

## CURRICULUM VITAE

### Nicholas Bambos

R. Weiland Professor of Electrical Engineering  
and of Management Science & Eng.

Fortinet Chairman, Management Science & Eng.

Stanford University

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Nick Bambos is R. Weiland Professor in the School of Engineering at Stanford University, having a joint appointment in the Department of Electrical Engineering and the Department of Management Science & Engineering. He is also the Fortinet Chairman of the Management Science & Engineering department. He heads the Computer Network Architecture and Performance Engineering research group at Stanford. This is comprised of PhD students and industry visitors engaged in research projects in his Computer Network Laboratory, which require solid understanding of the physical principles of computing and networking, hardware and software architectures (e.g., digital design, file systems), and focuses on system architectures and high-performance engineering of computer systems and networks. His research contributions span the areas of wireless networking, the Internet, cloud computing and data centers, high-speed networking, multimedia streaming, information service engineering, computer systems security, etc. His methodological interests and contributions span the areas of network control, online task scheduling, routing and distributed processing, etc.

He has graduated over 25 Ph.D. students, who have moved on to key positions in academia (Stanford, CalTech, Michigan, GaTech, NYU, USC, Columbia, etc.), the information technology industry (Cisco, IBM, Broadcom, Qualcomm, Nokia, MITRE, ST Micro, Intel, Samsung, Google, Facebook, Twitter, etc.), technology startups and the finance industry. From 1999 to 2005 he served as Director of the Stanford Networking Research Center project, a partnership between Stanford and information technology industries, involving tens of corporate members, faculty and doctoral students.

He received his Ph.D. in Electrical Engineering and Computer Sciences (EECS) from the University of California at Berkeley (1989), as well as the M.S. in EECS (1987) and the M.A. in Mathematics (1989) from the same University. He graduated in Electrical Engineering from the National Technical University of Athens-Greece (1984) with first class honors. Before joining Stanford as an Associate Professor in 1996, he served as Assistant (1990-95) and tenured Associate Professor (1995-96) in the Electrical Engineering Department of the University of California at Los Angeles (UCLA).

Nick Bambos has received several best paper awards, has held the Cisco Systems Faculty Development Chair (1999-2003) in computer networking at Stanford, and has won the IBM Faculty Award (2002) for high-impact research in performance engineering of computer systems and networks, as well as the Griffin Award (1997). He has been the David Morgenthaler Faculty Scholar (1996-99) at Stanford, and has received the National Young Investigator Award (1992) from the National Science Foundation (NSF) for research in computer networks and distributed computing architectures, as well as the NSF Research Initiation Award (1990) for studies in performance modeling of computer systems. He has also been a U.C. Regents Fellow, a David Gale Fellow, and an Earl Anthony Fellow at U.C. Berkeley.

He has served as editor of various research journals, on international technical and scientific committees, and on review panels for networking and computing technologies. He has also served on the boards of start-up companies, as a consultant for high-technology development and management, and as an expert witness in high-profile patent litigation cases involving networking, computing and information technologies.

## EDUCATION

- **Ph.D. in Electrical Engineering and Computer Sciences**, University of California at Berkeley, 1989.
- **M.A. in Mathematics**, University of California at Berkeley, 1989.
- **M.S. in Electrical Engineering and Computer Sciences**, University of California at Berkeley, 1987.
- **Diploma in Electrical Engineering - First Class Honors**, National Technical University of Athens-Greece, 1984.

## PROFESSIONAL EXPERIENCE

- **R. Weiland Professor** in the School of Engineering, Stanford University, 2016 – present.
- **Fortinet Chairman**, Department of Management Science & Engineering, Stanford University, 2016 – present.
- **Professor**, Department of Management Science & Engineering, and Department of Electrical Engineering, Stanford University, 2003 – present.
- **Head, Computer/Network Architecture and Performance Engineering Research Lab**, Stanford University, 1998 – present.
- **Director**, Stanford Networking Research Center, Stanford University, 1999 – 2005.
- **Associate Professor**, Department of Management Science & Engineering, and Department of Electrical Engineering, Stanford University, 1999 – 2003.
- **Associate Professor**, Department of Engineering-Economic Systems & Operations Research, and (courtesy appointment at) Department of Electrical Engineering, Stanford University, 1996 – 1999.
- **Associate Professor** (tenured), Department of Electrical Engineering, University of California at Los Angeles, 1995 – 1996.
- **Assistant Professor**, Department of Electrical Engineering, University of California at Los Angeles, 1989 – 1995.

## HONORS AND AWARDS

- **Best Paper Award in Green Communication and Computing** by the TAOS (Transmission, Access & Optical Systems) Technical Committee for the paper: *Dynamic Resource Management in Virtualized Data Centers with Bursty Traffic* (with M. Valdez-Vivas, J. Apostolopoulos) presented in the IEEE International Communications Conference (ICC'14) in Sydney, Australia, June 2014.
- **“Best of Globecom” Paper Award** (top 2%) for the paper: *Dynamic Resource Management in Cloud Computing with Frictions and Congestion “Weather”* (with M. Valdez-Vivas, J. Apostolopoulos) presented in IEEE Global Communications Conference (Globecom'14) in Austin, TX, December 2014.
- **2013-14 Eugene L. Grant Teaching Award**, Stanford University.
- **Best Journal Paper Award for 2011** from the IEEE Multimedia Communications Technical Committee for the paper: *Channel, Deadline, and Distortion Aware Scheduling of Video Streams over Wireless Links* (with A. Dua, C. Chan, J. Apostolopoulos), IEEE Trans. on Wireless Communications, 9(3):1001-1011, 2010.
- **HP Faculty Award**, Hewlett-Packard Laboratories, Palo Alto, 2006
- **Cisco Systems Faculty Scholar**, School of Engineering, Stanford University, 1999 - 2003.
- **IBM Faculty Award**, IBM Corporation Research Labs, 2002.
- **Dana Adams Griffin Award**, School of Engineering, Stanford University, 1997.
- **David Morgenthaler Faculty Scholar**, School of Engineering, Stanford University, 1996 - 1999.
- **National Young Investigator Award**, National Science Foundation, 1992 - 1997.
- **Research Initiation Award**, National Science Foundation, 1990 - 1992.
- **EECS Departmental Scholar**, University of California at Berkeley, 1988 - 1989.
- **U.C. Regents Fellow**, University of California at Berkeley, 1986 - 1988.
- **Earl C. Anthony Fellow**, University of California at Berkeley, 1985 - 1986.
- **David and Sylvia Gale Fellow**, University of California at Berkeley, 1984 - 1985.
- **First Class Honors** for top graduating students in 1984 (among 150 students), Electrical Engineering Department, National Technical University of Athens-Greece, 1984.
- **Academic Excellence Awards** (annual), Hellenic State Scholarships Foundation, Greece, 1979 - 1984.
- **Academic Prizes** (annual), Hellenic Engineering Society, Greece, 1979 - 1984.
- **First Class Honors** for top students admitted to the University in 1979 (among tens of thousands of students participating in a national-level entrance exam), National Technical University of Athens-Greece, 1979.

## **DISTINGUISHED INVITED LECTURES AND TALKS** (selected; additional talks on pg. 19)

- *Keynote Address – Power Control and Bandwidth Management in Wireless Networking*, IEEE Wireless On-Demand Network Systems and Services Conference (WONS), Jackson Hole, WY, February 2017.
- *Plenary Address – Digital Living 2030*, Shandong Chinese Academy of Sciences, Jinan, China, January 2017.
- *Keynote Address – A Risk Management View to Information Security*, IEEE Conference on Decision and Game Theory for Security, Berlin, Germany, Nov. 2010.
- *Keynote Address – Wireless Computing: From Infrastructure to Services*, IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Athens, September 2007.
- *Invited Distinguished Lecture - Three Control Problems in Packet Switching*, Workshop on Mathematics of Networks, Ecole Normale Supérieure, Paris, France, June 2007.
- *Invited Distinguished Talk - Throughput and Power Issues in Packet Switches*, Center for Ultra-Broadband Information Networks, University of Melbourne, Australia, August 2007.
- *Keynote Talk - Opportunities and Challenges in Wireless Computing and Multimedia Networking*, Network Ventures Conference, Redwood Shores, CA, March 2005.
- *IBM Distinguished Talk - Resource Management and Load Balancing in Flexible Computing/Networking Service Platforms*, IBM Research Labs, Almaden, CA, June 2005
- *Distinguished Speaker - Power Control in Wireless Networks*, Wireless Industry Forum, Electrical Engineering Department, University of Texas at Austin, April 2004.
- *Plenary Talk - Power Control in Wireless Networks* and member of Panel of Experts on Network Technology Trends, IEEE Workshop on Local and Metropolitan Area Networks (LANMAN), pp. 69-74, CA, April 2004
- *Invited Lecture - Geometry of Packet Scheduling in Communication Switches*, Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Nov. 2004.
- *Plenary Talk – Next Generation Wireless System Architectures* and member of Panel of Experts on Wireless Technologies in the IEEE International Conference in Broadband Networks (BroadNets), San Jose, CA, October 2004.
- *Plenary Talk – Next Generation Wireless Data Networks: Control Plane Principles and Architectures*. Strategic Architecture Council of Sun Microsystems, Nov. 2003
- *International Expert* invited to serve on the International Evaluation Committee for network engineering research at INRIA (the French/European National Institute of Informatics and Automation of 900 scientists working in six campuses), 2003-2004.

## UNIVERSITY AND PROFESSIONAL SERVICE

- *Academic Senate* of Stanford University (Member), 2005 – 2010
- *Committee on Research*, Stanford University (Member), 2009 – 2012.
- *Member of the Steering Board*, Conference on Decision and Game Theory for Security (GameSec), 2010-present.
- *Member of the Scientific Board*, LINCS – Laboratory on Information, Networking and Communication Sciences, Paris, France (founded by INRIA, Institut Telecom, France Telecom and Alcatel-Lucent), 2010-present.
- *Member the Editorial Boards* of the Wireless Networks Journal (2001-07), Computer Networks Journal (2000-02), Queueing Systems Theory and Applications (1999-2007).
- *Member of the Technical Program Committees* of the various networking/computing conferences (IEEE Infocom 2001-03, IEEE Globecom 2001-03, IEEE Mobicom 2002, IEEE VTC 2003, IEEE MobiWac 2005, SpasWin 2006, BroadNets 2006-07, Wireless Broadband World Forum 2006-07, GameComm 2008)
- *Technical Reviewer* for several research journals in computing and networking, as well as in queueing systems and applied probability (IEEE/ACM Transactions on Networking, IEEE Tran. on Vehicular Technology, IEEE Tran. on Automatic Control, Advances in Applied Probability, Journal of Applied Probability, Annals of Applied Probability, Operations Research, Journal of the ACM, Math of OR, IEEE Trans. on Communications)
- *Member of various Technical Panels* of the National Science Foundation (NSF) and other research and technology development agencies (NSF Information Technology Research Panel, 2002; INRIA Project Evaluation Panel, 2003; NSF CAREER Panel, 2005; NSF Foundations Panel, 2006; NSF NeTS CAREER Panel, 2006; NSF FIND Panel, 2007; NSF CDI Panel, 2008).

## RESEARCH PUBLICATIONS, REPORTS, TALKS, ETC.

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### BOOK CHAPTERS:

1. **Power Control in Wireless Networking: Basic Principles and Core Algorithms** (with S. Gitzenis). Signal Processing for Mobile Communications Handbook (M.Ibnkahla, Editor), CRC Press, 2004.
2. **Transmitter Power Control in Wireless Computing** (with S. Gitzenis). Handbook of Mobile Computing (I. Mahgoub, Editor), CRC Press, 2004.
3. **Adaptive Batch Scheduling for Packet Switching with Delays** (with K. Ross). High-Performance Packet Switching Architectures (Editors: I. Elhanany, M. Hamdi), Springer-Verlag, pp. 66-80, 2006.
4. **Geometry of Packet Scheduling: Maximal Throughput Cone Scheduling Algorithms** (with K. Ross). High-Performance Packet Switching Architectures (Editors: I. Elhanany, M. Hamdi), Springer-Verlag, pp. 82-100, 2006.
5. **Autonomic Admission Control for Networked Information Servers** (with G. Paleologo). Telecommunications Network Design and Management, Operations Research and Computer Science Interfaces, Kluwer, vol. 23, pp. 227-244, 2003

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### JOURNAL PAPERS:

6. **Service Rate Control of Tandem Queues with Power Constraints** (with L. Xia, D. Miller, Z. Zhou). IEEE Transactions on Automatic Control, March 2017.
7. **Power Control for Packet Streaming with Head-of-Line Deadlines** (with N. Master). Journal of Performance Evaluation, 106:1-18, 2016.
8. **Power Optimization in Random Wireless Networks** (with A. Moustakas, P. Mertikopoulos). IEEE Transactions on Information Theory, 62(9):5030-5058, September 2016.
9. **Adaptive Prefetching in Wireless Computing** (with N. Master, A. Dua, D. Tsamis, J.P. Singh). IEEE Transactions on Wireless Communications, 15(5):3296-3310, 2016.
10. **Myopic Policies for Non-Preemptive Scheduling of Jobs with Decaying Value** (with N. Master). Journal of Probability in Engineering and Informational Sciences, November 2016.
11. **Maximum Weight Matching with Hysteresis in Overloaded Queues with Setups** (with C. Chan, M. Armony). Queueing Systems, 82:315-351, 2016,
12. **Cone Schedules for Processing Systems in Fluctuating Environments** (with K. Ross, G. Michailidis). IEEE Transactions of Automatic Control, 60(10):2710-2715, 2015.

13. **Personalized Monitors for Real-Time Detection of Physiological States** (with L. Chow, A. Gilman, A. Chander). International Journal of e-Health and Medical Communications, 5(4):1-19, October 2014.
14. **Air Traffic Control Area Configuration Advisories from Near-Optimal Distinct Paths** (with M. Bloem). Journal of Aerospace Information Systems, 11(11):764-784, November 2014.
15. **Ground Delay Program Analytics with Behavioral Cloning and Inverse Reinforcement Learning** (with M. Bloem). AIAA Journal of Aerospace Information Systems, 2015.
16. **Optimizing Intensive Care Unit Discharge Decisions with Patient Readmissions** (with C. Chan, V.F. Farias, G. Escobar). Operations Research (INFORMS), 60(6):1323-1341, Jan. 2013.
17. **BEST-AP: Non-Intrusive Estimation of Available Bandwidth and its Application for Dynamic Access Point Selection** (with P. Dely, L. Chow, N. Bayer, H. Einsiedler, C. Peylo). Computer Communications (Elsevier), 39:78-91, Jan 2014.
18. **A Software-Defined Networking Approach for Handover Management with Real-Time Video in WLANs** (with P. Dely, A. Kassler, L. Chow, N. Bayer, H. Einsiedler, C. Peylo, D. Mellado, M. Sanchez). Journal of Modern Transportation (Springer), 21:58-65, March 2013.
19. **Network Assisted Mobile Computing with Optimal Uplink Query Processing** (with C. Chan, J. Singh). IEEE Transactions on Mobile Computing, 60(6):1323-1341, Jan. 2013.
20. **Optimizing Intensive Care Unit Discharge Decisions with Patient Readmissions** (with C. Chan, V.F. Farias, G. Escobar). Operations Research (INFORMS), 60(6):1323-1341, Jan. 2013.
21. **Power and Delay Aware Management of Packet Switches** (with L. Mastroleon, D. O'Neill, B. Yolken). IEEE Transactions on Computers, , 61(12):1789-1799, Dec. 2012.
22. **Optimal State Surveillance under Observation Budget Constraints** (with P. Bommannavar). Int. Journal on Advances in Intelligent Systems, 4(4):57-67, Dec. 2011.
23. **A Scalable Delay-Power Control Algorithm for Bandwidth Sharing in Wireless Networks** (with F. Baccelli and N. Gast). IEEE/ACM Transactions on Networking, 19(5):1458-1471, October 2011.
24. **An Integrated Approach to Security Risk Management for IT-Intensive Organizations** (with Jeff Mounzer and Tansu Alpcan). Journal of Information Assurance and Security, 6(2):115-123, 2011.
25. **Channel, Deadline, and Distortion Aware Scheduling of Video Streams over Wireless Links** (with A. Dua, C. Chan, J. Apostolopoulos). IEEE Trans. on Wireless Communications, 9(3):1001-1011, March 2010.
26. **A Characterization of Max-Min SIR-Balanced Power Allocation with Applications** (with S. Stanczak, M. Kaliszan). ACM Wireless Networks, 16: 2335-2347, Nov. 2010.
27. **Game Based Capacity Allocation for Utility Computing Environments** (with B. Yolken). Telecommunications Systems Journal, pp. 1-17, May 2010.
28. **Scheduling Algorithms for Broadcasting Media with Multiple Distortion Measures**, (with C. W. Chan, S. Wee, J. Apostolopoulos), IEEE Trans. on Wireless Communications, 8(8) 4188-4199, 2009.
29. **Adaptive Data-Aware, Utility-Based Scheduling in Resource-Constrained Systems** (with D. Vengerov, L. Mastroleon, D. Murphy). Journal of Parallel and Distributed Computing, 70:871-879, 2009.

30. **Projective Cone Scheduling (PCS) Algorithms for Maximal Throughput Packet Switches** (with K. Ross). IEEE/ACM Transactions on Networking, 17(3):976-989, June 2009.
31. **Joint Task Migration and Power Management in Wireless Computing** (with S. Gitzenis). IEEE Transactions of Mobile Computing, 8(9): 1189-1204, Sept. 2009.
32. **Content-Aware Playout and Packet Scheduling for Video Streaming over Wireless** (with Y. Li, A. Markopoulou, J. Apostolopoulos) IEEE Trans. on Multimedia, 10(5):885-895, Aug. 2008.
33. **Joint Transmitter Power Control and Mobile Cache Management in Wireless Computing** (with S. Gitzenis). IEEE Transactions of Mobile Computing, 7(4):498-512, April 2008.
34. **Transmission Power and Duration-Aware Playout Control for Packetized Media Streaming over Wireless Links** (with Y. Li). Wireless Communications and Mobile Computing, 8:309-326, Jan. 2008
35. **Downlink Wireless Packet Scheduling with Deadlines** (with A. Dua). IEEE Trans. on Mobile Computing, 6(12), pp. 1410-1425, 2007.
36. **TCP Performance Dynamics and Link-Layer Adaptation Based Optimization Methods for Wireless Networks** (with J. P. Singh, Y. Li, A. Bahai, B. Xu, G. Zimmerman). IEEE Trans. Wireless Communications, 6(5), pp. 1864-1878, 2007.
37. **Transmission Power and Duration-Aware Playout Control for Packetized Media Streaming over Wireless Links** (with Y. Li). Wireless Communications and Mobile Computing, 2008.
38. **Joint Power-Playout Control for Media Streaming over Wireless Links** (with Y. Li, A. Markopoulou, J. Apostolopoulos), IEEE Transactions in Multimedia, 2006.
39. **Optimal Processor Allocation to Differentiated Job Flows** (with G. Michailidis and K. Wasserman), Performance Evaluation, v. 63(1), pp. 1-14, Jan. 2006.
40. **Queueing Networks of Random Link Topology: Stationary Dynamics of Maximum Throughput Schedules** (with G. Michailidis), Queueing Systems Theory and Applications, v. 50(1), pp. 5-52, May 2005.
41. **A Fuzzy Reinforcement Learning Approach to Power Control in Wireless Transmitters** (with D. Vengerov and H. Berenji). IEEE Trans. SMC (Part B), v. 35-4, pp. 768-778, Aug. 2005.
42. **Queueing and Scheduling in Random Environments** (with G. Michailidis). Advances in Applied Probability, vol. 36 (1), 293-317, 2004.
43. **Scheduling Optical Traffic Bursts in Time-Domain Wavelength Interleaved Optical Networks** (with K. Ross, K. Kumaran, I. Saniee, I. Widjaja). IEEE Journal of Selected Areas in Communications, vol. 21(9), pp. 1441-1451, 2003.
44. **Queueing Dynamics and Maximal Throughput Scheduling in Switched Processing Systems** (with M. Armony). Queueing Systems Theory and Applications, vol. 44(3), pp. 209-252, 2003.
45. **On Stability of Queueing Networks with Job Deadlines** (with A. Ward). Journal of Applied Probability, vol. 40(2), pp. 293-304, 2003.
46. **On Parallel Queueing with Random Server Connectivities and Routing Constraints** (with G. Michailidis). Probability in the Engineering and Informational Sciences, vol. 16, pp. 185-203, 2002.



47. **Optimal Control of Parallel Queues with Batch Service** (with C. Xia, G. Michailidis, P. Glynn). Probability in the Engineering and Informational Sciences, vol. 16, pp. 289-307, 2002.
48. **Power Controlled Multiple Access (PCMA) Schemes in High Performance Wireless Packet Networks** (with S. Kandukuri). IEEE Personal Communications, vol. 9(3), pp.58-64, 2002.
49. **Dynamic Online Task Scheduling on Parallel Processors** (with C. Xia, G. Michailidis). Performance Evaluation, vol. 46, pp. 219-233, 2001.
50. **Globally Constrained Power Control Across Multiple Channels in Wireless Packet Networks** (with S. Kandukuri). ACM Mobile Networks, vol. 6(5), pp. 427-434, 2001. (invited paper)
51. **Channel Access Algorithms with Active Link Protection for Wireless Communication Networks with Power Control** (with S. Chen, G. Pottie). IEEE/ACM Transactions on Networking, vol. 8(5), pp. 583-597, 2000.
52. **On Synchronization of Poisson Processes and Queueing Networks with Service and Synchronization Nodes** (with B. Prabhakar, T. Mountford). Advances in Applied Probability, vol. 32(3), pp. 824-843, 2000.
53. **Power-Induced Time Division on Asynchronous Channels** (with J. Rulnick). ACM Wireless Networks, vol. 5(2), pp. 71-80, 1999. (invited paper)
54. **Towards Power-Sensitive Network Architectures in Wireless Communications: Concepts, Issues and Design Aspects.** IEEE Personal Communications, vol. 5(3), pp. 50-59, 1998. (invited paper)
55. **Mobile Power Management for Wireless Communication Networks** (with J. Rulnick). ACM Wireless Networks, vol. 3(1), pp. 3-14, 1997. (invited paper)
56. **On a Singular Feature of Critical G/M/1 Queues** (with B. Prabhakar). Systems and Control Letters, vol. 28(5), pp. 239-245, 1996.
57. **Wireless, Mobile, Multimedia Networks** (with A. Alwan, R. Bagrodia, N. Bambos, J. Cong, M. Gerla, L. Kleinrock, J. Villasenor). IEEE Personal Communications, vol. 3(2), pp. 34-51, 1996.
58. **Convergence of Departures in Tandem Networks of  $^*/GI/Infinity$  Queues** (with B. Prabhakar, T. Mountford). Probability in the Engineering and Informational Sciences, vol. 10(4), pp. 487-500, 1996.
59. **The Supercomputer Supernet Testbed: A WDM-Based Supercomputer Interconnect** (with L. Kleinrock, M. Gerla, J. Cong, E. Gafni, L. Bergman, J. Bannister, S.P. Monacos, T. Bujewski, P-C. Hu, B. Kannan, B. Kwan, E. Leonardi, J. Peck, P. Palnati, S. Walton). IEEE/OSA Journal of Lightwave Technology, vol. 14(6), pp. 1388-1399, 1996.
60. **Optimal Server Allocation to Parallel Queues with Finite Capacity Buffers** (with K. Wasserman). Probability in the Engineering and Informational Sciences, vol. 10(2), pp. 279-285, 1996.
61. **Asymptotic Optimality of Statistical Multiplexing in Pipelined Processing** (with K. Wasserman). Queueing Systems Theory and Applications, vol. 21, pp. 97-123, 1995.
62. **OPTIMIC: A Scalable, Distributed, All-Optical Terabit Network** (with L. Kleinrock, J. Cong, E. Gafni, M. Gerla, L. Bergman, J. Bannister). Journal of High Speed Networks, vol. 4(4), pp. 407-424, 1995.

63. **On Infinite Queueing Tandems** (with B. Prabhakar). *Systems and Control Letters*, vol. 23, pp. 305-314, 1994.
64. **Optimality Aspects of Greedy Schemes in Parallel Processing of Random Graph-Structured Jobs** (with S. Chen). *Probability in the Engineering and Informational Sciences*, vol. 8, pp. 229-243, 1994.
65. **On Stationary Tandem Queueing Networks with Job Feedback** (with K. Wasserman). *Queueing Systems Theory and Applications*, vol. 15, pp. 137-164, 1994.
66. **Scheduling and Stability Aspects of a General Class of Parallel Processing Systems** (with J. Walrand). *Advances in Applied Probability*, vol. 25, pp. 176-202, 1993.
67. **On Closed Ring Queueing Networks**. *Journal of Applied Probability*, vol. 29(4), pp. 979-995, 1992.
68. **On Flows in Stochastic Marked Graphs** (with F. Baccelli & J. Walrand). *Probability in the Engineering and Informational Sciences*, vol. 5, pp. 145-157, 1991.
69. **On Stability and Performance of Parallel Processing Systems** (with J. Walrand). *Journal of the Association for Computing Machinery*, vol. 38(2), pp. 429-452, 1991.
70. **An Invariant Distribution for the G/G/1 Queueing Operator** (with J. Walrand). *Advances in Applied Probability*, vol. 22, pp. 254-256, 1990.
71. **On the Asymptotic Execution Time of Multi-Tasked Processes on Tandem Processors** (with J. Walrand). *Systems and Control Letters*, vol. 13, pp. 391-396, 1989.
72. **On State-Dependent Queues and Acyclic Queueing Networks** (with J. Walrand). *Advances in Applied Probability*, vol. 21, pp. 681-701, 1989.
73. **On Queues with Periodic Inputs** (with J. Walrand). *Journal of Applied Probability*, vol. 26, pp. 381-389, 1989.

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**PEER-REVIEWED CONFERENCE PAPERS:**

74. **Asynchronous Best Response Dynamics for Resource Allocation Games in Utility Computing** (with K. Schubert, N. Master, Z. Zhou). *Proceedings of IEEE American Control Conference (ACC)*, 6 pages, Seattle, WA, May 2017.
75. **An Infinite Dimensional Model for a Single-Server Priority Queue** (with N. Master, Z. Zhou). *Proceedings of IEEE American Control Conference (ACC)*, 6 pages, Seattle, WA, May 2017.
76. **Join-the-Shortest Queue Scheduling with Delay: A Case Study** (with S. Mehdian, Z. Zhou). *Proceedings of IEEE American Control Conference (ACC)*, 6 pages, Seattle, WA, May 2017.
77. **Cost-Sensitive Security Risk Management for Large-Scale Computing Infrastructures** (with N. Master). *Proceedings of the IEEE International Conference on Computing, Networking and Communications (ICNC)*, 6 pages, San Jose, CA, January 2017.
78. **An Infinite Dimensional Model for a Many Server Priority Queue** (with N. Master, Z. Zhou). *Proceeding of the Conference on Information Sciences and Systems (CISS)*, 6 pages, Johns Hopkins

University, Baltimore, MD, March 2017.

79. **Wireless Channel Selection with Non-Invasive Power Probing** (with K. Schubert). Proceedings of IEEE Wireless Telecommunications Symposium, 6 pages, Chicago, IL, April 2017.
80. **Infinite Server Queueing Networks with Deadline Bases Routing** (with N. Master), IEEE Conference on Decision and Control (CDC), pp. 5360-5366, Las Vegas, NV, December 2016.
81. **Repeated Games for Power Control in Wireless Communications: Equilibrium and Regret** (with Z. Zhou, P. Glynn). Proceedings of IEEE Conference on Decision and Control (CDC), pp. 3603-3610, Las Vegas, NV, December 2016.
82. **A Game-Theoretical Formulation of Influence Networks** (w Z. Zhou, B. Yolken, R.A. Miura-Ko). Proceeding of IEEE American Control Conference, pp. 3802-3807, Boston, MA, July 2016.
83. **Dynamics of Linear Influence Networks under Stochastic Environments** (with Z. Zhou, P. Glynn). Proceeding (Springer) of Conference on Decision and Game Theory for Security (GameSec), 6 pages, New York, NY, November 2016.
84. **A Stochastic Stability Characterization of the Foschini-Miljanic Algorithm in Random Wireless Networks** (with Z. Zhou, D. Miller, P. Glynn). Proceedings of IEEE Global Communications Conference (GLOBECOM), 6 pages, Washington, DC, December 2016.
85. **Wireless Power-Controlled TCP with Holdover** (with K. Schubert). Proceedings of IEEE International Conference on Communications (ICC), 6 pages, Kuala Lumpur, Malaysia, May 2016.
86. **Data Aggregation for Low Power Wireless Devices** (with K. Schubert). Proceedings of IEEE MILCOM, 6 pages, November 2016.
87. **Detecting Inaccurate Predictions of Pediatric Surgical Durations** (with Z. Zhou, D. Miller, N. Master, P. Glynn). IEEE International Conference on Data Science and Advanced Analytics (DSAA), pp. 452-457, Montreal, Canada, October 2016.
88. **Reliable and Efficient Performance Monitoring in Linux** (with M. Dimakopoulou, S. Eranian, N. Koziris). Proceedings of International Conference for High Performance Computing, Networking, Storage and Analysis, 11 pages, Salt Lake City, Utah, November 2016.
89. **Scalable Data Center Power Management via a Global Stress Signal** (with D. Miller, N. Master, Z. Zhou, N. Bambos). IEEE Global Communications Conference (GLOBECOM), 7 pages, 2015.
90. **Target-Rate Driven Resource Sharing in Queueing Systems** (with Z. Zhou). Proceedings of IEEE Conference on Decision and Control (CDC), pp. 4490-4945, Osaka, Japan, December 2015.
91. **Wireless Communication Games in Fixed and Random Environments** (with Z. Zhou). Proceedings of IEEE Conference on Decision and Control (CDC), pp. 1637-1642, Osaka, Japan, December 2015.
92. **Dynamic Management of Network Risk from Epidemic Phenomena** (A. Sinha, J. Ducci). IEEE Conference on Decision and Control (CDC), 6 pages, Osaka, Japan, December 2015.
93. **Low Latency Policy Iteration via Parallel Processing and Randomization** (with N. Master). IEEE Conference on Decision and Control (CDC), pp. 1084-1091, 2015.
94. **Channel Responsive Wireless TCP** (with K. Schubert, H. Endo). IEEE International Communications Conference (ICC'14), 6 pages, London, UK, 2015.

95. **A General Model for Resource Allocation in Utility Computing** (with Z. Zhou). American Control Conference, pp. 1746-1751, Chicago, IL, 2015.
96. **Service Rate Control for Jobs with Decaying Value** (with N. Master). American Control Conference, 6 pages, Chicago, IL, 2015.
97. **Ground Delay Program Analytics with Behavioral Cloning and Inverse Reinforcement Learning** (with M. Bloem). Proceedings of AIAA Aviation Technology, Integration, and Operations (ATIO) Conference, 6 pages, Atlanta, GA, June 2014.
98. **Infinite Time Horizon Maximum Causal Entropy Inverse Reinforcement Learning** (with M. Bloem). IEEE Conference on Decision and Control (CDC'14), pp. 4911-4916, Los Angeles, CA, December 2014.
99. **Power-Controlled Multiple Access with Queue-Dependent Backoff Threshold** (with J. Mounzer, K. Schubert, A. Goldsmith). IEEE Global Communications Conference (GlobeCom'14), pp. 4738-4744, Austin, TX, December 2014.
100. **Randomized Iterations for Low Latency Fixed Point Computation** (with N. Master). IEEE Conference on Decision and Control (CDC'14), pp. 5208-5215, Los Angeles, CA, December 2014.
101. **Distributed Smart Grid Architecture for Delay and Price Sensitive Power Management** (with N. Master, J. Mounzer), accepted to the IEEE International Communications Conference (ICC'14), pp. 3670-3675, Sydney, Australia, June 2014.
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Distributed Systems (ICPADS '96), Tokyo, Japan, pp. 500-507, June 1996.

241. **Best Effort Bandwidth Reservation in High Speed LANs Using Wormhole Routing** (with B. Kwan, P-C. Hu, L. Kleinrock, Hong Xu, Joseph Touch). Proceeding of 5th IEEE International Conference on Computer Communications and Networks (ICCCN '96), Rockville, Maryland, 1996.
242. **Mobile Power Management for Maximum Battery Life in Wireless Communication Networks** (with J. Rulnick). Proceedings of the 1996 IEEE Conference on Computer Communications (INFOCOM '96), San Francisco, CA, vol. 2, pp. 443-450, March 1996.
243. **The Supercomputer Supernet (SSN): A High-Speed Electro-Optical Campus and Metropolitan Network** (with L. Kleinrock, J. Bannister, L. Bergman, J. Cong, E. Gafni, M. Gerla). Proceedings of the 1996 IEEE/ SPIE Conference on Optical Interconnects in Broadband Switching Architectures, San Jose, pp. 22-33, Feb. 1996.
244. **Optimal Server Allocation to Parallel Queues with Randomly Modulated Service Rates** (with G. Michailidis). Proceedings of the Conference on Information Sciences and Systems, Princeton University, Princeton, New Jersey, pp. 692-698, March 1996.
245. **Routing and Channel Assignment for Low Power Transmission in Personal Communication Systems** (with K. Scott). 1996 IEEE International Conference on Universal Personal Communications, vol. 2, pp. 498-502, 1996.
246. **On the Stationary Dynamics of Parallel Queues with Random Server Connectivities** (with G. Michailidis). Proceedings of the 34<sup>th</sup> IEEE Conference on Decision and Control (CDC '95), New Orleans, LA, vol. 4, pp. 3638-3643, Dec. 1995.
247. **The Self-Organizing Wireless Adaptive Network (SWAN) Protocol for Communication Among Mobile Users** (with K. Scott). Proceedings of the 1995 IEEE Global Telecommunications Conference (GLOBECOM '95), Singapore, vol. 1, pp. 355-359, Nov. 1995.
248. **Channel Probing for Distributed Access Control in Wireless Communication Networks** (with S. Chen, D. Mitra). Proceedings of the 1995 IEEE Global Telecommunications Conference (GLOBECOM '95), Singapore, v. 1, pp.322-326, November 1995.
249. **Radio Link Admission Algorithms for Wireless Networks with Power Control and Active Link Quality Protection** (with S. Chen, G. Pottie). Proceedings of the 1995 IEEE Conference on Computer Communications (INFOCOM '95), Boston, MA, v. 1, pp. 97-104, June 1995.
250. **Entropy Methods for High Speed Communications** (with B. Prabhakar). Proceedings of the 1995 Conference on Information Sciences and Systems, The Johns Hopkins University, Baltimore, Maryland, pp. 448-453, March 1995.
251. **Adaptive (T1/T2)-Multiplexing Transmission Schemes for Voice/Data Networks** (with A. Nguyen, M. Sherif) Proceedings of the 1995 IEEE International Symposium on Computers and Communications (ISCC '95), pp. 430-435, June 1995.
252. **A Distributed, Mobile, Wireless Infrastructure for Multimedia Applications** (with S. Chen, M. Gerla, J. Tsai). Proceedings of the 1995 WINLAB Conference, Rutgers University, East Brunswick, NJ, March 1995.
253. **Admission Control Schemes for Wireless Communication Networks with Adjustable Transmitter Powers** (with S. Chen, G. Pottie). Proceedings of the 1994 IEEE Conference on Computer

- Communications (INFOCOM '94), Toronto, Canada, vol. 1, pp. 21-28, May 1994.
254. **On Distributed Power Control for Radio Networks** (with S. Chen, G. Pottie). Proceedings of the 1994 International Communications Conference (ICC '94), New Orleans, LA, vol. 3, pp. 1281-1285, March 1994.
  255. **On Power Control with Active Link Quality Protection in Wireless Communication Networks** (with S. Chen and G. Pottie). Proceedings of the 1994 Conference on Information Sciences and Systems, Princeton, NJ, pp. 426-467, March 1994.
  256. **The Asymptotics of Traffic Processes in Large Queueing Networks** (with T. Mountford and B. Prabhakar). Proceedings of the 1994 Allerton Conference on Communication, Control and Computing, University of Illinois at Urbana-Champaign, Urbana, Illinois, pp. 563-572, Oct. 1994.
  257. **Queueing Dynamics and Throughput of Ring Networks with Spatial Reuse** (with A. Nguyen). Proceedings of the 1993 Allerton Conference on Communication, Control and Computing, University of Illinois at Urbana-Champaign, Urbana, Illinois, pp. 576-587, Oct. 1993 (invited paper).
  258. **On Parallel Processing of Random Graph Structured Jobs** (with S. Chen). Proceedings of the 1993 NSF Design and Manufacturing Systems Conference, University of North Carolina at Charlotte, Charlotte, NC, pp. 3-11, Jan. 1993.
  259. **Power Control Based Admission Policies in Cellular Radio Networks** (with G. Pottie). Proceedings of the 1992 IEEE Global Telecommunications Conference (GLOBECOM '92), Orlando, Florida, vol. 2, pp. 863-867, Dec. 1992.
  260. **Optimal Message Flow on Ring Networks with Spatial Reuse** (with A. Nguyen). Proceedings of the 31<sup>st</sup> IEEE Conference on Decision and Control (CDC '92), Tuscon, AZ, vol. 2, pp. 2360-2363, Dec. 1992.
  261. **On Power Control in High Capacity Cellular Radio Networks** (with G. Pottie). Proceedings of the 1992 WINLAB Conference, Rutgers University, East Brunswick, New Jersey, pp. 239-247, April 1992.
  262. **On Parallel Processing in Tandem Queueing Networks with Feedback**. Proceedings of the 1992 NSF Design and Manufacturing Systems Conference, Georgia Institute of Technology, Atlanta, GA, pp. 495-498, Jan. 1992.
  263. **On Tandem Queueing Networks with Feedback** (with K. Wasserman). Proceedings of the 1991 Allerton Conference on Communication, Control, and Computing, University of Illinois at Urbana-Champaign, pp. 310-312, Oct. 1991.
  264. **Queueing Theoretic Analysis of a General Class of Concurrent Processing Systems**. Proceedings of the 1991 NSF Design and Manufacturing Systems Conference, The University of Texas at Austin, Texas, pp. 1-5, January 1991.
  265. **Maximal Throughput for Stability of a Class of Parallel Processing Systems** (with J. Walrand). Proceedings of the 29<sup>th</sup> IEEE Conference on Decision and Control (CDC '90), Honolulu, Hawaii, vol. 1, pp. 161-166, Dec. 1990.
  266. **Flow Analysis of Stochastic Marked Graphs** (with F. Baccelli, J. Walrand). Proceedings of the 28<sup>th</sup> IEEE Conference on Decision and Control (CDC '89), Tampa, Florida, vol. 2, pp. 1528-1531, Dec. 1989.

267. **On Bifurcated Shortest Path Routing in Communication Networks** (with G. Stassinopoulos). Proceedings of the 1984 IEEE European Conference on Control and Communications, Patras, pp. 604-609, July 1984.

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**REPORTS:**

268. **ARQ: A Multiclass Admission Control Protocol for Heterogeneous Datacenters** (with C. Delimitrou, C. Kozyrakis). Stanford Technical Multiscale Architecture & Systems Lab. Stanford Technical Report, TR-2013-002, Jan. 2013.
269. **Adaptive Data-Aware Utility-Based Scheduling in Resource-Constrained Systems** (with D. Vengerov, L. Mastroleon, D. Murhpy). Sun Microsystems Labs Technical Report SMLI TR-2007-164, April 2007.
270. **Architecting Novel Information Services and Markets**, Detecon Management Report, 2006.
271. **Wireless Packet Scheduling with Deadlines**. Stanford Technical Report, 2005
272. **Projective Processing Schedules in Queueing Structures: Applications to Packet Scheduling in Communication Networks Switches**. Stanford Technical Report. 2002.
273. **Network Security and Infrastructure Assurance – Architectural and Performance Engineering Issues**. Stanford Technical Report, 2004
274. **Noninvasive Channel Probing for Distributed Admission Control and Channel Allocation in Wireless Networks** (with J-W. Kim, D. Mitra, S. Chen). Stanford Technical Report, 2002
275. **Power-Controlled Data Prefetching and Caching in Wireless Mobile Networking** (with S. Gitzenis). Stanford Technical Report, 2002.
276. **Queueing Networks with Random Link Topologies; Stationary Dynamics of Maximal Throughput Schedules** (with G. Michailidis). Stanford Technical Report, 2001.
277. **On Stationary Multi-Processor Queues with Threshold-Based Server Activation** (with J. Rulnick). Technical Report: NetLab 1997-09-01, Stanford University, 1997.
278. **Convergence of Departures in Tandem Networks of  $/GI/Infinity$  Queues** (with T. Mountford, B. Prabhakar). Technical Report: HPL-BRIMS-96-15, BRIMS, HP Labs, UK, 1996.
279. **Processor Migration in Distributed Queueing: An Analysis of the two Processor Case** (with K. Scott). Technical Report UCLA-ENG-95-138, School of Engineering and Applied Science, UCLA, 1995.
280. **Multicopy Parallel Processing Networks: Throughput Analysis** (with K. Scott). Technical Report UCLA-ENG-95-137, School of Engineering and Applied Science, UCLA, 1995.
281. **Critical Phenomena in Massively Parallel Processing Networks: Throughput Analysis - Initial Results** (with A. Zarkesh). Technical Report UCLA-ENG-95-141, School of Engineering and Applied Science, UCLA, 1995.



282. **A Fully Distributed Algorithm for the Creation and Maintenance of Wireless Networks of Mobile Users** (with K. Scott). Technical Report UCLA-ENG-95-112, Department of Electrical Engineering, University of California at Los Angeles, 1995
283. **Probing the Collective Behavior of Massively Parallel Processing Systems by the Renormalization Group Method** (with A. Zarkesh). Technical Report UCLA-ENG-95-140, School of Engineering and Applied Science, UCLA, 1995.
284. **Performance of a Switch State Dependent Timeout Scheme in a Wormhole Switching LAN** (with B. Kwan). UCLA Technical Report UCLA-ENG-95-121, School of Engineering and Applied Science, UCLA, 1995.
285. **Branching Processes in Rollback Synchronization of Parallel Processing Systems: Structural Results** (with J. Rulnick). Technical Report UCLA-ENG-95-136, School of Engineering and Applied Science, UCLA, 1995.
286. **Optimal Choice of Queue Length Thresholds for Processor Activation in the M/M/K Queue** (with J.M. Rulnick). Technical Report UCLA-ENG-95-134, School of Engineering and Applied Science, UCLA, 1995.
287. **Partial Worm Retraction Routing Scheme for Wormhole Switching LANs** (with B. Kwan). UCLA Technical Report UCLA-ENG-94-108, November 1994.
288. **Admission Control and Routing Protocols in Stationless Multi-Hop Radio Networks** (with K. Scott). Technical Report UCLA-ENG-94-106, School of Engineering and Applied Science, U.C. Los Angeles, 1994.
289. **Optimistic (Partial Retraction) Routing Schemes for Wormhole Switching LANs** (with B. Kwan). Technical Report UCLA-ENG-94-108, School of Engineering and Applied Science, U.C. Los Angeles, 1994.
290. **Radio Link Admission Algorithms for Wireless Networks with Power Control and Active Link Quality Protection** (with S. Chen, G. Pottie). Technical Report UCLA-ENG-94-25. School of Engineering and Applied Science, U.C. Los Angeles, 1994.
291. **Distributed Dynamic Power Control Schemes in High Capacity Wireless Radio Networks** (with S. Chen, G. Pottie). Technical Report UCLA-ENG-93-57, School of Engineering and Applied Science, U.C. Los Angeles, 1993.
292. **A Localized Power and Admission Control Scheme Adapted to Varying Channel Conditions for High Capacity Wireless Radio Networks** (with S. Chen, G. Pottie). Technical Report UCLA-ENG-93-56, School of Engineering and Applied Science, U.C. Los Angeles, 1993.
293. **Admission Control Schemes for Guaranteed Link Quality in High Capacity Cellular Radio Networks** (with S. Chen, G. Pottie). Technical Report UCLA-ENG-93-55, School of Engineering and Applied Science, U.C. Los Angeles, 1993.
294. **On Generalized Multiserver Queues** (with J. Walrand). Technical Report UCLA-ENG-9-24-90, School of Engineering and Applied Science, U.C. Los Angeles, 1990.
295. **Recent Results on the Asymptotic Behavior of Concurrent Processing Systems Under Stationary and Ergodic Inputs** (with J. Walrand). Technical Report UCB/ERL M88/78, Electronics Research Laboratory, U.C. Berkeley, 1988.

296. **An Alternative Approach to the Asymptotic Makespan of Serially Executed Multitasked Jobs** (with J. Walrand). Technical Report UCB/ERL M88/79, Electronics Research Laboratory, U.C. Berkeley, 1988.

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**TALKS:**

1. **Invited Seminar – A Risk Management Approach to Cyber-Security**, Operations Research Program, School of Engineering, University of Texas at Austin, March 2017.
2. **Predicting Pediatric Surgical Case Durations** (published abstract with N. Master, D. Scheinker). INFORMS International Meeting, Hawaii, 2016.
3. **Myopic Scheduling of Jobs with Decaying Value with Applications**, (abstract with N. Master, C.W. Chan) INFORMS International Meeting, Hawaii, 2016. (content essentially the same as of talk below.)
4. **Games on Influence Networks: Equilibria, Free Riding and Dynamics** (with Z. Zhou, P. Glynn). INFORMS Annual Meeting, Nashville, Tennessee, 2016.
5. **Myopic Scheduling of Jobs with Decaying Value with Applications in Patient Scheduling** (published abstract with N. Master, C.W. Chan). INFORMS Annual Meeting, Philadelphia, PA, 2015.
6. **Distinguished Invited Seminar: Power and Throughput Issues in Next-Generation Packet Switches**, National Technical University of Athens, Greece, Feb. 2009.
7. **Distinguished Invited Seminar: Wireless Multimedia Computing**, DoCoMo Research Labs, Palo Alto, Feb. 2009.
8. **Plenary Talk: Architecting Novel Information Services and Markets**, 4<sup>th</sup> International IMS Workshop, Fraunhofer Institute for Open Communication Systems – FOKUS, Berlin, Germany, Nov. 2008.
9. **Video Streaming over Wireless Networks – Control Architectures and Performance Engineering**, NEC Research Labs, Tokyo, July 2008.
10. **Power Management in Networking and Computing**, Hitachi Labs, Tokyo, July 2008.
11. **Power Management of Packet Switches**, Sun Labs, Menlo Park, April 2008.
12. **Power and Throughput Issues in Next-Generation Packet Switches**, UC Irvine, February 2008.
13. Invited Distinguished Lectures: 1) **Robust Maximal Throughput Schedules in Processing Systems**, 2) **Transmitter Power Control in Wireless Multimedia Networking**, Advanced Network Sciences Institute, University of California, San Diego, August 2008.
14. **Autonomous Admission (and Power) Control in Wireless Networking**, Technical University of Berlin, December 2007.
15. **Video Streaming over Wireless Networks – Control Architectures and Performance Engineering**, Samsung Labs, Santa Clara, December 2008.

16. **Geometry of Resource Allocation and Load Balancing in Computing/Networking**, Stanford OR Seminar, November 2007.
17. **Throughput and Power Issues in Packet Switching**, University of Sydney, Australia, August 2007.
18. **Video Streaming over Wireless Networks – Control Architectures and Performance Engineering**, Bogazici University, Istanbul, Turkey, August 2007.
19. **Outsourcing in Computing and Data Storage Services**, Deutsche Telekom Laboratories, Berlin, August 2007.
20. **Dynamic Control of Packet Switches**, Sun Labs, Menlo Park, February 2007.
21. **Geometry of Resource Allocation and Load Balancing in Computing/Networking**, Deutsche Telekom Laboratories, Berlin, January 2007.
22. **Network Control Issues in Video Transmission and Distribution**, Deutsche Telekom Labs, August 2006.
23. **Power Control in Wireless Networks**, IBM Research Labs, Hawthorne, July 2006.
24. **Scheduling and Power Management Issues in Data Centers and High-Performance Computing**, Sun Labs, Menlo Park, May 2006.
25. **Video Streaming over Wireless Networks – Control Architectures and Performance Engineering**, Athens Information Technology Institute, May 2006.
26. **Power Control in Wireless Networks**, ENS, Paris.
27. **Video Streaming over Wireless Networks – Control Architectures and Performance Engineering**, Technical University of Athens, December 2005.
28. **Geometry of Resource Allocation and Load Balancing in Computing/Networking**, Athens University of Economics and Business, November 2005.
29. **Power Control in Wireless Networks**, Sprint Labs, Burlingame, December 2004.
30. **‘Geometry’ of Packet Scheduling in Communication Switches**, MIT LIDS Seminar, November 2004.
31. **Power(Rate)/Playout-Controlled Video over Wireless**, France Telecom Research Labs, Paris, June 2004.
32. **Next-Generation Wireless Data/Media Networks**, Athens Information Technology Institute, February 2004.
33. **Projective Packet Scheduling in Switching Systems**, France Telecom Research Labs, Paris, February 2004.
34. **Next-Generation Wireless Data/Media Networks**, France Telecom Research Labs, February 2004.
35. **Geometry of Packet Scheduling Algorithms for Input-Queued Communication Switches**. INFORMS Conference, San Jose, CA, Nov. 2002.

36. **Adaptive Admission Control for Multiclass Web Servers** (with G. Paleologo). INFORMS Telecommunications Conference, Boca Raton, FL, March 2002.
37. **Power-Controlled Data (Pre)Fetching and Caching in Wireless Networking** (with S. Gitzenis). INFORMS Telecommunications Conference, FL, March 2002.
38. **On Stability of Queueing Networks with Job Deadlines** (with A. Ward). INFORMS Applied Probability Conference, New York City, NY, July 2001.
39. **Throughput Maximizing Properties of Statistical Multiplexing in Stationary Ergodic Networks with Feedback** (with C. Westphal). INFORMS Applied Probability Conference, New York City, NY, July 2001.
40. **Predictive Caching Techniques in Wireless Networks** (with A. Ward). INFORMS Telecommunications Conference, Boca Raton, FL, March 2000.
41. **Dynamic Cone Policies for Skilled Based Routing in Call Centers** (with M. Armony). INFORMS Telecommunications Conference, Boca Raton, FL, March 2000.
42. **Dynamic Cone Policies for Queueing Networks with Interfering Resources** (with M. Armony). INFORMS Conference, Philadelphia, PA, November 1999.
43. **Stability and Performance Issues of a General Heterogeneous Parallel Processing System** (with G. Michailidis, K. Wasserman, S. Akin). INFORMS Applied Probability Conference, Ulm, Germany, July 1999.
44. **Bandwidth Allocation in Wireless Networks** (with G. Michailidis). INFORMS Conference, Seattle, WA, October 1998.
45. **Stability and Large Buffer Asymptotics of a General Parallel Processing System** (with G. Michailidis, K. Wasserman, S. Akin). Conference of the Canadian Operational Research Society, Windsor, Ontario, June 1999.
46. **Dynamic Cone Policies for Queueing Networks with Interfering Resources** (with M. Armony). INFORMS Conference, Philadelphia, PA, November 1999.
47. **Power Control and QoS in Wireless Communication Networks** (with M. Armony). INFORMS Conference, Cincinnati, OH, May 1999.
48. **Scheduling Algorithms for High Performance Switches** (with S. Yip). INFORMS Conference, Seattle, WA, Oct. 1998.
49. **Bandwidth Allocation in Wireless Networks** (with G. Michailidis). INFORMS Conferences., Seattle, WA, October 1998.
50. **Queueing in Interfering Resource Environments** (with M. Armony). INFORMS Conference, Tel Aviv, Israel, June 1998.
51. **Allocation of Interdependent Resources in Queueing Systems with Applications to Wireless Networks** (with M. Armony). INFORMS Telecommunications Conference, Boca Raton, FL, March 1998.
52. **On Performance and Limitations of Ultra Large Scale Digital Interconnects with Reconfigurable Topologies** (with S. Yip). IEEE/LEOS Conference on Interconnection of High Speed Digital Systems,

Santa Fe, NM, May 1997.

53. **Queueing in Random Environments** (with G. Michailidis). INFORMS Applied Probability Conference, Boston, MA, June 1997.
54. **Network Flows in Random Environments** (with G. Michailidis). INFORMS Applied Probability Conference, Atlanta, GA, June 1995.
55. **On Queueing Networks with Random Link Topologies** (with G. Michailidis). INFORMS Telecommunications Conference, Boca Raton, FL, March 1995.
56. **Power Control Issues in Wireless Networks** (with S. Chen, G. Pottie). INFORMS Telecommunications Conference, Boca Raton, FL, March 1995.
57. **The Entropy and Delay of Traffic Processes in ATM Networks** (with B. Prabhakar). 1995 IEEE Information Theory Workshop on Multiple Access and Queueing, St. Louis, Missouri, April 1995.
58. **Scalable Supercomputer Network** (with L. Kleinrock, N. Bambos, L. Bergman, J. Cong, E. Gafni, M. Gerla). 1994 IEEE Gigabit Networking Workshop, Toronto, Canada, June 1994.
59. **The Supercomputer Supernet Hardware Design** (with L. Kleinrock, N. Bambos, L. Bergman, J. Cong, E. Gafni, M. Gerla). DARPA Networking Systems Meeting, Santa Fe, NM, September 1994.
60. **Dynamics of Parallel Processing: A Non-Causal Queue** (with J. Rulnick). Annual meeting of the Society of Industrial and Applied Mathematics (SIAM), San Diego, CA, July 1994.
61. **On the Synchronization of Poisson Processes and Queueing Networks with Synchronization Nodes** (with B. Prabhakar and T. Mountford). Fifth Workshop on Stochastic Analysis and Related Fields, Silivri, Turkey, July 1994.
62. **On Flow Control in Ring Structured Local Area Networks with Spatial Reuse** (with A. Nguyen). INFORMS Telecommunications Conference, Boca Raton, Florida, March 1992.
63. **Stable Policies for Processing Systems with Precedence Constraints**. ORSA/TIMS Joint National Meeting, Anaheim, California, November 1991.
64. **On Stability of Parallel Processing Systems** (J. Walrand). SIAM Conference on Applied Probability in Science and Engineering, New Orleans, LA, March 1990.
65. **State-Dependent Queues and Queueing Networks** (with J. Walrand). International Conference on Stochastic Programming, Ann Arbor, MI, August 1989.
66. **Recent Developments in Power Control and their Impact on Next-Generation Dense Wireless Network** (invited distinguished talk). Wireless/Sensor Network Track of the 2002 IEEE Wireless Communications and Networking Conference (WCNC 2002), Orlando, Florida, March 2002.
67. **Power Control and Management Issues in Next-Generation Wireless Networks** (invited keynote talk). 2001 IEEE Symposium on Ad Hoc Wireless Networks (SAWN 2001) of the 2001 IEEE Global Communications Conference (GLOBECOM 2001), San Antonio, Texas, November 2001.
68. **Queueing Models and Problems in Wireless Network Control** (invited plenary talk). Stochastic Networks Conference, Madison, WI, June 2000.

69. **Power Controlled Multiple Access (PCMA) in Wireless Networking** (invited talk). IEEE Computer Communications Workshop, Estes Park, Colorado, November 1999.
70. **Queueing Networks with Interdependent Resources** (invited plenary talk). Oberwolfach Workshop on Applied Probability,, Mathematisches Forschungsinstitut, Oberwolfach, Germany, December 1998.
71. **Power Control Issues in Wireless Communication Networks** (invited plenary talk). Workshop on System and Control Issues in Communication Networks, National Science Foundation and Army Research Office, Airlie Center, Airlie, Virginia, August 1996.
72. **On Queueing Networks with Random Link Topologies: Bandwidth Allocation in Wireless Communication Networks** (invited plenary talk). BRIMS Workshop on Mathematical Trends in Communication Networks, Hewlett-Packard Labs, Bristol, UK, June 1996.
73. **Power Control with Active Link Protection in Wireless Networking** (invited plenary talk). EPFL Workshop on Computer Networking, EPFL, Switzerland, Summer 1996.
74. **Power Control Algorithms in High Performance Wireless Networks** (invited talk). Networking Seminar, IBM Watson Research Center, NY, July 2001.
75. **Queueing Networks in Random Environments** (invited talk). Networking Seminar, Dept. of EECS, U.C. Berkeley, March 1998.
76. **On Queueing Networks with Randomly Modulated Service Rates** (invited talk). Research Colloquium, Center for Operations Research, MIT, September 1997.
77. **High-Performance Wireless Networking**. Networking Seminar, Dept. of EECS, U.C. Berkeley, Nov. 1996

May 10, 2017

Please note that most engagements identified below are governed by confidentiality agreements.

**A) EXPERT WITNESS ENGAGEMENTS OF NICHOLAS BAMBOS**

I, Nicholas Bambos, have had the following temporary expert witness engagements in the litigation cases listed below:

1. (2002-2003) Technical consultant and expert witness (*deposed*) for *Altima Communications, Inc.* in the case “Level One Communications, Inc. v. Altima Communications, Inc.” Case No. CIV. S-99-2488 GEB (GGH), US District Court, Eastern District of California
2. (2004-2005) Technical consultant and expert witness (*deposed*) for *Microsoft Corporation* in the litigation case “Lextron Systems, Inc. vs. Microsoft Corporation” Case No. CV 04-00588-VRW, US District Court, Northern District of California, San Francisco Division
3. (2004-2005) Technical consultant and expert witness (*not deposed*) for *Quova, Inc.* in the case “Quova, Inc. v. Digital Envoy, Inc.” Case No. C04 02674JL, US District Court, Northern District of California, San Jose Division.
4. (2004-2005) Technical consultant and expert witness (*deposed*) for *American Honda Motor Co., Inc.* in the litigation case “Donner, Inc. (Plaintiff and Counter-Defendant) v. American Honda Motor Co. Inc. and McDavid Plano-Acra, L.P. and The Beaumont Company d/b/a Classic Acura, (Defendants and Counter-Plaintiffs) v. Irah H. Donner (Counter-Defendant)” Civil Action File No. 5:03-CV-253 (DF), US District Court, Eastern District of Texas, Texarkana Division.
5. (2005-06) Technical consultant and expert witness (*deposed*) for *Pulse Engineering Inc. and Full Rise Electronics Co.* in the litigation case “Regal Electronics, Inc. v. Pulse Engineering, Inc., Fahrner-Miller Associates, Inc., Full Rise Electronics Co. Ltd., Max Lion Electronics, Inc., Bell Fuse, Inc., Stewart Connector Systems, Inc.” Civil Case No: 03-01296 JW, US District Court, Northern District of California, San Jose Division.
6. (2005-2008) Technical consultant and expert witness (*not deposed*) for *Realtek Semiconductor Corporation* in the litigation case “3COM Corporation v. D-Link Systems, Inc. and Realtek Semiconductor Corporation” Case No. CV-03-2177 VRW BZ, US District Court, Northern District of California, San Francisco Division.
7. (2006-2007) Technical consultant and expert witness (*deposed*) for *Tekelec, Inc.* in the litigation case “Bouygues Telecom, S.A. vs. Tekelec, Inc.” Case No. 4:05 CV 78-FL3, US District Court, Eastern District of North Carolina.
8. (2006-2008) Technical consultant and expert witness (*deposed*) for *Nissan North America, Inc.* in the litigation case “Mobile Micromedia Solutions LLC vs. Nissan North America, Inc.” Civil Action File No. 5:05-CV-230, US District Court, Eastern District of Texas, Texarkana Division.

9. (2006-2013) Technical consultant and expert witness (*not* deposed) for *J2 Global Communications, Inc.* and *Catch Curve, Inc.* in the litigation cases (all related) “J2 Global Communications Inc. v. CallWave, Inc.” Civil Action No. CVO4-706D8 DP (AJWx); and “J2 Global Communications Inc. v. Venali, Inc.” Civil Action No. CVO4-1172DDP (AJWx); and “Catch Curve, Inc. (Plaintiff/Counterclaim-Defendant) v. Venali, Inc. (Defendant/Counterclaimant)” Civil Action No. 05-4820 DDP (AJWx), US District Court, Central District of California; and “J2 Global Communications, Inc. and Advanced Messaging Technologies, Inc. v. Protus IP Solutions, Inc.” Civil Action No. CV05-5610 DDP (AJWx); and “COA Network, Inc. v. J2 Global Communications, Inc.”; and “J2 Global Communications, Inc. and Advanced Messaging Technologies, Inc. v. Captaris, Inc. and Open Text Corp.” Civil Action No. CV09-4150 DDP (AJWx); and J2 Global Communications, Inc. and Advanced Messaging Technologies, Inc. v. Packetel, Inc.” Civil Action No. CV09-3240 DDP (AJWx); and “J2 Global Communications, Inc. and Advanced Messaging Technologies, Inc. v. Easylink Services International Corporation” Civil Action No. CV 09-4189 DDP (AJWx); and “J2 Global Communications, Inc. and Advanced Messaging Technologies, Inc. v. Venali, Inc.” CV04-1172 DDP (AJWx); and the related case in Canada “J2 Global Communications, Inc. and Catch Curve Inc. v. Protus IP Solutions Inc.” Canadian Federal Court Action No. T-139-06.
10. (2007) Technical consultant and expert witness (*not* deposed) for *Netgear* in the litigation case “Serconet, Ltd. (Plaintiff) v. Netgear, Inc. (Defendant/Third-Party Plaintiff) v. Cameo Communications, Inc., Delta Networks, Inc., Hon Hai Precision Industry Co., Ltd., Sercomm Corp., and Z-Com, Inc. (Third Party Defendants)” Civil Action No. C-06-04646 PJ, US District Court, Northern District of California, San Francisco Division.
11. (2008) Technical consultant and expert witness (*not* deposed) for *Quantum Corporation* in the litigation case “Quantum Corporation v. Riverbed Technology, Inc.” Case No. C-08-0927-WHA, US District Court, Northern District of California.
12. (2008) Technical consultant and expert witness (*deposed*) for Vero Systems (Teoco) in the litigation case “Telarix, Inc. vs. Vero Systems, Inc.” Eastern District of Virginia Case No. 1-08-cv-587 (CMH)
13. (2009-2010) Technical consultant and expert witness (*not* deposed) for ActiveIdentity Corporation in the litigation case “ActiveIdentity vs. Intercede Group PLC and Intercede Ltd.” Northern District of California, Case No. C-08-4577 VRW.
14. (2010-2011) Technical consultant and expert witness (*not* deposed) for Perfect 10 Satellite Distributing Company in the litigation case “John Mezzalingua Associates, Inc. vs. Pace Electronics, Inc., Perfect 10 Antenna Company and DS Engineering, LLC” Case Number: 0.10-cv-00064-MJD-JJG.
15. (2010) Technical consultant and expert witness (*not* deposed) for Belkin International, Inc., Cisco-Linksys L.L.C., D-Link Systems, Inc., Netgear, Inc., and SMC Networks, Inc. in the litigation case “OptimumPath, L.L.C. v. Belkin Int’l, Inc., et al” Case No. 4:09-CV-1398-CW (N.D. Cal)
16. (2011) Technical consultant and expert witness (*not* deposed) for Infoblox, Inc. in the litigation case “Infoblox v. BlueCat” Case Number CV 10-01962 JVS.
17. (2011-2012) Technical consultant and expert witness (*deposed*) for Twitter, Inc. in the litigation case “Copper Notification, Inc., v. Twitter, Inc., Everbridge, Inc., Rave Wireless, Inc., Federal Signal Corp” Civil Action No. 09-865-LPS.
18. (2011-2014) Technical consultant and expert witness (*deposed*) for Barnes & Noble, Inc. in the litigation case “Barnes & Noble, Inc. v. LSI Corp.” No. 3:11-CV-2709-EMC, U.S.D.C. N.D. Cal.



19. (2011-2013) Technical consultant and expert witness (*not* deposed) for Google, Inc. in the litigation case “MasterObjects, Inc. v. Coogole, Inc.” Case No. CV 11-01054 PJH, Northern District of California, Oakland Division.
20. (2012-2013) Technical consultant and expert witness (*not* deposed) for Money Suite Company in the litigation case “The Money Suite Company v. Insurance Answer Center, LLC, et al,” USDC Central District of California – Case No. SACV 11-1847-AG (JPRx)
21. (2012-2013) Technical consultant and expert witness (*deposed*) for Brilliant Telecommunications / Juniper Networks in the litigation case “Alcatel Lucent Technologies USA Inc. v. Brilliant Telecommunications, Inc., et al,” Case No.: 1-11-CV-206910, Superior Court of California, County of Santa Clara.
22. (2012-2013) Technical consultant and expert witness (*deposed & testified at ITC trial*) for HTC Corporation / HTC America Inc. (Respondents) and for Google, Inc. (Intervener) in “The Matter of Certain Electronic Devices, Including Mobile Phones, Tablet Computers, and Components Thereof, ITC Inv. No. 337-TA-847.” (Complainants: Nokia Corp., Nokia Inc., Intellisync Corp.) Worked on three patents, two of which were dropped by Complainants and the Judge found no infringement on the third.
23. (2013) Technical consultant and expert witness (*not* deposed) for HTC Corporation / HTC America, Inc. in the litigation case “Smartphone Technologies vs. AT&T Mobility LLC, HTC Corporation, HTC America, Inc.” Case No. 6:11-CV-561 (E.D. Tex.).
24. (2013) Technical consultant and expert witness (*deposed*) for Aeritas, LLC in the litigation cases: 1) Aeritas, LLC v. Alaska Air Group, Inc., Case No. 11-967-SLR (D. Del.); 2) Aeritas, LLC v. Continental Airlines, Inc., Case No. 11-968-SLR (D. Del.); 3) Aeritas, LLC v. Delta Airlines, Inc., Case No. 11-969-SLR (D. Del.); 4) Aeritas, LLC v. United Airlines, Inc., Case No. 11-970-SLR (D. Del.); 5) Aeritas, LLC v. US Airways, Inc., Case No. 11-1267-SLR (D. Del.); and 6) Aeritas, LLC v. Virgin America, Inc., Case No. 12-1492-SLR (D. Del.).
25. (2013-2014) Technical consultant and expert witness (*deposed*) for IpLearn, LLC in the litigation case “IpLearn, LLC v. Blackboard Inc.” Case No. 1:11-CV-00876-RGA (D. Del.).
26. (2013-2015) Technical consultant and expert witness (*not* deposed) for Infoblox, Inc. in the litigation case “Versata Software, Inc., et al v. Infoblox, Inc.” Case No. 1:13-cv-00678-LPS (D. Del.)
27. (2014 - 2015) Technical consultant and expert witness (*not* deposed) for Kyocera Corp. and Kyocera Communications Inc. in the litigation case “Adaptix, Inc. v. Kyocera Communications Inc.” Case No(s) 5:14-cv-02894-PSG (and -02895-PSG), Northern District of California, and related IPR case(s).
28. (2015-2016) Technical consultant and expert witness (*deposed*) for IBM Corporation in the litigation case “Twin Peaks Software Inc. v. IBM Corporation” Case No: 14-CV-03933-JST.
29. (2016 - ) Technical consultant and expert witness (*not* deposed) for Samsung in the litigation case “Huawei Technologies, Co. Ltd. Et al v. Samsung Electronics Co. Ltd. Et al.” Case No: 3:16-CV-02787 N.D. Cal.

## **B) OTHER CONSULTING, ETC. ENGAGEMENTS OF NICHOLAS BAMBOS**

Additionally, I have had the following startup-founding, technical advising, consulting, and other engagements (with compensation) in the past.

1. (1994-1996) Research visitor to the AT&T Bell Labs Mathematics Center for two weeks in the summer of 1994 and two weeks in the summer of 1996.
2. (1996-present) Research proposal review panelist at the National Science Foundation.
3. (1998) Research consultant for Sun Microsystems for two weeks in 1998.
4. (1999-2001) Co-founder of “AON Networks” (optical networking technology startup).
5. (2001-2003) Member of the Technical Advisory Board of ChainCast (peer-to-peer audio streaming technology startup; now StreamAudio).
6. (2001-2003) Member of the Technical Advisory Board and consultant for Greenfield Networks (packet switching technology startup; eventually acquired by Cisco).
7. (2001-2004) Advisor at ITU Ventures, Los Angeles, CA (technology investment firm).
8. (2004-2004) Member (uncompensated) of the Advisory Board of Detecon USA (consulting branch of Deutsche Telekom).
9. (2008-2009) Co-founder of Dhaani (initially Verde) Systems (technology startup focusing on power management of desktop computers).
10. (2008) Presentation for Cyber Ark International, Inc. on “science and technology innovation in the Silicon Valley” to Chinese delegation in Oct. 2008.
11. (2012) Consulting for Quinn-Emanuel on patent analysis in Oct. & Nov. of 2012.
12. (2013) Consulting for Kilpatrick-Townsend-Stockton on prior art for defendant in Sept. & Oct. 2013, regarding multimedia messaging services (MMS) technology.
13. (2015) Consulting for Quinn-Emanuel on patent analysis in Jan. to May of 2015.
14. (2015) Consulting for Kirkland-Ellis on patent analysis in April 2015, regarding network resource management technology.
15. (2015) Consulting for Winston-Strawn on prior art for defendant in the period May-September 2015.
16. (2016) Consulting for Quinn-Emanuel on patent litigation in January 2016 (engaged, but performed no work and received no compensation).
17. (2016 - ) Consulting for Wilson-Sonsini on patent litigation, regarding networking technologies.

18. (2016 - ) Consulting for Morrison-Foerster on patent litigation, regarding wireless technologies.

## ISSUED PATENTS

Nicholas Bambos

May 10, 2017

1. **US 6,711,280 B2** – Method and Apparatus for Intelligent Ranging via Image Subtraction, 2004 (2001).
2. **US 7,317,730 B1** – Queueing Architecture and Load Balancing for Parallel Packet Processing in Communication Networks, 2008 (2001).
3. **US 7,634,287 B1** – Power Controlled Multiple Access (PCMA) in Wireless Communication Networks, 2009 (2001).
4. **US 8,320,269 B2** – Scalable Delay-Power Control Algorithm for Bandwidth Sharing in Wireless Networks, 2012 (2009).
5. **US 8,423,070 B2** – Method and System to Model TCP Throughput, Assess Power Control Measures, and Compensate for Fading and Path Loss, for Highly Mobile Broadband Systems, 2013 (2004).
6. **US 8,488,500 B2** – Power Management of Networked Devices, 2013 (2008).
7. **US 9,454,209 B2** – Power Management of Networked Devices, 2016 (2008) – continuation.
8. **US 9,614,958 B2** – Predictive Computer Network Services Provisioning for Mobile Users 2017 (2008).