vol. 20, No. 1, January 2010, pp. 214-237. (with Guodong Pang).
- A Stochastic-Difference-Equation Model for Hedge-Fund Relative Returns. *Quantitative Finance*, vol. 10, 2010, pp. 701-733 (with Emanuel Derman and Kunsoo Park).
- Service-Level Differentiation in Many-Server Service Systems Via Queue-Ratio Routing. *Operations Research*, vol. 58, No. 2, March-April 2010, 316-328.(with Itay Gurvich).
- Integer Sequences from Queueing Theory. *Journal of Integer Sequences*. vol. 13, 2010, article 10.5.5 (with Joseph Abate).
- Delay Predictors for Customer Service Systems with Time-Varying Parameters. *Proceedings of 2010 Winter Simulation Conference*, December 2010 (with Rouba Ibrahim).
- Two-Parameter Heavy-Traffic Limits for Infinite-Server Queues. *Queueing Systems* vol. 65, 2010, pp. 325-364. (with Guodong Pang).
- A Fluid Approximation for Large-Scale Service Systems: Extended Abstract. *Performance Evaluation Review*, Special issue on 2010 MAMA conference, vol. 38, No. 2 (with Yunan Liu).
- Heavy-Traffic Limits for Nearly Deterministic Queues: Extended, vol. 38, No. 2 Abstract. *Performance Evaluation Review*, Special issue on 2010 MAMA conference (with Karl Sigman).

2011 Brownian Motion and the Generalized Catalan Numbers. *Journal of Integer Sequences*, vol. 14, 2011, article 11.2.6 (with Joseph Abate).

Real-Time Delay Estimation Based on Delay History in Many-Server Queues with Time-Varying Arrivals. *Production and Operations Management*, vol. 20, September-October 2011, pp. 654-667 (with Rouba Ibrahim).

Large-Time Asymptotics for the  $G_t/M_t/s_t + GI_t$  Many-Server Fluid Queue with Abandonment. *Queueing Systems*, vol. 67, 2011, pp. 145-182 (with Yunan Liu).

Biography: Ward Whitt. *Production and Operations Management*, vol. 20, No. 3, May-June 2011, pp. vii-viii.

An ODE for an Overloaded X Model Involving a Stochastic Averaging Principle. *Stochastic Systems*, vol. 1, 2011, pp. 59-108 (with Ohad Perry).

Nearly Periodic Behavior in the The Overloaded G/D/S+GI Queue. *Stochastic Systems*, vol. 1, 2011, pp. 340-410 (with Yunan Liu).

The Asymptotic Variance of Departures in Critically Loaded Queues. *Journal of Applied Probability*, vol. 43, 2011, pp. 243-263 (with Ahmad Al Hanbali, Michel Mandjes and Yoni Nazarathy).

Heavy-Traffic Limits for Nearly Deterministic Queues. *Journal of Applied Probability*, vol. 48, September 2011, pp. 657-678 (with Karl Sigman).

Heavy-Traffic Limits for Nearly Deterministic Queues: Stationary Distributions. *Queueing Systems*, vol. 69, 2011, pp. 145-173 (with Karl Sigman).

A Network of Time-Varying Many-Server Fluid Queues with Customer Abandonment. *Operations Research*, vol. 59, 2011, pp. 835-846 (with Yunan Liu).

A Fluid Approximation for Service Systems Responding to Unexpected Overloads. *Operations Research*, vol. 59, 2011, pp. 1159-1170 (with Ohad Perry).

Wait-Time Predictors for Customer Service Systems with Time-Varying Demand and Capacity. *Operations Research*, vol. 59, 2011, pp. 1106-1118 (with Rouba Ibrahim).

2012 Fitting Birth-and-Death Queueing Models to Data. *Statistics and Probability Letters*, vol. 82, 2012, pp. 998-1004.

The  $G_t/GI/s_t + GI$  Many-Server Fluid Queue. *Queueing Systems*, vol. 71, 2012, pp. 405-444 (with Yunan Liu).

The Impact of Dependent Service Times on Large-Scale Service Systems. *Manufacturing and Service Operations Management*, vol. 14, 2012, pp. 262-278 (with Guodong Pang).

Extending the FCLT Version of  $L = \lambda W$ . *Operations Research Letters*, vol. 40, 2012, pp. 230-234.

- Infinite-Server Queues with Batch Arrivals and Dependent Service Times. *Probability in the Engineering and Information Sciences*, vol. 26, 2012, pp.197-220 (with Guodong Pang).
- A Many-Server Fluid Limit for the  $G_t/GI/s_t + GI$  Queueing Model Experiencing Periods of Overloading. *Operations Research Letters*, vol. 40, 2012, pp. 307-312 (with Yunan Liu).
- Stabilizing Customer Abandonment in Many-Server Queues with Time-Varying Arrivals. *Operations Research*, vol. 60, 2012, pp. 1551-1564. (with Yunan Liu).
- 2013 Two-Parameter Heavy-Traffic Limits for Infinite-Server Queues with Dependent Service Times. *Queueing Systems*, vol. 73, 2013, pp. 119-146 (with Guodong Pang).
- A Fluid Limit for an Overloaded X Model Via an Averaging Principle. *Mathematics of Operations Research*, vol. 38, 2013, pp. 294-349 (with Ohad Perry).
- Offered Load Analysis for Staffing. *Manufacturing and Service Operations Management*, vol. 15, 2013, pp. 166-169.
- Statistical Analysis with Little's Law. *Operations Research*, vol. 61, 2013, pp. 1030-1045 (with Song-Hee Kim).
- Estimating Waiting Times with the Time-Varying Little's Law. *Probability in the Engineering and Information Sciences*, vol. 27, 2013, pp. 471-506 (with Song-Hee Kim).
- Using Simulation to Study Statistical Tests for Arrival Processes and Service Time Models for Service Systems. *Proceedings of the 2013 Winter Simulation Conference*, R. Pasupathy, S.-H. Kim, A. Tolk, R. Hill, and M. E. Kuhl, eds., Washington, D.C. (with Song-Hee Kim).
- Continuous-Time Markov Chain Models to Estimate the Premium for Extended Hedge Fund Lockups. *Annals of Operations Research*, vol. 211, 2013, pp. 357-379 (with Kunsoo Park).
- 2014 Algorithms for Time-Varying Networks of Many-Server Fluid Queues. *Informs Journal on Computing*, vol. 26, 2014, pp. 59-73 (with Yunan Liu).
- Many-Server Heavy-Traffic Limits for Queues with Time-Varying Parameters. *Annals of Applied Probability*, vol. 24, 2014, pp. 378-421 (with Yunan Liu).
- Choosing Arrival Process Models for Service Systems: Tests of a Nonhomogeneous Poisson Process. *Naval Research Logistics*, vol. 61, 2014, pp. 66-90 (with Song-Hee Kim)
- Diffusion Approximations for an Overloaded X Model Via an Averaging Principle. *Queueing Systems*, vol. 76, 2014, pp. 347-401 (with Ohad Perry).
- Approximate Blocking Probabilities for Loss Models with Independence and Distribution Assumptions Relaxed. *Performance Evaluation*, vol. 80, 2014, pp. 82-101 (with Andrew Li).
- Are Call Center and Hospital Arrivals Well Modeled by Nonhomogeneous Poisson Processes? *Manufacturing and Service Operations Management*, vol. 16, No. 3, 2014, pp. 464-480 (with Song-Hee Kim).

- Stabilizing Performance in Networks of Queues with Time-Varying Arrival Rates. *Probability in the Engineering and Informational Sciences*, vol. 28, No. 4, 2014, pp. 419-449 (with Yunan Liu).
- The Steady-State Distribution of the  $M_t/M/\infty$  Queue with a Sinusoidal Arrival Rate. *Operations Research Letters*, vol. 42, 2014, pp. 311-318.
- Heavy-Traffic Limits for Queues with Periodic Arrival Rates. *Operations Research Letters*, vol. 42, 2014, pp. 458-461.
- 2015 Stochastic Grey-Box Modeling of Queueing Systems: Fitting Birth-and-Death Processes to Data. *Queueing Systems*, vol. 79, 2015, pp. 391-426. (with James Dong).
- The Maximum Throughput on a Golf Course. *Production and Operations Management*, vol. 24, No. 5, 2015, pp. 685-703.
- Poisson and Non-Poisson Properties in Appointment-Generated Arrival Processes: the Case of an Endocrinology Clinic. *Operations Research Letters*, vol. 43, 2015, pp. 247-253 (with Song-Hee Kim, Ponni Vel and Won Chul Cha).
- The Power of Alternative Kolmogorov-Smirnov Tests Based on Transformations of the Data. *ACM Transactions on Modeling and Computer Simulation (TOMACS)* vol. 24, No. 4, 2015, article 24. (with Song-Hee Kim).
- Achieving Rapid Recovery in an Overload Control for a Large-Scale Service System. *INFORMS Journal on Computing*, vol. 27, No. 3, 2015, pp. 491-506 (with Ohad Perry).
- Analyzing the Pace of Play in Golf. *Journal of Sports Analytics*, vol. 1, No. 1, 2015, pp. 43-64 (with Qi Fu).
- Stabilizing Performance in a Single-Server Queue with Time-Varying Arrival Rate. *Queueing Systems*, vol. 81, 2015, pp. 341-378, DOI 10.1007/s11134-015-9462-x.
- Using Simulation to Study Service-Rate Controls to Stabilize Performance in a Single-Server Queue with Time-Varying Arrival Rate. *Proceedings of the 2015 Winter Simulation Conference*, Huntington Beach, CA, December 6-9, 2015, L. Yilmaz, W. K. V. Chan, I. Moon, T. M. K. Roeder, C. Macal and M. D. Rossetti, eds. (with Ni Ma).
- Using a Birth-and-Death Process to Estimate the Steady-State Distribution of a Periodic Queue. *Naval Research Logistics*, vol. 62, No. 8, 2015, pp. 664-685 (with James Dong).
- 2016 Efficient Simulation of Non-Poisson Non-Stationary Point Processes to Study Queueing Approximations. *Statistics and Probability Letters*, vol. 102, 2016, pp. 202-207 (with Ni Ma).
- Staffing to Stabilize Blocking in Loss Models with Time-Varying Arrival Rates, *Probability in the Engineering and Informational Sciences*, vol. 30, No. 2, 2016, pp. 185-211 (with Andrew Li and Jingtong Zhao).

Approximations for Heavily-Loaded  $G/GI/n + GI$  Queues. *Naval Research Logistics*, vol. 63, No. 3, April 2016, pp. 187-217 (with Yunan Liu and Yao Yu).

Staffing a Service System with Non-Poisson Nonstationary Arrivals. *Probability in the Engineering and Informational Sciences*, vol. 30, June 2016, pp. 593-621. (with Beixiang He and Yunan Liu).

Heavy-Traffic Fluid Limits for Periodic Infinite-Server Queues, *Queueing Systems*, vol. 84, 2016, pp. 111-143.

A Poisson Limit for the Departure Process from a Queue with Many Busy Servers, *Operations Research Letters*, vol. 44, 2016, pp. 602-606.

Heavy-Traffic Limits for a Single-Server Queue Leading Up to a Critical Point, *Operations Research Letters*, vol. 44, 2016, pp. 796-800.

Chattering and Congestion Collapse in an Overload Switching Control. *Stochastic Systems*, vol. 6, No. 1, 2016, pp. 132-210, (with Ohad Perry).

2017 Stabilizing Performance in a Service System with Time-Varying Arrivals and Customer Feedback. *European Journal of Operations Research*, vol. 256, No. 2, 2017, pp. 473-486 (with Yunan Liu).

A Data-Driven Model of an Emergency Department. *Operations Research for Health Care*, vol. 12, No. 1, 2017, pp. 1-15 (with Xiaopei Zhang).

## II. Papers Accepted for Publication

Heavy-Traffic Limit for the Initial Content Process. *Stochastic Systems*, forthcoming (with A. Korhan Aras and Yunan Liu).

Many-Server Loss Models with Non-Poisson Time-Varying Arrivals. *Naval Research Logistics*, forthcoming. (with Jingtong Zhao).

## III. Other Completed Papers Submitted for Publication

A Data-Driven Model of an Appointment-Generated Arrival Processes at an Outpatient Clinic. (with Song-Hee Kim and Won Chul Cha).

Using Robust Queueing to Expose the Impact of Dependence in Single-Server Queues. (with Wei You).

A Rare-Event Simulation Algorithm for Periodic Single-Server Queues. submitted to *INFORMS Journal on Computing* (with Ni Ma).



Time-Varying Robust Queueing, submitted to *Operations Research* (with Wei You)

Creating Work Breaks from Available Idleness. *Manufacturing and Service Operations Management*, submitted (with Xu Sun).

Managing the Pace of Play in Golf (With MoonSoo Choi and Qi Fu)

Periodic Little's Law (With Xiaopei Zhang)