

## Phillipa Gill

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### RESEARCH INTERESTS

My research interests are in the broad area of computer networking and security with an emphasis on network measurement. I am particularly interested in designing new tools and techniques that push the boundaries of what we can learn from measurements. I apply these techniques to study routing security, Web privacy, online information controls (e.g., censorship) and circumvention technologies.

### EDUCATION

- Ph.D., University of Toronto**, Department of Computer Science **2008 - 2012**  
**Supervisory Committee:** Yashar Ganjali, David Lie, Sharon Goldberg  
**Research areas:** Economic incentives for security and privacy, large-scale systems reliability
- M.Sc., University of Calgary**, Department of Computer Science **2006 - 2008**  
**Advisors:** Anirban Mahanti, Zongpeng Li  
**Thesis:** YouTube Workload Characterization
- B.Sc., University of Calgary**, Department of Computer Science **2003 - 2006**

### EMPLOYMENT

- School of Public Policy, University of Massachusetts**, Faculty Associate **2017 - present**  
**Computer Science, University of Massachusetts – Amherst**, Assistant Professor **2016 - present**  
**Computer Science, Stony Brook University**, Assistant Professor **2013 - 2016**  
**The Citizen Lab, University of Toronto**, Postdoctoral Researcher **2012 - 2013**  
**AT&T Labs – Research**, Visiting Researcher **Fall 2011**  
**Computer Science, Boston University**, Visiting Scholar **Fall/Winter 2010 - 2011**  
**Microsoft Research Redmond**, Research Intern **Summer 2010**  
**HP Labs Palo Alto** (located in Calgary, AB), Research Intern **Summer 2008**  
**Computer Science, University of Calgary**, Research Assistant **2005 - 2006**  
**TRI-Faculty Lab, University of Calgary**, Computer Lab Supervisor **Summer-Fall 2004**  
**iTiva Development Corporation**, Junior Engineer **Summer 2004**

### AWARDS

- 10 Women in Networking/Communications That You Should Watch**, N2Women **2016**  
**Best Student Paper – Runner Up**, PETS **2016**  
**Google Faculty Research Award**, Google **2014**  
**NSF CAREER Award**, National Science Foundation **2014**  
**Best Paper Award**, ACM Internet Measurement Conference **2013**  
**Best Presentation Award**, IBM Workshop for Frontiers of Cloud Computing **2011**  
**Canada Anita Borg Finalist**, Google **2009, 2010**  
**Alexander Graham Bell Canada Graduate Scholarship (CGS)**, NSERC **2008 - 2010**  
**Helen Sawyer Hogg Award**, Dept. of Computer Science, University of Toronto **2008**  
**Best Paper Award**, Passive and Active Measurement Conference **2008**  
**Graduate Student Award**, Alberta Learning **2008**  
**Teaching Assistant Award**, Dept. of Computer Science, University of Calgary **2007**

<b>Department Research Award</b> , Dept. of Computer Science, University of Calgary	<b>2007</b>
<b>Canada Graduate Scholarship (CGS)</b> , NSERC	<b>2006 - 2008</b>
<b>Graduate Student Scholarship</b> , iCORE	<b>2006 - 2008</b>
<b>Dean's Research Excellence Award</b> , University of Calgary	<b>2006</b>
<b>Undergraduate Student Research Award (USRA)</b> , NSERC	<b>2005, 2006</b>
<b>Louise McKinney Scholarship</b> , Alberta Learning	<b>2004</b>
<b>Dean's List</b> , University of Calgary	<b>2003 - 2006</b>
<b>Merit Award</b> , University of Calgary	<b>2003 - 2006</b>
<b>Alexander Rutherford Scholarship</b> , Alberta Learning	<b>2003</b>

## FUNDING

1. **Principal Investigator.** Google Faculty Research Award **2017**  
 PathCache: An Internet Path Prediction Toolkit.  
 \$53K. Awarded February 2017
2. **Co-Principal Investigator.** National Science Foundation **2016-2017**  
 EAGER: Collaborative Research: Exploring Internet Balkanization Through the Lens of Regional  
 Discrimination (with Co-PI Vern Paxson at International Computer Science Institute)  
 \$300K (\$75K at U. Mass.) Awarded October 2016. Duration 1 year.
3. **Principal Investigator.** National Science Foundation **2016**  
 NeTS: Student Travel Support for the 2016 SIGCOMM Conference  
 \$25K. Awarded July 2016.
4. **Co-Principal Investigator.** National Science Foundation **2015-2020**  
 TWC: TTP Option: Large: Collaborative: Towards a Science of Censorship Resistance (with Co-PI:  
 Vern Paxson at International Computer Science Institute, Jedidiah Crandall at University of New  
 Mexico, and Nick Feamster at Princeton University)  
 \$3M (\$324K at Stony Brook U.). Awarded August 2015. Duration 5 years.
5. **Principal Investigator.** National Science Foundation **2015**  
 NeTS: Student Travel Support for the 2015 CoNEXT Conference.  
 \$20K. Awarded June 2015.
6. **Co-Principal Investigator.** National Science Foundation **2014-2017**  
 TWC: TTP Option: Small: Collaborative: Detecting and Characterizing Internet Traffic Interception  
 based on BGP Hijacking (with Co-PI: Alberto Dainotti at the Center for Applied Internet Data Analysis  
 (CAIDA) at UCSD)  
 \$500K (\$150K at Stony Brook U.). Awarded June 2014. Duration 3 years.
7. **Principal Investigator.** Comcast Tech Fund **2015**  
 Detecting and Characterizing Internet Traffic Interception Based on BGP Hijacking.  
 \$65K. Awarded February 2015.
8. **Co-Principal Investigator.** National Science Foundation **2014-2017**  
 TWC: TTP Option: Small: Collaborative: Detecting and Characterizing Internet Traffic Interception  
 based on BGP Hijacking (with Co-PI: Alberto Dainotti at the Center for Applied Internet Data Analysis  
 (CAIDA) at UCSD) \$500K (\$150K at Stony Brook U.). Awarded June 2014. Duration 3 years.
9. **Principal Investigator.** Google Faculty Research Award **2014**  
 Internet Censorship Lab: Illuminating Internet Censorship with Principled Network Measurements.  
 \$43K. Awarded February 2014.
10. **Principal investigator.** National Science Foundation **2014-2019**  
 CAREER: Illuminating the Impacts of Internet Censorship with Principled Network Measurements.  
 \$514K. Awarded February 2014. Duration 5 years.

## RESEARCH CONTRIBUTION SUMMARY

Since my first research assistantship in 2005, I have published a total of 26 conference papers (13 since completing my PhD), 3 workshop papers (1 since completing my PhD), 11 journal papers (5 since completing my PhD) and 5 posters (all since my PhD). My work has been cited a total of 3,057 times (according to Google Scholar as of March 2017).

**Real world impact.** My work characterizing YouTube informed the design of SPECWeb2009<sup>1</sup>, an industry standard benchmarking tool, and my work on BGPsec deployment spurred the creation of a working group in the FCC<sup>2</sup>. My ongoing work on Internet censorship is informed by interactions with political scientists and civil society organizations. My measurements have provided solid empirical data that has been the basis for white papers and write ups by these groups, highlighting issues related to human rights and online information controls (see press coverage below).

## PUBLICATIONS

### Journal

1. Meddle: Enabling Transparency and Control for Mobile Internet Traffic. Ashwin Rao, Arash Molavi Kakhki, Abbas Razaghpanah, Anke Li, David Choffnes, Arnaud Legout, Alan Mislove, and Phillipa Gill. *In Journal of Technology Science (JoTS)*, Oct. 2015.
2. Characterizing Web Censorship Worldwide: Another Look at the OpenNet Initiative Data. Phillipa Gill, Masashi Crete-Nishihata, Jakub Dalek, Sharon Goldberg, Adam Senft, and Greg Wiseman. *ACM Transactions on Web*. 9 (1). Jan. 2015.
3. A Survey of Interdomain Routing Policies. Phillipa Gill, Michael Schapira, and Sharon Goldberg. *ACM SIGCOMM Computer Communication Review (CCR)*. Jan. 2014.
4. Privacy on Twitter: A Content Analysis of Personal Information. Lee Humphreys, Phillipa Gill, and Balachander Krishnamurthy. *Information, Communication & Society*. (Online Oct. 2013)
5. Historicizing New Media: A Content Analysis of Twitter. Lee Humphreys, Phillipa Gill, Balachander Krishnamurthy, and Elizabeth Newbury. *The Journal of Communication*. June 2013.
6. Modeling on Quicksand: Dealing with the Scarcity of Ground Truth in Interdomain Routing Data. Phillipa Gill, Michael Schapira, and Sharon Goldberg. *ACM SIGCOMM Computer Communication Review (CCR)*. Jan. 2012.
7. Characterizing Organizational Use of Web-based Services: Methodology, Challenges, Observations, and Insights. Phillipa Gill, Martin Arlitt, Niklas Carlsson, Anirban Mahanti, and Carey Williamson. *ACM Transactions on the Web (TWeb)*. 5(4). Oct. 2011.
8. Characterizing Intelligence Gathering and Control on an Edge Network. Martin Arlitt, Niklas Carlsson, Phillipa Gill, Aniket Mahanti and Carey Williamson. *ACM Transactions on Internet Technology (TOIT)* 11(1). July 2011.
9. A Socratic Method for Validation of Measurement-based Networking Research. Balachander Krishnamurthy, Walter Willinger, Phillipa Gill and Martin Arlitt. *Computer Communications*. 34(1). Jan. 2011.
10. Understanding Latent Sector Errors and How to Protect Against Them. Bianca Schroeder, Sotirios Damouras and Phillipa Gill. *Transaction on Storage (ToS)*. 6(3). Sept. 2010.
11. Scalable On-Demand Media Streaming for Heterogeneous Clients. Phillipa Gill, Liqi Shi, Anirban Mahanti, Zongpeng Li, and Derek Eager. *ACM Transactions on Multimedia Computing, Communications, and Applications*. 5(1). Oct. 2008.

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<sup>1</sup><https://www.spec.org/web2009/>

<sup>2</sup>[http://transition.fcc.gov/pshs/advisory/csric3/wg-descriptions\\_v1.pdf](http://transition.fcc.gov/pshs/advisory/csric3/wg-descriptions_v1.pdf)

## Conference

1. Classifiers Unclassified: An Efficient Approach to Revealing IP-Traffic Classification Rules. Fangfan Li, Arash Molavi-Kakhki, David Choffnes, Phillipa Gill, and Alan Mislove. In *ACM Internet Measurement Conference (IMC)*, Santa Monica, USA. Nov. 2016.
2. Games Without Frontiers: Investigating Video Games as a Covert Channel. Bridger Hahn, Rishab Nithyanand, Phillipa Gill, and Rob Johnson. In *European Symposium on Security and Privacy (EuroS&P)*. Saarbrücken, DE. Mar. 2016. (Accept rate 17%)
3. Measuring and Mitigating AS-level adversaries against Tor. Rishab Nithyanand, Oleksii Starov, Adva Zair, Phillipa Gill, and Michael Schapira. In *NDSS symposium*. San Diego, USA. Feb. 2016. (Accept rate 16%)
4. Are You Sure You Want to Contact Us? Quantifying the Leakage of PII via Website Contact Forms. Oleksii Starov, Nick Nikiforakis, Phillipa Gill. In *PETS 2016*. July 2016. (**Best Student Paper – Runner Up**).
5. Identifying Traffic Differentiation in Mobile Networks. Arash Molavi Kakhki, Abbas Razaghpanah, Anke Li, Hyungjoon Koo, Rajeshkumar Golani, David Choffnes, Phillipa Gill, Alan Mislove. In *proceedings of the ACM SIGCOMM IMC*, Tokyo, JP. Oct. 2015 (Accept rate: 25%)
6. Investigating Interdomain Routing Policies in the Wild. Ruwaifa Anwar, Haseeb Niaz, David Choffnes, Italo Cunha, Phillipa Gill, Ethan Katz-Bassett In *proceedings of the ACM SIGCOMM IMC*, Tokyo, JP. Oct. 2015 (Accept rate: 25%)
7. Internet Outages, the Eyewitness Accounts: Analysis of the Outages Mailing List. Ritwik Banerjee, Abbas Razaghpanah, Luis Chiang, Akassh Mishra, Vyas Sekar, Yejin Choi, and Phillipa Gill. In *Proc. of the Passive and Active Measurement Conference (PAM)*. New York, USA. Mar. 2015. (Accept rate 27%)
8. Automated Detection and Fingerprinting of Censorship Block Pages. Ben Jones, Tzu-Wen Lee, Nick Feamster, and Phillipa Gill. In *proceedings of the ACM SIGCOMM IMC*. Vancouver, Canada. Nov. 2014 (Accept rate: 22% )
9. A First Look at Performance in Mobile Virtual Network Operators. Fatima Zarinni, Ayon Chakraborty, Vyas Sekar, Phillipa Gill, and Samir Das. In *proceedings of the ACM SIGCOMM IMC*. Vancouver, Canada. Nov. 2014 (**Best Paper Nominee**, Accept rate: 22%)
10. Targeted Threat Index: Characterizing and Quantifying Politically-Motivated Targeted Malware. Seth Hardy, Masashi Crete-Nishihata, Katharine Kleemola, Adam Senft, Byron Sonne, Greg Wiseman, Phillipa Gill, and Ronald J. Deibert. In *proceedings of the 23rd Usenix Security Symposium*. San Diego, USA. Aug. 2014 (Accept rate: 19% )
11. A Method for Identifying and Confirming the Use of URL Filtering Products for Censorship. Jakub Dalek, Bennett Haselton, Helmi Noman, Adam Senft, Masashi Crete-Nishihata, Phillipa Gill, and Ronald J. Deibert. In *proceedings of the ACM SIGCOMM IMC*. Barcelona, ES. Oct. 2013. (Accept rate: 24% )
12. Follow the Money: Understanding Economics of Online Aggregation and Advertising. Phillipa Gill, Vijay Erramilli, Augustin Chaintreau, Balachander Krishnamurthy, Konstantina Papagiannaki, and Pablo Rodriguez. In *proceedings of the ACM SIGCOMM IMC*. Barcelona, ES. Oct. 2013. (**Best Paper Award**; Accept rate: 24%; **60 citations as of March 2017** )
13. Characterizing Large-scale Routing Anomalies: A Case Study of the China Telecom Incident. Rahul Hiran, Niklas Carlsson, and Phillipa Gill. In *proceedings of the PAM Conference 2013*. Hong Kong. Mar. 2013. (Accept rate: 32% )
14. Historicizing New Media: A Content Analysis of Twitter. Lee Humphreys, Phillipa Gill, Balachander Krishnamurthy, and Elizabeth Newbury. In *proceedings of the Conference of International Communication Association*. Phoenix, USA. May 2012.

15. Let the Market Drive Deployment: A Strategy for Transitioning to BGP Security. Phillipa Gill, Michael Schapira and Sharon Goldberg. *In proceedings of ACM SIGCOMM 2011*. Toronto, Canada. Aug. 2011. (Accept rate: 14% , **83 citations as of March 2017** )
16. Understanding Network Failures in Data Centers: Measurement, Analysis, and Implications. Phillipa Gill, Navendu Jain and Nachi Nagappan. *In proceedings of ACM SIGCOMM 2011*. Toronto, Canada. Aug. 2011. (Accept rate: 14% , **367 citations as of March 2017** )
17. Dude, Where's that IP? Circumventing Measurement-based IP Geolocation. Phillipa Gill, Yashar Ganjali, Bernard Wong and David Lie. *In proceedings of the 19th Usenix Security Symposium*. Washington D.C., USA. Aug. 2010. (Accept rate: 15% )
18. How Much is Too Much? Privacy Issues on Twitter. Lee Humphreys, Phillipa Gill and Balachander Krishnamurthy. *In proceedings of the Conference of International Communication Association*. Singapore. June 2010. (**60 citations as of March 2017**)
19. Understanding Latent Sector Errors and How to Protect Against Them. Bianca Schroeder, Sotirios Damouras and Phillipa Gill. *In proceedings of the 8th Usenix Conference on File and Storage Technologies (FAST 2010)*. San Jose, USA. Feb. 2010. (Accept rate: 24%, **100 citations as of March 2017** )
20. Network Information Flow in Network of Queues. Phillipa Gill, Zongpeng Li, Anirban Mahanti, Jingxiang Luo and Carey Williamson. *In proceedings of the 16th IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS)*. Baltimore, USA. Sept. 2008.
21. The Flattening Internet Topology: Natural Evolution, Unsightly Barnacles or Contrived Collapse? Phillipa Gill, Martin Arlitt, Zongpeng Li, and Anirban Mahanti. *In proceedings of the PAM Conference*. Cleveland, USA. Apr. 2008. (**Best Paper Award**; Accept rate: 32% , **129 citations as of March 2017**)
22. Characterizing User Sessions on YouTube. Phillipa Gill, Martin Arlitt, Zongpeng Li, and Anirban Mahanti. . In proceedings of *ACM/SPIE MMCN*. San Jose, USA. Jan. 2008. (**54 citations as of March 2017**)
23. YouTube Traffic Characterization: A View From the Edge. Phillipa Gill, Martin Arlitt, Zongpeng Li, and Anirban Mahanti. *In proceedings of the ACM SIGCOMM IMC*. San Diego, USA. Oct. 2007. (Accept rate: 24% for full papers, **832 citations as of March 2017**)
24. Video to Go: The Effects of Mobility on Streaming Media in a CDMA2000 1xEV-DO Network. Phillipa Sessini, Matei Leventer, and Anirban Mahanti. *In proceedings of the ACM/SPIE Multimedia Computing and Networking Conference (MMCN)*. San Jose, USA. Jan. 2007. (Accept rate: 30%)
25. Scalable Streaming for Heterogeneous Clients. Liqi Shi, Phillipa Sessini, Anirban Mahanti, Zongpeng Li, and Derek Eager. *In proceedings of ACM Multimedia 2006*. Santa Barbara, USA. Oct. 2006. (Accept rate: 16%; **57 citations as of March 2017**)
26. Observations on the Round-Trip Times of TCP Connections. Phillipa Sessini and Anirban Mahanti. *In proceedings of the Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS) 2006*. Calgary, Canada. July/Aug. 2006.

## Workshop

1. The Politics of Routing: Investigating the Relationship Between AS Connectivity and Internet Freedom. Rachee Singh, Hyungjoon Koo, Najmehalsadat Miramirkhani, Fahimeh Mirhaj, Leman Akoglu and Phillipa Gill. In *USENIX Workshop on Free and Open Communication on the Internet*. Austin, USA. Aug. 2016.
2. Short Paper: A Look at SmartPhone Permission Models. Kathy Au, Billy Zhou, Zhen Huang, Phillipa Gill and David Lie. *In proceedings of ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices*. Chicago, USA. Oct. 2011. (**65 citations as of March 2017**)

3. A Few Chirps About Twitter. Balachander Krishnamurthy, Phillipa Gill, and Martin Arlitt. *In proceedings of ACM SIGCOMM Workshop on Online Social Networks*. Seattle, USA. Aug. 2008. (Accept rate: 35% , **775 citations as of March 2017** )

### Poster

1. A client-side analysis of TLS usage in mobile apps. *USENIX Security Poster session*. Austin, USA. Aug. 2016.
2. PathCache: A Path Prediction Toolkit. Rachee Singh and Phillipa Gill. *ACM SIGCOMM Poster and Demo Session*. Florianopolis, Brazil. Aug. 2016.
3. Haystack: In Situ Mobile Traffic Analysis in User Space. Abbas Razaghpanah, Narseo Vallina-Rodriguez, Srikanth Sundaresan, Christian Kreibich, Phillipa Gill, Mark Allman, and Vern Paxson. *Poster in ACM Hotmobile*. St. Augustine, USA. Feb. 2016.
4. Poster: Games Without Frontiers: Investiating Video Games as a Covert Channel. Bridger Hahn, Rishab Nithyanand, Phillipa Gill, and Rob Johnson. *Poster at IEEE Security & Privacy*. San Jose, USA. May 2015.
5. Identifying Traffic Differentiation in Cellular Data Networks. Arash Molavi Kakhki, Abbas Razaghpanah, Rajesh Golani, David Choffnes, Phillipa Gill, and Alan Mislove. *ACM SIGCOMM Poster and Demo Session*. Chicago, USA. Aug. 2014. (**Runner up in ACM Student Research Competition at SIGCOMM '14**)

### Technical Report

1. Exploring the Design Space of Longitudinal Censorship Measurement Platforms. Abbas Razaghpanah, Anke Li, Arturo Filasto, Rishab Nithyanand, Vasilis Ververis, Will Scott, and Phillipa Gill. ArXiv Tech Report. <https://arxiv.org/abs/1606.01979> May 2016.
2. Holding all the ASes: Identifying and Circumventing the Pitfalls of AS-aware Tor Client Design. Rishab Nithyanand, Rachee Singh, Shinyoung Cho, and Phillipa Gill. ArXiv Tech Report. <https://arxiv.org/abs/1605.03596> May 2016.
3. Information Controls during Military Operations: The case of Yemen during the 2015 political and armed conflict. Jake Dalek, Ronald Deibert, Sarah McKune, Phillipa Gill, Naser Noor, and Adam Senft. Citizen Lab White Paper. Oct. 2015. <https://citizenlab.org/2015/10/information-controls-military-operations-yemen/>
4. Haystack: In Situ Mobile Traffic Analysis in User Space. Abbas Razaghpanah, Narseo Vallina-Rodriguez, Srikanth Sundaresan, Christian Kreibich, Phillipa Gill, Mark Allman, and Vern Paxson. ArXiv Tech Report. <http://arxiv.org/abs/1510.01419> Oct. 2015.
5. Modeling the Gaia Hypothesis: Daisyworld. Phillipa Sessini. *Dept. of Computer Science, University of Calgary*. Tech Report #2007-857-09. Apr. 2007.

### Dissertation

1. Improving Dependability for Internet-scale Services. Phillipa Gill. PhD Dissertation, *Dept. of Computer Science, University of Toronto*. Sept 2012. (Defended: Sept. 7, 2012).
2. YouTube Workload Characterization. Phillipa Gill. MSc. Thesis, *Dept. of Computer Science, University of Calgary*. March 2008. (Defended: March 7, 2008).

### Patent

1. Method and system for determining the impact of failures in data center networks. Navendu Jain, Phillipa Gill, US Patent Application (US 20130232382 A1). Filed: Mar. 2012.

## PRESS COVERAGE

1. Q&A: The Science of Online Censorship. J. Bohannon. Science Magazine. Nov. 2016. Interview about my NSF large grant and research program on measuring and evading Internet censorship.
2. Yemen rebels using Canadian software to censor Internet, report finds. M. Pizzi. Al Jazeera America. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
3. Canadian Web Co. Helps Yemen Censor Net. S. Harris. The Daily Beast. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
4. Canadian Internet-filtering company accused of aiding censorship in Yemen. Metro News. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
5. Canadian software tied to Yemen civil war, report alleges. C. Freeze. The Globe and Mail. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
6. Canadian Internet-filtering company accused of aiding censorship in war-torn Yemen. J. Kestler-D'Amours. Toronto Star. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
7. Researchers Accuse Canadian Internet Company of Helping Yemen Censor The Web. L. Franceschi-Bicchieri. Motherboard. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
8. Canadian software tied to Yemen civil war, report alleges. C. Freeze. The Globe and Mail. Oct. 2015. Coverage of work with the Citizen Lab using ICLab to characterize censorship products used in Yemen.
9. Tool makes it easier to evade online censors. T. Simonite. MIT Tech Review Aug. 2015. Quotation about evolvability of censorship tools as a design point in the arms race against censors.
10. Hackers build a new Tor client designed to beat the NSA. P. Howell O'Neill. The Daily Dot. May 2015. Coverage of our AS-aware Tor client, Astoria.
11. New relay selection fix for Tor to spoil spooks' fun (eventually). A. Martin. The Register. May 2015. Coverage of our AS-aware Tor client, Astoria.
12. Researchers design new Tor client resistant to NSA attacks. L. Caldwell. Slash Gear. May 2015. Coverage of our AS-aware Tor client, Astoria.
13. An app that hides secret messages in Starcraft-style games. A. Greenberg. Wired. April 2015. Coverage of our video game-based covert channel system, Castle.
14. Anti-censorship technology uses online video games to bypass Chinese Internet restrictions. J. Griffiths. South China Morning Post. April 2015. Coverage of our video game-based covert channel system, Castle.
15. Inside Citizen Lab, the "Hacker Hothouse" protecting you from Big Brother. J. Kopstein. Arstechnica. July 2014. Quotation in relation to my postdoctoral research with the Citizen Lab and ongoing work on the ICLab platform.
16. Study Shows Google's Dominance of Online Advertising. T. Simonite. MIT Tech Review Dec. 2013. Article about my IMC 2013 paper on online aggregators.
17. Is it Wrong to Use Data from the World's First 'Nice' Botnet? R. McMillan. Wired. May 2013. Quotation in article about the ethics of using data from the Carna bonnet.

## PRESENTATIONS

- 1. Developing a Science of Internet Censorship: Experiences and Open Challenges**  
MC2 Workshop on Data-Driven Security, U. Maryland-College Park **Jan. 2017**
- 2. Measuring and Mitigating AS-level Adversaries Against Tor**  
CyLab Distinguished Seminar, CMU, Pittsburgh, PA **Oct. 2016**
- 3. Measuring network interference & censorship: Opportunities and Challenges – Revisited**  
Citizen Lab Summer Institute, Toronto, ON **July 2016**
- 4. Measurement & Anonymity Systems**  
ISAT/DARPA Tech. Disruptions of Societies and Organizations, Washington DC. **Mar. 2016**
- 5. Winning the Censorship Arms Race**  
Yale University, New Haven, CT **Feb. 2016**  
University of British Columbia, Vancouver, BC **Feb. 2016**  
UMass Amherst, Amherst, MA **Feb. 2016**  
Northeastern University, Boston, MA **Mar. 2016**
- 6. Measuring and Mitigating AS-level Adversaries Against Tor**  
Berkman Center, Harvard University **Dec. 2015**  
UMass Amherst, Amherst, MA **Oct. 2015**  
New England Security Day, Amherst, MA **Sept. 2015**  
New England Network and Systems Day, Boston, MA **Oct. 2015**
- 7. Session Preview Security, Privacy, and Censorship**  
SIGCOMM 2015 Preview Sessions, London, UK **Aug. 2015**
- 8. Measuring network interference & censorship: Opportunities and Challenges**  
Citizen Lab Summer Institute, Toronto, ON **June 2015**
- 9. What’s a researcher to do? Case study of ethics in network measurement research**  
Intl. Assn. For Computing and Philosophy - CEPE, Newark, DE **June 2015**
- 10. Understanding Politically-Motivated Adversaries: Targeted Threats and Censorship Product Fingerprinting**  
UMass - DCS Women Lunch **Nov. 2016**  
UMass - Alumni Night **Nov. 2016**  
Princeton University **Oct. 2015**  
University of California - Berkeley **Apr. 2015**  
Hebrew U. Networking Summer 1st Workshop, Jerusalem, IL **June 2015**  
NAE Germany-America Frontiers of Engineering, Potsdam, DE **Apr. 2015**
- 11. Targeted Threat Index: Characterizing and Quantifying Politically-Motivated Targeted Malware**  
University of Illinois - Urbana Champaign **Sept. 2014**  
New England Networking Systems Day (Keynote) **Oct. 2014**  
UMD Workshop on Data Driven Security and Privacy, College Park, MD **Jan. 2015**
- 12. ICLab: A Platform for Measuring Online Information Controls**  
Workshop on Active Internet Measurements (AIMS), San Diego, CA **Mar. 2015**  
USENIX FOCI Workshop (Work in Progress session), San Diego, CA **Aug. 2014**  
Citizen Lab Summer Institute, Toronto, ON **July 2014**
- 13. Security for the next billion Internet users**  
NSF SATC CyberSpace 2025 Workshop, Washington DC **Apr. 2014**
- 14. Measuring Cyber-attacks: A Network Measurement Perspective**  
Known-knowns and Unknowns about the Internet: Measuring the Economic, Social, and Governance Impact of the Web, Washington DC **Nov. 2013**
- 15. Characterizing Web Censorship Worldwide**  
Boston Freedom in Online Communications Day, Boston, MA **Mar. 2013**



16. **Characterizing Global Web Censorship: Why is it so hard?**  
 Workshop on Active Internet Measurements (AIMS), San Diego, CA Feb. 2013  
 Cyber Stewards Workshop, Toronto, ON Apr. 2013
17. **A Survey of Interdomain Routing Policies**  
 NANOG56, Dallas, TX Oct. 2012
18. **Things that go bump in the net (Data center net. reliability + China Telecom incident)**  
 Renesys, Hanover, NH July 2012
19. **Security and Reliability for Internet-scale Services**  
 University of Toronto Mar. 2012  
 Stony Brook University Mar. 2012  
 Cornell University Mar. 2012  
 University of Illinois - Urbana-Champaign Mar. 2012  
 Boston University Feb. 2012  
 University of Illinois - Chicago Feb. 2012  
 University of British Columbia Feb. 2012  
 Northeastern University Feb. 2012  
 Microsoft Research, Redmond, WA Mar. 2012  
 AT&T Labs – Research, Florham Park, NJ Mar. 2012
20. **Understanding Network Failures in Data Centers**  
 Industry: IBM Student Workshop for Frontiers of Cloud Computing, Hawthorne, NY Dec. 2011  
 Conference: SIGCOMM 2011, Toronto, ON Aug. 2011
21. **Let the Market Drive Deployment: A Strategy for Transitioning to BGP Security**  
 Columbia University Nov. 2011  
 University of Calgary July 2011  
 Princeton University Mar. 2011  
 Georgia Tech Mar. 2011  
 AT&T Security Research Center, New York, NY Nov. 2011  
 AT&T Labs – Research, Florham Park, NJ Oct. 2011  
 Telefonica I+D, Barcelona, ES June 2012  
 SIGCOMM 2011, Toronto, ON Aug. 2011
22. **Modeling Adoption of Secure BGP**  
 Boston Azure Users Group Dec. 2010
23. **Dude, Where’s that IP? Circumventing measurement-based IP geolocation**  
 Google Scholars’ Retreat, San Francisco, CA June 2010  
 AT&T Labs – Research, Florham Park, NJ Dec. 2010  
 NSERC ISSNet Workshop, Ottawa, ON Apr. 2010  
 Usenix Security 2010, Washington, DC Aug. 2010
24. **A Few Chirps About Twitter**  
 Workshop on Online Social Networks, Seattle, WA Aug. 2008
25. **Characterizing User Sessions on YouTube**  
 Multimedia Computing and Networking, San Jose, CA Jan. 2008
26. **YouTube Workload Characterization: A View From the Edge**  
 Internet Measurement Conference, San Diego, CA Oct. 2007
27. **Video to Go: The Effects of Mobility on Streaming Media in a CDMA2000 1xEV-DO Network**  
 Multimedia Computing and Networking, San Jose, CA Jan. 2007
28. **Scalable Streaming for Heterogeneous Clients**  
 ACM Multimedia, Santa Barbara, CA Oct. 2006
29. **Observations on the Round-Trip Times of TCP Connections**  
 Symposium on Performance Evaluation of Computer and Telecommunication Systems July 2006

## STUDENTS

### Current

1. Shinyoung Cho (PhD, Stony Brook University) **Spring 2016 - present**
2. Arian Niaki (PhD, UMass – Amherst) **Fall 2016 - present**
3. Abbas Razaghpanah (PhD, Stony Brook University) **Fall 2013 - present**
4. Rachee Singh (PhD, UMass – Amherst) **Fall 2015 - present**
5. Isaac Vawter (MS, UMass – Amherst) **Spring 2017 - present**
6. Arun Dunna (Undergrad, UMass – Amherst) **Spring 2017 - present**
7. John Geenty (Undergrad, UMass – Amherst) **Fall 2016 - present**
8. Jack Zhao (Undergrad, Hampshire College) **Fall 2016 - present**

### Graduated - PhD

1. Rishab Nithyanand (PhD, Stony Brook U.; co-advised with Rob Johnson) **Spring 2015 - Fall 2016**  
Thesis: DOCTor: Defending and Opening Communication via Tor

### Graduated - MS

1. Sharath Paduru (MS, Stony Brook University) **Spring 2016 - Fall 2016**  
Topic: ICLab
2. Michael Liuzzi (MS, Stony Brook University) **Spring 2016 - Fall 2016**  
Topic: Haystack, mobile application security  
First job: Booz Allen
3. Ruwaifa Anwar (MS, Stony Brook University) **Fall 2014 - Fall 2016**  
Topic: Internet routing, prefix hijacks and interceptions.  
First job: Cisco
4. Adrian (Anke) Li (MS, Stony Brook University) **Fall 2014 - Fall 2016**  
Topic: Traffic differentiation and ICLab.  
First job: Facebook
5. Nikhil Mohan (MS, Stony Brook University) **Fall 2015 - Fall 2016**  
Topic: Internet routing security
6. Ravi Sadineni (MS, Stony Brook University) **Spring 2015 - Fall 2015**  
Topic: ICLab Web interface
7. Ashish Singh (MS, Stony Brook University) **Spring 2015 - Fall 2015**  
Topic: Routing policies measurements, ICLab development
8. Arpit Singh (MS, Stony Brook University) **Spring 2015 - Fall 2015**  
Topic: censorship circumvention and measurement
9. Praveen Alam (MS, Stony Brook University) **Spring 2015 - Fall 2015**  
Topic: Mobile middlebox measurements.
10. Shriya Gupta (MS, Stony Brook University) **Summer 2015 - Fall 2015**  
Topic: AS aware Tor, visualizing traceroutes
11. Haseeb Niaz (MS, Stony Brook University) **Fall 2013 - Spring 2015**  
Topic: Routing policies measurements  
First job: Viptela
12. Himanshu Shah (MS, Stony Brook University) **Spring 2014 - Spring 2015**  
Topic: ICLab, Internet censorship measurements  
First job: Apple
13. Rajesh Golani (MS, Stony Brook University) **Spring 2014 - Fall 2014**  
Topic: Traffic differentiation in mobile networks.  
First job: Windows Azure Developer, Microsoft

### Other students I have worked with

1. Xinwen (Jason) Wang (Undergraduate, Stony Brook University) **Fall 2015 - Fall 2016**  
Topic: ICLab platform
2. Srinivas Muthunoori (MS, Stony Brook University) **Spring 2015**  
Topic: Real time detection of BGP traffic interceptions  
First job: HGST Inc.
3. Eric Goren (High school intern, Stony Brook University) **Summer 2014, Summer 2015**  
Topic: ICLab development, specifically DNS.  
Current position: Undergraduate at University of Maryland
4. Hyungjoon Koo (PhD, Stony Brook University) **Summer 2014 - Fall 2014**  
Topic: Traffic differentiation in mobile networks.
5. Taha Khan (PhD, Stony Brook University) **Fall 2014**  
Topic: Collateral damage of censorship  
Current position: PhD Student at UI Chicago
6. Tzu-Wen Lee (PhD, Stony Brook University) **Fall 2013 - Spring 2014**  
Topic: Detecting and fingerprinting censorship blockpages
7. Haneef Ghanim (Undergraduate, University of Toronto) **Summer 2011**  
Topic: Facebook privacy application.
8. Serge Gorbunov (Undergraduate, University of Toronto) **Summer 2011**  
Topic: Secure IP Geolocation.  
Current position: Assistant Professor at University of Waterloo.

### PhD Committees

1. Arash Molavi Kakhki (PhD, Northeastern University) **Spring 2016 -**  
Thesis title: *Measuring and understanding performance in the mobile Internet*
2. Zafar Qazi (PhD, Stony Brook University) **Fall 2015**  
Thesis title: *Minimally Disruptive Management Frameworks for Network Functions*
3. Xiang Cai (PhD, Stony Brook University) **Summer 2014**  
Thesis title: *Website Fingerprinting Attacks And Defenses On Anonymity Networks*
4. Sam Burnett (PhD, Georgia Tech) **Fall 2013 - Spring 2014**  
Thesis title: *Empowering bystanders to facilitate Internet censorship measurement and circumvention*

## TEACHING

### Department of Computer Science, University of Massachusetts – Amherst

#### Instructor

- **INFO203/INFO290NW:** A Networked World **Spring 2017**  
Networking course designed for non-majors. Mix of technical lectures on networking and discussion of how the Internet impacts society  
**Notes:** First time offering this course. ~ 50 Undergraduate students
- **CS590B/690B:** Detecting Interference in Networks **Fall 2016**  
Advanced course for a range of students (undergrad to PhD) covering issues related to Internet censorship and related information controls.  
**Notes:** ~ 14, Undergrad, MS and PhD students.

### Department of Computer Science, Stony Brook University

#### Instructor

- **CSE 592:** Topics in Internet Security: Internet Censorship **Fall 2015**  
Advanced graduate course covering issues related to Internet censorship and related information controls.  
**Notes:** Revised assignments, projects, and evaluation methods. ~ 10 MS and PhD students.

- **CSE534:** Fundamentals of Computer Networks **Spring 2015**  
Graduate level computer networking course covering background on Internet architecture, and current topics relating to content delivery and network design.  
**Notes:** Completely revised course syllabus. ~ 65 MS and PhD students.
- **CSE390:** Advanced Computer Networks **Fall 2014**  
Advanced undergraduate course covering background on Internet architecture, and current topics relating to content delivery and network design.  
**Notes:** New course offering. ~ 10 undergraduate students.
- **CSE594:** Internet Censorship **Spring 2014**  
Advanced graduate course covering issues related to Internet censorship and related information controls.  
**Notes:** New course offering, ~ 25 MS students.
- **CSE592:** Internet Measurement **Fall 2013**  
Advanced graduate course covering foundations and recent developments in Internet measurement research.  
**Notes:** New course offering, ~ 5 PhD students.

#### **Department of Computer Science, University of Toronto**

*Teaching Assistant*

- **SCI199Y:** Great Ideas in Computing **Fall/Winter 2009-2010**  
First year seminar course about various aspects of computer science for non-science majors.

#### **Teaching and Learning Center, University of Calgary**

*Instructor Skills Workshop*

**Aug. 2007**

Participated in a four day interdisciplinary workshop on improving teaching skills.

#### **Department of Computer Science, University of Calgary**

*Teaching Assistant*

- **CPSC325:** Hardware/Software Interface **Fall 2007**  
Second year hardware course covering more advanced assembly language, device drivers and interrupts.  
Received **Teaching Assistant (TA) award** for this course.
- **CPSC313:** Introduction to Computability **Winter 2007**  
Second year theory course on models of computation (eg., finite automata, grammars and Turing machines).
- **CPSC265:** Computer Architecture and Low-Level Programming **Fall 2006**  
Introductory assembly language programming class (SPARC Assembler).

#### **OUTREACH, PANELS, and ROUNDTABLES**

**CITP Internet Censorship Measurement Ethics workshop. Princeton, NJ      December 2016**  
Interdisciplinary round table about the ethics of measuring Internet censorship at Princeton. Outputs will be a paper taxonomizing different types of censorship measurement, associated risks and a framework for reasoning about ethics.

**Citizen Lab Summer Institute 2016. Toronto, Canada.      July 2016**  
Participated in a panel discussion about measuring network interference at an interdisciplinary workshop. Panel focused on motivating censorship measurement and finding common ground for measurements.

**SIGCOMM Workshop on NS Ethics****August 2015**

Participated in a day long interdisciplinary workshop following SIGCOMM 2015. Workshop took a hands on approach using breakout sessions to understand ethical challenges in network measurement and security research. This workshop continues a series of ethics related workshops initiated by the Oxford Internet Institute (see Oxford Internet Institute/MLab Workshop on Ethics in Mobile Measurement Workshop below).

**SIGCOMM 2015 Preview sessions****August 2015**

Gave a high level overview of topics covered in the security, privacy, and censorship session at SIGCOMM 2015. The goal of these preview sessions was to give students at the conference the relevant background needed to understand the technical content of the paper presentations.

**Citizen Lab Summer Institute 2015. Toronto, Canada.****June 2015**

Participated in a panel discussion about measuring network interference at an interdisciplinary workshop. Themes of the panel were the subject of breakout groups in the following two days of the workshop.

**Philosophy meets Internet Engineering: Ethics in Networked Systems****June 2015**

Participated in a panel discussion at a philosophy conference focused on ethics of computing. Presented a case study of network measurements to highlight ethical issues faced when performing measurement research in practice. Outputs of this discussion will inform development of ethical guidelines for measurement research.

**ICLab/Google Workshop on Network Inference Measurement.****May 2015**

Hosted the 4th iteration of the ICLab/Google workshop on network interference at Stony Brook University. Workshop was attended by academics and practitioners working in the area of online information controls/measurements. Workshop was followed by an afternoon session for middle school students to learn more about network security held at the Center for Science and Math Education (CESAME).

**Ethics Feedback Panel for Networking and Security.****Summer 2014 - present**

Participating in a multi-disciplinary group that aims to provide feedback on ethical issues faced in network measurement/computer security studies. Particularly, I am working to help define/establish best practices for Internet censorship research where risks can be unclear and highly variable. This relates to our ICLab project that is working to manage these issues.

**Citizen Lab Summer Institute 2014. Toronto, Canada.****July 2014**

Presented ICLab: A Platform for Measuring Online Information Controls on a panel at a multi-day interdisciplinary workshop focused on measuring online information controls.

**NSF SaTC CyberSpace 2025 Workshop. Workshop in Washington, DC.****Apr. 2014**

Presented Security for the Next Billion Internet Users at a workshop comprised of government, industry and academic researchers focusing on cyber security challenges for the next decade and beyond.

**Cyber Dialogue. Workshop at The Citizen Lab, Toronto, Canada****Mar. 2014**

Participated in a working group discussion about threats facing activist organizations and individuals around the globe.

**Known-knowns and Unknowns about the Internet: Measuring the Economic, Social, and Governance Impact of the Web. Workshop in Washington, DC.****Nov. 2013**

Presented Measuring Cyber-Attacks: A Network Measurement Perspective at a workshop comprised of government, industry and academics interested in the economic impact of the Internet (attacks, performance issues, and reliability).

**Cyber Stewards Workshop. Workshop at The Citizen Lab, Toronto, Canada.****Apr. 2013**

Presented Characterizing Global Web Censorship: Why is it So Hard? to the Citizen Lab's network of Cyber Stewards network who are located around the world engaged in research of online information controls.

**Citizen Lab Summer Institute 2013. Toronto, Canada** **July 2013**  
Co-organized a workshop to bring together researchers working on measuring Internet censorship from both a political/social science perspective and computer science/network measurement perspective. Interactions at this workshop helped form the core for the current ICLab project.

**OII/MLab Workshop on Ethics in Mobile Measurement. Oxford, UK.** **June, 2013**  
Roundtable discussion with legal and technical experts to map out the space of measurement ethics for mobile measurements. Output was a guideline for measurements by the synthesized Oxford Internet Institute.

**ISOC Routing Resiliency Measurements Workshop. Atlanta, USA.** **Nov. 2012**  
This workshop overviewed the state of routing resiliency monitoring and highlighted the need for more unified metrics for assessing routing resilience to attacks and hijacks. Discussions at this workshop spurred collaboration between myself and Alberto Dainotti of CAIDA that was recently funded by NSF.

**Internet Health Monitoring and Visualization. Harvard University.** **Sept. 2012**  
Roundtable about how to define Internet Health, both technical health in terms of reliability and social health in terms of Internet freedom were discussed as axes for quantifying network health. Data sets for assessing Internet health were discussed (e.g., technical data from organizations like CAIDA or data about Internet freedom from Citizen Lab).

## SERVICE

### Editorships

**ACM SIGCOMM Computer Communication Review (CCR), Editorial Board** **2013 - 2015**

### Chairships

**ACM CoNEXT, TPC Co-chair** **2017**  
**ACM Internet Measurement Conference (IMC), Co-chair** **2016**  
**USENIX Workshop on Free and Open Communication on the Internet (FOCI), Co-chair** **2015**  
**ACM CoNEXT Student Workshop, Co-chair** **2013**

### Program Committee Memberships

**ACM CCS, PC Member** **2017**  
**ACM SIGCOMM Reproducibility Workshop, PC Member** **2017**  
**ACM SIGCOMM, PC Member** **2017**  
**USENIX NSDI, PC Member** **2017**  
**ACM SIGCOMM, PC Member** **2016**  
**MOBIDATA Workshop at Mobisys, PC Member** **2016**  
**Workshop on Data and Algorithmic Transparency, PC Member** **2016**  
**USENIX FOCI Workshop, PC Member** **2016**  
**ACM Internet Measurement Conference (IMC), PC Member** **2016**  
**ACM SIGCOMM, PC Member** **2016**  
**WWW Conference, PC Member - Security & Privacy Track** **2016**  
**ACM SIGCOMM, Poster and Demo Committee** **2015**  
**USENIX Annual Technical Conference (ATC), PC Member** **2015**  
**ACM CoNEXT, PC Member** **2015**  
**ACM IMC, PC Member** **2015**  
**Conference on Applied Cryptography and Network Security (ACNS), PC Member** **2015**  
**ACM Hotnets, PC Member** **2014**  
**ACM CoNEXT, PC Member** **2014**  
**ACM IMC, PC Member, Session chair** **2014**  
**USENIX FOCI workshop, PC Member, Session chair** **2014**  
**Workshop on Traffic Monitoring and Analysis (TMA), PC Member** **2014**  
**ACM SIGCOMM, Poster/Demo committee** **2014**  
**ACM SIGCOMM, Poster/Demo committee** **2013**

<b>Annual Computer Security Applications Conference (ACSAC), PC Member</b>	<b>2013</b>
<b>IEEE MASCOTS, PC Member</b>	<b>2013</b>
<b>USENIX ATC, PC Member</b>	<b>2013</b>
<b>USENIX NSDI, Poster/Demo committee</b>	<b>2013</b>
<b>USENIX FOCI Workshop, PC Member</b>	<b>2013</b>
<b>ACSAC, PC Member</b>	<b>2012</b>
<b>ACM CoNEXT Student Workshop, PC Member</b>	<b>2012</b>
<b>Workshop on Privacy and Digital Economy, PC Member</b>	<b>2012</b>
<b>Organizing Committee Memberships</b>	
<b>ACM SIGCOMM, Travel grant co-chair</b>	<b>2016</b>
<b>ACM CoNEXT, Travel grant co-chair</b>	<b>2015</b>
<b>ACM SIGCOMM, Publicity committee</b>	<b>2014</b>
<b>University Service</b>	
<b>CyberSecurity Hiring Committee, (U. Mass - Public Policy School) Member</b>	<b>2016-present</b>
<b>4+1 BS/MS Committee, (U. Mass) Member</b>	<b>2016-present</b>
<b>Operations committee, (Stony Brook U) Member</b>	<b>2014 - 2016</b>
<b>Building planning committee, (Stony Brook U) Member</b>	<b>2014 - 2016</b>
<b>Graduate admissions committee, (Stony Brook U) Member</b>	<b>2013 - 2016</b>
<b>Computer Science Graduate Society , (University of Toronto) GSU representative</b>	<b>2009 - 2010</b>
<b>Graduate Students Assn 40th Anniversary Scholarship, (University of Calgary) Reviewer</b>	<b>2008</b>
<b>Computer Science Graduate Society, (University of Calgary) VP Communications</b>	<b>2007 - 2008</b>
<b>Computer Science Graduate Society, (University of Calgary) Lab Representative</b>	<b>2006 - 2007</b>
<b>Funding Review Panels</b>	
<b>NSF NeTS, Review panel member</b>	<b>2017</b>
<b>Telefonica Digital Technology Lab (DTL) Grants, Program committee member</b>	<b>2017</b>
<b>NSF NeTS, Review panel member</b>	<b>2016</b>
<b>NSF SaTC, Review panel member</b>	<b>2015</b>
<b>NSF NeTS, Review panel member</b>	<b>2013</b>
<b>Additional Peer Review</b>	
<b>ACM SIGCOMM Computer Communication Review (CCR), Reviewer</b>	<b>2011 - 2013</b>
<b>ACM/IEEE Transactions on Networking (ToN), Reviewer</b>	<b>2012 - 2013</b>
<b>Computer Communications, Reviewer</b>	<b>2012</b>