

# Fabián E. Bustamante

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## RESEARCH INTEREST

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Several areas of experimental systems, in particular large-scale distributed computing, computer networks, mobile/wireless systems and operating systems.

## EDUCATION

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December 2001 – Ph.D. Computer Science  
Georgia Institute of Technology  
Advisor: Prof. Karsten Schwan  
Dissertation title: The Active Streams Approach to Distributed Applications and Services

December 1997 – M.S. Computer Science  
Georgia Institute of Technology.

March 1993 – Licenciado en Ciencias de la Computacion (5-year-and-project degree)  
Universidad Nacional de la Patagonia San Juan Bosco (Argentina).

April 1992 – Analista Programador Universitario (3-year degree)  
Universidad Nacional de la Patagonia San Juan Bosco (Argentina).

## PROFESSIONAL EXPERIENCE

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Associate Professor, Department of Electrical Engineering and Computer Science, McCormick School of Engineering, Northwestern U., 2008-Present.

E.T.S. Walton Visiting Research Fellow. Department of Computer Science and Statistics, Trinity College, Dublin, 2009.

Assistant Professor, Department of Electrical Engineering and Computer Science, McCormick School of Engineering, Northwestern U., 2005-2008.

Assistant Professor, Department of Computer Science, McCormick School of Engineering, Northwestern U., 2002-2005.

Affiliated Faculty, Transportation Center, Northwestern U., 2006-Present.

Advisory Board, Dosensio, March 2008-2011.

Advisory Board, Neokast, March 2007-2009.

Research Scientist, College of Computing, Georgia Institute of Technology, 2001-2002.

Graduate Research Assistant, College of Computing, Georgia Institute of Technology, 1997-2001.

Research Intern, Hewlett-Packard Labs – Palo Alto, Fall 1999.

Visiting Researcher, University of Maryland, College Park, Summer 1997.

Teaching Assistant, Universidad Nacional de la Patagonia San Juan Bosco (Argentina), 1987-1995.

#### AWARDS AND HONORS

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Invited speaker, Annual Meeting, Society of Hispanic Professional Engineers (SPHE 2012).

Apps For Metro Chicago Grand Challenge 2011, Second Place (Trailblaze), Fifth Place For Community Round (Fixit!) And Fourth Place For Transportation Round (Trailblaze).

Invited participant, Computing Community Consortium Leadership in Science Policy Institute (LiSPI), November 2011.

Senior Member of the IEEE, 2010.

Invited participant, NSF Future Internet Architecture Summit, October 2009.

Invited panelist, The 16th International Conference on Network Protocols (ICNP), October 2008.

Senior Member of the Association for Computing Machinery, 2008.

Science Foundation of Ireland E.T.S. Walton Visitor Award, May 2008.

National Science Foundation CAREER Award recipient, Jan. 2007 - Dec. 2011.

AGEP Professor - Midwest Crossroads AGEP (Alliances for Graduate Education and the Professoriate) - a partnership of Northwestern, Indiana and Purdue to increase minority participation in graduate studies and academia, 2005.

Best Paper Award, USENIX Annual Technical Conference - Freenix Track, 2004 (with Brian Cornell and Peter A. Dinda).

Searle Junior Fellow, Searle Center for Teaching Excellence, Northwestern U., 2003-2004.

Nominated attendee to the Richard Tapia Celebration of Diversity in Computing, Symposium 2001.

Best Student Paper, Nomination, ACM/IEEE Conference on Supercomputing 2000.

#### GRANTS

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Renewal: A Global View of ISP Interference According to P2P Users  
Google Research Award, 2011 \$65,000.

Collaborative Research: Enabling Exascale Hardware and Software Design through Scalable System Virtualization  
Department of Energy X-Stack Program, Sep. 2010 - Aug. 2013 (Co-P.I. with P. Dinda and Russ Joseph from Northwestern and collaborators from U. of New Mexico, Sandia National Labs, and Oak Ridge National Labs) \$730,000 (from a total of \$2.5 Million).

A Global View of ISP Interference According to P2P Users  
Google Research Award, 2010 \$50,000.

CNS: NeTS: Parallax – Leveraging the Perspective of Ten Million Peers  
National Science Foundation Grant: CNS 0917233, Aug. 2009 - Jul. 2012 (P.I. with Yan Chen)  
\$500,000.

CRI: II-NEW: Sharing The Perspective of Ten Million Peers  
National Science Foundation Grant: CNS 0855253, Jul. 2009 - Jun. 2011 \$262,333.

Transportation Center Seed Grant: Understanding The Potential of Cooperative Foresight for Traffic Avoidance  
Transportation Center, McCormick School of Engineering and Applied Sciences, Northwestern U., May 2008 (P.I.) \$9,998.

E.T.S. Walton Visitor Award  
Science Foundation of Ireland, May 2008 Euro 67,933.

Collaborative Research: CRI: CRD: An Open Source Extensible Virtual Machine Monitor  
National Science Foundation Grant: CNS 0709168, Sep. 2007 - Aug. 2011 (Co-P.I. with P. Dinda and Russ Joseph from Northwestern and B. Maccabe from U. New Mexico) \$800,000.

CAREER: Ensuring Sustainable Scalability for Globally-Distributed Systems  
National Science Foundation CAREER Grant: CNS 0644062, Jan. 2007 - Dec. 2011 \$425,000.

Neokast Fellowship  
Metis Enterprise Technologies LLC, August 2006 \$22,000.

Motorola Undergraduate Research Grant, April 2006 (two grants) \$4,000.

Integrated Modular Trustworthy Computing Curriculum Development,  
Microsoft Research Trustworthy Computing Award, March 2005 (co-P.I. with Yan Chen, Peter Dinda and Aleksandar Kuzmanovic) \$50,000.

A Virtual Lab for Experimental Systems Education,  
Northwestern U. Murphy Society, October 2005 (P.I. with P. Dinda, B. Dennis, Y. Chen, and A. Kuzmanovic) \$35,750.

SUN Center of Excellence,  
Sun Microsystems, July 2005 \$119,326.

Midwest Crossroads AGEP Professor,  
National Science Foundation, May 2005 (with faculty from Northwestern, Purdue and Indiana) \$3,240.

Ford Undergraduate Research Grant,  
Ford Foundation, Nov. 2004 (Co P.I. with R. Dick) \$5,000.

SUN Academic Excellence Grant,  
Sun Microsystems, Sep. 2003 (Equipment award) \$58,920.

## PUBLICATIONS

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(acceptance rates provided when available)

## JOURNAL ARTICLES

- kc claffy, Emile Aben, Jordan Auge, Robert Beverly, Fabián E. Bustamante, Benoit Donnet, Timur Friedman, Marina Fomenkov, Peter Haga, Matthew Luckie, and Yuval Shavitt, “The 2nd Workshop on Active Internet Measurements (AIMS-2) Report”, ACM SIGCOMM CCR, October 2010.
- David R. Choffnes and Fabián E. Bustamante, “Pitfalls for Testbed Evaluations of Internet Systems”, ACM SIGCOMM CCR, April 2010.
- David R. Choffnes and Fabián E. Bustamante, Taming the Torrent, USENIX ;login:, February 2010.
- Guohan Lu, Yan Chen, Stefan Birrer, Fabián E. Bustamante, and Xing Li, “POPI: A User-level Tool for Inferring Router Packet Forwarding Priority”, IEEE/ACM Transactions on Networking (ToN), 18(1):1-14, February 2010.
- Ao-Yan Su, David R. Choffnes, Aleksandar Kuzmanovic and Fabián E. Bustamante, “Drafting Behind Akamai: Inferring Network Conditions Based on CDN Redirections”, IEEE/ACM Transactions on Networking,, 17(6):1752-1765, February 2008.
- Yi Qiao, Dong Lu, Fabián E. Bustamante, Peter Dinda and Stefan Birrer, “Improving Peer-to-Peer Performance Through Server-Side Scheduling,” ACM Transactions on Computer Systems, 26(4), December 2008.
- Fabián E. Bustamante and Yi Qiao, “Designing Less-structured P2P Systems for the Expected High Churn,” IEEE/ACM Transactions on Networking, 16(3):617-627, June 2008.
- Stefan Birrer and Fabián E. Bustamante, “A Comparison of Resilient Overlay Multicast Approaches,” IEEE Journal on Selected Areas in Communications (JSAC) – Special Issue on Advances in Peer-to-Peer Streaming Systems, 25(9):1695–1705, December 2007.
- Greg Eisenhauer, Fabián E. Bustamante and Karsten Schwan, “Publish-subscribe for high-performance computing,” IEEE Internet Computing - Asynchronous Middleware and Services, 10(1): 8-25, January/February 2006.
- Greg Eisenhauer, Fabián E. Bustamante and Karsten Schwan, “Native Data Representation: An Efficient Wire Format for High-Performance Computing,” IEEE Transaction on Parallel and Distributed Systems, 13(12):1234-1246, December 2002.
- Patrick Widener, Greg Eisenhauer, Karsten Schwan, and Fabián E. Bustamante, “Open Metadata Formats: Efficient XML-Based Communication for High Performance Computing,” Cluster Computing: The Journal of Networks, Software Tools, and Applications, 5(3): 315-324, July 2002 (invited submission).
- Greg Eisenhauer, Fabián E. Bustamante and Karsten Schwan, “Event Services in High Performance Systems,” Cluster Computing: The Journal of Networks, Software Tools, and Applications, 4(3): 243-252, July 2001 (invited submission).

## EDITED PROCEEDINGS

- Fabián E. Bustamante, “Proc. of the 3rd International Workshop on Hot Topics in Autonomic Computing (HotAC)”, June 2008.
- Fabián E. Bustamante and Emre Kiciman, “Proc. of the 2nd International Workshop on Hot Topics in Autonomic Computing (HotAC)”, June 2007.
- Fabián E. Bustamante and Jeffrey Kephart, “Proc. of the 1st International Workshop on Hot Topics in Autonomic Computing (HotAC)”, June 2006.

## CONFERENCE PUBLICATIONS

- John S. Otto, Mario A. Sánchez, David R. Choffnes, Fabián E. Bustamante, and Georgos Siganos, “On Blind Mice and the Elephant – Understanding the Network Impact of a Large Distributed Systems,” Proc. ACM SIGCOMM, August 2011 (14% acceptance rate, 32/223).
- David R. Choffnes, Fabián E. Bustamante, Zihui Gao, “Crowdsourcing Service-Level Network Event Detection,” Proc. of ACM SIGCOMM, August 2010 (12% acceptance rate, 33/276).
- David R. Choffnes, Mario A. Sánchez, Fabián E. Bustamante, “Network positioning from the edge: An empirical study of the effectiveness of network positioning in P2P systems,” Proc. of IEEE INFOCOM (miniconference), March 2010 (24% acceptance rate, 382/1575).
- Kai Chen, David R. Choffnes, Rahul Potharaju, Yan Chen, Fabián E. Bustamante, Dan Pei, Yao Zhao, “Where the Sidewalk Ends: Extending the Internet AS Graph Using Traceroutes From P2P Users,” Proc. of ACM CoNEXT, December 2009 (17% acceptance rate, 29/170).
- John S. Otto and Fabián E. Bustamante, “Distributed or Centralized Traffic Advisory Systems – The Application’s Take,” Proc. of IEEE SECON, June 2009 (18.8% acceptance rate, 81/431).
- John S. Otto, Fabián E. Bustamante and Randall Berry, “Down the Block and Around the Corner: The Impact of Radio Propagation on Inter-vehicle Wireless Communication,” Proc. of the International Conference on Distributed Computing Systems (ICDCS), June 2009 (16% acceptance rate, 74/455).
- David R. Choffnes and Fabián E. Bustamante, “On the Effectiveness of Measurement Reuse for Performance-Based Detouring,” Proc. of IEEE INFOCOM, April 2009 (20% acceptance rate, 282/1435).
- David R. Choffnes and Fabián E. Bustamante, “Taming the Torrent: A Practical Approach to Reducing Cross-ISP Traffic in Peer-to-Peer Systems,” Proc. of ACM SIGCOMM, August 2008 (12% acceptance rate, 36/288).
- Ao-Jan Su, David R. Choffnes, Fabián E. Bustamante and Aleksandar Kuzmanovic, “Relative Network Positioning via CDN Redirections,” Proc. of the International Conference on Distributed Computing Systems (ICDCS), June 2008.
- Jack Lange, Peter Dinda and Fabián E. Bustamante. “Vortex: Enabling Cooperative Selective Wormholing for Network Security Systems,” Proc. of the International Symposium on Recent Advances in Intrusion Detection (RAID), September 2007 (16% acceptance rate, 16/101).
- Guohan Lu, Yan Chen, Stefan Birrer, Fabián E. Bustamante, Chin Yin Cheung and Xing Li. “End-to-end Inference of Router Packet Forwarding Priority,” Proc. of IEEE INFOCOM, May 2007 (18% acceptance rate, 252/1404).
- Stefan Birrer and Fabián E. Bustamante. “Resilience in Overlay Multicast Protocols,” Proc. of the IEEE/ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), September 2006.
- Ao-Jan Su, David R. Choffnes, Aleksandar Kuzmanovic and Fabián E. Bustamante. “Drafting Behind Akamai (Travelocity-Based Detouring),” Proc. of ACM SIGCOMM, September 2006 (10% acceptance rate, 37/345).
- Yi Qiao and Fabián E. Bustamante. “Structured and Unstructured Overlays Under the Microscope: A Measurement-based View of Two P2P Systems That People Use,” Proc. of USENIX Annual Technical Conference (Full Paper), June 2006 (13.7% acceptance rate, 21/153).

- Stefan Birrer and Fabián E. Bustamante. “The Feasibility of DHT-based Streaming Multicast,” Proc. of the IEEE/ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), September 2005.
- Yi Qiao and Fabián E. Bustamante. “Elders Know Best - Handling Churn in Less Structured P2P Systems,” Proc. of the IEEE International Conference on Peer-to-Peer Computing (IEEE P2P), September 2005 (19.1% acceptance rate, 26/136).
- David R. Choffnes and Fabián E. Bustamante, “STRAW - An Integrated Mobility and Traffic Model for VANETs,” Proc. of International Command and Control Research and Technology Symposium (ICCRTS), June 2005.
- Dong Lu, Yi Qiao, Peter Dinda, Fabián E. Bustamante, “Characterizing and Predicting TCP Throughput on the Wide Area Network,” Proc. of the IEEE International Conference on Distributed Computing Systems (ICDCS), June 2005 (13.8% acceptance rate).
- Dong Lu, Yi Qiao, Peter Dinda, Fabián E. Bustamante, “Modeling and Taming Parallel TCP on the Wide Area Network,” Proc. of IEEE International Parallel and Distributed Processing Symposium (IPDPS), April 2005 (12% acceptance rate, 60/505).
- Stefan Birrer and Fabián E. Bustamante. “Nemo - Resilient Peer-to-Peer Multicast without the Cost,” Proc. of the Annual Multimedia Computing and Networking Conference (MMCN), January 2005 (24% acceptance rate, 24/100).
- Brian Cornell, Peter A. Dinda and Fabián E. Bustamante. “Wayback: A User-level Versioning File System for Linux,” Proc. of the USENIX Technical Conference (Freenix Track), June 2004. Best Paper Award (24.6% acceptance rate, 15/61).
- Patrick Widener, Karsten Schwan and Fabián E. Bustamante. “Differential Data Protection for Dynamic Distributed Applications,” Proc. Annual Computer Security Applications Conference (ACSAC), December 2003.
- Fabián E. Bustamante, Greg Eisenhauer, Karsten Schwan, and Patrick Widener. “Scalable Directory Services Using Proactivity,” Proc. of the ACM/IEEE Conference on Supercomputing (SC), November 2002 (29% acceptance rate).
- Greg Eisenhauer, Fabián E. Bustamante and Karsten Schwan. “A Middleware Toolkit for Client-Initiated Service Specialization,” Proc. of Principles of Distributed Computing (PODC) Middleware Symposium, July 2000. Also appears in ACM SIGOPS, Vol 35, No. 2, pp. 7–20, April 2001.
- Fabián E. Bustamante, Greg Eisenhauer, Karsten Schwan, and Patrick Widener. “Efficient Wire Formats for High Performance Computing,” Proc. of the ACM/IEEE Conference on Supercomputing (SC), November 2000. Nominated for Best Student Paper.
- Greg Eisenhauer, Fabián E. Bustamante and Karsten Schwan. “Event Services for High Performance Computing,” Proc. of ACM International Symposium on High Performance Distributed Computing (HPDC), August 2000.
- Fabián E. Bustamante and Karsten Schwan. “Active I/O Streams for Heterogeneous High Performance Computing,” Proc. of Parallel Computing (ParCo), August 1999 ( 30% acceptance rate).
- Asmara Afework, Michael Benyon, Fabián E. Bustamante, Angelo DeMarzo, Renato Ferreira, Roberth Miller, Mark Silberman, Joel Saltz, Alan Sussman. “Digital Dynamic Telepathology - the Virtual Microscope,” Proc. of the AMIA Annual Fall Symposium, August 1998.

## REFEREED WORKSHOP PUBLICATIONS

- John Rula and Fabián E. Bustamante, “Crowd (Soft) Control: Moving Beyond Opportunistic Sensing,” Proc. of the ACM Workshop on Mobile Computing Systems and Applications (HotMobile), February 2012.
- Zachary S. Bischof, John S. Otto and Fabián E. Bustamante, “Distributed Systems and Natural Disasters – BitTorrent as a Global Witness,” Proc. of ACM CoNEXT Special Workshop on Internet and Disasters (WoID), December 2011.
- Zachary S. Bischof, John S. Otto, Mario A. Sánchez, John P. Rula, David R. Choffnes, and Fabián E. Bustamante, “Crowdsourcing ISP Characterization to the Network Edge,” Proc. ACM SIGCOMM Workshop on Measurements Up the STack (W-MUST), August 2011.
- David R. Choffnes, Jordi Duch, Dean Malmgren, Roger Guimera, Fabián E. Bustamante, Luis Amaral, “Strange Bedfellows: Communities in BitTorrent,” Proc. of the International Workshop on Peer-to-Peer Systems (IPTPS), April 2010 (20% acceptance rate, 13/64).
- David R. Choffnes and Fabián E. Bustamante. “Exploiting Emergent Behavior for Inter-Vehicle Communication,” Proc. of International Workshop on Hot Topics in Autonomic Computing (HotAC), June 2007 (29% acceptance rate, 5/17).
- David R. Choffnes and Fabián E. Bustamante, “An Integrated Mobility and Traffic Model for Vehicular Ad Hoc Networks,” Proc. of ACM International Workshop on Vehicular Ad Hoc Networks (VANET) (Full Paper), September 2005 (26.7% acceptance rate, 8/30).
- Stefan Birrer and Fabián E. Bustamante. “Magellan: Performance-based, Cooperative Multicast,” Proc. of the International Workshop on Web Content Caching and Distribution (WCW), September 2005 (28.6% acceptance rate, 10/35).
- Yi Qiao, Dong Lu, Fabián E. Bustamante and Peter Dinda. “Looking at the Server-Side of Peer-to-Peer Systems,” Proc. of the Workshop on Languages, Compilers and Run-time Support for Scalable Systems (LCR), October 2004 (25% acceptance rate).
- Stefan Birrer, Dong Lu, Fabián E. Bustamante, Yi Qiao and Peter Dinda. “FatNemo: Building a Resilient Multi-Source Multicast Fat-Tree,” Proc. International Workshop on Web Content Caching and Distribution (WCW), October 2004 (30% acceptance rate, 15/50).
- Fabián E. Bustamante and Yi Qiao. “Friendships that last: Peer lifespan and its role in P2P protocols,” Proc. International Workshop on Web Content Caching and Distribution (WCW), Sep.-Oct. 2003 (32.6% acceptance rate, 15/46).
- Fabián E. Bustamante, Christian Poellabauer and Karsten Schwan. “AIMS: Robustness Through Sensible Introspection,” Proc. of the ACM SIGOPS European Workshop (Extended Abstract), September 2002.
- Fabián E. Bustamante, Greg Eisenhauer, Patrick Widener, and Calton Pu. “Active Streams: An Approach to Adaptive Distributed Systems,” Proc. of Workshop on Hot Topics in Operating Systems (HotOS-VIII), May 2001.
- Mustaque Ahamad, Raja Das, Karsten Schwan, Fabián E. Bustamante, Todd Rose, and Dong Zhou. “Objent: A Framework for High-End Collaborative Applications,” Proc. of the Dartmouth Workshop on Transportable Agents, February 1997.

## REFEERED POSTERS AND WORK-IN-PROGRESS PRESENTATIONS

- Mario A. Sánchez, John S. Otto, Zachary S. Bischof, and Fabián E. Bustamante. “Dasu - ISP Characterization from the Edge: A BitTorrent Implementation”, Demo Session, ACM SIGCOMM, August 2011.
- John S. Otto, Fabián E. Bustamante and Randall A. Berry. “Turning the Corner in the City – The Impact of Radio Propagation on Inter-vehicle Wireless Communication,” Poster Session, Workshop on Mobile Computing Systems and Applications (HotMobile), February 2009.
- David R. Choffnes and Fabián E. Bustamante. “NEWS: Crowd Sourcing Network Anomaly Detection,” Poster Session, USENIX Symposium on Operating Systems Principles (OSDI), December 2008.
- David R. Choffnes and Fabián E. Bustamante. “SideStep - Scalable Detouring by Reusing CDN Measurements,” Poster Session, ACM Symposium on Operating Systems Principles (SOSP), October 2007.
- Ashish Gupta, Peter Dinda and Fabián E. Bustamante. “Distributed Popularity Indices,” Poster Session, ACM SIGCOMM, August 2005.
- Stefan Birrer, Fabián E. Bustamante, Dong Lu, Peter Dinda and Yi Qiao. “FatNemo: Multi-Source Multicast Overlay Fat-Tree,” Poster Session, USENIX Symposium on Networked Systems Design & Implementation (NSDI), May 2005.
- Ashish Gupta, Manan Sanghi, Peter Dinda and Fabián E. Bustamante. “Magnolia: A novel DHT architecture for keyword-based searching,” Poster Session, USENIX Symposium on Networked Systems Design & Implementation (NSDI), May 2005.
- Dong Lu, Peter Dinda, Yi Qiao, Huanyuan Sheng, Fabián E. Bustamante, “Applications of SRPT Scheduling with Inaccurate Scheduling Information,” Poster Session, IEEE/ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), October 2004.
- Yi Qiao and Fabián E. Bustamante. “Elders Know Best: Lifespan-based Ideas in P2P Systems,” Work-In-Progress Session, ACM Symposium on Operating Systems Principles (SOSP), October 2003.
- Fabián E. Bustamante, Greg Eisenhauer, Karsten Schwan and Patrick Widener. “Active Streams and the Effects of Stream Specialization,” Poster Session, ACM International Symposium on High Performance Distributed Computing (HPDC), August 2001.
- Fabián E. Bustamante, Patrick Widener, and Karsten Schwan. “A Case for Proactive Directory Services,” Poster Session, ACM/IEEE Conference on Supercomputing (SC), November 2001.

#### NON-REFEREED PUBLICATIONS

- John S. Otto, John P. Rula, and Fabián E. Bustamante, “C3R – Participatory Urban Monitoring from your Car,” Tech. Report NWU-EECS-09-10, EECS, Northwestern University, 2009.
- David R. Choffnes and Fabián E. Bustamante, “Modeling Vehicular Traffic and Mobility for Vehicular Wireless Networks,” Tech. Report NWU-CS-05-03, Department of Computer Science, Northwestern University, 2005.
- Fabián E. Bustamante, “Pacioli: A Framework for Model Construction,” Tech. Report, Storage System Program, Computer Systems Laboratory, Hewlett-Packard Laboratory, February 2000. (Work done in collaboration with Guillermo Alvarez, Ralph Becker-Szendy, and John Wilkes)

Fabián E. Bustamante and Richard M. Fujimoto. “An Empirical Comparison of Time Warp and the NPSI Elastic Time Protocol,” Tech. Report GIT-CC-97-13, College of Computing, Georgia Institute of Technology, 1997.

## PATENTS

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“Technique for programmatically obtaining experimental measurements for model construction,” G. Alvarez, F. Bustamante, R. Becker-Szendy and J. Wilkes) US patent 7505886, filed 3-Sep-2002, issued 17-Mar-2009. Assignee: Hewlett-Packard).  
<http://www.google.com/patents?id=AQW6AAAAEBAJ>

## SOFTWARE ARTIFACTS

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FixIt! – An app to crowdsource the report and report validation of issues requiring city attention such as broken streetlights, potholes, and graffiti. This app was 5th in the Apps 4 Metro Chicago challenge, Community Round <http://aqualab.cs.northwestern.edu/projects/Fixit.html>

TrailBlaze Chicago – An app to crowdsource the planning and status report of bike paths. This app was 2nd in the Apps 4 Metro Chicago Grand Challenge, and 4th in the Apps 4 Metro Chicago Challenge, Transportation Round (and 1st among the non-for-profit!) <https://market.android.com/details?id=edu.northwestern.cs.aqualab>

Dasu – An extension to the popular Vuze/Azureus BitTorrent client. Dasu is a dual-objective system providing ISP characterization, including the detection of network interference, and supporting Internet experimentation.  
<http://www.aqualab.cs.northwestern.edu/projects/Dasu.html>

SwarmScreen – An extension to the popular Vuze/Azureus BitTorrent client to make it difficult to classify users’ downloading behavior by looking at his/her connection patterns.  
<http://www.aqualab.cs.northwestern.edu/projects/SwarmScreen.html>

NEWS – A system for Network Early Warning System built by taking advantage of the natural P2P traffic. NEWS is implemented as plugin/extension for the BitTorrent Azureus client.  
<http://www.aqualab.cs.northwestern.edu/projects/NEWS.html>

SideStep/DraFTP – The SideStep service reuses CDN information to locate quality overlay paths in the Internet with minimum overhead. We also implemented DraFTP, and open-source FTP suite that uses SideStep to improve download performance. <http://www.aqualab.cs.northwestern.edu/projects/SideStep.html>

Ono – A plugin/extension for the Azureus client that implements our proposed CDN-based positioning for peer selection in the popular BitTorrent system.  
<http://www.aqualab.cs.northwestern.edu/projects/Ono.html>

STRAW – An integrated mobility and traffic model for Vehicular Ad-Hoc Networks (VANETs); STRAW’s current implementation is written for the JiST/SWANS discrete-event simulator.  
<http://www.aqualab.cs.northwestern.edu/projects/STRAW/>

SWANS++ – An extensions to the Jist/SWANS Discrete-event Simulator, including new/re-implementation of well-known protocols, mobility models and a steering/visualization tool.  
<http://aqualab.cs.northwestern.edu/projects/swans++/>

Ceratias – Real-time visualization tool for the JiST/SWANS simulation platform. Also enables interaction with and online modification of the ongoing simulation, and can be detached/reattached dynamically for performance.

<http://sourceforge.net/projects/straw/>

NUPastry, NUScribe, NUSplitStream – Re-implementation of the Pastry DHT and the Scribe/SplitStream overlay multicast protocols.

<http://www.aqualab.cs.northwestern.edu/projects/nuscribe/index.html>

Nemo – Reference implementation of a structurally resilient, performance-centric overlay multicast protocol for streaming applications.

<http://www.aqualab.cs.northwestern.edu/projects/nemo/index.html>

Nixes Toolset – A set of bash scripts to install, maintain, control and monitor applications on PlanetLab.

<http://www.aqualab.cs.northwestern.edu/nixes.html>

Gnutella peer session time traces – Trace of the lifespans, or session lengths, of peers in the Gnutella network collected, through active measurement, during March 2003.

<http://www.aqualab.cs.northwestern.edu/lifeTrace.html>

PDS - A Proactive Directory Service – An information repository supporting a proactive, dynamically customizable, interface for client notifications.

<http://www-static.cc.gatech.edu/systems/projects/PDS/>

ECho - A High-performance Event Delivery System – An event delivery middleware system for heterogeneous, high-performance applications (includes support for event typing, event handlers for transparent support of both inter- and intra-process communication, etc).

<http://www-static.cc.gatech.edu/systems/projects/ECho/>

PBIO - Portable Binary I/O Communication – A portable binary communication library that implements our Native Data Representation (NDR) wire-format for handling binary data in storage and communication.

<http://www-static.cc.gatech.edu/systems/projects/PBIO/>

Virtual Microscope – A client-server system that provides a realistic digital emulation of a high power light microscope.

Pacioli – A toolset for automatic model construction of large-scale RAID storage systems.

## STUDENT SUPERVISION

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### Ph.D. Students

#### Stefan Birrer

December 2002 - December 2007

Title: Addressing the Limitations of Tree-based Approaches to High-Bandwidth Streaming Multicast

Graduated; now Principal at Sempitech Inc. and Software Professional at Symphonoe LLC. Past President for Technology & Research and co-founder of Neokast LLC and Dosensio LLC.

David R. Choffnes

September 2004 - June 2010

Title: Service-Level Network Event Detection from Edge System.

Graduated; Winner of the EECS Department Outstanding Ph.D. Thesis

Now a Computing Innovation Fellow at University of Washington.

John S. Otto, Fifth year student

Mario A. Sánchez, Fourth year student

Zachary Bischof, Third year student

John Rula, Second year student

Ted Stein, First year student

#### Ph.D. Thesis Committees

Dong Lu (Graduated 2005), Ananth Sundararaj (Graduated 2006), Bin Lin (Graduate 2007), Ashish Gupta (Graduated 2008), John R. Lange (Graduated 2010), Kai Chen, Lei Xia.

#### M.S. Students

Mario A. Sánchez (June 2009), Soyannwo Olusanya (June 2009), Xian Yi Teng, (September 2008), David R. Choffnes (December 2006), Stefan Birrer (May 2004), Yi Qiao (May 2004).

#### Undergraduate Students

Advisor for several undergraduates' and graduates' independent studies (> 35). Some of the undergraduate students advised include: Alex Yi (Ph.D. student at UIUC), Nikola Borisov (at a startup, selected among the 2010 50 for The Future by the Illinois Technology Foundation), Ted Stein (Ph.D. student at Northwestern), Eugenia Gabrielova, John Rula (Ph.D. student at Northwestern), Aaron Johnson (Ph.D. student at Yale), John Otto (Ph.D. student at Northwestern), Aaron Beach (Ph.D. student at U. of Colorado), Brian Cornell (M.S. from U. of North Carolina at Chapel Hill, now at Google, also honorable mention for the CRA Outstanding Undergraduate Awards) and Robert Adolf (honorable mention for the CRA Outstanding Undergraduate Award).

#### TEACHING

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Advanced Operating Systems (EECS 495, renumbered EECS 443; graduate course), Winter 2003, Spring 2005, Winter 2007, Winter 2009.

Distributed Systems (EECS-495, renumbered EECS 344; undergraduate course), Spring 2003, Winter 2005, Winter 2008, Winter 2010.

Operating Systems (EECS 343; undergraduate course), Fall 2002-2011.

Distributed Systems in Challenging Environments (EECS 395/495), Spring 2008, Winter 2011.

Internet Experimentation Systems (EECS 395/495), Winter 2012.

Introduction to Computer Systems (EECS 213; undergraduate course), Spring 2007, Spring 2010, Spring 2011.

Autonomic Computing Systems (EECS 395/495; graduate course), Winter 2006.

NSRG Systems Reading Group (EECS 399/499).

Undergraduate and Graduate Independent Projects (EECS 399/499).

Peer-to-Peer Computing (MSIT-491; Master of Science on Information Technology Program).

#### COURSE DEVELOPMENT

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Advanced Operating Systems (EECS 443; graduate course). Seminar-style course based on article readings, in-class discussion, and a quarter-length project.

Operating Systems (EECS 343; undergraduate course). Overview of operating systems concepts with a significant project component.

Distributed Systems (EECS 344; undergraduate course). Introduction to principles and main paradigms in distributed computing. New course model, developed during tenure as Searle Junior Fellow, combining traditional lecture-oriented and seminar-style approaches. Course includes a quarter-length, team-based project.

Distributed Systems in Challenging Environments (EECS 395/495; senior undergraduate and graduate course). Seminar-style course that reviews interesting ideas and ongoing projects that are pushing distributed systems into new and challenging domains.

Peer-to-Peer Computing (MSIT-491; Master of Science on Information Technology Program). A short introductory course in peer-to-peer computing, potential, limitations and implications.

#### PROFESSIONAL ACTIVITIES

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##### Program Committee

The ACM SIGCOMM, 2012.

The ACM Internet Measurement Conference (IMC), 2011.

The ACM SIGCOMM Workshop on Home Networks (HomeNets) 2011.

The ACM SIGCOMM Poster/Demos 2011.

The International ACM Symposium on High Performance Distributed Computing (HPDC), 2010.

IEEE/ACM International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS), 2008, 2009.

The ACM International Workshop on Vehicular Inter-Networking (VANET), 2008, 2009.

The IEEE International Conference on Pervasive Computing and Communications (PerCom), 2009.

The International Conference on Communication Systems and Networks (COMSNETS), 2009, 2010.

The International World Wide Web Conference (WWW), 2006, 2009, 2010.

The IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO), 2008.

The International Workshop on Peer-to-Peer Systems (IPTPS), 2008.

The International Workshop on Wireless Mesh and Ad hoc Networks (WiMAN), 2008.

The First International Workshop on Pervasive Transportation Systems (PerTrans), 2007.

The IEEE International Conference on Distributed Computing Systems (ICDCS), 2006, 2007, 2008.

The IEEE International Conference on Autonomic Computing (ICAC), 2005, 2006, 2007, 2008, 2009, 2010, 2011.

The International Conference on Computer Communications and Networks (ICCCN), 2006, 2007.

The International Conference on Self-Organization and Autonomic systems in Computing and Communication (SOAS), 2006, 2007.

The International Conference on High Performance Computing and Communications (HPCC), 2005, 2006, 2007.

The IEEE Conference on Peer-to-Peer Computing (P2P), 2006, 2007, 2008, 2009.

The International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MOBIQUITOUS), 2007.

The International Workshop on Quality of Service (IWQoS), 2007.

The Percom Workshop on Pervasive Transportation Systems (PerTran), 2007.

The International Conference on Autonomic and Trusted Computing (ATC), 2006.

The Adaptive Grid Computing Workshop, part of IEEE International Symposium on Network Computing and Applications, 2006.

The International Conference on Parallel Processing (ICPP), 2006.

The International Conference on Parallel and Distributed Systems (ICPADS), 2006.

The IADIS International Conference on Applied Computing, 2005.

#### ORGANIZATION

Co-Chair, The IEEE International Conference on Peer-to-Peer Computing (P2P), 2012.

Local Arrangements Chair, The ACM/USENIX Internet Measurement Conference (IMC), 2009.

General Chair, The second IEEE Workshop on Hot Topics in Web Systems and Technologies (HotWeb), 2008.

Local Organizer, The International Conference on Autonomic Computing (ICAC), 2008.

Co-Chair, The Workshop on Hot Topics in Autonomic Computing (HotAC), 2006, 2007, 2008, 2009.

Co-Founder, The Workshop on Hot Topics in Autonomic Computing (HotAC).

#### OTHER

Executive Education, Management Skills for Innovative University Leaders, Kellogg School of Management, 2009.

Panelist, Portuguese Fundação para Ciência e a Tecnologia (Foundation for Science and Technology), 2009.

Panelist, National Science Foundation, 2002, 2005, 2006, 2010, 2011.

USENIX/SAGE University Representative for Northwestern U. (2004-Present).

Referee for the following journals: ACM Transaction on Computer Systems, IEEE/ACM Transactions on Networking, IEEE Computer, IEEE Journal on Selected Areas in Communication, IEEE Journal, IEEE Transactions on Parallel and Distributed Systems, IEEE Multimedia, IEEE Transactions on Software Engineering, Elsevier Journal of Parallel and Distributed Computing, and Software Practice and Experience.

Senior member of the ACM; Senior Member of IEEE and the IEEE Computer Society; member of USENIX and the Society of Hispanic Professional Engineers (SHPE).

DEPARTMENTAL AND UNIVERSITY ACTIVITIES

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- Collaborative Service - Faculty Working Group, Northwestern U. , 2011-Present.
- Research Computing Committee, Robert McCormick School of Engineering and Applied Science, Northwestern U., 2011-Present.
- Restructuring Committee, Chair, EECS, 2011.
- Computer Systems and Infrastructure Committee, Chair, EECS, Northwestern U., 2010-Present.
- Computer Science Undergraduate Curriculum Committee, EECS, Northwestern U., 2010-Present.
- Committee on Mission and Goals, EECS, Northwestern U., 2009-2010.
- Publicity, Alumni and Industrial Relations Committee, Chair, EECS, Northwestern U., 2008-2011.
- Computer Systems and Infrastructure Committee, EECS, Northwestern U., 2002-2010.
- Publicity, Alumni and Industrial Relations, EECS, Northwestern U., 2006-2008.
- Undergraduate Recruiting, EECS, Northwestern U., 2006-2011.
- Undergraduate Advisor, Robert McCormick School of Engineering and Applied Science, Northwestern U., 2003-Present.
- Invited Panelist, Workshop for Industrial Funded Research, McCormick School of Engineering and Applied Science, Northwestern U., 2006.
- Web-Site Re-Design Committee, Department of Computer Science, Northwestern U., 2005-2006.
- Chair's Advisory Committee, Department of Computer Science, Northwestern U., 2003-2004.
- Colloquia Chair, Department of Computer Science, Northwestern U., 2003-2004.
- Curriculum Committee, Department of Computer Science, Northwestern U., 2002-2003.
- Web-Site Re-Design Committee, Department of Computer Science, Northwestern U., 2002-2003.
- Member of Web Redesign Committee, Robert McCormick School of Engineering and Applied Science, Northwestern U., 2003-2004.
- Co-founder of the Northwestern Systems Research Group, Department of Computer Science, Northwestern U., 2002.
- Initiator and coordinator of the Systems Reading Group, College of Computing, Georgia Institute of Technology, 1998-2002.
- Lab Coordinator for Systems Research Group, College of Computing, Georgia Institute of Technology, 1997-2002.
- Member of the Graduate Student Council, College of Computing, Georgia Institute of Technology, 1996-1999.
- Founder and president of the Computer Science Student Center, Universidad Nacional de la Patagonia San Juan Bosco, 1986.

RECENT INVITED LECTURES

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- September 2011 – “The State of Broadband - Getting a straight answer”, Science Cafe, Evanston, IL.
- April 2011 – “Crowdsourcing Broadband Service Characterization to the Network Edge,” UIUC, Urbana-Champaign, IL.
- April 2011 – “Crowdsourcing Broadband Service Characterization to the Network Edge,” DePaul U., Chicago, IL.
- February 2011 – “Crowdsourcing ISP Characterization to The Network Edge,” CAIDA AIMS Workshop, San Diego, CA.
- October 2010 – “Crowdsourcing Service-Level Network Event Monitoring,” HP Labs, Palo Alto, CA.
- July 2009 – “Crowdsourcing Network Monitoring,” University of Cambridge, Cambridge, UK.
- February 2009 – “Vehicular-Based Monitoring for Sustainable Urban Growth,” Trinity College, Dublin, Ireland.
- October 2008 – “Tension between P2P communication and service providers,” International Conference on Network Protocols (ICNP), Invited panelist.
- September 2008 – “Taming the Torrent – Can’t ISPs and P2P just get along?,” U. of Wisconsin-Madison.
- June 2008 – “Taming the Torrent – Can’t ISPs and P2P just get along?,” IBM Research, Watson, NY.
- June 2008 – “Taming the Torrent – Can’t ISPs and P2P just get along?,” AT&T Research, Florham Park, NJ.
- October 2007 – “Distributed Systems on Vehicular Networks – Challenges and Opportunities,” U. of Illinois, Chicago – Computational Transportation Science.
- May 2007 – “3R: Ensuring Sustainable scalability for globally-distributed systems,” University of Maryland, College Park.
- April 2007 – “3R: Ensuring Sustainable scalability in globally-distributed systems,” Boston University.
- March 2007 – “3R: Ensuring Sustainable scalability in globally-distributed systems,” U. of Illinois at Urbana-Champaign.
- February 2007 – “3R: Ensuring Sustainable scalability in globally-distributed systems,” Hewlett-Packard Research Lab, Palo Alto, CA.
- November 2006 – “Sustainable scalability in globally-distributed systems,” Purdue University.
- October 2006 – “Sustainable scalability in globally-distributed systems,” U. of Minnesota, Twin Cities.
- August 2006 – “Sustainable scalability in large-scale distributed systems,” U. of Notre Dame.
- June 2006 – “Sustainable scalability in large-scale distributed systems,” Trinity College, Dublin, Ireland.
- February 2006 – “Sustainable scalability in cooperative distributed systems,” IBM Research, Watson, NY.

COLLABORATORS

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Yan Chen, Peter Dinda, Russ Joseph, Aleksandar Kuzmanovic (Northwestern U., EECS), Karen Smilowitz (Northwestern U., IEMS), Luis Neves-Amaral (Northwestern U., Chem. E), Greg Eisenhauer, Karsten Schwan (Georgia Institute of Technology), Zihui Ge, Balachander Krishnamurthy, Kobus van der Merwe, Walter Willinger (AT&T Research), Barney McCabe (Oak Ridge National Lab), Patrick Bridges (U. New Mexico), .

PERSONAL INFORMATION

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Naturalized US citizen; Argentinian.

Married to Dr. Jeanine M. Casler; two children (Luca and Sofia).

Fluent in English and Spanish. Reading knowledge of Italian and Portuguese.

Long-distance runner (marathons, half-marathons, 10K, and 5K); rugby player (Lock) for Chenque Rugby Club (1984–1993).