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EDUCATION

Harvard University: Div. of Applied Sciences, M.S., Ph.D. Thesis advisor: Y. C. Ho.

Brown University: Div. of Applied Mathematics. Sc.B. - Sc.M.

PROFESSIONAL EXPERIENCE

Defense Science Board task force on Defense Intelligence 2010 - 2011

Member of taskforce making recommendations related to Counter Insurgency (COIN) Intelligence, Sureveillance, and Reconnaissance (ISR) Operations sponsored by the USD(I).

The MITRE Corporation, Principal Member Technical Staff 2009 -

Recent Projects: Developed non-linear tracker for Marine system; modeled preferences of aircraft pilots for new communication system; provided technical guidance to ONR for their HSCB (Human Social, Cutural and Behavioral Sciences) program; evaluated IRS marketing study; conducted portfolio analysis to assist a value based budgeting project; developed new algorithms to analyzing social media; other projects in area of data mining.

MIT Lincoln Laboratory, Member Technical Staff 2000 - 2009

- *SUMMARY:* Member of Communication Division (2000-2003) focused on performance analysis of optical communication systems. Member of Sensor Division (2004-present) focused on tracking and abnormality detection at the theoretical and applied level with increasingly levels of responsibility.
- Technical lead for multi-sensor traffic maritime tracking project. Applied analysis to heaviest traffic lane in the world using real data. Automatically identified pirate activity based on ship tracks.
- Consultant to DARPA maritime abnormality project, PANDA.
- Led effort to develop and patent fast large scale erasure code.

GTE / Verizon Laboratories, Prin. Mem. of Tech. Staff 1983-2000

- *SUMMARY:* Technical leadership role in telecommunication system analysis effort for over ten years; consultant for all major GTE subsidiaries in areas of wireless communication, traffic engineering, capacity estimation and scheduling; recipient of highest technical award from GTE CEO; collaborated with researchers at major universities around the world.
- Developed world's fastest numerical algorithms to solve a wide class of capacity estimation problems with anticipated application to cellular telephone access, wireless voice/data protocols, and multi-class internet capacity estimation. *Status:* Cellular telephone rollout expected in 2000 with multi-million dollar savings expected.
- Jointly developed inventory policy recommendations for new telephone lines which mediates tradeoffs between capital costs and installation expenses. *Impact:* Recommendations adopted with multi-million dollar savings expected;

received highest GTE Technical Award from GTE's Chief Executive Officer (1999).

- Proposed and implemented a new approach to maintenance scheduling of airplanes with air-to-ground telephones based on statistical analysis of billing records. *Impact:* Radically reduced time to detection of faulty equipment while reducing costs.
- Proposed and implemented a new approach to inferring the delays and lost revenue due to impatient air-to-ground telephone customers based on statistical analysis of billing records. *Impact:* Analysis supported capacity expansion plans.
- Proposed and conducted fundamental research for a new approach for incorporating burstiness of SS7 signaling traffic in the SS7 network capacity design. *Impact:* Recommendations adopted using substantially less capacity than previously planned.
- Assisted GTE Airfone with testimony to the FCC.
- Patented new approach for fraud protection for use in cellular communication system.
- Support call center operations using analytic methods to improve agent staffing levels, identify critical drivers of customer service, and invent an improved routing algorithm.
- Proposed new processor schedule, *Bernoulli* Schedule, that received worldwide attention in academic literature, which was motivated by GTE's local switch scheduling needs.
- Generalized a longstanding cornerstone formula in queueing theory, Little's Law, to relate waiting time distributions to queue length probability distributions.
- Extensive personal research collaborations with researchers around the world. Strong role advising and vetting projects between universities and GTE Laboratories.

Harvard University

1989-1990

Massachusetts Institute of Technology

- *SUMMARY:* Sabbatical leave from GTE Laboratories.
- Taught graduate queueing theory course at MIT.
- Advised Ph.D. students at Harvard University and MIT.
- Published research related to transient networks of queues, inferencing of queues, and scheduling issues.

Bell Laboratories: Member of Technical Staff

Summer '78, 1981-1983

- *SUMMARY:* Performance analysis of telecom systems, published three papers.

PROFESSIONAL ACTIVITIES

INFORMS (Institute of Operations Research and Management Sciences)

- Candidate for President-Elect 2009
- Board of Directors ,1998-2002, 2007-2008.
- Elected Fellow, 2004.
- Chair, INFORMS Boston Chapter, 2005 – present.
- Chair, INFORMS Applied Probability Society, 1999.
- Chair, INFORMS Telecommunication Society. 1995.
- Associate Editor, ORSA Journal on Computing. 1992-98.
- Associate Editor, Operations Research, 1989-1994.
- Associate Editor, Management Science, 2005 – 2009.
- Co-Program Chair of first Northeast Regional INFORMS conference, 2011

Other

- Department Editor, *J. of Discrete Event Dynamic Systems*, 2009-
- Ph.D. thesis committee, MIT, 1990, 2000.
- Ph.D. thesis committee, Harvard, 1990.
- Ph.D. thesis committee, BU, 2007-present.
- Judge, Mass. State Science Fair, 1996 – present.
- Evaluation committee, Math Dept, UMASS, Lowell, 1993.
- IEEE Senior member

PATENTS

- *System and Method for Determining an Optimal Threshold for Increasing Telephone Line Capacity and For Evaluating Line Management Policies*, with R. Tobin and J. Drew. No. 7,162,017. January 9, 2007.
- *Method and Apparatus for Protecting Data*. No. 7,032,166. April 18, 2006.
- *System and method for redirecting calls to blocked cell sites*, with G. Greene, W. Hogg, M. Nail, V. Stone, No. 6,681,113. January 20, 2004.
- *Fast method for capacity estimation of systems*. No 6,397,066. May 28, 2002.
- *Probabilistic use of wireless reserve channels for admission control*, with G. Greene, W. Hogg, M. Nail. No. 6,314,293. November 6, 2001.
- *Method and apparatus for efficient call routing*, with S. Humair, No. 6,115,462. September 5, 2000.
- *Method of fault identification for multiplexed devices*. No. 5,940,754. August 17, 1999.
- *Control process for allocating services in communication systems*, with J. Keilson, No.5,381,546. January 10, 1995.
- *Method of verifying identification*. No. 5,278,904. January 11, 1994.
- *Wireless device for verifying identification*. No. 5,319,711. January 7, 1994.

SELECTED PUBLICATIONS (from 32 refereed journal papers, 5 with over 20 citations)

- Analysis of Trends in Times Series with Discontinuities. Operations Research Letters. To appear, 2013.
- *Software-based Erasure Codes for Scalable Distributed Storage*, with J. Cooley, E. Tsung and J. Mineweaser. Mass Storage Systems and Technologies, 2003. (MSST 2003). Apr 7-10, 2003, pp. 157-164.
- *Exploiting Markov Chains to Infer Queue-Length From Transactional Data*, with D. J. Daley, Journal of Applied Probability, Vol. 29, 1992, pp. 713-732.
- *Optimizing Bernoulli Routing Policies for Balancing Loads on Call Centers and Minimizing Transmission Costs*, with S. Humair, Journal of Optimization Theory and Applications (JOTA), 1999. Vol. 100, No. 3, pp. 623-659.
- *A Distributional Form of Little's Law*, with J. Keilson, Operations Research Letters, Vol. 7, No. 5, 1988, pp. 223-227.
- *A Class of Center-Free Resource Allocation Algorithms*, with Y. C. Ho and R. Suri, Journal of Large Scale Systems: Theory and Application, Vol. 1, No. 1, Feb., 1980, pp. 51-62.
- *Capacity Estimation of Cyclic Queues*, IEEE Trans. On Communications, Vol. COM-33, No. 3, Mar., 1985, pp. 279-281.
- *Nested Square Roots of Two*, American Math. Monthly, Vol. 110, No. 4, pp. 326-330.