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EDUCATIONAL BACKGROUND

Degree	Year	University	Field
Ph.D.	2005	Massachusetts Institute of Technology Cambridge, MA <i>Dissertation:</i> Proactive Techniques for Correct and Predictable Internet Routing <i>Sprows Honorable Mention for best MIT Ph.D. dissertation in computer science</i> <i>Advisor:</i> Hari Balakrishnan Minor in Game Theory	Computer Science
M.Eng.	2001	Massachusetts Institute of Technology Cambridge, MA <i>Dissertation:</i> Adaptive Delivery of Real-Time Streaming Video <i>Advisor:</i> Hari Balakrishnan <i>William A. Martin Memorial Thesis Award</i> (MIT M.Eng. thesis award)	Computer Science
S.B.	2000	Massachusetts Institute of Technology Cambridge, MA	Electrical Engineering and Computer Science

EMPLOYMENT HISTORY

Title	Organization	Years
Assistant Professor	Georgia Institute of Technology	2006–Present
Postdoctoral Research Staff	Princeton University	Fall 2005
Research Assistant	Massachusetts Institute of Technology	2000–2005
Intern/Consultant	AT&T Labs–Research	2001–2005
Technical Associate	Bell Laboratories	1999
Intern	Hewlett-Packard Laboratories	1999
Technical Staff	LookSmart, Ltd.	1997

CURRENT FIELDS OF INTEREST

My research focuses on networked computer systems, with a strong emphasis on network architecture and protocol design; network security, management and measurement; routing; and anti-censorship techniques. The primary goal of my research is to help network operators run their networks better, and to enable users of these networks (both public and private) to experience high availability and good end-to-end performance. I have a strong interest in tackling practical problems using a “first principles” approach, designing systems based on these principles, and implementing and deploying these systems in practice.

I. TEACHING

A. Courses Taught

Quarter/Year	Course Number & Title	Number of Students	Comments
Spring 2006	CS 7260 Internetworking Protocols and Architectures	27	New Syllabus
Fall 2006	CS 7001 Introduction to Graduate Studies	74	New Syllabus
Fall 2006	CS 8001 Networking Research Seminar	30	New Syllabus
Fall 2006	CS 1100 Freshman Leap Seminar	15	
Spring 2007	CS 7260 Internetworking Protocols and Architectures	29	
Fall 2007	CS 7001 Introduction to Graduate Studies	53	
Spring 2008	CS 4251 Computer Networking II	14	New Syllabus
Fall 2008	CS 4251 Computer Networking II	16	
Fall 2008	CS 7001 Introduction to Graduate Studies	44	
Spring 2009	CS 6262 Network Security	45	Updated Syllabus
Fall 2009	CS 7001 Introduction to Graduate Studies	39	
Spring 2010	CS 3251 Computing Networking I	53	
Spring 2010	CS 8803 NGN Next Generation Networking	50	New Course

Guest lecture for MIT Course 6.829 (Computer Networking) in Fall 2005.

Multiple guest lectures for CS 4251 (Computer Networks II) in Spring 2006.

Guest lecture for CS 3251 (Computer Networks I) in Fall 2006.

Guest lecture for CS 6250 (Advanced Computer Networks) in Fall 2007.

Lecture for DIMACS Tutorial on Next-Generation Internet Routing Algorithms in August 2007.

B. Curriculum Development

CS 8803 Next-Generation Networking: I have developed a brand-new graduate course that gives students practical experience with a variety of tools for next-generation networking, ranging from the Click software router to the OpenFlow switch framework. The course also teaches students about the state of the art in networking research—students read papers about research and industry trends and do a course project that incorporates aspects of these new technologies. This course relates to the larger nationwide effort on Global Environment for Network Innovations (GENI), which is building infrastructure for researchers to provide the next generation of networking protocols and technologies.

CS 7001 Introduction to Graduate Studies: With Professor Alex Gray, I have developed a new course syllabus and structure to CS 7001 around the larger goal of introducing new students to *how to do great research* as soon as their first term at Georgia Tech. In contrast with previous terms, where CS 7001 consisted of faculty “advertisements” for their research and projects consisted of short “mini-projects” where little research could be accomplished in a short time span of 3 weeks, we have improved the syllabus by bringing in faculty members to talk about research philosophy, exciting new directions, etc. We have also given the students the option to do a research project that is a term-long project in conjunction with CS 8903; our goal is to give students the flexibility to select meaningful research problems based on their research assistantships while helping them learn the skills required for writing papers, finding and evaluating research ideas, and performing other tasks associated with doing great research. Alex Gray and I wrote a conference paper on our development of this course, which appeared at *ACM SIGCSE 2008*.

College of Computing Research Day and Seminar Series: In addition to the course itself, to fulfill some of the functions of the former 7001 course, Alex Gray and I financed and organized a college-wide seminar

series and research day in Fall 2009. Throughout the term, faculty speakers from across the college gave one-hour talks about their research; we raised money from Yahoo to support this event. The research day brings together students and faculty from around the college to see talks, demonstrations, and posters from around the collage to exchange ideas.

CS 4251 Computer Networking II: *Spring/Fall 2008.* Developed new hands-on assignments to give students experience with real-world networking tools and software (*e.g.*, Emulab, Quagga, Click). Revamped the course around various high-level themes in networking, including layering, resource sharing, tree formation (routing and forwarding, etc.). Developed over 20 new lectures for the syllabus, as well as new problem sets which can be re-used for future offerings of the course.

CS 6262 Network Security: *Spring 2009.* In the process of updating the syllabus to include recent network attacks (*e.g.*, spam, botnets, reflection attacks, etc.) and also to integrate more hands-on assignments. Updating problem sets and project lists.

CS 7260 Internetworking Architectures and Protocols: *Spring 2006.* Developed a new project-based graduate course with substantial programming assignments using a wide variety of state-of-the-art networking software tools and platforms (*e.g.*, rcc, PlanetLab, scriptroute, NetFlow, etc.). Contributed questions to a larger bank of questions also used in graduate-level networking courses at Carnegie Mellon and MIT. Developed 24 new lectures, many based on current “hot topics” in computer networking (*e.g.*, spam, botnets, traffic anomaly detection, etc.)

Spring 2007. Developed two new course modules: (1) sound techniques for network measurement; and (2) evaluation platforms (Emulab, VINI, etc.). Developed new problem sets on these topics. With faculty at Carnegie Mellon, instituted the use of a cross-institutional online forum for paper discussion. Students read papers from the CS 7260 syllabus and comment on papers before class to help stimulate paper discussion; students also read the discussion blog and can comment on papers being discussed in networking classes at other schools.

C. Individual Student Guidance

C.1. Postdocs Supervised

Cristian Lumezanu College of Computing
Fall 2009 - Present
Research on Internet measurement and economics.

C.2. Ph.D. Students Supervised

Mukarram Bin Tariq College of Computing
Spring 2007 - Spring 2010
Co-advised with Mostafa Ammar. Research on statistical inference methods for network planning and troubleshooting problems. Mukarram’s dissertation work is now part of operational systems at Google. Mukarram is now working full time in Google’s network monitoring group.

Anirudh Ramachandran College of Computing
Spring 2006 - Present
Research on network-level behavior of spammers and passive botnet detection.

Murtaza Motiwala College of Computing
Fall 2006 - Present

Research on (1) in-band troubleshooting and (2) scalable network architectures for path diversity, including path splicing.

Vytautas Valancius College of Computing
Summer 2007 - Present
Research on interdomain routing and network virtualization.

Shuang Hao College of Computing
Fall 2007 - Present
Research on botnet detection, network monitoring, and spam filtering.

Maria Konte College of Computing
Fall 2007 - Present
Measurement study of fast-flux networks.

Robert Lychev College of Computing
Fall 2008 - Present
Research on contract enforcement for transit markets.

Sam Burnett College of Computing
Fall 2008 - Present
Design and implementation of anti-censorship systems.

Bilal Anwer College of Computing
Fall 2006 - Present
Research on support for hardware forwarding in virtual network environments.

Yogesh Mundada College of Computing
Fall 2007 - Present
Development of experiment specification for VINI and integration of VINI with Emulab.

C.3. Masters Students Supervised

Winston Wang M.I.T. EECS
Fall 2002 - Spring 2003
Thesis on an implementation of the Infranet anti-censorship system received MIT's Charles and Jennifer Johnson Thesis Prize.

Manas Khadilkar College of Computing
Fall 2006 - Spring 2007
Research on efficient settings of lease times for DHCP address allocation. Algorithm in development, to be used on the Georgia Tech campus network for optimizing lease time settings. Manas now works full-time for Expedia.

Han Lu College of Computing
Fall 2006 - Spring 2007
Research on spam traffic patterns by IP address space, to study the persistence of spamming IP addresses.

Samantha Lo Hong Kong Polytechnic University
Spring 2007
Research on market-based network architectures and inbound traffic engineering. Samantha is now a Ph.D. student at Georgia Tech.

Chris Kelly College of Computing
Fall 2006 - Fall 2007

Developing new software features for the Campus-Wide Performance Monitoring and Recovery (CPR) project. *Chris now works full-time for SugarCRM, an Atlanta-based startup.*

Yiyi Huang College of Computing
Spring 2006 - Fall 2009
Co-advised with Jim Xu. Research on fast, distributed network anomaly detection. Yiyi now works full-time at Microsoft.

Nadeem Syed College of Computing
Spring 2007 - Spring 2008
Co-advised with Alex Gray. Developing and implementing new machine learning techniques for fast disruption detection.

Kaushik Bhandakar College of Computing
Spring 2007 - Summer 2008
Experiments for VINI performance benchmarking; implementation and prototyping for the "Pedigree" packet provenance project; research on incentives in BitTorrent.

Umayr Hassan College of Computing
Fall 2008 - Spring 2010
Research on the design of a market for Internet transit, and on home network configuration.

Ankur Nayak College of Computing
Spring 2009 - Present
Dynamic access control with programmable switches.

C.4. Undergraduate Students Supervised

Alex Reimers College of Computing
Spring 2009 - Present
Worked on dynamic access control (a replacement of Georgia Tech OIT's current authentication system) with programmable switches. Alex now works full time at Cisco.

Megan Elmore College of Computing
Fall 2007 - Present
Experiments for interdomain path splicing; design and implementation of the path splicing prototype. Work received 2nd prize in 2008 Georgia Tech College of Computing undergraduate research competition. Megan was also the winner of the 2009 College of Computing Undergraduate Research Award, and the 2009 Sigma Xi Best Undergraduate Researcher Award. Megan is now a Ph.D. student at Stanford University.

Hongyi Hu M.I.T. EECS
Spring 2005 - Fall 2005
Extensions to the rcc router configuration checker tool for static configuration analysis of internal routing protocol configurations.

C.5. Special Projects

Daniel Mentz College of Computing
Spring 2006 - Summer 2006
Research on campus network security troubleshooting.

Buddy Moore College of Computing
Summer 2006
Implemented distributed version of the Infranet anti-censorship software. Publicly available.

Amit Khanna College of Computing

Fall 2006

Implemented Secure BGP (S-BGP) in the Quagga software router. Software publically available and operators are using the codebase for ongoing work on certificates for secure routing.

Bhairav Dutia College of Computing

Fall 2006

Research on anti-censorship techniques and countermeasures.

Megan Benoit College of Computing

Fall 2006

Research on spammers' email address harvesting practices.

Sagar Mehta College of Computing

Fall 2006 - Spring 2008

Research on anti-phishing techniques.

Radhika Partharathy College of Computing

Fall 2008

Research on anti-phishing techniques.

Sonali Batra College of Computing

Summer 2009

Research on anti-phishing techniques.

II. RESEARCH AND CREATIVE SCHOLARSHIP

A. Theses

- A.0.1 Nick Feamster. *Proactive Techniques for Correct and Predictable Internet Routing*. PhD thesis, Massachusetts Institute of Technology, February 2006. Winner of the MIT George M. Sprowls Honorable Mention for Best MIT Ph.D. Dissertation in Computer Science.
- A.0.2 Nick Feamster. Adaptive delivery of real-time streaming video. Master's thesis, Massachusetts Institute of Technology, May 2001. Winner of the MIT EECS William A. Martin Memorial Thesis Award.

B. Journal Publications

- B.0.1 Bilal Answer and Nick Feamster. Building a fast, virtualized data plane with programmable hardware. *ACM SIGCOMM Computer Communication Review*, April 2010.
- B.0.2 Nick Feamster, Ramesh Johari, and Hari Balakrishnan. Stable Policy Routing with Provider Independence. *IEEE/ACM Transactions on Networking*, December 2007.
- B.0.3 Nick Feamster and Jennifer Rexford. Network-Wide Prediction of BGP Routes. *IEEE/ACM Transactions on Networking*, June 2007.
- B.0.4 Nick Feamster, Jaeyeon Jung, and Hari Balakrishnan. An Empirical Study of "Bogon" Route Advertisements. *ACM Computer Communications Review*, 35(1):63–70, November 2004.
- B.0.5 Nick Feamster, Jay Borckenhagen, and Jennifer Rexford. Guidelines for Interdomain Traffic Engineering. *ACM Computer Communications Review*, 33(5):19–30, October 2003.

C. Books and Book Chapters

- C.0.1 Anirudh Ramachandran, Nick Feamster, and David Dagon. *Botnet Detection: Countering the Largest Security Threat*. Springer, 2008. Chapter: Revealing Botnet Membership with DNSBL Counterintelligence.

D. Refereed Conference Publications

- D.0.1 Vytautas Valancius, Nick Feamster, Jennifer Rexford, and Akihiro Nakao. Wide-Area Routing for Distributed Services. In *Proc. USENIX Annual Technical Conference*, Boston, MA, June 2010.
- D.0.2 Roberto Perdisci, Wenke Lee, and Nick Feamster. Behavioral Clustering of HTTP-Based Malware. In *Proc. 7th ACM/USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, San Jose, CA, April 2010.
- D.0.3 Mohammed Mukarram bin Tariq, Murtaza Motiwala, Nick Feamster, and Mostafa Ammar. Detecting General Network Neutrality Violations with Causal Inference. In *4th International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*, Rome, Italy, December 2009.
- D.0.4 Mohammed Mukarram bin Tariq, Ahmed Mansy, Nick Feamster, and Mostafa Ammar. Measuring VLAN-Induced Sharing on a Campus Network. In *Proc. ACM SIGCOMM Internet Measurement Conference*, Chicago, Illinois, October 2009.

- D.0.5 Italo Cunha, Renata Teixeira, Nick Feamster, and Christophe Diot. Techniques for Fast and Accurate Network Tomography. In *Proc. ACM SIGCOMM Internet Measurement Conference*, Chicago, Illinois, October 2009.
- D.0.6 Shuang Hao, Nadeem Syed, Nick Feamster, Alexander Gray, and Sven Krasser. Detecting Spammers with SNARE: Spatio-temporal Network-level Automatic Reputation Engine. In *Proc. 18th USENIX Security Symposium*, Montreal, Quebec, Canada, August 2009.
- D.0.7 Maria Konte, Nick Feamster, and Jaeyeon Jung. Dynamics of Online Scam Infrastructure. In *Proc. Passive and Active Measurement Conference*, Seoul, Korea, March 2009.
Best paper award.
- D.0.8 Anirudh Ramachandran, Srinivasan Seetharaman, Nick Feamster, and Vijay Vazirani. Fast Monitoring of Traffic Subpopulations. In *Proc. ACM SIGCOMM Internet Measurement Conference*, Vouliagmeni, Greece, October 2008.
- D.0.9 Murtaza Motiwala, Megan Elmore, Nick Feamster, and Santosh Vempala. Path Splicing. In *Proc. ACM SIGCOMM*, Seattle, WA, August 2008.
- D.0.10 Mohammed Mukarram bin Tariq, Amgad Zeitoun, Nick Feamster, and Mostafa Ammar. Answering What-If Deployment and Configuration Questions with WISE. In *Proc. ACM SIGCOMM*, Seattle, WA, August 2008.
- D.0.11 David Andersen, Hari Balakrishnan, Nick Feamster, and Scott Shenker. Accountable Internet Protocol (AIP). In *Proc. ACM SIGCOMM*, Seattle, WA, August 2008.
- D.0.12 Nick Feamster and Alexander Gray. Can Great Research Be Taught? Independent Research with Cross-Disciplinary Thinking and Broader Impact. In *ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE)*, Portland, OR, March 2008.
- D.0.13 Anirudh Ramachandran, Nick Feamster, and Santosh Vempala. Filtering Spam with Behavioral Blacklisting. In *Proc. 14th ACM Conference on Computer and Communications Security (CCS)*, Alexandria, VA, October 2007.
- D.0.14 Manas Khadilkar, Nick Feamster, Russ Clark, and Matt Sanders. Usage-Based DHCP Lease Time Optimization. In *Proc. ACM SIGCOMM Internet Measurement Conference*, San Diego, CA, October 2007.
- D.0.15 Yiyi Huang, Nick Feamster, Anukool Lakhina, and Jim Xu. Exposing Routing Problems with Network-Wide analysis. In *Proc. ACM SIGMETRICS*, San Diego, CA, June 2007.
- D.0.16 Feng Wang, Nick Feamster, and Lixin Gao. Measuring the contributions of routing dynamics to prolonged end-to-end internet path failures. In *Proc. IEEE Conference on Global Communications (GlobeCom)*, Washington, DC, November 2007.
- D.0.17 Christopher P. Lee, Keshav Attrey, Carlos Caballero, Nick Feamster, Milena Mihail, and John A. Copeland. MobCast: Overlay Architecture for Seamless IP Mobility using Scalable Anycast Proxies. In *IEEE Wireless Communications and Networking Conference*, Hong Kong, March 2007.
- D.0.18 Anirudh Ramachandran and Nick Feamster. Understanding the Network-Level Behavior of Spammers. In *Proc. ACM SIGCOMM*, Pisa, Italy, August 2006. An earlier version appeared as Georgia Tech TR GT-CSS-2006-001.
Best student paper award.

- D.0.19 Andy Bavier, Nick Feamster, Mark Huang, Larry Peterson, and Jennifer Rexford. In VINI Veritas: Realistic and controlled network experimentation. In *Proc. ACM SIGCOMM*, Pisa, Italy, August 2006.
- D.0.20 Nick Feamster and Hari Balakrishnan. Correctness Properties for Internet Routing. In *Forty-third Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, September 2005.
- D.0.21 Nick Feamster, Ramesh Johari, and Hari Balakrishnan. The Implications of Autonomy for Stable Policy Routing. In *Proc. ACM SIGCOMM*, pages 25–36, Philadelphia, PA, August 2005.
- D.0.22 Michael Freedman, Mythili Vutukuru, Nick Feamster, and Hari Balakrishnan. Geographic Locality of IP Prefixes. In *Proc. ACM SIGCOMM Internet Measurement Conference*, New Orleans, LA, October 2005.
- D.0.23 Nick Feamster and Hari Balakrishnan. Detecting BGP Configuration Faults with Static Analysis. In *Proc. 2nd Symposium on Networked Systems Design and Implementation (NSDI)*, pages 43–56, Boston, MA, May 2005.
Best paper award.
- D.0.24 Matthew Caesar, Don Caldwell, Nick Feamster, Jennifer Rexford, Aman Shaikh, and Kobus van der Merwe. Design and Implementation of a Routing Control Platform. In *Proc. 2nd Symposium on Networked Systems Design and Implementation (NSDI)*, pages 15–28, Boston, MA, May 2005.
- D.0.25 Nick Feamster, Zhuoqing Morley Mao, and Jennifer Rexford. BorderGuard: Detecting Cold Potatoes from Peers. In *Proc. ACM SIGCOMM Internet Measurement Conference*, pages 213–218, Taormina, Sicily, Italy, October 2004.
- D.0.26 Nick Feamster, Jared Winick, and Jennifer Rexford. A Model of BGP Routing for Network Engineering. In *Proc. ACM SIGMETRICS*, pages 331–342, New York, NY, June 2004.
- D.0.27 Nick Feamster, David Andersen, Hari Balakrishnan, and M. Frans Kaashoek. Measuring the Effects of Internet Path Faults on Reactive Routing. In *Proc. ACM SIGMETRICS*, pages 126–137, San Diego, CA, June 2003.
- D.0.28 Nick Feamster, Magdalena Balazinska, Greg Harfst, Hari Balakrishnan, and David Karger. Infranet: Circumventing Web censorship and surveillance. In *Proc. 11th USENIX Security Symposium*, San Francisco, CA, August 2002.
Best student paper award.
- D.0.29 Kevin Fu, Emil Sit, Kendra Smith, and Nick Feamster. Dos and don'ts of client authentication on the Web. In *Proc. 10th USENIX Security Symposium*, Washington, DC, August 2001.
Best student paper award.
- D.0.30 Susie Wee, John Apostolopoulos, and Nick Feamster. Field-to-frame transcoding with temporal and spatial downsampling. In *IEEE International Conference on Image Processing*, October 1999.
- D.0.31 Nick Feamster and Susie Wee. An MPEG-2 to H.263 transcoder. In *SPIE Voice, Video, and Data Communications Conference*, Boston, MA, September 1999.

E. Workshop Publications

- E.0.1 Bilal Answer and Nick Feamster. Building a fast, virtualized data plane with programmable hardware. In *ACM SIGCOMM Workshop on Virtualized Infrastructure, Services, and Architectures (VISA)*, Barcelona, Spain, August 2009.
- E.0.2 Ankur Nayak, Alex Reimers, Russ Clark, and Nick Feamster. Resonance: Dynamic Access Control for Enterprise Networks. In *ACM SIGCOMM Workshop on Research in Enterprise Networks (WREN)*, Barcelona, Spain, August 2009.
- E.0.3 Sapan Bhatia, Murtaza Motiwala, Wolfgang Muehlbauer, Yogesh Mundada, Vytautas Valancius, Andy Bavior, Nick Feamster, Larry Peterson, and Jennifer Rexford. Trellis: A Platform for Building Flexible, Fast Virtual Networks on Commodity Hardware. In *3rd International Workshop on Real Overlays & Distributed Systems*, December 2008.
- E.0.4 Vytautas Valancius, Nick Feamster, Ramesh Johari, and Vijay Vazirani. MINT: A Market for Internet Transit. In *ACM SIGCOMM CoNext Workshop on Re-Architecting the Internet*, December 2009.
- E.0.5 Mohammed Mukarram bin Tariq, Murtaza Motiwala, and Nick Feamster. NANO: Network Access Neutrality Observatory. In *Proc. 7th ACM Workshop on Hot Topics in Networks (Hotnets-VII)*, Calgary, Alberta, Canada, October 2008.
- E.0.6 S. Yardi, N. Feamster, and A. Bruckman. Photo-Based Authentication Using Social Networks. In *Proc. ACM SIGCOMM Workshop on Online Social Networks*, Seattle, WA, August 2008.
- E.0.7 Anirudh Ramachandran and Nick Feamster. Authenticated Out-of-Band Communication over Social Links. In *Proc. ACM SIGCOMM Workshop on Online Social Networks*, Seattle, WA, August 2008.
- E.0.8 Murtaza Motiwala, Nick Feamster, and Santosh Vempala. Path Splicing: Reliable Connectivity with Rapid Recovery. In *Proc. 6th ACM Workshop on Hot Topics in Networks (Hotnets-VI)*, Atlanta, GA, November 2007.
- E.0.9 David G. Andersen, Hari Balakrishnan, Nick Feamster, and Scott Shenker. Holding the Internet Accountable. In *Proc. 6th ACM Workshop on Hot Topics in Networks (Hotnets-VI)*, Atlanta, GA, November 2007.
- E.0.10 Anirudh Ramachandran, Atish das Sarma, and Nick Feamster. BitStore: An Incentive-Compatible Solution for Blocked Downloads in Bittorrent. In *ACM Joint Workshop on The Economics of Networked Systems and Incentive-Based Computing (NetEcon)*, San Diego, CA, June 2007.
- E.0.11 Anirudh Ramachandran, Nick Feamster, and David Dagon. Revealing Botnet Membership with DNSBL Counter-Intelligence. In *2nd USENIX Workshop on Steps to Reducing Unwanted Traffic on the Internet (SRUTI)*, San Jose, CA, July 2006.
- E.0.12 Anirudh Ramachandran, David Dagon, and Nick Feamster. Can DNSBLs Keep Up with Bots? In *3rd Conference on Email and Anti-Spam (CEAS)*, Mountain View, CA, July 2006.
- E.0.13 Nick Feamster, Hari Balakrishnan, and Jennifer Rexford. Some foundational problems in interdomain routing. In *Proc. 3rd ACM Workshop on Hot Topics in Networks (Hotnets-III)*, San Diego, CA, November 2004.
- E.0.14 Nick Feamster, Hari Balakrishnan, Jennifer Rexford, Aman Shaikh, and Kobus van der Merwe. The Case for Separating Routing from Routers. In *ACM SIGCOMM Workshop on Future Directions in Network Architecture*, pages 5–12, Portland, OR, September 2004.

- E.0.15 Nick Feamster and Roger Dingledine. Location diversity in anonymity networks. In *ACM Workshop on Privacy in the Electronic Society*, Washington, DC, October 2004.
- E.0.16 Nick Feamster, Magdalena Balazinska, Winston Wang, Hari Balakrishnan, and David Karger. Thwarting Web censorship with untrusted messenger discovery. In *3rd Workshop on Privacy Enhancing Technologies*, Dresden, Germany, March 2003.
- E.0.17 Nick Feamster. Practical Verification Techniques for Wide-Area Routing. In *Proc. 2nd ACM Workshop on Hot Topics in Networks (Hotnets-II)*, pages 87–92, Cambridge, MA, November 2003.
- E.0.18 Nick Feamster and Hari Balakrishnan. Towards a Logic for Wide-Area Internet Routing. In *ACM SIGCOMM Workshop on Future Directions in Network Architecture*, pages 289–300, Karlsruhe, Germany, August 2003.
- E.0.19 David G. Andersen, Nick Feamster, Steve Bauer, and Hari Balakrishnan. Topology inference from BGP routing dynamics. In *Proc. ACM SIGCOMM Internet Measurement Workshop*, Marseille, France, November 2002.
- E.0.20 Nick Feamster and Hari Balakrishnan. Packet loss recovery for streaming video. In *Proc. 12th International Packet Video Workshop (PV 2002)*, Pittsburgh, PA, April 2002.
- E.0.21 Nick Feamster, Deepak Bansal, and Hari Balakrishnan. On the interactions between congestion control and layered quality adaptation for streaming video. In *11th International Packet Video Workshop*, Kyongju, Korea, May 2001.

F. Other

F.1. Submitted Journal Papers

Removed for external version.

F.2. Submitted Conference and Workshop Papers

Removed for external version.

F.3. Other Technical Reports, Unrefereed Papers, and Drafts in Preparation

- F.3.1 Vytautas Valancius, Nick Feamster, Ramesh Johari, and Vijay Vazirani. A Market for Internet Connectivity, March 2010. *In Preparation.*
- F.3.2 Robert Lychev and Nick Feamster. Derailing Depeering: Incentives for Interdomain Contracts, March 2010. *In Preparation.*
- F.3.3 Srikanth Sundaresan, Lucas Di Cioccio, Nick Feamster, and Renata Teixeira. Which Factors Affect Access Network Performance?, November 2009. *In Preparation.*
- F.3.4 Anirudh Ramachandran, Hitesh Khandelwal, Shuang Hao, Nick Feamster, and Santosh Vempala. A Dynamic Reputation Service for Spotting Spammers, March 2010. *In Preparation.*
- F.3.5 Anirudh Ramachandran, Nick Feamster, Kobus van der Merwe, Balachander Krishnamurthy, and Oliver Spatschek. Fishing for Phishing in the Network Stream. March 2010. *In Preparation.*
- F.3.6 Vytautas Valancius and Nick Feamster. Managing BGP Routes with a BGP Session Multiplexer. Technical Report GT-CS-08-05, Georgia Tech School of Computer Science, July 2008.

- F.3.7 Anirudh Ramachandran, Kaushik Bhandakar, Mohammed Mukarram bin Tariq, and Nick Feamster. Packets with Provenance. Technical Report GT-CS-08-02, Georgia Tech School of Computer Science, February 2008.
- F.3.8 Shuang Hao and Nick Feamster. Estimating Botnet Populations from Attack Traffic. April 2008.
- F.3.9 Sapan Bhatia, Murtaza Motiwala, Wolfgang Muhlbauer, Vytautas Valancius, Andy Bav-ior, Nick Feamster, Larry Peterson, and Jennifer Rexford. Hosting Virtual Networks on Commodity Hardware. Technical Report GT-CS-07-10, Georgia Institute of Technology, Atlanta, GA, October 2007.
- F.3.10 Nick Feamster, Murtaza Motiwala, and Andy Bavier. In-Band Network Path Diagnosis. *In Submission*.
- F.3.11 Yiyi Huang, Nick Feamster, Renata Teixeira, and Christophe Diot. Making Tomography Practical: Scalable Network Monitoring for Fault Diagnosis. *In submission*.
- F.3.12 Nick Feamster, Ramesh Johari, and Vijay Vazirani. AGORA: A Market for Internet Connectivity. In *Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO)*, Princeton, NJ, May 2007.
- F.3.13 Murtaza Motiwala, Nick Feamster, and Santosh Vempala. Improving Interdomain Routing Security with BGP Path Splicing. In *Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO)*, Princeton, NJ, May 2007.
- F.3.14 Vytautas Valancius and Nick Feamster. Layering the Interdomain Routing Layer. In *Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO)*, Princeton, NJ, May 2007.
- F.3.15 Nick Feamster, Lixin Gao, and Jennifer Rexford. How to Lease the Internet in Your Spare Time. *ACM Computer Communications Review*, 37(1), January 2007. Editorial section.
- F.3.16 Nick Feamster. Can Information from End Systems Improve Routing? In *Workshop on Internet Routing Evolution and Design (WIRED)*, Atlanta, GA, October 2006.
- F.3.17 Murtaza Motiwala and Nick Feamster. Network Troubleshooting on Data Plane Coat-tails. In *Workshop on Internet Routing Evolution and Design (WIRED)*, Atlanta, GA, October 2006.
- F.3.18 David G. Andersen and Nick Feamster. Challenges and opportunities in Internet data mining. Technical Report CMU-PDL-06-102, Carnegie Mellon University, January 2006.
- F.3.19 Nick Feamster and Hari Balakrishnan. Verifying the correctness of wide-area Internet routing. Technical Report MIT-LCS-TR-948, Massachusetts Institute of Technology, May 2004.
- F.3.20 Nick Feamster. Rethinking routing configuration: Beyond stimulus-response reasoning. In *Workshop on Internet Routing Evolution and Design (WIRED)*, Mt. Hood, OR, October 2003.
- F.3.21 Nick Feamster and Jennifer Rexford. Network-Wide BGP Route Prediction for Traffic Engineering. In *Proc. SPIE ITCOM*, volume 4868, pages 55–68, Boston, MA, August 2002.
- F.3.22 Nick Feamster, Jennifer Rexford, and Jay Borkenhagen. Controlling the impact of BGP policy changes on IP traffic. Technical Report 011106-02, AT&T Labs–Research, Florham Park, NJ, November 2001.
- F.3.23 Russ White, B. Akyol, and Nick Feamster. *Considerations in Validating the Path in Routing Protocols*. IETF, June 2005.

F.4. Software

- F.4.1 *Campus-Wide OpenFlow Deployment: Access and Information Flow Control for Enterprise Networks.* Resonance is a system for controlling access and information flow in an enterprise network. Network operators currently use access control systems that are coarse-grained (i.e., it is difficult to apply specialized policy to individual users) and static (i.e., it is difficult to quickly change the extent of a user's access). Towards fixing these problems, we have developed a system that allows network operators to program network policy using a controller that is distinct from the switch itself and can be programmed to implement network-wide policy. We have implemented and deployed this system in an operational network that spans two buildings on the Georgia Tech campus; the network sees regular use, and a deployment in Georgia Tech dormitories or the wireless network is planned for the near future. We demonstrated the function of this network at the 7th GENI Engineering Conference in March 2010. See <http://groups.geni.net/geni/wiki/DTunnels> for details.
- F.4.2 *NANO: Network Access Neutrality Observatory.* The Network Access Neutrality Observatory (NANO) is a system to help users determine whether their traffic is being discriminated against by an access ISP. In contrast to existing systems for detecting network neutrality violations, NANO makes no assumptions about the mechanism for discrimination or the services that the ISP might be discriminated against. NANO has been released in collaboration with Google as part of the Measurement Lab project. A preliminary version of the software was released to a small group of users in March 2009 for testing; a more extensive release is planned for Summer 2009. See <http://gtnoise.net/nano/>.
- F.4.3 *Implementation of GENI Prototype: Virtual Networks and BGP Session Multiplexer.* In the process of developing software for the NSF-Sponsored GENI Project Office. This project (1) adds facilities and functions to the VINI testbed to enable experiments to carry traffic from real users; and (2) increases the experimental use of the VINI testbed by providing a familiar experiment management facility. The deliverables for this project all comprise software for supporting external connectivity and flexible, facile experimentation on the GENI testbed. The primary deliverables are a BGP session multiplexer—a router based on the Quagga software routing suite, software support for virtual tunnel and node creation, and integration of the above functionality with clearinghouse services developed as part of the ProtoGENI project. See <http://groups.geni.net/geni/wiki/DTunnels>.
- This project contributes to GENI design and prototyping through BGP mux development integration with ISPs; tunnel and topology establishment and management; ProtoGENI clearinghouse integration; and support for isolation and resource swapout. With researchers at Princeton, we have also built VINI, a large distributed testbed for specifying virtual network topologies and experimenting with routing protocols and architectures in a controlled, realistic emulation environment. See <http://vini-veritas.net/> for details.
- F.4.4 *rcc: router configuration checker.* Static configuration analysis tool for Border Gateway Protocol (BGP) routing configurations. Downloaded by over 100 network operators and many large, nationwide backbone ISPs around the world. See <http://gtnoise.net/rcc/> for details.
- F.4.5 *Infranet.* System for circumventing Web censorship firewalls (e.g., those in China, Saudia Arabia, etc.). Available on Sourceforge. Featured in articles in *Technology Review*, *New Scientist*, and *Slashdot*. See <http://nms.lcs.mit.edu/projects/infranet/>.

- F.4.6 *The Datapostory*. Originally the “MIT BGP Monitor”, the Datapostory is growing to support multiple data feeds (e.g., spam, end-to-end measurement probes, traceroutes, Abilene data, etc.). Currently used by researchers at Georgia Tech, Carnegie Mellon, University of Michigan, Princeton, MIT. See <http://www.datapostory.net/> for details.
- F.4.7 *Secure BGP Implementation*. Implementation of S-BGP in the Quagga software router. Our implementation may be used by Randy Bush and Geoff Huston in their project to develop a certificate infrastructure for secure routing protocols.
- F.4.8 *SR-RTP*. Transport protocol for selective retransmission of packets in an MPEG video stream. Incorporated into “Oxygen TV” for MIT Project Oxygen. Some ideas incorporated into the OpenDivX video transport protocol.

F.5. Conference Posters and Demos

- F.5.1 Anirudh Ramachandran, Yogesh Mundada, Mukarram bin Tariq, and Nick Feamster. Securing Enterprise Networks with Traffic Tainting. In *Proc. ACM SIGCOMM*, Barcelona, Spain, August 2009. Demo.
- F.5.2 Vytautas Valancius, Nick Feamster, Jennifer Rexford, and Aki Nakao. Transit Portal: Bringing Connectivity to the Cloud. In *Proc. ACM SIGCOMM*, Barcelona, Spain, August 2009. Demo.
- F.5.3 Murtaza Motiwala, Megan Elmore, Yogesh Mundada, and Nick Feamster. Network and End-System Support for Transparent Use of Multiple Paths. In *Proc. ACM SIGCOMM*, Barcelona, Spain, August 2009. Demo.
- F.5.4 Sam Burnett, Nick Feamster, and Santosh Vempala. Circumventing Internet Censorship with Collage. In *Proc. 6th Symposium on Networked Systems Design and Implementation (NSDI)*, Boston, MA, April 2009. Demo.
- F.5.5 Anirudh Ramachandran, Kaushik Bhandakar, Mohammed Mukarram bin Tariq, and Nick Feamster. Packets with Provenance. In *Proc. ACM SIGCOMM*, Seattle, WA, August 2008.
- F.5.6 Yogesh Mundada, Murtaza Motiwala, , Vytautas Valancius, Andy Bavier, Nick Feamster, Larry Peterson, Sapan Bhatia, and Jennifer Rexford. Trinity: A Framework for Managing Wide-Area Virtual Networks. In *Proc. 5th Symposium on Networked Systems Design and Implementation (NSDI)*, San Francisco, CA, April 2008.
- F.5.7 Vytautas Valancius and Nick Feamster. Multiplexing BGP Sessions with BGP-Mux. In *3rd International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*, New York, NY, December 2007.
- F.5.8 Nadeem Syed, Nick Feamster, and Alex Gray. Predicting bad behavior. In *NIPS Workshop on Machine Learning in Adversarial Environments for Computer Security*, Whistler, Canada, December 2007.
- F.5.9 Murtaza Motiwala, Andy Bavier, and Nick Feamster. In-Band Network Troubleshooting. In *Proc. Fourth Symposium on Networked Systems Design and Implementation (NSDI)*, Cambridge, MA, April 2007.
- F.5.10 Anirudh Ramachandran and Nick Feamster. Understanding the Network-Level Behavior of Spammers. In *Proc. Third Symposium on Networked Systems Design and Implementation (NSDI)*, San Jose, CA, May 2006.

- F.5.11 Nick Feamster and Hari Balakrishnan. Detecting BGP Configuration Faults with Static Analysis. In *Proc. First Symposium on Networked Systems Design and Implementation (NSDI)*, San Francisco, CA, March 2004.

G. Research Proposals and Grants (Principal Investigator)

1. Approved and Funded

- G.1.1 Verification and Modeling of Wide-Area Internet Routing**
Sponsor: Cisco Systems University Research Program
Investigator(s): N. Feamster and H. Balakrishnan (PI)
Amount: \$ 95,500 for 1 year.
Awarded: June 2004
- G.1.2 CABO: Concurrent Architectures are Better than One**
Sponsor: National Science Foundation NeTS-FIND Program
Investigator(s): N. Feamster (PI), L. Gao, J. Rexford
Amount: \$ 300,000 for 4 years
Awarded: June 2006
- G.1.3 Equipment Donation for Network Operations Research**
Sponsor: Intel Corporation
Investigator(s): N. Feamster
Amount: \$30,000
Awarded: October 2006
- G.1.4 Improving Network Operations with a View from the Edge.**
Sponsor: National Science Foundation CAREER Program
Investigator(s): N. Feamster (PI)
Amount: \$400,000 for 5 years.
Awarded: January 2007
- G.1.5 Fish4Phish: Fishing for Phishing in a Large Pond**
Sponsor: AT&T Labs—Research
Investigator(s): N. Feamster (PI), O. Spatscheck, K. van der Merwe
Amount: Funding for summer intern.
Awarded: February 2007
- G.1.6 Towards an Accountable Internet Architecture**
Sponsor: National Science Foundation CyberTrust Program (Team Proposal)
Investigator(s): D. Andersen, H. Balakrishnan, N. Feamster (PI), S. Shenker
Amount: \$ 300,000 for 3 years.
Awarded: May 2007
- G.1.7 SCAN: Statistical Collaborative Analysis of Networks**
Sponsor: National Science Foundation NeTS-NBD Program
Investigator(s): N. Feamster (PI), A. Gray, J. Hellerstein, C. Guestrin
Amount: \$ 95,000 for 3 years.
Awarded: June 2007
- G.1.8 Spam Filtering Research**
Sponsor: IBM Faculty Award
Investigator(s): N. Feamster
Amount: \$ 7,500 (unrestricted gift)
Awarded: June 2007

- G.1.9 **Countering Botnets: Anomaly-Based Detection, Comprehensive Analysis, and Efficient Mitigation**
Sponsor: Department of Homeland Security BAA07-09
Investigator(s): W. Lee (PI), N. Feamster, J. Giffin
Amount: \$1,050,730 for 2 years
Awarded: January 2008
- G.1.10 **SMITE: Scalable Monitoring in the Extreme**
Sponsor: DARPA BAA 07-52: Scalable Network Monitoring
Investigator(s): N. Feamster (PI), W. Lee
Amount: \$250,000 for 2 years
Awarded: January 2008
- G.1.11 **Enabling Security and Network Management Research for Future Networks**
Sponsor: National Science Foundation CRI-IAD Program
Investigator(s): N. Feamster (PI), Z. Mao, W. Lee
Amount: \$397,426 for 3 years
Awarded: February 2008
- G.1.12 **Sloan Research Fellowship**
Sponsor: Alfred P. Sloan Foundation
Investigator(s): N. Feamster
Amount: \$45,000 for 2 years
Awarded: February 2008
- G.1.13 **Virtual Center for Network and Security Data**
Sponsor: Department of Homeland Security
Investigator(s): N. Feamster
Amount: \$48,000 for 2 years
Awarded: March 2008
- G.1.14 **CLEANSE: Cross-Layer Large-Scale Efficient Analysis of Network Activities to Secure the Internet**
Sponsor: National Science Foundation Cybertrust Program
Investigator(s): W. Lee (PI), N. Feamster and others
Amount: \$1,200,000 for 5 years
Awarded: September 2008
- G.1.15 **Routing Without Recomputation**
Sponsor: Cisco Systems
Investigator(s): N. Feamster
Amount: \$96,019 for 1 year
Awarded: September 2008
- G.1.16 **Bringing Experimenters and External Connectivity to GENI**
Sponsor: GENI Project Office
Investigator(s): N. Feamster
Amount: \$320,000 for 3 years
Awarded: September 2008
- G.1.17 **Towards a Market for Internet Connectivity**
Sponsor: Office of Naval Research
Investigator(s): N. Feamster (PI), R. Johari, V. Vazirani
Amount: \$350,000 for 1 year
Awarded: March 2009

- G.1.18 **Taint-based Information Tracking in Networked Systems**
Sponsor: National Science Foundation Trusted Computing Program
Investigator(s): N. Feamster
Amount: \$450,000 for 3 years
Awarded: August 2009
- G.1.19 **Botnet Attribution and Removal: From Axioms to Theories to Practice**
Sponsor: Office of Naval Research
Investigator(s): W. Lee (PI), D. Dagon, J. Giffin, N. Feamster, K. Shin, F. Jahanian, M. Bailey, J. Mitchell, G. Vigna, C. Kruegel
Amount: \$7,500,000 for 5 years
Awarded: August 2009
- G.1.20 **Military Network Protocol**
Sponsor: DARPA Subcontract
Investigator(s): N. Feamster
Amount: \$37,000 for 1 year
Awarded: November 2009
- G.1.21 **CI Fellowship for Cristian Lumezanu**
Sponsor: National Science Foundation
Investigator(s): C. Lumezanu, N. Feamster (PI)
Amount: \$140,000 for 1 year
Awarded: November 2009
- G.1.22 **Studying DNS Traffic Patterns**
Sponsor: Verisign
Investigator(s): N. Feamster
Amount: \$30,000 for 1 year
Awarded: November 2009
- G.1.23 **Campus Network Access and Admission Control with Openflow**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), R. Clark
Amount: \$300,000 for 3 years
Awarded: January 2010
- G.1.24 **MEDITA - Multi-layer Enterprise-wide Dynamic Information-flow Tracking & Assurance**
Sponsor: National Science Foundation
Investigator(s): N. Feamster, A. Orso (PI), M. Prvulovic
Amount: \$900,000 for 3 years
Awarded: March 2010

2. Pending

Removed for external version.

H. Research Proposals and Grants (Contributor)

1. Approved and Funded

Removed for external version.

2. Pending

I. Other

I.0.1 **In-Band, Bottom-Up Support for Network Accountability**

Sponsor: N. Feamster, W. Lee, M. Ahamad
Investigator(s): DARPA Strategic Technology Office
Amount: *White paper / Request for Information.*
Submitted: *February 2007*

I.0.2 **Towards an Accountable Internet Architecture**

Sponsor: D. Andersen, H. Balakrishnan, N. Feamster, S. Shenker
Investigator(s): DARPA Strategic Technology Office
Amount: *White paper / Request for Information.*
Submitted: *February 2007*

J. Research Honors and Awards

2010	Georgia Tech Sigma Xi Young Faculty Award
2009	Best Paper, <i>Passive and Active Measurement Conference</i>
2009	Georgia Tech Sigma Xi Best Undergraduate Research Advisor
2008	NSF Presidential Early Career Award for Scientists and Engineers (PECASE)
2008	Alfred P. Sloan Fellowship
2008	Georgia Tech College of Computing Outstanding Junior Faculty Research Award
2007	IBM Faculty Award
2007	NSF CAREER Award
2006	George M. Sprowls honorable mention for best Ph.D. thesis in computer science, MIT
2006	Best Student Paper, <i>ACM SIGCOMM (Premier Networking Conference)</i>
2005	Best Paper, <i>2nd USENIX Symposium on Networked Systems Design and Implementation</i>
2002	Best Student Paper, <i>11th Usenix Security Symposium</i>
2001	Best Student Paper, <i>10th Usenix Security Symposium</i>
2002–2005	NSF Graduate Research Fellow
2001	MIT William A. Martin Memorial Thesis Award for Best EECS Master's Thesis

III. SERVICE

A. Professional Activities

A.1. Memberships and Activities in Professional Societies

Member, ACM Special Interest Group on Data Communications (SIGCOMM)

Member, USENIX Technical Association

A.2. Conference Committee Activities

- 2010 Program Committee, *ACM SIGCOMM Workshop on Virtualized Infrastructure Systems and Architectures (VISA)*
- 2010 **Program Committee Co-Chair**, *USENIX Workshop on Internet Network Management (INM/WREN)*
- 2010 Program Committee, *ACM SIGMETRICS*
- 2010 Program Committee, *IEEE Symposium on Internet Security and Privacy*
- 2010 Program Committee, *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*
- 2010 Program Committee *3rd USENIX Workshop on Large-Scale Exploits and Emergent Threats (LEET '10)*
- 2009 Program Committee, *ACM SIGCOMM Workshop on Research on Enterprise Networks (WREN)*
- 2009 Program Committee, *ACM SIGCOMM Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO)*
- 2009 Program Committee, *USENIX Technical Conference*
- 2009 Program Committee, *ACM SIGCOMM Workshop on Economics of Networked Systems (NetE-con)*
- 2009 Program Committee *2nd USENIX Workshop on Large-Scale Exploits and Emergent Threats (LEET '09)*
- 2009 **Poster/Demo Co-Chair**, *ACM SIGCOMM*
- 2009 Program Committee, *ACM SIGMETRICS*
- 2009 Program Committee, *6th ACM/USENIX Symposium on Networked Systems Design and Implementation (NSDI)*
- 2008 Program Committee, *3rd International Workshop on Real Overlays & Distributed Systems*
- 2008 Program Committee, *ACM SIGCOMM Internet Measurement Conference*
- 2008 Program Committee, *ACM Conference on Computer and Communications Security (CCS)*
- 2008 Program Committee, *ACM SIGCOMM*
- 2008 Program Committee, *ACM SIGMETRICS*
- 2008 Program Committee, *ACM SIGCOMM Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO)*
- 2008 Program Committee, *ACM SIGCOMM Workshop on Economics of Networked Systems (NetE-con)*
- 2008 Program Committee, *17th International World Wide Web Conference (Security/Privacy Track)*

- 2008 Program Committee, *ACM SIGMETRICS Workshop on Internet Network Management*
- 2008 Program Committee, *16th IEEE LAN/MAN Workshop*
- 2007 Program Committee, *3rd Annual CoNext Conference*
- 2007 Program Committee, *ACM SIGCOMM Workshop on Internet Management (INM)*
- 2007 Program Committee, *ACM SIGCOMM Student Poster Session*
- 2007 Program Committee, *ACM SIGMETRICS Workshop on Mining Internet Data (MineNet)*
- 2007 **Co-Organizer**, DIMACS Workshop Series on Internet Security
- 2007 Program Committee, *4th Conference on Email and Anti-Spam (CEAS)*
- 2007 Program Committee, *3rd USENIX Workshop on Steps to Reduce Unwanted Traffic on the Internet (SRUTI)*
- 2007 Program Committee, *USENIX Technical Conference*
- 2007 Program Committee, *CoNext*
- 2007 Program Committee, *16th International World Wide Web Conference (Security/Privacy Track)*
- 2007 Program Committee Co-Chair, *ACM/USENIX Workshop on Networks meet Databases (NetDB)*
- 2006– Program Committee, *North American Network Operators Group (NANOG)*
- 2006 Organizer, *Workshop on Internet Routing Evolution and Design*
- 2006 Program Committee, *ACM SIGCOMM Internet Measurement Conference*
- 2006 **Program Committee Co-Chair**, *Workshop on the Economics of Networked Systems (NetE-con)*
- 2006 **Program Committee Co-Chair**, *CoNext Student Workshop*
- 2006 Program Committee, *2nd Annual CoNext Conference*
- 2006 Program Committee, *ACM SIGCOMM Workshop on Internet Network Management*
- 2006 Program Committee, *IEEE Symposium on Security and Privacy*
- 2006 Program Committee, *IEEE Infocom Student Poster Session*
- 2006 Program Committee, *IEEE International Conference on Internet Surveillance and Protection*

External reviewer for *IEEE/ACM Transactions on Networking*, *SIGCOMM* (2002, 2003, 2004, 2006, 2007), *SOSP* (2001, 2003), *Infocom* (2004, 2006), *HotNets* (2003), *HotOS* (2001), *USENIX Security Symposium* (2002), *ACM Computer Communication Review*, *IEEE Network Magazine*, *IEEE Journal on Selected Areas in Communications*, *Image Communication (EURASIP)*, *ASPLOS* (2004), *MobiSys* (2004), *USENIX* (2005, 2006), *NSDI* (2005, 2006), *IPTPS* (2005), *Workshop on Privacy Enhancing Technologies* (2006).

A.3. Workshops and External Courses

Unless otherwise noted, all listed activities are invited speaking invitations for workshops, tutorials, and symposia.

- April 2010 Cisco Workshop on Network Complexity, London, England
- March 2010 **Co-Organizer**, DIMACS Workshop on Secure Internet Routing, New Brunswick, NJ

June 2009 **Organizer**, NSF Security Driven Architectures Workshop, Arlington, VA

March 2009 Workshop on Re-Architecting the Internet (NetArch), Monte Verita, Switzerland

February 2009 CAIDA Active Internet Measurement Systems (AIMS) Workshop, San Diego, CA

October 2008 Panelist at IEEE CCW, Steamboat Springs, Colorado

October 2008 Panelist at ACM SIGCOMM Internet Measurement Conference, Athens, Greece

June 2008 Google Workshop on Internet Measurement, Mountain View, CA

May 2008 Tutorial at 26th Brazilian Symposium on Computer Networks and Distributed Systems, Rio de Janeiro, Brazil

March 2008 Co-Organizer for DIMACS Workshop on Secure Internet Routing

November 2007 NSF/DARPA/ARO NCDI Workshop, College Park, MD

August 2007 DIMACS Tutorial on Algorithms for Next Generation Networks, New Brunswick, NJ

July 2007 INTIMATE Workshop on Methods and Tools for Network Analysis, Paris, France

May 2007 Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO), Princeton, NJ

April 2007 NeXtworking, the Second COST-NSF Workshop on Future Internet, Berlin, Germany

February 2007 GIG Routing and Addressing Workshop, Washington, DC

February 2007 DARPA Workshop on Assurable Global Networking, Washington, DC

December 2006 Next-Generation Internet Workshop, Lisbon, Portugal

September 2006 Clean Slate Network Research Symposium, Cambridge, UK

October 2006 **Co-organizer**, Workshop on Internet Routing Evolution and Design (WIRED), Atlanta, GA

August 2006 Cisco Routing Research Symposium, San Jose, CA

June 2006 ARO-DARPA-DHS Special Workshop on Botnets, Arlington, VA

June 2006 Microsoft Research EdgeNet Workshop, Snoqualmie, WA

June 2006 Microsoft Research "Networking on the Edge" Workshop on Network Management, Seattle, WA

February 2006 NSF Workshop on Theory of Networked Computation, Princeton, NJ

January 2006 Cisco Network Management Summit, San Jose, CA

B. On-Campus Georgia Tech Committees

Spring 2010 Faculty Recruiting Committee

Fall 2009 Strategic Planning Committee

Spring 2009–Spring 2010 Dean Search Committee

Spring 2009 Faculty Recruiting Committee

Spring 2008 Faculty Recruiting Committee

Fall 2006– Area Coordinator, Networking Area Group

Fall 2006 Co-Organizer, Networking and Telecommunications Group Open House

Spring 2006 – College of Computing Strategic Planning Committee

Spring 2006 Ph.D. Recruiting Weekend Organizing Committee, CSS Division Leader

C. Member of Ph.D. Examining Committees

Ph.D. Thesis Committee – Georgia Tech

1. Ruomei Gao, College of Computing, Georgia Tech., Fall 2005.
Principal Advisor: Professors Ellen Zegura and Constantine Dovrolis.
2. Sridhar Srinivasan, College of Computing, Georgia Tech., Spring 2006.
Principal Advisor: Professor Ellen Zegura.
3. Xenofontas Dimitropoulos, Electrical and Computer Engineering, Georgia Tech, Spring 2006.
Principal Advisor: Professor George Riley.
4. Qi Zhao, College of Computing, Georgia Tech, Spring 2006.
Principal Advisor: Professor Jim Xu.
5. Prahlad Fogla, College of Computing, Georgia Tech, Spring 2007.
Principal Advisor: Professor Wenke Lee.
6. Srinivasan Seetharaman, College of Computing, Georgia Tech, Spring 2007.
Principal Advisor: Professor Mostafa Ammar.
7. Guofei Gu, College of Computing, Georgia Tech, Spring 2008.
Principal Advisor: Professor Wenke Lee.
8. Steve Webb, College of Computing, Georgia Tech, Spring 2008.
Principal Advisor: Professor Calton Pu.
9. Vibhore Kumar, College of Computing, Georgia Tech, Spring 2008.
Principal Advisor: Professor Karsten Schwan.
10. Amogh Dhamdhere, College of Computing, Georgia Tech, Spring 2009.
Principal Advisor: Professor Constantine Dovrolis.
11. David Dagon, College of Computing, Georgia Tech., Spring 2010.
Principal Advisor: Professor Wenke Lee.
12. Junjie Zhang, College of Computing, Georgia Tech., Spring 2010.
Principal Advisor: Professor Wenke Lee.

Other — Question writer for Ph.D. Qualifying Exam

1. Yang Chen, College of Computing, Georgia Tech., Spring 2006.
Principal Advisor: Professor Jim Xu.
2. Mukarram Bin Tariq, College of Computing, Georgia Tech., Spring 2007.
Principal Advisor: Professor Nick Feamster.
3. Zhenshun Zhang, College of Computing, Georgia Tech., Spring 2007.
Principal Advisor: Professor Raghupathy Sivakumar.
4. Yiyi Huang, College of Computing, Georgia Tech., Spring 2008.
Principal Advisor: Professor Nick Feamster.

5. Anirudh Ramachandran, College of Computing, Georgia Tech., Spring 2008.
Principal Advisor: Professor Nick Feamster.
6. Murtaza Motiwala, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Nick Feamster.
7. Vytautas Valancius, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Nick Feamster.
8. Mehmet Demirci, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Mostafa Ammar.
9. Ahmed Mansy, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Mostafa Ammar.
10. Tonqing Qiu, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Jim Xu.
11. Nan Hua, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Jim Xu.
12. Chuck Zhao, College of Computing, Georgia Tech., Spring 2009.
Principal Advisor: Professor Jim Xu.

D. Consulting, Advisory, and Other External Appointments

1. Technical Advisory Board, Guavus, Inc. <http://www.guavus.com/>
2. Technical Advisory Board, Anchor Intelligence, Inc. <http://www.fraudwall.net/>
3. Consultant, Damballa, Inc. <http://www.anchorintelligence.com/>

IV. NATIONAL AND INTERNATIONAL RECOGNITION

A. Invited Conference Session Chair

- October 2008 Session chair, *ACM SIGCOMM HotNets-VII Workshop*, Calgary, Alberta, Canada
- October 2008 Session chair, *ACM SIGCOMM Internet Measurement Conference*, Athens, Greece
- March 2008 Session organizer, Security for the Future Internet, *NSF Cybertrust PI Meeting*, Arlington, VA
- June 2007 Session chair, Network Virtualization, *NSF NeTS-FIND PI Meeting*, Arlington, VA
- June 2006 Session chair, Mechanism Design and Networking, *First Workshop on the Economics of Networked Systems (NetEcon06)*, Ann Arbor, MI

B. Patents

- March 2007 “Method and System for Detecting and Responding to Attacking Networks”, U.S. Patent Application # 11/538,212

C. Editorial and Reviewer Work for Technical Journals and Publishers

- External reviewer for *IEEE/ACM Transactions on Networking*
- External reviewer for *IEEE Journal on Selected Areas in Communications*
- External reviewer for *IEEE Computer Networks*
- External reviewer for *ACM Transactions on Information and Systems Security*

V. OTHER CONTRIBUTIONS

A. Seminar Presentations

- A.0.1 Network-Level Spam and Scam Defenses. In *MIT Computer Science Department Colloquium*, Cambridge, MA, May 2010.
- A.0.2 Network-Level Spam and Scam Defenses. In *Harvard University Computer Science Department Colloquium*, Cambridge, MA, April 2010.
- A.0.3 Network-Layer Support for Secure Routing and Access Control. In *DIMACS Workshop on Secure Routing*, New Brunswick, NJ, March 2010.
- A.0.4 Detecting General Network Neutrality Violations with Causal Inference. In *ACM SIGCOMM CoNext*, Rome, Italy, December 2009.
- A.0.5 Dynamic Access Control with Resonance. In *DIMACS Workshop on Network Management*, New Brunswick, NJ, November 2009.
- A.0.6 Network-Level Spam and Scam Defenses. In *Princeton University Computer Science Department Colloquium*, Princeton, NJ, October 2009.
- A.0.7 SNARE: Spatio-Temporal Network-Level Automated Reputation Engine. In *Message Anti-Abuse Working Group (MAAWG) Plenary Session*, Philadelphia, PA, October 2009.
- A.0.8 A Platform for Building Flexible, Fast Virtual Networks on Commodity Hardware. In *Cisco Routing Architecture Workshop*, San Jose, CA, October 2009.

- A.0.9 Network-Level Spam and Scam Defenses. In *EPFL Summer Research Institute*, Lausanne, Switzerland, June 2009.
- A.0.10 Bringing Experimenters and External Connectivity to GENI. In *GENI Measurement Workshop*, Madison, WI, June 2009.
- A.0.11 Network-Level Spam Defenses. In *University of Wisconsin Computer Science Department Colloquium*, Madison, WI, April 2009.
- A.0.12 Trellis: A Platform for Building Flexible, Fast Virtual Networks on Commodity Hardware. In *NSF NeTS FIND PI Meeting*, Arlington, VA, April 2009.
- A.0.13 Dynamics of Online Scam Hosting Infrastructure. In *Passive and Active Measurement Conference*, Seoul, Korea, April 2009.
- A.0.14 Demonstration of Topology Creation Service and BGP Session Multiplexer. In *4th GENI Engineering Conference*, Miami, Florida, April 2009.
- A.0.15 Network Security Research. In *Georgia Tech College of Computing Wine & Cheese Talk*, Atlanta, GA, April 2009.
- A.0.16 Network-Level Spam Defenses. In *Cisco Systems Security Seminar*, San Jose, CA, March 2009.
- A.0.17 Network-Level Spam Defenses. In *Stanford University Networking Seminar*, Stanford, CA, March 2009.
- A.0.18 Network-Level Spam Defenses. In *University of North Carolina Computer Science Department Colloquium*, Chapel Hill, NC, March 2009.
- A.0.19 Dynamics of Online Scam Hosting Infrastructure. In *CAIDA Active Internet Measurement Systems (AIMS) Workshop*, San Diego, CA, February 2009.
- A.0.20 Outsourcing Network Security with Programmable Hardware. In *GENI Security Workshop*, Davis, CA, April 2009.
- A.0.21 Spam, Phishing, and Online Scams: A View from the Network-Level. In *University of Toronto Computer Science Department Colloquium*, Toronto, Ontario, Canada, December 2008.
- A.0.22 Detecting and Diagnosing Network Performance Degradations with Statistical Methods. In *IPAM Workshop on New Mathematical Frontiers in Network Multi-Resolution Analysis*, Los Angeles, CA, October 2008.
- A.0.23 Fighting Spam, Phishing, and Online Scams at the Network Level. In *Asian Internet Engineering Conference*, Bangkok, Thailand, November 2008.
- A.0.24 Multiplexing BGP Sessions with a BGP Session Multiplexer. In *3rd GENI Engineering Conference*, Palo Alto, CA, October 2008.
- A.0.25 Towards an Accountable Internet Architecture. In *The IEEE 22nd Annual Computer Communications Workshop*, Steamboat Springs, Colorado, October 2008.
- A.0.26 Network-Level Spam Filtering. In *IPAM Workshop on Applications of Internet MRA to Cyber-Security*, Los Angeles, CA, October 2008.
- A.0.27 Spam, Phishing, and Online Scams: A View from the Network-Level. In *Yahoo Tech Talk*, Sunnyvale, CA, August 2008.

- A.0.28 Path Splicing. In *EPFL Summer Research Institute*, Lausanne, Switzerland, July 2008.
- A.0.29 Spam, Phishing, and Online Scams: A View from the Network-Level. In *Google Tech Talk*, Mountain View, CA, June 2008. <http://www.youtube.com/watch?v=IBPg9Lyta3A>.
- A.0.30 Making Tomography Practical: Scalable Network Monitoring for Fault Diagnosis. In *DIMACS Workshop on Network Tomography*, New Brunswick, NJ, May 2008.
- A.0.31 Network-Based Spam Filtering. In *Internet2 Members Meeting*, Arlington, VA, April 2008.
- A.0.32 Path Splicing. In *Carnegie Mellon University Computer Science Seminar*, Pittsburgh, PA, April 2008.
- A.0.33 BGP, Bogons, and Spam. In *DIMACS Workshop on Secure Internet Routing*, New Brunswick, NJ, March 2008.
- A.0.34 Can Great Research Be Taught? Independent Research with Cross-Disciplinary Thinking and Broader Impact. In *ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE)*, Portland, OR, March 2008.
- A.0.35 Path Splicing. In *Colgate University Computer Science Seminar*, Hamilton, NY, November 2007.
- A.0.36 Path Splicing. In *Cornell University Computer Science Symposium*, Ithaca, NY, November 2007.
- A.0.37 Path Splicing. In *Bell Labs Networking Seminar*, Murray Hill, NJ, November 2007.
- A.0.38 Usage-Based DHCP Lease-Time Optimization. In *ACM/USENIX Internet Measurement Conference*, San Diego, CA, October 2007.
- A.0.39 Network-Based Spam Filtering. In *University of Southern California Computer Science Symposium*, Los Angeles, CA, October 2007.
- A.0.40 Path Splicing with Network Slicing. In *Georgia Tech Algorithms and Randomness Center (ARC) Symposium*, Atlanta, GA, October 2007.
- A.0.41 Internet Availability. In *DIMACS Tutorial on Algorithms for Next-Generation Networks*, New Brunswick, NJ, August 2007.
- A.0.42 Towards an Accountable Internet Architecture. In *INTIMATE Workshop on Methods and Tools for Network Analysis*, Paris, France, July 2007.
- A.0.43 Path Splicing with Network Slicing. In *UCL Networking Seminar*, Louvain La Neuve, Belgium, July 2007.
- A.0.44 Composing Virtual Networks. In *Third NSF-NeTS FIND PI Meeting*, Arlington, VA, June 2007.
- A.0.45 Path Splicing with Network Slicing. In *UCSD Networking and Systems Seminar*, San Diego, CA, June 2007.
- A.0.46 Path Splicing with Network Slicing. In *NANOG 40*, Bellevue, WA, June 2007.
- A.0.47 AGORA: A Market for Internet Connectivity. In *Workshop on Programmable Routers for Extensible Services of Tomorrow*, Princeton, NJ, May 2007.
- A.0.48 Path Splicing with Network Slicing. In *NeXtworking 2007, the Second COST-NSF Workshop on Future Internet*, Berlin, Germany, April 2007.

- A.0.49 Towards an Accountable Internet Architecture. In *DARPA GIG Routing and Addressing Workshop*, Arlington, VA, February 2007.
- A.0.50 Towards an Accountable Internet Architecture. In *DARPA STO Assurable Global Networking Workshop*, Arlington, VA, February 2007.
- A.0.51 Improving Network Operations with a View from the Edge. In *National Science Foundation CyberTrust PI Meeting*, Atlanta, GA, January 2007.
- A.0.52 Network Virtualization for Experimentation and Profit. In *University of Michigan Networking Seminar*, Ann Arbor, MI, December 2006.
- A.0.53 Network Virtualization for Experimentation and Profit. In *Stanford Networking Seminar*, Stanford, CA, November 2006.
- A.0.54 Network Architecture Research. In *National Science Foundation NeTS-FIND Informational Meeting*, Reston, VA, November 2006.
- A.0.55 Network Virtualization. In *National Science Foundation NeTS-FIND PI Meeting*, Reston, VA, November 2006.
- A.0.56 Understanding the Network-Level Behavior of Spammers. In *Johns Hopkins Security and Applied Research Lab Seminar*, Baltimore, MD, October 2006.
- A.0.57 Revealing Botnet Membership with DNSBL Counter-Intelligence. In *NANOG 38*, St. Louis, MO, October 2006.
- A.0.58 VINI: A Virtual Network Infrastructure. In *Centre national de la recherche scientifique (CNRS)*, Paris, France, September 2006.
- A.0.59 Botnets and Spam. In *Seminar: Laboratoire d'informatique de Paris 6*, Paris, France, September 2006.
- A.0.60 Network Virtualization and Graph Embedding. In *Georgia Tech Algorithms and Randomness Center Seminar*, Atlanta, GA, September 2006.
- A.0.61 Cabo: Concurrent Architectures are Better than One. In *Cisco Internet Routing Research Symposium*, San Jose, CA, August 2006.
- A.0.62 Botnets and Spam. In *ARO-DARPA-DHS Special Workshop on Botnets*, Arlington, VA, June 2006.
- A.0.63 Understanding the Network-Level Behavior of Spammers. In *CS 548: Internet and Distributed Systems Seminar*, Stanford, CA, June 2006.
- A.0.64 Understanding the Network-Level Behavior of Spammers. In *NANOG 37*, San Jose, CA, June 2006.
- A.0.65 Campus and Personal Network Troubleshooting. In *Microsoft Research EdgeNet 2006*, Snoqualmie, WA, June 2006.
- A.0.66 Infranet: Circumventing Web censorship and surveillance. In *Georgia Tech NTG Seminar*, Atlanta, GA, April 2006.
- A.0.67 Filtering: Sharpening Two Sides of a Double-Edged Sword. In *Interzone 5*, Tucker, GA, March 2006.
- A.0.68 Theory of Measurement and Monitoring. In *Workshop on the Theory of Networked Computation*, Princeton, NJ, February 2006.

- A.0.69 Challenges and Opportunities in Internet Data Mining. In *Cisco Network Management Summit*, San Jose, CA, February 2006.
- A.0.70 BGP Spamming Agility. In *NANOG 36*, Dallas, TX, February 2006.
- A.0.71 Spam Forensics. In *IEEE Security and Privacy Crystal Ball Workshop*, Berkeley, CA, February 2006.
- A.0.72 Network Security. In *Georgia Tech Information Security Center Lunch*, Atlanta, GA, January 2006.
- A.0.73 Geographic Locality of IP Prefixes. In *NANOG 35*, Los Angeles, CA, October 2005.
- A.0.74 rcc demonstration. In *NANOG 35*, Los Angeles, CA, October 2005.
- A.0.75 Detecting BGP Configuration Faults with Static Analysis. In *Princeton University Systems Reading Group*, Princeton, NJ, October 2005.
- A.0.76 Proactive Techniques for Correct and Predictable Internet Routing. In *University of Cambridge Symposium*, England, United Kingdom, June 2005.
- A.0.77 Proactive Techniques for Correct and Predictable Internet Routing. In *Hewlett-Packard Laboratories*, Palo Alto, CA, October 2005.
- A.0.78 Open problems in BGP anomaly detection. In *CAIDA Workshop on Internet Signal Processing*, San Diego, CA, November 2004.
- A.0.79 On end-to-end path failures and routing instability. In *CAIDA Workshop on Internet Signal Processing*, San Diego, CA, November 2004.
- A.0.80 Wide-area network data and analysis at MIT. In *CAIDA Internet Measurement Data Catalog Workshop*, San Diego, CA, June 2004.
- A.0.81 Verifying wide-area routing configuration. In *NANOG 31*, San Francisco, CA, May 2004.
- A.0.82 Verifying wide-area routing configuration with rcc. AT&T Labs; Florham Park, NJ, February 2004.
- A.0.83 Verifying wide-area routing configuration with rcc. In *NYU Systems Reading Group*, New York, NY, February 2004.
- A.0.84 A systematic approach to BGP configuration checking. In *NANOG 29*, Chicago, IL, October 2003.
- A.0.85 Characterizing path failures: Location, characterization, correlation. In *CAIDA Internet Statistics, Metrics, and Analysis Workshop*, Leiden, The Netherlands, October 2002.
- A.0.86 Infranet: Circumventing Web censorship and surveillance. In *Harvard Kennedy School of Government Seminar*, Cambridge, MA, November 2002.
- A.0.87 Infranet: Circumventing Web censorship and surveillance. Hewlett-Packard Laboratories; Palo Alto, CA, August 2002.
- A.0.88 Infranet: Circumventing Web censorship and surveillance. In *Carnegie Mellon University SDI Seminar*, Pittsburgh, PA, April 2002.
- A.0.89 Controlling the impact of BGP policy changes on IP traffic. In *NANOG 25*, Toronto, Ontario, Canada, June 2002.