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RESEARCH INTERESTS

Networking; distributed systems; Internet measurement; broadband networks; peer-to-peer systems.

EDUCATION

- **Ph.D., Computer Science** (December 2016)
Northwestern University, Evanston, Illinois
Advisor: Prof. Fabián E. Bustamante
- **M.S., Computer Science** (September 2013)
Northwestern University, Evanston, Illinois
Advisor: Prof. Fabián E. Bustamante
GPA: 3.857/4.0
- **B.S., Computer Engineering** (June 2009)
Japanese Language & Culture Minor
Northwestern University, Evanston, Illinois
GPA: 3.495/4.0

EXPERIENCE

- **Postdoctoral researcher.** IIJ Innovation Institute Inc., Tokyo, Japan 2017 to present
– Funded by the JSPS (日本学術振興会) Postdoctoral Fellowship
- **Adjunct lecturer.** EECS Department, Northwestern University, Evanston, IL Winter 2017
– Taught *Intro to Computer Systems* (EECS 213)
– Course textbook: *Computer Systems: A Programmer's Perspective*
- **Graduate research assistant.** AquaLab, Northwestern University, Evanston, IL 2009 to 2016
– Advised by Prof. Fabián E. Bustamante
– Conduct research related to broadband networks, Internet measurement, and distributed systems
- **Research intern.** Inria, Paris, France Summer 2015
– Supervised by Renata Teixeira
– Analyzed home network traffic and developed methods for identifying background traffic
- **Research intern.** Telefonica Research, Barcelona, Spain. Summer 2013
– Supervised by Rade Stanojevic
– Studied relationship between broadband markets and user behavior
- **Research intern.** IIJ Innovation Institute Inc., Tokyo, Japan. Summer 2012
– Supervised by Kenjiro Cho
– Developed tool to monitor and analyze video streaming performance
- **Teaching assistant.** EECS Department, Northwestern University, Evanston, IL
– Introduction to Computer Systems (EECS 213) Spring 2011, Spring 2012
– Operating Systems (EECS 343) Fall 2013, Fall 2015
– Distributed Systems (EECS 345) Winter 2013, Winter 2014, Spring 2015, Spring 2016
– Responsible for grading assignments and projects, weekly recitations, and occasional lectures
– Co-wrote/designed original course projects for Distributed Systems based on Kademlia in Go

- **Undergraduate research assistant.** Database Systems Laboratory, Northwestern 2007 to 2009
 - Funded by Northwestern Undergraduate Research Grant
 - Extended SIDnet-SWANS for simulations and experimentation

PUBLICATIONS

Journal articles

- “A Measurement Experimentation Platform at the Internet’s Edge.” Mario A. Sánchez, John S. Otto, Zachary S. Bischof, David R. Choffnes, Fabián E. Bustamante, Balachander Krishnamurthy, and Walter Willinger. In *IEEE/ACM Transactions on Networking (ToN)*, September 2014.
- “Up, Down and Around the Stack: ISP Characterization from Network Intensive Applications.” Zachary S. Bischof, John S. Otto, and Fabián E. Bustamante. In *ACM SIGCOMM Computer Communication Review*, October 2012.
- “Controlled Multi-Path Routing in Sensor Networks Using Bezier Curves.” Oliviu Ghica, Goce Trajcevski, Peter Scheuermann, Nikolay Valtchanov, and Zachary Bischof. *The Computer Journal*, January 2010.

Conferences

- “The Growing Importance of Being Always On A first look at the reliability of broadband Internet access.” Zachary S. Bischof, Fabián E. Bustamante, and Nick Feamster. *The 46th Research Conference on Communications, Information, and Internet Policy*, September 2018.
- “The Utility Argument - Making a Case for Broadband SLAs.” Zachary S. Bischof, Fabián E. Bustamante, and Rade Stanojevic. In *Proc. of Passive and Active Measurement Conference (PAM)*, March 2017.
- “In and Out of Cuba: Characterizing Cuba’s Connectivity.” Zachary S. Bischof, John P. Rula, and Fabián E. Bustamante. In *Proc. of ACM SIGCOMM Internet Measurement Conference (IMC)*, October 2015.
- “Need, Want, Can Afford: Broadband Markets and the Behavior of Users.” Zachary S. Bischof, Fabián E. Bustamante, and Rade Stanojevic. In *Proc. of ACM SIGCOMM Internet Measurement Conference (IMC)*, November 2014.
- “Dasu: Pushing Experiments to the Internet’s Edge.” Mario A. Sánchez, John S. Otto, Zachary S. Bischof, David R. Choffnes, Fabián E. Bustamante, Balachander Krishnamurthy, and Walter Willinger. In *Proc. of the USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, April 2013.
- “Trying Broadband Characterization at Home.” Mario A. Sánchez, John S. Otto, Zachary S. Bischof, and Fabián E. Bustamante. In *Proc. of 14th Passive and Active Measurement Conference (PAM)*, March 2013.

Peer-reviewed workshop publications

- “Second Chance: A look at the features that matter in broadband networks.” John P. Rula, Zachary S. Bischof, and Fabián E. Bustamante. In *Proc. of SIGCOMM Workshop on Crowdsourcing and Crowdsharing of Big (Internet) Data (C2B(I)D)*, August 2015.
- “Up, Down and Around the Stack: ISP Characterization from Network Intensive Applications.” Zachary S. Bischof, John S. Otto, and Fabián E. Bustamante. In *Proc. of ACM SIGCOMM Workshop on Measurements Up the SStack (W-MUST)*, August 2012.
- “Distributed Systems and Natural Disasters: BitTorrent as a Global Witness.” Zachary S. Bischof, John S. Otto, and Fabián E. Bustamante. In *Proc. of CoNEXT Special Workshop on the Internet and Disasters (SWID)*, December 2011.

- “Crowdsourcing ISP Characterization to The Network Edge.” Zachary S. Bischof, John S. Otto, Mario A. Sánchez, John P. Rula, David R. Choffnes, and Fabián E. Bustamante. In Proc. of ACM SIGCOMM Workshop on Measurements Up the STack (W-MUST), August 2011.

Posters and demos

- “AMP up your mobile web experience: Benefits (and a hidden cost) of Accelerated Mobile Pages.” Sung Yoon Whang, Zachary S. Bischof, and Fabian E. Bustamante. Poster at IMC, November 2017.
- “A Time for Reliability: The Growing Importance of Being Always On.” Zachary S. Bischof and Fabián E. Bustamante. Poster in Proc. of ACM SIGCOMM, August 2014.
- “A Cliq of Content Curators.” Angela H. Jiang, Zachary S. Bischof, and Fabián E. Bustamante. Poster in Proc. of ACM SIGCOMM, August 2014.
- “Characterizing Broadband Services with Dasu.” Zachary S. Bischof, Mario A. Sánchez, John S. Otto, John P. Rula, and Fabián E. Bustamante. Demonstration at USENIX NSDI, April 2013.
- “Experiments at the Internet’s Edge with Dasu.” Mario A. Sánchez, John S. Otto, Zachary S. Bischof, David R. Choffnes, Fabián E. Bustamante, and Walter Willinger. Demonstration at USENIX NSDI, April 2013.
- “Dasu - ISP Characterization from the Edge: A BitTorrent.” Mario A. Sánchez, John S. Otto, Zachary S. Bischof, and Fabián E. Bustamante. Poster in Proc. of ACM SIGCOMM, August 2011.
- “Range queries for mobile objects in wireless sensor networks.” Goce Trajcevski, Zachary Bischof, and Peter Scheuermann. Poster paper in Proc. ACM SIGSPATIAL, November 2009.
- “SIDnet-SWANS: a simulator and integrated development platform for sensor networks applications.” Oliviu Ghica, Goce Trajcevski, Peter Scheuermann, Zachary Bischof, and Nikolay Valtchanov. Poster paper in Proc. ACM SenSys, November 2008.

PROFESSIONAL ACTIVITIES

- Sigcomm '18 IoT S&P workshop PC member
- ITC 30 TPC member
- IMC '17 Shadow PC member

PROJECTS

- Namehelp: An application that improves web performance when using a remote DNS service. <http://aqualab.cs.northwestern.edu/projects/namehelp>
- Dasu: An extension to the Vuze BitTorrent client that characterizes multiple aspects of ISP performance (such as bandwidth, latency, and DNS performance) through the use of both active and passive measurements. <http://aqualab.cs.northwestern.edu/projects/Dasu.html>
- NEWSight: NEWSight is a tool for visualizing network anomalies across different periods of time and regions of the network. NEWSight gathers its anomaly information from the NEWS (Network Early Warning System) plugin for the Vuze BitTorrent client, which finds network problems by passively monitoring BitTorrent performance and checking for changes that might indicate problems with the network.

SKILLS AND EXPERTISE

- Primary programming languages: C, Go, Python

- Extensive experience with: Assembly (IA-32, AMD64 and 8051), C++, Java, Javascript, Perl, PHP, Racket/Scheme, Ruby, SQL, VHDL
- Revision control: Mercurial, Git
- Large-scale data analysis: Hadoop, Pig, & Dumbo (a Python interface for Hadoop)
- Proficient in Japanese

HONORS AND AWARDS

- Japan Society for the Promotion of Science (日本学術振興会) Postdoctoral Fellowship 2017-2019
- Terminal Year Fellowship Award, Northwestern University 2016
- Nominated for Best Paper Award, ACM Internet Measurement Conference 2014
- Best Paper Award, ACM SIGCOMM Workshop on Measurement Up and Down the Stack 2012
- Invited Panelist, ACM SIGCOMM Workshop on Measurement Up and Down the Stack 2012
- Walter P. Murphy Graduate Fellowship; Northwestern University 2009–2010
- Undergraduate Research Grant; Northwestern University Summer 2007

CETERA

- US Citizen
- Co-organizer of “Systems Reading Group” (SRG) at Northwestern (2011 to 2013)
- Coordinator for “Graduate Research Seminar in CS & CE” at Northwestern (2010 to 2011)