Stacy Patterson

Technion - Israel Institute of Technology

Department of Electrical Engineering

Haifa 32000, Israel

Phone: +972 54 657 8334

stacyp@ee.technion.ac.il

http://webee.technion.ac.il/people/stacyp

Research Interests

I am interested in combining tools and theoretical foundations from distributed computing, cooperative control, and signal processing to develop solutions for monitoring and management of large-scale, dynamic networks. Applications of my work include estimation in sensor networks, environment monitoring with vehicle networks, resource management in cloud computing, information dynamics in social networks, and autonomous vehicle formation control.

Education

06/2009	**Ph.D. Computer Science**, Advisor: Amr El Abbadi **University of California, Santa Barbara**, Santa Barbara, California
06/2003	**M.S. Computer Science** **University of California, Santa Barbara**, Santa Barbara, California
05/1998	**B.S. Computer Science, B.A. Mathematics** **Rutgers University**, New Brunswick, New Jersey

Honors and Awards

Technion Postdoctoral Fellowship, sponsored by the Technion Fund and the Arlene & Arnold Goldstein Center at the Technion Autonomous Systems Program, 2011 – 2013

Andrew and Erna Finci Viterbi Postdoctoral Fellowship, 2011 – 2013

Visiting Scholar, Lund Center for Control of Complex Engineering Systems, 02/2010

INSCITES Graduate Teaching Scholar Fellowship, 2007 – 2008

Outstanding Teaching Assistant, Fall 2005, Fall 2006, Winter 2009

Grace Hopper Celebration of Women in Computing Scholarship, 10/2006

UC Santa Barbara Computer Science Departmental Fellowship, 2004 – 2005

Research Experience

10/2011 – Present	**Postdoctoral Fellow**, Department of Electrical Engineering **Technion – Israel Institute of Technology**, Haifa, Israel Supervisor: Professor Idit Keidar Research projects include: ▪ Funded proposal with General Motors Advanced Technical Center – Israel on the design and analysis of distributed algorithms for data summarization and estimation in vehicle networks. ▪ Algorithms for distributed compressed sensing and sparse signal recovery.
07/2009 – 09/2011	**Postdoctoral Scholar**, Center for Control, Dynamical Systems, and Computation **University of California, Santa Barbara,** Santa Barbara, California Supervisor: Professor Bassam Bamieh Research topics included: ▪ Distributed algorithms for network optimization. ▪ Distributed consensus and distributed formation control algorithms for stochastic networks. ▪ Tomographic sensing with ultrasonic transceivers, for generation of 3-dimensional maps of temperature, air flow, and chemical clouds.

| 07/2007 – | **Graduate Research Assistant**, Department of Computer Science |
| 03/2009 | **University of California, Santa Barbara**, Santa Barbara, California |

Supervisor: Professor Amr El Abbadi

Research topics included:

- Algorithms for distributed aggregation and load balancing in dynamic networks.
- Algorithms for environment monitoring and estimation with mobile sensor networks.

Teaching Experience

| 02/2010 – | **Instructor**, The Gevirtz Graduate School of Education |
| 06/2011 | **University of California, Santa Barbara,** Santa Barbara, California |

- Developed and co-taught an undergraduate course on education and green technologies.
- Part of an NSF Course, Curriculum, and Laboratory Improvement grant to revise, implement, and research pedagogically innovative undergraduate courses on the environment and sustainability aimed to recruit and prepare students for careers in secondary science and mathematics education.

| 04/2009 – | **Teaching Associate**, Department of Computer Science |
| 06/2009 | **University of California, Santa Barbara,** Santa Barbara, California |

- Instructor for CS 5JA: Introduction to Computer Programming in Java, class size of 94 students with 3 teaching assistants.

| 09/2005 – | **Teaching Assistant**, Department of Computer Science |
| 03/2009 | **University of California, Santa Barbara,** Santa Barbara, California |

- Assisted in seven Computer Science courses, including Advanced Topics in Database Systems (graduate course), Advanced Topics in Distributed Systems (graduate course), and Foundations of Computer Science (lower division course).

| 09/2007 – | **INSCITES Graduate Teaching Scholar** |
| 06/2008 | **California NanoSystems Institute, UC Santa Barbara**, Santa Barbara, California |

- Jointly responsible, with two other graduate scholars, for the development and teaching of an interdisciplinary, undergraduate course on the science, economics, history, and sociology of innovative green technologies.
- Received training in curriculum development, novel pedagogical methods, and evaluation.

Publications

Distributed Sparse Signal Recovery for Sensor Networks, Stacy Patterson, Yonina C. Eldar, and Idit Keidar, *38th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2013 (to appear).

Network Optimization with Dynamic Demands and Link Prices, Stacy Patterson, Mike Wittie, Kevin Almeroth, and Bassam Bamieh, *50th Annual Allerton Conference on Communication, Control, and Computing*, October 2012.

Coherence in Large-Scale Networks: Dimension Dependent Limitations of Local Feedback, Bassam Bamieh, Mihailo Jovanović, Partha Mitra, and Stacy Patterson. *IEEE Transactions on Automatic Control*, September 2012.

Serializable, Not Serial: Concurrency Control and Availability in Multi-Datacenter Datastores, Stacy Patterson, Aaron J. Elmore, Faisal Nawab, Divyakant Agrawal, and Amr El Abbadi, *Proceedings of the VLDB Endowment (PVLDB)*, July 2012.

Coherence in Fractal Networks, Stacy Patterson and Bassam Bamieh, *50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC)*, December 2011.

Data-Driven Modeling and Analysis of Online Social Networks, Divyakant Agrawal, Bassam Bamieh, Ceren Budak, Amr El Abbadi, Andrew J. Flanagin, and Stacy Patterson, *12th International Conference on Web-Age Information Management (WAIM)*, September 2011.

Leader Selection for Optimal Network Coherence, Stacy Patterson and Bassam Bamieh, *49th IEEE Conference on Decision and Control (CDC)*, December 2010.

Convergence Rates of Consensus Algorithms in Stochastic Networks, Stacy Patterson and Bassam Bamieh, *49th IEEE Conference on Decision and Control (CDC)*, December 2010.

Convergence Rates of Distributed Average Consensus with Stochastic Link Failures, Stacy Patterson, Bassam Bamieh, and Amr El Abbadi, *IEEE Transactions on Automatic Control*, April 2010.

From the Ground Up: Developing an Interdisciplinary Course Focusing on Materials Science and Society in Green Technologies, Meredith Murr, Stacy Patterson, Evelyn Hu, Fiona Goodchild, and Patrick McCray, *Journal of Materials Education,* December 2009.

Effect of Topological Dimension on Rigidity of Vehicle Formations: Fundamental Limitations of Local Feedback, Bassam Bamieh, Mihailo Jovanović, Partha Mitra, and Stacy Patterson, *47th IEEE Conference on Decision and Control (CDC)*, December 2008.

Using Tomography for Ubiquitous Sensing, Stacy Patterson, Bassam Bamieh, and Amr El Abbadi, *16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS)*, November 2008.

Distributed Consensus with Link Failures as a Structured Stochastic Uncertainty Problem, Stacy Patterson and Bassam Bamieh, *46th Annual Allerton Conference on Communication, Control, and Computing*, September 2008.

Environmental Tomography: Ubiquitous Sensing with Mobile Devices, Stacy Patterson, Bassam Bamieh, and Amr El Abbadi, *24th International Conference on Database Engineering (ICDE),* April 2008.

Distributed Average Consensus with Stochastic Communication Failures, Stacy Patterson, Bassam Bamieh, and Amr El Abbadi, *46th IEEE Conference on Decision and Control (CDC),* December 2007.

Brief Announcement: Convergence Analysis of Scalable Gossip Protocols, Stacy Patterson, Bassam Bamieh, and Amr El Abbadi, *20th International Symposium on Distributed Computing (DISC),* September 2006.

From Static Distributed Systems to Dynamic Systems, Achour Mostefaoui, Michel Raynal, Corentin Travers, Stacy Patterson, Divyakant Agrawal, and Amr El Abbadi, *24th IEEE Symposium on Reliable Distributed Systems (SRDS)*, October 2005.

Workshop Papers

Interaction-Driven Opinion Dynamics in Online Social Networks, Stacy Patterson and Bassam Bamieh, *First Workshop on Social Media Analytics (SOMA)* with *KDD*, July 2010.

On the Feasibility of Large-Scale Automated Highways, Stacy Patterson, Bassam Bamieh, Amr El Abbadi, and Mihailo Jovanović, *First International Workshop on Computational Transportation Science* with *MOBIQUITOUS*, July 2008 (invited paper).

Guaranteeing Correctness of Lock-Free Range Queries over P2P Data, Stacy Patterson, Divyakant Agrawal, and Amr El Abbadi, *Third International Workshop on Databases, Information Systems, and Peer-to-Peer Computing (DBISP2P)* with *VLDB*, August 2005.

In Preparation

Consensus and Coherence in Fractal Networks, Stacy Patterson and Bassam Bamieh.

Global Estimation with Local Communication, Ittay Eyal, Idit Keidar, Stacy Patterson, and Raphi Rom (*authors in alphabetical order*).

Research Grants

General Motors Corporation: Ubiquitous Sensing with Vehicle Networks, Idit Keidar and Stacy Patterson, $63K$ USD, February 2012 – January 2013.

NSF-EAGER: Data-Driven Framework for Analyzing User Interactions in Social Media, Divyakant Agrawal, Amr El Abbadi, Andrew Flanagin, Bassam Bamieh, and Stacy Patterson, $200K$ USD, May 2011 – April 2013.

Invited Talks

Distributed Average Consensus and Coherence in Dynamic Networks, Department Colloquium, School of Engineering and Computer Science, Hebrew University of Jerusalem, June 2012.

Distributed Average Consensus and Coherence in Dynamic Networks, Research Seminar, Department of Computer Science, Montana State University, April 2012.

Academic Service

Technical Reviewer: ACM Computing Surveys, ACM Transactions on Computer Systems, IEEE Transactions on Automatic Control, Automatica, EuroSys, PODC, SIGMOD, VLDB, ICDT, ICDE, EDBT, ICDCS, PODS, SSTD, CIKM, SSDBM, LADIS, NecSys, CDC, ACC, IFAC World Congress

Program Committee: Second International Workshop on Computational Transportation Science, 2009