Saikat Ray

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EDUCATION

Ph.D., Electrical Engineering, Boston University, May 2005.
GPA: 4.00/4.00.
Dissertation title: "Global Effects of Local Transmission Strategies in Multihop Wireless Networks."
Advisor: Prof. David Starobinski

M.S., Electrical Engineering, Boston University, May 2002.
GPA: 4.00/4.00.
Thesis title: "The Deaf Node Problem in Wireless Networks."
Advisor: Prof. David Starobinski

B. Tech., Electronics and Communication Engineering, Indian Institute of Technology (IIT), Guwahati, India, May 2000.
GPA: 9.23/10.00.

Silver medal awarded for securing the first rank in the department of ECE.

First rank among 10,000 candidates in Graduate Aptitude Test in Engineering (GATE), 2000 in Electronics (GATE is the all India entrance examination for Master's Program).

AREAS OF INTEREST

Design, performance analysis and optimization of network protocols.

Applications of Mathematical Programming.

PROFESSIONAL EXPERIENCE

UNIVERSITY OF BRIDGEPORT Bridgeport, CT, January 2007-present.
Assistant Professor, Department of Electrical Engineering and Computer Engineering.

UNIVERSITY OF PENNSYLVANIA Philadelphia, PA, September 2005-December 2006.
Postdoctoral Researcher, Department of Electrical and Systems Engineering.
Advisor: Roch Guerin.
Coauthors: Saswati Sarkar, Rute Sofia, Ratul K. Guha.

BOSTON UNIVERSITY Boston, MA.
Instructor, Department of Electrical and Computer Engineering, Summer 2005.

Research Assistant, Department of Electrical and Computer Engineering, 2001-2005.
Advisor: David Starobinski.
Coauthors: Jeffrey B. Carruthers, Ari Trachtenberg, Yannis Paschalidis.

Teaching Assistant, Department of Electrical and Computer Engineering, 2000-2001.

MICROSOFT RESEARCH Cambridge, UK
Summer Intern, 2003.

FUJITSU NETWORK COMMUNICATIONS Acton, MA
Summer Intern, 2001.

PROFESSIONAL ACTIVITIES

Panelist: National Science Foundation SING panel, June, 2008.

Co-chair of the Technical Program Committee of Robocomm 2009

Member of the Technical Program Committee of WCNC 2009, GLOBECOM 2008, INFOCOM 2008, ICCCN 2007, PIMRC 2007, INFOCOM 2007, etc.

Reviewer for IEEE Transactions on Networking; IEEE Transactions on Vehicular Technology, IEEE Transactions on Automatic Control; Mobihoc 2008; IEEE INFOCOM 2002, 2003 and 2005; IEEE WCNC 2003; IEEE CDC/ECC 2005; IEEE JSAC; Journal of Computer Communications; Automatica; IEEE Transactions on Communications; IEEE Transactions on Wireless Communications; IEEE Transactions on Multimedia; IEEE Communication Letters, etc.

Local arrangements volunteer, IEEE Conference on Decision and Control (CDC), 2004.

GRANT PROPOSALS

"CAREER: Self-signaling Algorithms for Wireless Networks," PI: Saikat Ray, National Science Foundation.

"Enabling Next-Generation Services: Towards Management-Free Networks," PIs: Saikat Ray and Roch Guerin. HP Laboratories, Innovation Research Program.

"Body Area Networks Enabling Personalized and Location-Centric E-Health Applications," PIs: Ioannis Ch. Paschalidis, Thomas D. C. Little, Keyong Li (Boston University) and Saikat Ray. National Science Foundation (**Pending**).

"CDI Type I: Understanding the Complexity of Interacting Spectrum Access Mechanisms in Large Unlicensed Wireless Networks" PIs: David Starobinski (Boston University) and Saikat Ray; Collaborator: Patrick Thiran (EPFL). National Science Foundation, Cyber-enabled Discovery and Innovation program.

"Jet Engine Testing and Monitoring with Wireless Sensor Networks," PI: Saikat Ray; Collaborator: Mary Austin (Pratt and Whitney). Start-up grant, Connecticut Space Grant Consortium, NASA.

"Collaborative Research: Principled Robustness for the Next Generation Internet," Roch Guérin, Saikat Ray, Saleem A. Kassam, Vince Poor. National Science Foundation.

"Robust Large-Scale Ocean Surveillance Networks with Applications to Sonobuoy Systems," Roch Guérin, Saikat Ray, Saleem A. Kassam, Zhi-Li Zhang, Rochard E. Dator.

PROFESSIONAL SKILLS

Computer Programming: C, C++, C#, Unix shell scripts, PERL, TCL, HTML, etc.

Mathematical Tools: MATLAB, CPLEX, MOSEL.

Network Simulators: OPNET, NS, OMNeT++.

Embedded programming: TinyOS (nesC), Programming MSP430 devices.

Standards: IEEE 802.11 (WiFi); Familiar with HYPERLAN, IEEE 802.15.4, IEEE 802.16, IEEE 802.1, etc.

Hardware: Familiar with Texas Instrument's and Analog Devices' MSP and DSP processors; HPVEE; Cadence.

Publishing Tool: LaTeX.

PATENTS

"Processing data packets using markers," Kyl W. Scott, Saikat Ray and Xunxiang Zhou. Organization: Fujitsu Network Inc. United States Patent 7,372,865 (approved, May 13, 2008).

"Scalable Packet Based Network," Roch Guerin, Saikat Ray and Rute Sofia. Organization: Siemens Corporation. United States Patent Application Number: 20080069107.

"Method and system for processing data packets using markers and logic program," Kyl W. Scott, Saikat Ray and Xunxiang Zhou. Organization: Fujitsu Network Inc. European Patent Application Number: JP20040201582 20040708.

"Scalable Packet Based Network," Roch Guerin, Saikat Ray and Rute Sofia. Organization: Siemens Corporation. International Application Number: PCT/EP2007/059652.

DEVELOPMENT PROJECTS

[Embedded RF System] *Development of an embedded RF System.* Sponsored by ARDEC, Picatinny. (2008-present)

[Discrete Event Simulator] *Development of a MATLAB based Discrete Event Simulator for Metro Area Ethernet.* Shell (tcsh/bash) and MATLAB scripts to automate simulation configuration and simulation run on a networked multiprocess environment, data collection from different machines, data analysis and visualization. (2006)

[Testbed] *Implementation of wireless sensor network based robust and optimized indoor positioning system prototype.* Software development for automating data collection, implementation of networking client on a PDA, and interfacing sensor APIs for seamless operation. (2004-2005)

[Testbed] *Development of distributed wireless networking testbed.* Development of shell scripts for automatic system configuration, running test sequence and data collection. (2003-2004)

[Discrete Event Simulator] *Development of an event-driven IEEE 802.11 standard wireless multihop network simulator in MATLAB.* Development of shell scripts and MATLAB scripts to automate simulation configuration, data collection, data analysis and visualization. (2002-2003)

[Simulation] *Modeling and simulation of Bluetooth physical layer using MATLAB.* Comparison of the spectral efficiency of GFSK modulation with Bluetooth parameters against GMSK modulation with GSM parameters. Obtained the BER vs. SNR curve for a transmitter-receiver pair with no interference as well as under interference from neighboring piconets. Development and documentation of MATLAB functions for GFSK, GMSK modulation and Frequency Hopping. (2001)

[Firmware] *Development of the transmitter and the carrier acquisition block of the receiver of a V.32 standard MODEM on TMS320C542 DSP processor.* Development and implementation of initial carrier phase estimation algorithm. Assembly-level code optimization. (2000)

[Firmware] *Development of G.723 vocoder on ADSP 21xx series processors.* Assembly-level code optimization. (2000)

[Hardware] *Hardware development of multistage ECG amplifier.* Design and implementation of low noise preamplifier and high gain amplifier. Design and implementation of safety circuits. (1999)

[Hardware System] *Design and implementation of Fuzzy measure based motor controller.* (1998)

Courses Taken

Engineering: Digital Communications, Information Theory, Wireless Communications, Computer Communications, Stochastic Processes, Optimization, Queuing Theory.

Mathematics: Funcational Analysis, Abstract Algebra, Probability and Measure, Mathematics of Finance.

Fellowships and Awards

Travel award, Student Workshop, INFOCOM 2005.

Scholarship awarded for excellence in academic performance, IIT Guwahati, 1999-2000.

Sigma Xi award for excellent performance at Boston University Science Day, 2002.

Memberships

Member: Institute of Electrical and Electronics Engineers (IEEE)

Invited Member: Sigma Xi, The Scientific Research Society

Teaching

Bioinformatics	Spring 2008
Modeling Techniques in classical and intelligent optimization	Spring 2008
Probability and Stochastic Processes	Fall 2007
Digital Communication	Fall 2007
Digital Signal Processing Lab	Fall 2007
Modern Control Theory	Spring 2007
Wireless Sensor Networks	Spring 2007, Spring 2008

Introduction to Digital Logic Design — Boston University, Summer 2005

Recent student evaluations: On average, about 90% students recommended me for another course; about 2/3 students gave 5/5 in most categories.

University Services

University of Bridgeport

- Chair: Biomedical Program Proposal Preparation Committee for preparing proposal to Department of Higher Education (Connecticut) for creating a new Biomedical Program in University of Bridgeport.
- Development of the School of Engineering Colloquium Series.

Boston University

Student member of graduate admissions committee, Dept. of ECE, Boston University, 2002.

Invited Talks

"Wireless Mesh Networks". May 25, 2007. Indian Institute of Technology, Guwahati, India.

"Arbitrary Throughput versus Complexity Tradeoffs in Wireless Networks using Graph Partitioning". May 28, 2007, Bell Laboratories, Bangalore, India.

"Algorithms for Next Generation Systems". May 31, 2006, Philips Research, Eindhoven, Netherlands.

"Indoor Positioning Systems: Performance and Robustness". June 15, 2006, Create-net, Trento, Italy.

Publications

Publications in Refereed Journals

[J1] Saswati Sarkar and Saikat Ray, "Arbitrary Throughput Versus Complexity Tradeoffs in Wireless Networks using Graph Partitioning," accepted for publication in IEEE Trasactions on Automatic Control.

[J2] Saikat Ray and David Starobinski, "On False Blocking in RTS/CTS-based Multi-hop Wireless Networks," IEEE Transactions on Vehicular Technology, Vol. 56, No. 2, pp. 849-862, March 2007.

[J3] Saikat Ray, Wei Lai and Ioannis Paschalidis, "Statistical Location Detection with Sensor Networks," Joint special issue of the *IEEE Transactions on Information Theory* and the *IEEE/ACM Transactions on Networking* on networking and information theory, Vol. 52, No. 6, pp. 2670-2683, June 2006.

[J4] Saikat Ray, Jeffrey B. Carruthers and David Starobinski, "Evaluation of the Masked Node Problem in Ad-Hoc Wireless LANs," *IEEE Transactions on Mobile Computing*, Vol. 4, No. 5, pp. 430-442, September/October 2005.

[J5] Saikat Ray, David Starobinski and Jeffrey B. Carruthers, "Performance of Wireless Networks with Hidden Nodes: A Queueing-Theoretic Analysis," *Journal of Computer Communications (Special Issue on the Performance of Wireless LANs, PANs, and Ad-Hoc Networks)*, vol. 28, issue 10, pp. 1179-1192, 16 June 2005.

[J6] Saikat Ray, David Starobinski, Ari Trachtenberg and Rachanee Ungrangsi, "Robust Location Detection with Sensor Networks," *IEEE JSAC (Special Issue on Fundamental Performance Limits of Wireless Sensor Networks)*, vol. 22, no. 6, pp. 1016–1025, August 2004.

Publications at Conferences

[C1] Ratul K. Guha and Saikat Ray, "Polynomial-time Optimal Distributed Algorithm for Dynamic Allocation of Discrete Resources," IEEE SECON 2008, June '08, San Francisco, CA.

[C2] Ratul K. Guha and Saikat Ray, "Optimal On-Demand Mobile Sensor Allocation," IEEE Sensors 2007, Atlanta, October 2007.

[C3] Saikat Ray, Roch Guerin and Rute Sofia, "Distributed Path Computation without Transient Loops: An Intermediate Variables Approach", in 20th International Teletraffic Congress (ITC), Ottawa, Canada, June 2007.

[C4] Saikat Ray, Roch Guerin and Rute Sofia, "A Distributed Hash Table Based Address Resolution Scheme for Large-scale Ethernet Networks", in IEEE International Conference on Communications (ICC) 2007, Glasgow, U.K., June 2007.

[C5] Saikat Ray, Saswati Sarkar, "Arbitrary Throughput Versus Complexity Tradeoffs in Wireless Networks using Graph Partitioning," Invited paper; Information Theory and Applications (ITA @ UCSD) workshop, San Diego, January 2007.

[C6] Saikat Ray, Wei Lai and Ioannis Paschalidis, "Deployment Optimization of Sensornet-based Stochastic Location-Detection Systems," in *Proceedings of IEEE INFOCOM 2005*, March 2005.

[C7] Ioannis Paschalidis and Saikat Ray, "Optimizing Location Detection Services in Wireless Sensor Networks," in *Proceedings of IEEE CDC 2004*, Atlantis, Paradise Island, Bahamas, December 2004.

[C8] Saikat Ray, Rachanee Ungrangsi, Francesco de Pellegrini, Ari Trachtenberg and David Starobinski, "Robust Location Detection in Emergency Sensor Networks," in *Proceedings of IEEE INFOCOM 2003*, April 2003, pp. 1044–1053.

[C9] Saikat Ray, Jeffrey B. Carruthers and David Starobinski, "RTS/CTS-Induced Congestion in Ad-Hoc Wireless LANs," in *Proceedings of IEEE WCNC 2003*, New Orleans, March 2003, pp. 1516–1521.

[C10] Saikat Ray, Anup K. Gogoi and Ranjan K. Mallik, "Closed Form Expression for Mutual Partial Inductance between Two Skewed Linear Current Segments", in *Proceedings of IEEE AP–S International Symposium, 1999*, Orlando, pp. 1278-1281, July 1999.

[C11] Saikat Ray, David Starobinski and Jeffrey Carruthers, "Instability Issues of Wi-Fi Mesh Networks" Infocom 2005 Student Workshop, Miami, March 2005.

[C12] Jeffrey Carruthers, Saikat Ray and David Starobinski, "The Deaf Node Problem in Wireless LANs" in High-Speed Networking Workshop, 2002 (HSN 2002), New York, June 2002.