Nick Feamster

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Research Interests

My research focuses on networked computer systems, with an 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 design tools, techniques, and policies to help networks operate better, and to enable users of these networks (both public and private) to experience high availability and good end-to-end performance. The problems that I tackle often involve the intersection of networking technology and policy. I study problems in the pricing and economics of Internet interconnection, global Internet censorship and information control, the security and privacy implications of emerging technologies, and the performance of consumer, commercial, and enterprise networks. My research achieves impact through new design paradigms in network architecture, the release of open-source software systems, and data and evidence that can influence public policy discourse.

Education

Degree	Year	University	Field
Ph.D.	2005	Massachusetts Institute of Technology Cambridge, MA *Dissertation:* Proactive Techniques for Correct and Predictable Internet Routing *Sprowls Honorable Mention for best MIT Ph.D. dissertation in Computer Science* *Advisor:* Hari Balakrishnan Minor in Game Theory	Computer Science
M.Eng.	2001	Massachusetts Institute of Technology Cambridge, MA *Dissertation:* Adaptive Delivery of Real-Time Streaming Video *Advisor:* Hari Balakrishnan *William A. Martin Memorial Thesis Award* (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
Neubauer Professor	University of Chicago	*July 2019–Present*
Professor	Princeton University	*January 2015–June 2019*
Professor	Georgia Institute of Technology	*March 2014–December 2018*
Associate Professor	Georgia Institute of Technology	*March 2011–March 2014*
Assistant Professor	Georgia Institute of Technology	*2006–2011*
Postdoctoral Researcher	Princeton University	*Fall 2005*
Research Assistant (Ph.D.)	Massachusetts Institute of Technology	*2000–2005*
Researcher	AT&T Labs–Research	*2001–2005*
Technical Associate	Bell Laboratories	*1999*
Research Intern	Hewlett-Packard Laboratories	*1999*
Technical Staff	LookSmart, Ltd.	*1997*

Honors and Awards

National Awards

- ACM Fellow
- NSF Presidential Early Career Award for Scientists and Engineers (PECASE)
- ACM SIGCOMM Rising Star Award
- Technology Review Top Innovators Under 35
- Alfred P. Sloan Fellowship
- NSF CAREER Award
- IBM Faculty Award

University Awards

- John P. Imlay Distinguished Lecture, Georgia Tech
- Hesburgh Teaching Fellow, Georgia Tech
- Georgia Tech College of Computing Outstanding Junior Faculty Research Award
- Georgia Tech Sigma Xi Young Faculty Award
- Georgia Tech Sigma Xi Best Undergraduate Research Advisor

Paper and Publication Awards

- ACM SIGCOMM Internet Measurement Conference Test of Time Award (2025)
- *Wall Street Journal* Front Page (A1) Feature (August 19, 2019).
- USENIX "Best of the Rest" Paper Award for Best Paper in all USENIX Conferences (2016)
- USENIX Community Contribution Award, USENIX/ACM Symposium on Networked Systems Design and Implementation (2015)
- USENIX "Test of Time" Best Paper Award (2015)
- Internet Research Task Force Applied Networking Research Prize (2012, 2015)
- ACM SIGCOMM Community Award, ACM SIGCOMM Internet Measurement Conference (2013)
- Best Paper, Passive and Active Measurement Conference (2009)
- Best Student Paper, ACM SIGCOMM (2006)
- Best Paper, USENIX Symposium on Networked Systems Design and Implementation (2005)
- Best Student Paper, 11th USENIX Security Symposium (2002)
- Best Student Paper, 10th USENIX Security Symposium (2001)
- PRSA Bronze Anvil Award for *Wall Street Journal* Editorial Article

Thesis Awards

- George M. Sprowls honorable mention for best Ph.D. thesis in computer science, MIT
- MIT William A. Martin Memorial Thesis Award for Best EECS Master's Thesis

Other Honors

- Panelist for NSF/Discover Magazine Special Issue on "The New Internet"
- U.S. National Academy of Engineering Frontiers of Engineering Symposium
- U.S. National Academy of Science Kavli Frontiers of Science Symposium

Publications

Theses

[1]   Nick Feamster. *Proactive Techniques for Correct and Predictable Internet Routing*. PhD thesis, February 2006. Winner of the MIT George M. Sprowls Honorable Mention for Best MIT Ph.D. Dissertation in Computer Science.

[2]   Nick Feamster. Adaptive delivery of real-time streaming video. Master's thesis, May 2001. Winner of the MIT EECS William A. Martin Memorial Thesis Award.

Journal Publications

[3]   Nguyen Phong Hoang and Nick Feamster. Measuring the Great Firewall's Multi-layered Web Filtering Apparatus. In *USENIX ;login:*, pages 1–10. USENIX, August 2024.

[4]   Kun Yang, Samory Kpotufe, and Nick Feamster. An Efficient One-Class SVM for Novelty Detection in IoT. *Transactions on Machine Learning Research*, 11(2022):1–24, November 2022.

[5]   Noah Apthorpe, Pardis Emami-Naeini, Arunesh Mathur, Marshini Chetty, and Nick Feamster. You, Me, and IoT: How Internet-Connected Consumer Devices Affect Interpersonal Relationships. *ACM Transactions on Internet of Things (TIOT)*, pages 1–14, 2022.

[6]   Danny Yuxing Huang, David Major, Marshini Chetty, and Nick Feamster. Alexa, who am i speaking to? *ACM Transactions on Internet Technologies (TOIT)*, 22(1):1–14, 2021.

[7]   Nick Feamster and Jason Livingood. Measuring Internet Speed: Current Challenges and Future Recommendations. *Communications of the ACM (CACM)*, 63(12):72–80, December 2020.

[8]   Muhammad Shahbaz, Lalith Suresh, Jennifer Rexford, Nick Feamster, Ori Rottenstreich, and Mukesh Hira. Elmo: Source Routed Multicast for Public Clouds. *IEEE/ACM Transactions on Networking*, pages 458–471, 2020.

[9]   Jasmine Peled, Ben Zevenbergen, and Nick Feamster. The Man in the Middlebox: Violations of End-to-End Encryption. *USENIX ;login:*, 44(2):6–11, August 2019.

[10]   Nick Feamster. Implications of the Software Defined Networking Revolution for Technology Policy. *Colorado Tech Law Journal (CTLJ)*, 17(2):281–294, August 2019.

[11]   Gordon Chu, Noah Apthorpe, and Nick Feamster. Security and Privacy Analyses of Internet of Things Children's Toys. *IEEE Internet of Things Journal (IOT-J)*, 6(1):978–985, November 2018.

[12]   Nick Feamster. Mitigating the Increasing Risks of an Insecure Internet of Things. *Colorado Tech Law Journal (CTLJ)*, 16(1):87–102, August 2018.

[13]   Paul Pearce, Roya Ensafi, Frank Li, Nick Feamster, and Vern Paxson. Toward Continual Measurement of Global Network-Level Censorship. In *IEEE Security and Privacy*, pages 24–33, January 2018.

[14]   Paul Pearce, Ben Jones, Frank Li, Roya Ensafi, Nick Feamster, and Vern Paxson. Global Measurement of DNS Manipulation. In *USENIX ;login:*, volume 42, pages 6–13, December 2017.

[15]   Ava Chen, Nick Feamster, and Enrico Calandro. Exploring the Walled Garden Theory: An Empirical Framework to Assess Pricing Effects on Mobile Data Usage. *Telecommunications Policy*, 41(7):587–599, October 2017.

[16]   Gianni Antichi, Muhammad Shahbaz, Yiwen Geng, Noa Zilberman, Adam Covington, Marc Bruyere, Nick McKeown, Nick Feamster, Bob Felderman, and Michaela Blott. OSNT: Open source network tester. *Network, IEEE*, 28(5):6–12, 2014.

[17]   Nick Feamster, Jennifer Rexford, and Ellen Zegura. The Road to SDN: An Intellectual History of Programmable Networks. *ACM Computer Communication Review*, 44(2):87–98, April 2014.

[18]   Sam Burnett and Nick Feamster. Making Sense of Internet Censorship: A New Frontier for Internet Measurement. *ACM SIGCOMM Computer Communications Review*, 43(3):84–89, July 2013.

[19]   Hyojoon Kim and Nick Feamster. Improving network management with software defined networking. *Communications Magazine, IEEE*, 51(2):114–119, 2013.

[20]   Mohammed Mukarram bin Tariq, Vytautas Valancius, Kaushik Bhandakar, Amgad Zeitoun, Nick Feamster, and Mostafa Ammar. Answering "What-If" Deployment and Configuration Questions with WISE: Techniques and Deployment Experience. *IEEE/ACM Transactions on Networking*, 21(1):1–13, January 2013.

[21]   Srikanth Sundaresan, Walter de Donato, Nick Feamster, Renata Teixeira, Sam Crawford, and Antonio Pescape. Measuring home broadband performance. *Communications of the ACM*, 55(9):100–109, September 2012.

[22]   Srikanth Sundaresan, Nazanin Magharei, Nick Feamster, and Renata Teixeira. Accelerating last-mile web performance with popularity-based prefetching. *ACM SIGCOMM Computer Communication Review*, 42(4):303–304, 2012.

[23]   Marshini Chetty and Nick Feamster. Refactoring Network Infrastructure to Improve Manageability: A Case Study of Home Networking. *ACM SIGCOMM Computer Communications Review*, 42(3):54–71, July 2012.

[24]   Murtaza Motiwala, Amogh Dhamdhere, and Nick Feamster. Towards a Cost Model for Network Traffic. *ACM SIGCOMM Computer Communications Review*, 42(1):55–60, January 2012.

[25]   Nick Feamster and Jennifer Rexford. Getting Students' Hands Dirty With Clean-Slate Networking. *ACM SIGCOMM Computer Communications Review*, December 2011.

[26]   Nick Feamster, Lixin Gao, and Jennifer Rexford. A Survey of Virtual LAN Usage in Campus Networks. *IEEE Communications*, 49(7), July 2011.

[27]   Teemu Koponen, Scott Shenker, Hari Balakrishnan, Nick Feamster, Igor Ganichev, Ali Ghodsi, P. Brighten Godfrey, Nick McKeown, Guru Parulkar, Barath Raghavan Jennifer Rexford, Somaya Arianfar, and Dimitriy Kuptsov. Architecting for Innovation. *ACM SIGCOMM Computer Communications Review*, 43(1):24–36, July 2011.

[28]   Ken Calvert, W. Keith Edwards, Nick Feamster, Rebecca Grinter, Ye Deng, and Xuzi Zhou. Instrumenting Home Networks. *ACM SIGCOMM Computer Communications Review*, 41(1):55–60, January 2011.

[29]   Bilal Anwer and Nick Feamster. Building a fast, virtualized data plane with programmable hardware. *ACM SIGCOMM Computer Communication Review*, 40(1):1–6, April 2010.

[30]   Yaping Zhu, Andy Bavier, Nick Feamster, Sampath Rangarajan, and Jennifer Rexford. UFO: A Resilient Layered Routing Architecture. *ACM SIGCOMM Computer Communication Review*, 38(5):59–62, 2008.

[31]   Nick Feamster, Ramesh Johari, and Hari Balakrishnan. Stable Policy Routing with Provider Independence. *IEEE/ACM Transactions on Networking*, December 2007.

[32]   Nick Feamster and Jennifer Rexford. Network-Wide Prediction of BGP Routes. *IEEE/ACM Transactions on Networking*, June 2007.

[33]   Nick Feamster, Jaeyeon Jung, and Hari Balakrishnan. An Empirical Study of "Bogon" Route Advertisements. *ACM SIGCOMM Computer Communications Review*, 35(1):63–70, November 2004.

[34]   Nick Feamster, Jay Borkenhagen, and Jennifer Rexford. Guidelines for Interdomain Traffic Engineering. *ACM SIGCOMM Computer Communication Review*, 33(5):19–30, October 2003.

Books and Book Chapters

[35]   Andrew S Tanenbaum, Nick Feamster, and David Wetherall. *Computer Networks*. Pearson, 2020.

[36]   Nick Feamster. *Who Will Control Speech Online? [Working Title]*. Princeton University Press, 2021. In progress.

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

Conference Publications

[38]   Siddhant Ray, Xi Jiang, Jack Luo, Nick Feamster, and Junchen Jiang. SwiftQueue: Optimizing Low-Latency Applications with Swift Packet Queuing. In *New Ideas in Networked Systems (NiNeS)*, pages 1–14, Online, February 2026.

[39]   Ayoub Ben Ameur, Francesco Bronzino, Nick Feamster, and Paul Schmitt. Measuring Low Latency at Scale: A Field Study of L4S in Residential Broadband. In *Passive and Active Measurement Conference (PAM)*, pages 1–14, 2026.

[40]   Amanda Hsu, Nick Feamster, Paul Pearce, and Frank Li. The Impact of IP Version on Household Internet Speed: A Comparative Study. In *ACM SIGMETRICS*, pages 1–14, Ann Arbor, MI, June 2026.

[41]   Ted Shaowang, Shinan Liu, Jonatas Marques, Nick Feamster, and Sanjay Krishnan. Algorithmic Data Minimization for Machine Learning over Internet-of-Things Data Streams. In *Proceedings of the VLDB Endowment (VLDB)*, pages 1–14, London, UK, August 2026.

[42]   Xi Jiang, Shinan Liu, Saloua Naama, Francesco Bronzino, Paul Schmitt, and Nick Feamster. JITI: Dynamic Model Serving for Just-in-Time Traffic Inference. In *International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*, pages 1–14, Hong Kong, December 2025.

[43]   Andrew Chu, Xi Jiang, Shinan Liu, Arjun Nitin Bhagoji, Francesco Bronzino, Paul Schmitt, and Nick Feamster. NetSSM: Multi-Flow and State-Aware Network Trace Generation using State-Space Models. In *International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*, pages 1–14, Hong Kong, December 2025.

[44]   Synthia Wang, Nick Feamster, and Marshini Chetty. Understanding User Privacy Concerns of Shared Smart TVs. In *Conference on Computer-Supported Cooperative Work and Social Computing*, pages 1–14, Bergen, Norway, October 2025.

[45]   Lan Gao, Oscar Chen, Rachel Lee, Nick Feamster, Chenhao Tan, and Marshini Chetty. " I Cannot Write This Because It Violates Our Content Policy": Understanding Content Moderation Policies and User Experiences in Generative AI Products. In *USENIX Security Symposium*, pages 1–14, Seattle, WA, August 2025.

[46]   Gerry Wan, Shinan Liu, Francesco Bronzino, Nick Feamster, and Zakir Durumeric. CATO: End-to-End Optimization of ML-Based Traffic Analysis Pipelines. In *Proceedings of the 22nd USENIX Symposium on Networked Systems Design and Implementation (NSDI '25)*, pages 1–14, Boston, MA, USA, 2025. USENIX Association.

[47]   Keran Mu, Jianjun Chen, Jianwei Zhuge, Qi Li, Haixin Duan, and Nick Feamster. The Silent Danger in HTTP: Identifying HTTP Desync Vulnerabilities with Gray-box Testing. In *USENIX Security Symposium*, pages 1–14, Philadelphia, PA, 2025. USENIX Association.

[48]   Van Hong Tran, Aarushi Mehrotra, Ranya Sharma, Marshini Chetty, Nick Feamster, Jens Frankenreiter, and Lior Strahilevitz. Dark Patterns in the Opt-Out Process and Compliance with the California Consumer Privacy Act (CCPA). In *ACM CHI Conference on Human Factors in Computing Systems*, pages 1–14, Honolulu, HI, USA, 2025. ACM.

[49] Taveesh Sharma, Paul Schmitt, Francesco Bronzino, Nicole P. Marwell, and Nick Feamster. Beyond Data Points: Regionalizing Crowdsourced Latency Measurements. In *ACM SIGMETRICS*, pages 1–14, Stony Brook, NY, June 2025.

[50] Ranya Sharma, Nick Feamster, and Marc Richardson. A longitudinal study of the prevalence of wifi bottlenecks in home access networks. In *Proceedings of the 2024 ACM Internet Measurement Conference (IMC)*, pages 44–50, Madrid, Spain, November 2024. ACM.

[51] Jonatas Marques, Alexis Schrubbe, Nicole P. Marwell, and Nick Feamster. Are we up to the challenge? an analysis of the fcc broadband data collection fixed internet availability challenges. In *Proceedings of the 52nd Research Conference on Communications, Information and Internet Policy (TPRC)*, Arlington, VA, USA, September 2024. Available at `https://arxiv.org/ab s/2404.04189`.

[52] Nguyen Phong Hoang, Jakub Dalek, Masashi Crete-Nishihata, Nicolas Christin, Vinod Yegneswaran, Michalis Polychronakis, and Nick Feamster. GFWeb: Measuring the Great Firewall's Web Censorship at Scale. In *USENIX Security Symposium*, pages 2617–2633, Philadelphia, PA, August 2024.

[53] Weijia He, Kevin Bryson, Ricardo Calderon, Vijay Prakash, Nick Feamster, Danny Yuxing Huang, and Blase Ur. Can Allowlists Capture the Variability of Home IoT Device Network Behavior? In *2024 IEEE 9th European Symposium on Security and Privacy (EuroS&P)*, pages 114–138, Vienna, Austria, July 2024. IEEE.

[54] Andrew Chu, Xi Jiang, Shinan Liu, Arjun Bhagoji, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Feasibility of State Space Models for Network Traffic Generation. In *Proceedings of the 2024 SIGCOMM Workshop on Networks for AI Computing*, pages 9–17, 2024.

[55] Jonatas Marques, Alexis Schrubbe, Nicole P Marwell, and Nick Feamster. The Hitchhiker's Guide to Analyzing of the FCC Broadband Data Collection. In *Telecommunications Policy Research Conference (TPRC)*, pages 1–10, Washington, DC, September 2024.

[56] Yihua Cheng, Ziyi Zhang, Hanchen Li, Anton Arapin, Yuhan Liu, Qizheng Zhang, Xu Zhang, Kuntai Du, Francis Yan, Amrita Mazumdar, Nick Feamster, and Junchen Jiang. GRACE: Loss-Resilient Real-Time Video through Neural Codecs. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pages 1–14, Santa Clara, CA, September 2024.

[57] Xi Jiang, Shinan Liu, Aaron Gember-Jacobson, Arjun Nitin Bhagoji, Paul Schmitt, Francesco Bronzino, and Nick Feamster. NetDiffusion: Network Data Augmentation Through Protocol-Constrained Traffic Generation. In *ACM SIGMETRICS*, pages 1–14, Venice, Italy, June 2024.
Acceptance rate: 15%

[58] Brennan Schaffner, Arjun Nitin Bhagoji, Michael Cheng, Jacqueline Mei, Jay Shen, Grace Wang, Genevieve Lakier, Chenhao Tan, Nick Feamster, and Marshini Chetty. Community Guidelines Make This the Best Party on the Internet: An In-Depth Study of Online Platforms' Content Moderation Policies. In *ACM CHI Conference on Human Factors in Computing Systems*, pages 1–14, Honolulu, Hawaii, May 2024.
Acceptance rate: 10%

[59] Van Tran, Aarushi Mehrotra, Marshini Chetty, Nick Feamster, Jens Frankenreiter, and Lior Strahilevitz. Measuring Compliance with the California Consumer Privacy Act Over Space and Time. In *ACM CHI Conference on Human Factors in Computing Systems*, pages 1–14, Honolulu, Hawaii, May 2024.
Acceptance rate: 10%

[60] Tejas Kannan, Synthia Qia Wang, Max Sunog, Abraham Bueno de Mesquita, Nick Feamster, and Henry Hoffmann. Acoustic Keystroke Leakage on Smart Televisions. In *Network and Distributed System Security Symposium (NDSS)*, pages 1–14, San Diego, CA, February 2024.

[61] Kate Keahey, Nick Feamster, Guilherme Martins, Mark Powers, Marc Richardson, Alexis Schrubbe, and Michael Sherman. Discovery testbed: an observational instrument for broadband research. In *2023 IEEE 19th International Conference on e-Science (e-Science)*, pages 1–4. IEEE, 2023.

[62] Jacob Alexander Markson Brown, Xi Jiang, Van Tran, Arjun Nitin Bhagoji, Nguyen Phong Hoang, Nick Feamster, Prateek Mittal, and Vinod Yegneswaran. Augmenting Rule-based DNS Censorship Detection at Scale with Machine Learning. In *SIGKDD Conference on Knowledge, Discovery, and Data Mining (KDD)*, pages 1–12, Long Beach, CA, August 2023.

[63] Shinan Liu, , Francesco Bronzino, Paul Schmitt, Arjun Nitin Bhagoji, Nick Feamster, Hector Garcia Crespo, Timothy Coyle, and Brian Ward. LEAF: Navigating Concept Drift in Cellular Networks. In *ACM SIGCOMM International Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, pages 1–12, Paris, France, December 2023.

[64] Xi Jiang, Shinan Liu, Aaron Gember-Jacobson, Paul Schmitt, Francesco Bronzino, and Nick Feamster. Generative, High-Fidelity Network Traces. In *ACM SIGCOMM Workshop on Hot Topics in Networks (HotNets)*, Cambridge, Massachusetts, November 2023.

[65] Tejas Kannan, Nick Feamster, and Henry Hoffmann. Prediction Privacy in Distributed Multi-Exit Neural Networks: Vulnerabilities and Solutions. In *ACM Conference on Computer and Communications Security (CCS)*, pages 1–12, Copehangen, Denmark, November 2023.
Acceptance rate: 19%

[66] Taveesh Sharma, Tarun Mangla, Arpit Gupta, Junchen Jiang, and Nick Feamster. Estimating WebRTC Video QoE Metrics Without Using Application Headers. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 1–12, Montreal, Canada, October 2023.

[67] Taveesh Sharma, Jonatas Marques, Nick Feamster, and Nicole Marwell. A First Look at the Spatial and Temporal Variability of Internet Performance Data in Hyperlocal Geographies. In *Research Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–6, Washington, DC, September 2023.

[68] Stefany Cruz, Logan Danek, Shinan Liu, Christopher Kraemer, Zixin Wang, Nick Feamster, Danny Yuxing Huang, Yaxing Yao, and Josiah Hester. Toward Identifying Home Privacy Leaks Using Augmented Reality. In *Symposium on Usable Security and Privacy (USEC)*, San Diego, CA, February 2023.

[69] Shinan Liu, Tarun Mangla, Ted Shaowang, Jinjin Zhao, John Paparrizos, Sanjay Krishnan, and Nick Feamster. AMIR: Active Multimodal Interaction Recognition from Video and Network Traffic in Connected Environments. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)/Ubicomp*, Cancun, Mexico, October 2023.

[70] Alexandra Nisenoff, Ranya Sharma, and Nick Feamster. User Awareness and Behaviors Concerning Encrypted DNS Settings in Web Browsers. In *USENIX Security Symposium*, Anaheim, CA, August 2023.

[71] Sadia Nourin, Van Tran, Xi Jiang, Kevin Bock, Nick Feamster, Nguyen Phong Hoang, and Dave Levin. Measuring and Evading Turkmenistan's Internet Censorship. In *Proceedings of the Web Conference (WWW)*, Austin, TX, April 2023.

[72] Kyle MacMillan, Tarun Mangla, James Saxon, Nicole P Marwell, and Nick Feamster. A Comparative Analysis of Ookla Speedtest and Measurement Labs Network Diagnostic Test (NDT7). In *ACM SIGMETRICS*, Orlando, Florida, June 2023.

[73] Agnieszka Dutkowska-Zuk, Austin Hounsel, Andre Xiong, Molly Roberts, Brandon Stewart, and Nick Feamster Marshini Chetty. Understanding How and Why University Students Use Virtual Private Networks . In *USENIX Security Symposium*, pages 1–12, Boston, MA, August 2022.

[74]   Nick Feamster and Nicole Marwell. Benchmarks or Equity? A New Approach to Measuring Internet Performance. In *Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–10, Washington, DC, September 2022.

[75]   Kyle MacMillan, Tarun Mangla, Nick Feamster, and Nicole Marwell. Best Practices for Collcting Speed Test Data. In *Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–10, Washington, DC, September 2022.

[76]   Kyle MacMillan, Tarun Mangla, Nick Feamster, and Nicole Marwell. Internet Inequity in Chicago: Adoption, Affordability, and Availability. In *Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–10, Washington, DC, September 2022.

[77]   Jamie Saxon and Nick Feamster. GPS-Based Geolocation of Consumer IP Addresses. In *Passive and Active Measurement Conference (PAM)*, pages 1–12, Virtual, March 2022.
Acceptance rate: 49%

[78]   Francesco Bronzino and Paul Schmitt and Sara Ayoubi and Hyojoon Kim and Renata Teixeira and Nick Feamster. Traffic Refinery: Cost-Aware Data Representation for Machine Learning on Network Traffic. In *ACM SIGMETRICS*, pages 1–12, Mumbai, India, 2022.
Acceptance rate: 28%

[79]   Austin Hounsel, J. Nathan Matias, and Nick Feamster. Software-Supported Audits of Decision-Making Systems: Testing Google and Facebook's Political Advertising Policies. In *ACM Symposium on Computer Supported Cooperative Work (CSCW)*, pages 1–12, Virtual, October 2021.
Acceptance rate: 20%

[80]   Kyle MacMillan, Tarun Mangla, James Saxon, and Nick Feamster. Measuring the Performance and Network Utilization of Popular Video Conferencing Applications. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 1–14, Virtual, October 2021.
Acceptance rate: 27%

[81]   Jordan Holland, Paul Schmitt, Nick Feamster, and Prateek Mittal. New Directions in Automated Traffic Analysis. In *ACM Conference on Computer and Communications Security (CCS)*, pages 1–14, Seoul, Korea, November 2021.

[82]   Francesco Bronzino, Nick Feamster, Shinan Liu, James Saxon, and Paul Schmitt. Mapping the Digital Divide: Before, During, and After COVID-19. In *Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–11, February 2021.

[83]   Austin Hounsel, Paul Schmitt, Kevin Borgolte, and Nick Feamster. Can Encrypted DNS Be Fast? In *Passive and Active Measurement Conference (PAM)*, pages 444–459, Brandenburg, Germany, March 2021.
Acceptance rate: 44%

[84]   Shinan Liu, Paul Schmitt, Francesco Bronzino, and Nick Feamster. Characterizing Service Provider Response to the COVID-19 Pandemic in the United States. In *Passive and Active Measurement Conference (PAM)*, pages 20–38, Brandenburg, Germany, March 2021.
Acceptance rate: 44%

[85]   Danny Yuxing Huang, Noah Apthorpe, Frank Li, Gunes Acar, and Nick Feamster. Iot inspector: Crowdsourcing labeled network traffic from smart home devices at scale. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT/UbiComp)*, 4(2):1–21, 2020.
Acceptance rate: 20%

[86]   Austin Hounsel, Kevin Borgolte, Paul Schmitt, Jordan Holland, and Nick Feamster. Comparing the Effects of DNS, DoT, and DoH on Web Performance. In *The Web Conference (WWW)*, pages 562–572, Taipei, Taiwan, April 2020.
Acceptance rate: 19%

[87]   Kevin Borgolte and Nick Feamster. Understanding The Performance Costs and Benefits of Privacy-focused Browser Extensions. In *The Web Conference (WWW)*, pages 2275–2286, Taipei, Taiwan, April 2020.
Acceptance rate: 19%

[88]   Yotam Harchol, Dirk Bergemann, Nick Feamster, Eric Friedman, Arvind Krishnamurthy, Aurojit Panda, Sylvia Ratnasamy, Michael Schapira, and Scott Shenker. A public option for the core. In *ACM SIGCOMM*, pages 377–389, New York, NY, 2020.
Acceptance rate: 15%

[89]   Paul Schmitt, Francesco Bronzino, Sara Ayoubi, Guilherme Martins, Renata Teixeira, and Nick Feamster. Inferring Streaming Video Quality from Encrypted Traffic: Practical Models and Deployment Experience. In *ACM SIGMETRICS*, volume 3, pages 1–25, Boston, Massachusetts, June 2020.
Acceptance rate: 23%

[90]   Hooman Moghaddam, Gunes Ajar, Arunesh Mathur, Danny Huang, Ben Burgess, Prateek Mittal, Nick Feamster, Arvind Narayanan, and Ed Felten. Watching You Watch: The Tracking Ecosystem of Over-the-Top TV Streaming Devices. In *ACM Conference on Computer and Communications Security (CCS)*, pages 131–147, London, United Kingdom, November 2019.
Acceptance rate: 14%

[91]   Noah Apthorpe, Yan Shvartzshnaider, Nick Feamster, and Helen Nissenbaum. Going Against the (Appropriate) Flow: A Contextual Integrity Approach to Privacy Policy Analysis. In *AAAI Conference on Human Computation and Crowdsourcing (HCOMP)*, volume 7, pages 162–170, Skamania, Washington, October 2019.
Acceptance rate: 25%

[92]   Tithi Chattopadhyay, Paul Schmitt, Kevin Borgolte, Jordan Holland, Austin Hounsel, and Nick Feamster. How DNS over HTTPS is Reshaping Privacy, Performance, and Policy in the Internet Ecosystem . In *Research Conference on Communications, Information and Internet Policy (TPRC)*, pages 1–9, Washington, DC, September 2019.

[93]   Muhammad Shahbaz, Lalith Suresh, Jennifer Rexford, Nick Feamster, Ori Rottenstreich, and Mukesh Hira. Elmo: Source Routed Multicast for Public Clouds. In *ACM SIGCOMM*, pages 458–471, Beijing, China, August 2019.
Acceptance rate: 14%

[94]   Noah Apthorpe, Sarah Varghese, and Nick Feamster. Evaluating the Contextual Integrity of Privacy Regulation: Parents' IoT Toy Privacy Norms Versus COPPA. In *USENIX Security Symposium*, pages 123–140, Santa Clara, CA, August 2019.
Acceptance rate: 10%

[95]   Noah Apthorpe, Danny Huang, Dillon Reisman, Arvind Narayanan, and Nick Feamster. Keeping the Smart Home Private with Smart(er) Traffic Shaping. In *Symposium on Privacy Enhancing Technologies (PETS)*, pages 128–148, Stockholm, Sweden, July 2019.
Acceptance rate: 14%

[96]   Paul Schmitt, Anne Edmundson, and Nick Feamster. Oblivious DNS: Practical Privacy for DNS Queries. In *Symposium on Privacy Enhancing Technologies (PETS)*, pages 228–244, Stockholm, Sweden, July 2019.
Acceptance rate: 14%

[97]   Matheus Xavier Ferreira, Danny Yuxing Huang, Tithi Chattopadhyay, Nick Feamster, and S. Matthew Weinberg. Selling a Single Item with Negative Externalities. In *International World Wide Web Conference (WWW)*, pages 196–206, San Francisco, CA, May 2019.
Acceptance rate: 18%

[98]   Amreesh Phokeer, Josiah Chavula, David Johnson, Melissa Densmore, Gareth Tyson, Arjuna Sathi-aeelan, and Nick Feamster. On the Potential of Google AMP to Promote Local Content in Developing Regions. In *11th International Conference on COMmunication Systems & NETworkS (COMSNETS)*, pages 80–87, Bengaluru, India, January 2019.

[99]   Paul Schmitt, Francesco Branzino, Renata Teixeira, Tithi Chattopadhyay, and Nick Feamster. Enhancing Transparency: Internet Video Quality Inference from Network Traffic. In *Research Conference on Communications, Information and Internet Policy (TPRC)*, pages 1–15, Washington, DC, September 2018.

[100]   Zach Bischoff, Fabian Bustamante, and Nick Feamster. Characterizing and Improving the Reliability of Broadband Internet Access. In *Research Conference on Communications, Information and Internet Policy (TPRC)*, pages 1–15, Washington, DC, September 2018.

[101]   Serena Zheng, Noah Apthorpe, Marshini Chetty, and Nick Feamster. User Perceptions of Smart Home IoT Privacy. In *ACM Conference on Computer Supported Cooperative Work (CSCW)*, pages 1–20, Jersey City, NJ, November 2018.
Acceptance rate: 25%

[102]   Noah Apthorpe, Dillon Reisman Yan Shvartzshnaider, and Nick Feamster. Discovering Smart Home IoT Privacy Norms using Contextual Integrity. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, pages 1–23, Singapore, October 2018.

[103]   Philipp Winter, Anne Edmundson, Laura Roberts, Marshini Chetty, and Nick Feamster. How Do Tor Users Interact with Onion Services? In *USENIX Security Symposium*, pages 411–428, Baltimore, Maryland, August 2018.
Acceptance rate: 19%

[104]   Arpit Gupta, Rob Harrison, Marco Canini, Nick Feamster, Jennifer Rexford, and Walter Willinger. Sonata: Query-Driven Streaming Network Telemetry. In *ACM SIGCOMM*, pages 357–371, Budapest, Hungary, August 2018.
Acceptance rate: 18%

[105]   Anne Edmundson, Roya Ensafi, Nick Feamster, and Jennifer Rexford. Nation-State Hegemony in Internet Routing. In *Proceedings of the ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)*, pages 1–11, Menlo Park, CA, June 2018.
Acceptance rate: 40%

[106]   Josiah Chavula, Amreesh Phokeer, Agustin Formoso, and Nick Feamster. Insight into Africa's Country-Level Latencies. In *IEEE AFRICON*, pages 938–944, Cape Town, South Africa, September 2017.

[107]   Paul Pearce, Ben Jones, Frank Li, Roya Ensafi, Nick Feamster, and Vern Paxson. Global Measurement of DNS Manipulation. In *USENIX Security Symposium*, pages 307–323, Vancouver, British Columbia, Canada, August 2017.
Acceptance rate: 16%

[108]   Yixin Sun, Anne Edmundson, Nick Feamster, Mung Chiang, and Prateek Mittal. Counter-RAPTOR: Safeguarding Tor Against Active Routing Attacks. In *IEEE Symposium on Security and Privacy (Oakland)*, pages 977–992, San Jose, CA, May 2017.
Acceptance rate: 13%

[109]   Paul Pearce, Roya Ensafi, Frank Li, Nick Feamster, and Vern Paxson. Augur: Internet-Wide Detection of Connectivity Disruptions. In *IEEE Symposium on Security and Privacy (Oakland)*, pages 427–443, San Jose, CA, May 2017.
Acceptance rate: 13%

[110]   Robert MacDavid, Rudiger Birkner, Ori Rottenstreich, Arpit Gupta, Nick Feamster, and Jennifer Rexford. Concise Encoding of Flow Attributes in SDN Switches. In *ACM Symposium on SDN Research (SOSR)*, pages 48–60, Santa Clara, CA, April 2017.
Acceptance rate: 23%

[111]   Rudiger Birkner, Arpit Gupta, Nick Feamster, and Laurent Vanbever. SDX-Based Flexibility or Internet Correctness? Pick Two! In *ACM Symposium on SDN Research (SOSR)*, pages 1–7, Santa Clara, CA, April 2017.
Acceptance rate: 23%

[112]   Benjamin Greschbach, Tobias Pulls, Laura Roberts, Philipp Winter, and Nick Feamster. The Effect of DNS on Tor's Anonymity. In *Network and Distributed Systems Security Symposium*, pages 1–15, San Diego, CA, February 2017.
Acceptance rate: 16%

[113]   Amreesh Phokeer, David Johnson, Melissa Densmore, and Nick Feamster. A First Look at Mobile Internet Use in Township Communities in South Africa. In *ACM Symposium on Computing for Development (DEV)*, number 15, pages 1–15, Nairobi, Kenya, November 2016.
Acceptance rate: 25%

[114]   Ava Chen, Nick Feamster, and Enrico Calandro. Exploring the Walled Garden Theory: An Empirical Framework to Assess Pricing Effects on Mobile Data Usage. In *Communications Policy Research South (CPRSouth)*, pages 1–18, Zanzibar, Tanzania, September 2016.

[115]   Shuang Hao, Alex Kantchelian, Brad Miller, Vern Paxson, and Nick Feamster. PREDATOR: Proactive Recognition and Elimination of Domain Abuse at Time-Of-Registration. In *ACM Conference on Computer and Communications Security (CCS)*, pages 1568–1579, Vienna, Austria, October 2016.
Acceptance rate: 16%

[116]   Nick Feamster. Revealing Utilization at Internet Interconnection Points. In *Conference on Communications, Information, and Internet Policy (TPRC)*, pages 1–10, Washington, DC, September 2016.

[117]   Philipp Winter, Roya Ensafi, Karsten Loesing, and Nick Feamster. Identifying and Characterizing Sybils in the Tor Network. In *USENIX Security Symposium*, pages 1169–1185, Austin, TX, August 2016.
Acceptance rate: 15%

[118]   Muhammad Shahbaz, Sean Choi, Ben Pfaff, Changhoon Kim, Nick Feamster, Nick McKeown, and Jennifer Rexford. PISCES: A Programmable, Protocol-Independent Software Switch. In *ACM SIGCOMM*, pages 525–538, Florianopolis, Brazil, August 2016.
Acceptance rate: 17%

[119]   Yogesh Mundada, Nick Feamster, and Balachander Krishnamurthy. Half-Baked Cookies: Hardening Cookie-Based Authentication for the Modern Web. In *ACM Asia Conference on Computer and Communications Security (ASIACCS)*, pages 675–685, Xi'an, China, June 2016.
Acceptance rate: 21%

[120]   Arpit Gupta, Robert MacDavid, Rudiger Birkner, Marco Canini, Nick Feamster, Jennifer Rexford, and Laurent Vanbever. An Industrial-Scale Software Defined Internet Exchange Point. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pages 1–14, Santa Clara, CA, March 2016.
Acceptance rate: 20%
Best of USENIX Paper Award.
USENIX Community Contribution Award.

[121]   Srikanth Sundaresan, Nick Feamster, and Renata Teixeira. Home or Access? Locating Last-Mile Downstream Throughput Bottlenecks. In *Passive and Active Measurement Conference (PAM)*, pages 111–123, Heraklion, Crete, Greece, March 2016.
Acceptance rate: 32%

[122]   Sarthak Grover, Roya Ensafi, and Nick Feamster. A Case Study of Traffic Demand Response to Broadband Service-Plan Upgrades. In *Passive and Active Measurement Conference (PAM)*, pages 124–135, Heraklion, Crete, Greece, March 2016.
Acceptance rate: 32%

[123]   Ben Jones, Nick Feamster, Vern Paxson, Nick Weaver, and Mark Allman. Detecting DNS Root Manipulation. In *Passive and Active Measurement Conference (PAM)*, pages 276–288, Heraklion, Crete, Greece, March 2016.
Acceptance rate: 32%

[124]   Arpit Gupta, Nick Feamster, and Laurent Vanbever. Authorizing Network Control at Software Defined Internet Exchange Points. In *ACM SIGCOMM Symposium on SDN Research (SOSR)*, pages 1–6, Santa Clara, CA, March 2016.
Acceptance rate: 25%

[125]   Ben Jones and Nick Feamster. Can Censorship Measurements Be Safe(r)? In *ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets)*, pages 1–7, Philadelphia, PA, October 2015.
Acceptance rate: 19%

[126]   Roya Ensafi, David Fifield, Philipp Winter, Nick Feamster, Nick Weaver, and Vern Paxson. Examining How the Great Firewall Discovers Hidden Circumvention Servers. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 445–458, Tokyo, Japan, October 2015.
Acceptance rate: 26% **Internet Research Task Force Applied Networking Research Prize.**

[127]   Sam Burnett and Nick Feamster. Encore: Lightweight Measurement of Web Censorship with Cross-Origin Requests. In *ACM SIGCOMM*, pages 653–667, London, England, August 2015.
Acceptance rate: 16%

[128]   Maria Konte, Roberto Perdisci, and Nick Feamster. ASwatch: An AS Reputation System to Expose Bulletproof Hosting ASes. In *ACM SIGCOMM*, pages 625–638, London, England, August 2015.
Acceptance rate: 16%

[129]   Ben Jones, Roya Ensafi, Nick Feamster, Vern Paxson, and Nick Weaver. Ethical Concerns for Censorship Measurement. In *ACM SIGCOMM Workshop on Ethics in Networked Systems Research*, pages 17–19, London, England, August 2015.

[130]   Muhammad Shahbaz and Nick Feamster. The Case for an Intermediate Representation for Programmable Data Planes. In *ACM SIGCOMM Symposium on SDN Research (SOSR)*, pages 1–6, Santa Clara, CA, June 2015.
Acceptance rate: 19%

[131]   Bilal Anwer, Theophilus Benson, Nick Feamster, and Dave Levin. Prorgramming Slick Network Functions. In *ACM SIGCOMM Symposium on SDN Research (SOSR)*, pages 1–13, Santa Clara, CA, June 2015.
Acceptance rate: 16%

[132]   Hyojoon Kim, Arpit Gupta, Muhammad Shahbaz, Joshua Reich, Nick Feamster, and Russ Clark. Kinetic: Verifiable Dynamic Network Control. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pages 59–72, Oakland, CA, May 2015.
Acceptance rate: 19%

[133]   Marshini Chetty, Hyojoon Kim, Srikanth Sundaresan, Sam Burnett, Nick Feamster, and Keith Edwards. uCap: An Internet Data Management Tool for the Home. In *ACM Conference on Human Factors in Computing Systems (CHI)*, pages 3093–3102, Seoul, Korea, April 2015.
Acceptance rate: 23%

[134]   Srikanth Sundaresan, Nick Feamster, and Renata Teixeira. Measuring the Performance of User Traffic in Home Wireless Networks. In *Passive and Active Measurement Confernece (PAM)*, pages 305–317, New York, NY, March 2015.
Acceptance rate: 27%

[135]   Josiah Chavula, Hussein Suleman, and Nick Feamster. Quantifying the Effects of Circuitous Routes on the Latency of Intra-Africa Internet Traffic: A Study of Research and Education Networks. In *6th International Conference on e-Infrastructure and e-Services for Developing Countries (Africomm)*, pages 64–73, Kampala, Uganda, November 2014.

[136]   Abhinav Narain, Nick Feamster, and Alex C. Snoeren. Deniable Liaisons. In *SIGSAC Conference on Computer and Communications Security (CCS)*, pages 525–536, November 2014.
Acceptance rate: 19%

[137]   Ben Jones, Tzu-Wen Lee, Nick Feamster, and Phillipa Gill. Automated Detection and Fingerprinting of Censorship Block Pages. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 299–304, Vancouver, British Columbia, Canada, October 2014.
Acceptance rate: 22%

[138]   Arpit Gupta, Muhammad Shahbaz, Laurent Vanbever, Hyojoon Kim, Russ Clark, Nick Feamster, Jennifer Rexford, and Scott Shenker. SDX: A Software Defined Internet Exchange. In *ACM SIGCOMM*, pages 551–562, Chicago, IL, 2014.
Acceptance rate: 19%

[139]   Srikanth Sundaresan, Sam Burnett, Nick Feamster, and Walter De Donato. BISmark: A Testbed for Deploying Measurements and Applications in Broadband Access Networks. In *USENIX Annual Technical Conference*, pages 383–394, Philadelphia, PA, June 2014.
Acceptance rate: 15%

[140]   Arpit Gupta, Matt Calder, Nick Feamster, Marshini Chetty, Enrico Calandro, and Ethan Katz-Bassett. Peering at the Internet's Frontier: A First Look at ISP Interconnectivity in Africa. In *Passive and Active Measurement (PAM)*, pages 204–213, Los Angeles, CA, 2014.
Acceptance rate: 31%

[141]   Xinyu Xing, Wei Meng, Dan Doozan, Nick Feamster, Wenke Lee, and Alex Snoeren. Exposing Inconsistent Web Search Results with Bobble. In *Passive and Active Measurement (PAM)*, pages 131–140, Los Angeles, CA, 2014.
Acceptance rate: 31%

[142]   Marshini Chetty, Srikanth Sundaresan, Sachit Muckaden, Nick Feamster, and Enrico Calandro. Measuring Broadband Performance in South Africa. In *ACM Symposium on Computing for Development (DEV)*, pages 1–10, Cape Town, South Africa, December 2013.
Acceptance rate: 33%

[143]   Yogesh Mundada, Anirudh Ramachandran, and Nick Feamster. SilverLine: Preventing Data Leaks from Cloud-Based Web Applications. In *Annual Computer Security Applications Conference (ACSAC)*, pages 329–338, New Orleans, LA, December 2013.
Acceptance rate: 19%

[144]   Shuang Hao, Matthew Thomas, Vern Paxson, Nick Feamster, Christian Kreibich, Chris Grier, and Scott Hollenbeck. Understanding the domain registration behavior of spammers. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 63–76, Barcelona, Spain, October 2013.
Acceptance rate: 23%

[145]   Sarthak Grover, Mi Seon Park, Srikanth Sundaresan, Sam Burnett, Hyojoon Kim, and Nick Feamster. Peeking behind the nat: An empirical study of home networks. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 377–390, Barcelona, Spain, October 2013.
Acceptance rate: 23%

[146]   Srikanth Sundaresan, Nick Feamster, Renata Teixeira, and Nazanin Magharei. Measuring and mitigating web performance bottlenecks in broadband access networks. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 213–226, Barcelona, Spain, October 2013.
Acceptance rate: 23%

[147]   Xinyu Xing, Wei Ming, Dan Doozan, Alex Snoeren, Nick Feamster, and Wenke Lee. Take this personally: Pollution attacks on personalized services. In *USENIX Security Symposium*, pages 671–686, Washington, DC, August 2013.
Acceptance rate: 16%

[148]   Vytautas Valancius, Bharath Ravi, Nick Feamster, and Alex C Snoeren. Quantifying the benefits of joint content and network routing. In *ACM SIGMETRICS*, pages 243–254, Pittsburgh, PA, June 2013.
Acceptance rate: 11%

[149]   Cristian Lumezanu and Nick Feamster. Observing Common Spam in Twitter and Email. In *ACM SIGCOMM Internet Measurement Conference*, pages 461–466, Boston, MA, November 2012.
Acceptance rate: 24%

[150]   Ethan Katz-Bassett, Colin Scott, David Choffnes, Italo Cunha, Vytautas Valancius, Nick Feamster, Harsha Madhyastha, T. Anderson, and A. Krishnamurthy. LIFEGUARD: Practical Repair of Persistent Route Failures. In *ACM SIGCOMM*, pages 395–406, Helsinki, Finland, August 2012.
Acceptance rate: 14%

[151]   Cristian Lumezanu, Nick Feamster, and Hans Klein. #bias: Measuring Propagandistic Behavior on Twitter. In *International Conference on Weblogs and Social Media (ICWSM)*, pages 1–8, Dublin, Ireland, June 2012.
Acceptance rate: 20%

[152]   Maria Konte and Nick Feamster. Re-wiring Activity of Malicious Networks. In *Passive and Active Measurement (PAM)*, pages 116–125, Vienna, Austria, 2012.
Acceptance rate: 30%

[153]   Hyojoon Kim and Theophilus Benson and Aditya Akella and Nick Feamster. Understanding the Evolution of Network Configuration: A Tale of Two Campuses. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 499–514, Berlin, Germany, November 2011.
Acceptance rate: 19%

[154]   Shuang Hao, Nick Feamster, and Ramakant Pandrangi. Monitoring the Initial DNS Behavior of Malicious Domains. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 269–278, Berlin, Germany, November 2011.
Acceptance rate: 19%

[155]   Vytautas Valancius, Cristian Lumezanu, Nick Feamster, Ramesh Johari, and Vijay Vazirani. How Many Tiers? Pricing in the Internet Transit Market. In *ACM SIGCOMM*, pages 194–205, Toronto, Ontario, Canada, August 2011.
Acceptance rate: 14%

[156]   Srikanth Sundaresan, Walter de Donato, Nick Feamster, Renata Teixeira, Sam Crawford, and Antonio Pescape. Broadband Internet Performance: A View From the Gateway. In *ACM SIGCOMM*, pages 134–145, Toronto, Ontario, Canada, August 2011.
Acceptance rate: 14%
Internet Research Task Force Applied Networking Research Prize.
***Communications of the ACM* Research Highlight.**

[157]   Anirudh Ramachandran, Anirban Dasgupta, Nick Feamster, and Kilian Weinberger. Spam or Ham? Characterizing and Detecting Fraudulent "Not Spam" Reports in Web Mail Systems. In *8th Annual Collaboration, Electronic messaging, Anti-Abuse and Spam Conference (CEAS 2011)*, Perth, Australia, September 2011.

[158]   Bilal Anwer, Murtaza Motiwala, Mukarram bin Tariq, and Nick Feamster. SwitchBlade: A Platform for Rapid Deployment of Network Protocols on Programmable Hardware. In *ACM SIGCOMM*, pages 183–194, New Delhi, India, 2010.
Acceptance rate: 12%

[159]   Sam Burnett, Nick Feamster, and Santosh Vempala. Chipping Away at Censorship Firewalls with Collage. In *USENIX Security Symposium*, Washington, DC, August 2010.
Acceptance rate: 15%

[160]   Manos Antonakakis and Roberto Perdisci and David Dagon and Wenke Lee and Nick Feamster. Building a Dynamic Reputation System for DNS. In *USENIX Security Symposium*, Washington, DC, August 2010.
Acceptance rate: 15%

[161]   Vytautas Valancius, Nick Feamster, Jennifer Rexford, and Akihiro Nakao. Wide-Area Routing for Distributed Services. In *USENIX Annual Technical Conference*, Boston, MA, June 2010.
Acceptance rate: 17%

[162]   Roberto Perdisci, Wenke Lee, and Nick Feamster. Behavioral clustering of http-based malware. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, San Jose, CA, 2011.
Acceptance rate: 16%

[163]   Mohammed Mukarram bin Tariq, Murtaza Motiwala, Nick Feamster, and Mostafa Ammar. Detecting General Network Neutrality Violations with Causal Inference. In *ACM SIGCOMM Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, pages 289–300, Rome, Italy, 2009.
Acceptance rate: 17%

[164]   Mohammed Mukarram bin Tariq, Ahmed Mansy, Nick Feamster, and Mostafa Ammar. Measuring VLAN-Induced Sharing on a Campus Network. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 116–121, Chicago, IL, November 2009.
Acceptance rate: 22%

[165]   Italo Cunha, Renata Teixeira, Nick Feamster, and Christophe Diot. Measurement Methods for Fast and Accurate Blackhole Identification with Binary Tomography. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 254–266, Chicago, IL, 2009.
Acceptance rate: 22%

[166]   Shuang Hao, Nadeem Syed, Nick Feamster, Alexander Gray, and Sven Krasser. Detecting Spammers with SNARE: Spatio-temporal Network-level Automatic Reputation Engine. In *USENIX Security Symposium*, Montreal, Quebec, Canada, August 2009.
Acceptance rate: 15%

[167]   Maria Konte, Nick Feamster, and Jaeyeon Jung. Dynamics of Online Scam Infrastructure. In *Passive and Active Measurement (PAM)*, pages 219–228, Seoul, Korea, 2009.
Acceptance rate: 20%   **Best paper award.**

[168]   Anirudh Ramachandran, Srinivasan Seetharaman, Nick Feamster, and Vijay Vazirani. Fast Monitoring of Traffic Subpopulations. In *ACM SIGCOMM Internet Measurement Conference*, pages 257–270, Vouliagmeni, Greece, October 2008.
Acceptance rate: 17%

[169]   Murtaza Motiwala, Megan Elmore, Nick Feamster, and Santosh Vempala. Path Splicing. In *ACM SIGCOMM*, pages 27–38, Seattle, WA, August 2008.
Acceptance rate: 12%

[170]   Mohammed Mukarram bin Tariq, Amgad Zeitoun, Nick Feamster, and Mostafa Ammar. Answering What-If Deployment and Configuration Questions with WISE. In *ACM SIGCOMM*, pages 99–110, Seattle, WA, August 2008.
Acceptance rate: 12%

[171]   David Andersen, Hari Balakrishnan, Nick Feamster, and Scott Shenker. Accountable Internet Protocol (AIP). In *ACM SIGCOMM*, pages 339–350, Seattle, WA, August 2008.
Acceptance rate: 12%

[172]   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 Edudation (SIGCSE)*, pages 471–475, Portland, OR, March 2008.

[173]   Anirudh Ramachandran, Nick Feamster, and Santosh Vempala. Filtering Spam with Behavioral Blacklisting. In *Proc. 14th ACM Conference on Computer and Communications Security (CCS)*, pages 342–351, Alexandria, VA, October 2007.
Acceptance rate: 24%

[174]   Manas Khadilkar, Nick Feamster, Russ Clark, and Matt Sanders. Usage-Based DHCP Lease Time Optimization. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 71–76, San Diego, CA, October 2007.
Acceptance rate: 24%

[175]   Yiyi Huang, Nick Feamster, Anukool Lakhina, and Jim Xu. Diagnosing Network Disruptions with Network-Wide Analysis. In *ACM SIGMETRICS*, pages 61–72, San Diego, CA, June 2007.
Acceptance rate: 17%

[176]   Feng Wang, Nick Feamster, and Lixin Gao. Measuring the contributions of routing dynamics to prolonged end-to-end internet path failures. In *IEEE Conference on Global Communications (GlobeCom)*, November 2007.
Acceptance rate: 40%

[177]   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.
Acceptance rate: 47%

[178]   Anirudh Ramachandran and Nick Feamster. Understanding the Network-Level Behavior of Spammers. In *ACM SIGCOMM*, pages 291–302, August 2006.
Acceptance rate: 12% **Best student paper award.**

[179]   Andy Bavier, Nick Feamster, Mark Huang, Larry Peterson, and Jennifer Rexford. In VINI Veritas: Realistic and controlled network experimentation. In *ACM SIGCOMM*, pages 3–14, Pisa, Italy, 2006.
Acceptance rate: 12%

[180]   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.

[181]   Nick Feamster, Ramesh Johari, and Hari Balakrishnan. The Implications of Autonomy for Stable Policy Routing. In *ACM SIGCOMM*, pages 25–36, Philadelphia, PA, August 2005.
Acceptance rate: 11%

[182]   Michael Freedman, Mythili Vutukuru, Nick Feamster, and Hari Balakrishnan. Geographic Locality of IP Prefixes. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 13–19, Berkeley, CA, October 2005.
Acceptance rate: 24%

[183]   Nick Feamster and Hari Balakrishnan. Detecting BGP Configuration Faults with Static Analysis. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pages 43–56, Boston, MA, 2005.
Acceptance rate: 22% **Best paper award.**

[184]   Matthew Caesar, Don Caldwell, Nick Feamster, Jennifer Rexford, Aman Shaikh, and Kobus van der Merwe. Design and Implementation of a Routing Control Platform. In *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pages 15–28, Boston, MA, 2005. *Acceptance rate: 22%* **Test of time paper award (2015).**

[185]   Nick Feamster, Zhuoqing Morley Mao, and Jennifer Rexford. BorderGuard: Detecting Cold Potatoes from Peers. In *ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 213–218, Taormina, Sicily, Italy, 2004. *Acceptance rate: 25%*

[186]   Nick Feamster, Jared Winick, and Jennifer Rexford. A Model of BGP Routing for Network Engineering. In *ACM SIGMETRICS*, pages 331–342, New York, NY, 2004. *Acceptance rate: 12%*

[187]   Nick Feamster, David Andersen, Hari Balakrishnan, and M. Frans Kaashoek. Measuring the Effects of Internet Path Faults on Reactive Routing. In *ACM SIGMETRICS Performance Evaluation Review*, volume 31, pages 126–137, 2003. *Acceptance rate: 12%*

[188]   Nick Feamster, Magdalena Balazinska, Greg Harfst, Hari Balakrishnan, and David Karger. Infranet: Circumventing Web censorship and surveillance. In *USENIX Security Symposium*, pages 247–262, 2002. *Acceptance rate: 17%* **Best student paper award.**

[189]   Kevin Fu, Emil Sit, Kendra Smith, and Nick Feamster. Dos and don'ts of client authentication on the Web. In *USENIX Security Symposium*, Washington, DC, August 2001. *Acceptance rate: 28%* **Best student paper award.**

[190]   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. *Acceptance rate: 45%*

[191]   Nick Feamster and Susie Wee. An MPEG-2 to H.263 transcoder. In *SPIE Voice, Video, and Data Communications Conference*, pages 164–175, Boston, MA, September 1999.

Workshop Publications

[192]   Austin Hounsel, Paul Schmitt, Kevin Borgolte, and Nick Feamster. Designing for Tussle in Encrypted DNS. In *ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets)*, pages 1–6, Virtual, October 2021. *Acceptance rate: 31%*

[193]   Kyle MacMillan and Nick Feamster. Beyond Speed Test: Measuring Latency Under Load Across Different Speed Tiers. In *Internet Architecture Board Workshop on Measuring Network Quality for End Users*, pages 1–3, Virtual, September 2021.

[194]   Austin Hounsel, Paul Schmitt, Kevin Borgolte, and Nick Feamster. Encryption without Centralization: Distributing DNS Queries Across Recursive Resolvers. In *ACM Applied Networking Research Workshop (ACM)*, pages 62–68, Virtual, July 2021.

[195]   Alexandra Nisenoff, Nick Feamster, Madeleine Hoofnagle, and Sydney Zink. User Expectations and Understanding of Encrypted DNS Settings. In *Network and Distributed Security Symposium Workshop on DNS Privacy*, pages 1–8, Virtual, February 2021.

[196]   Austin Hounsel, Jordan Holland, Ben Kaiser, Kevin Borgolte, Nick Feamster, and Jonathan Mayer. Identifying disinformation websites using infrastructure features. In *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*, pages 1–6, August 2020.

[197]   Trisha Datta, Nick Feamster, Jennifer Rexford, and Liang Wang. SPINE: Surveillance Protection in the Network Elements. In *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*, pages 1–6, Santa Clara, CA, August 2019.

[198]   Austin Hounsel, Kevin Borgolte, Paul Schmitt, Jordan Holland, and Nick Feamster. Analyzing the Costs (and Benefits) of DNS, DoT, and DoH for the Modern Web. In *IRTF Applied Networking Research Workshop (ANRW)*, pages 20–22, Montreal, Quebec, Canada, July 2019.

[199]   A. Hounsel, P. Mittal, and N. Feamster. CensorSeeker: Generating a Large, Culture-Specific Blocklist for China. In *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*, pages 1–6, Baltimore, Maryland, August 2018.

[200]   Trisha Datta, Noah Apthorpe, and Nick Feamster. A Developer-Friendly Library for Smart Home IoT Privacy-Preserving Traffic Obfuscation. In *ACM SIGCOMM Workshop on Internet of Things Security and Privacy*, pages 43–48, Budapest, Hungary, August 2018.

[201]   Gunes Acar, Danny Huang, Frank Li, Arvind Narayanan, and Nick Feamster. Web-based Attacks to Discover and Control Local IoT Devices. In *ACM SIGCOMM Workshop on Internet of Things Security and Privacy*, pages 29–35, Budapest, Hungary, August 2018.

[202]   Xiaohe Hu, Arpit Gupta, Arojit Panda, Nick Feamster, and Scott Shenker. Preserving Privacy at IXPs. In *Asia-Pacific Workshop on Networking (APNet)*, pages 43–49, Beijing, China, August 2018.

[203]   Rohan Doshi, Noah Apthorpe, and Nick Feamster. Machine Learning DDoS Detection for Consumer Internet of Things Devices. In *IEEE Security and Privacy Deep Learning and Security Workshop (DLS)*, pages 29–35, San Francisco, CA, May 2018.

[204]   Daniel Wood, Noah Apthorpe, and Nick Feamster. Cleartext Data Transmission in Consumer IoT Medical Devices. In *ACM Computer and Communications Security (CCS) Workshop on Security and Privacy in the Internet of Things*, pages 7–12, Dallas, TX, November 2017.

[205]   Noah Apthorpe, Dillon Reisman, and Nick Feamster. Closing the blinds: Four strategies for protecting smart home privacy from network observers. In *IEEE Workshop on Technology and Consumer Protection (ConPro)*, pages 1–6, San Francisco, CA, May 2017.

[206]   Noah Apthorpe, Dillon Reissman, and Nick Feamster. A Smart Home is No Castle: Privacy Vulnerabilities of Encrypted IoT Traffic. In *Workshop on Data and Algorithmic Transparency (DAT)*, pages 1–6, New York, NY, November 2016.

[207]   Arpit Gupta, Rudiger Birkner, Marco Canini, Nick Feamster, Chris Mac-Stoker, and Walter Willinger. Network Monitoring as a Streaming Analytics Problem. In *ACM SIGCOMM Symposium on Hot Topics in Networking (HotNets)*, pages 106–112, Atlanta, GA, November 2016.
Acceptance rate: 27%

[208]   M. Awan, T. Ahmad, S. Qaisar, N. Feamster, and S. Sundaresan. Measuring Broadband Access Network Performance in Pakistan: A Comparative Study. In *IEEE Workshop on Network Measurements (WNM)*, pages 595–602, Clearwater Beach, FL, October 2015.

[209]   Brandon Schlinker, Kyriakos Zarifis, Italo Cunha, Nick Feamster, and Ethan Katz-Bassett. PEERING: An AS for Us. In *SIGCOMM Workshop on Hot Topics in Networks (HotNets)*, pages 1–7, Los Angeles, CA, 2014.

[210]   Sean Donovan and Nick Feamster. Intentional Network Monitoring: Finding the Needle without Capturing the Haystack. In *SIGCOMM Workshop on Hot Topics in Networks (HotNets)*, pages 1–7, Los Angeles, CA, 2014.

[211]   Ben Jones, Sam Burnett, Nick Feamster, Sathya Gunasekaran, Sean Donovan, Sarthak Grover, Sathya, and Karim Habak. Facade: High-Throughput, Deniable Censorship Circumvention Using Web Search. In *USENIX Workshop on Free and Open Communications on the Internet (FOCI)*, pages 1–7, 2014.

[212]   Nick Feamster. Hidden Sources of Internet Latency. In *ISOC Workshop on Reducing Internet Latency*, pages 1–2, London, England, September 2013.

[213]   Marshini Chetty, Enrico Calandro, and Nick Feamster. Latency Effects on Broadband Performance in South Africa . In *ISOC Workshop on Reducing Internet Latency*, pages 1–2, London, England, September 2013.

[214]   B. Anwer, T. Benson, N. Feamster, D. Levin, and J. Rexford. A Slick Control Plane for Network Middleboxes. In *Open Network Summit*, Santa Clara, CA, April 2013.
Acceptance rate: 23%

[215]   N. Feamster, D. Levin, J. Rexford, S. Shenker, R. Clark, and J. Bailey. SDX: A Software Defined Internet Exchange. In *Open Network Summit*, pages 551–562, Santa Clara, CA, April 2013.
Acceptance rate: 23%

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[217]   Jake Martin and Nick Feamster. User-driven dynamic prioritization for home networks. In *ACM SIGCOMM Workshop on Measurements Up the Stack (W-MUST)*, pages 19–24, Helsinki, Finland, August 2012.

[218]   Srikanth Sundaresan, Nick Feamster, Renata Teixeira, Anthony Tang, W. Keith Edwards, Rebecca Grinter, Marshini Chetty, and Walter de Donato. Helping Users Shop for ISPs with Internet Nutrition Labels. In *ACM SIGCOMM Workshop on Home Networking (HomeNets)*, pages 13–18, Toronto, Ontario, Canada, August 2011.

[219]   Nick Feamster and Jennifer Rexford. Getting Students' Hands Dirty With Clean-Slate Networking. In *SIGCOMM Workshop on Network Education (NetEd)*, pages 1–6, Toronto, Ontario, Canada, August 2011.

[220]   Yogesh Mundada, Anirudh Ramachandran, and Nick Feamster. SilverLine: Data and Network Isolation for Cloud Services. In *3rd USENIX Workshop on Hot Topics in Cloud Computing (HotCloud '11)*, page 13, June 2011.

[221]   Bilal Anwer, Ankur Nayak, Nick Feamster, and Ling Liu. Network I/O Fairness in Virtual Machines. In *ACM SIGCOMM Workshop on Virtualized Infrastrastructure, Services, and Architectures (VISA)*, New Delhi, India, September 2010.

[222]   Nick Feamster. Outsourcing Home Network Security. In *ACM SIGCOMM Workshop on Home Networking (HomeNets)*, pages 37–42, New Delhi, India, September 2010.

[223]   Ken Calvert, W. Keith Edwards, Nick Feamster, Rebecca Grinter, Ye Deng, and Xuzi Zhou. Instrumenting Home Networks. In *ACM SIGCOMM Workshop on Home Networking (HomeNets)*, pages 55–60, New Delhi, India, September 2010.

[224]   Bilal Anwer and Nick Feamster. Building a Fast, Virtualized Data Plane with Programmable Hardware. In *ACM SIGCOMM Workshop on Virtualized Infrastrastructure, Services, and Architectures (VISA)*, pages 1–8, Barcelona, Spain, August 2009.

[225]   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)*, pages 11–18, Barcelona, Spain, August 2009.

[226]   Sapan Bhatia, Murtaza Motiwala, Wolfgang Muhlbauer, 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*, pages 1–7, December 2008.

[227]   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*, pages 1–6, December 2008.

[228]   Mohammed Mukarram bin Tariq, Murtaza Motiwala, and Nick Feamster. NANO: Network Access Neutrality Observatory. In *ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets)*, Calgary, Alberta, Canada, October 2008.
Acceptance rate: 20%

[229]   Sarita Yardi, Nick Feamster, and Amy Bruckman. Photo-Based Authentication Using Social Networks. In *ACM SIGCOMM Workshop on Online Social Networks (WOSN)*, pages 55–60, Seattle, WA, August 2008.

[230]   Anirudh Ramachandran and Nick Feamster. Authenticated Out-of-Band Communication over Social Links. In *ACM SIGCOMM Workshop on Online Social Networks (WOSN)*, pages 61–66, Seattle, WA, August 2008.

[231]   Murtaza Motiwala, Nick Feamster, and Santosh Vempala. Path Splicing: Reliable Connectivity with Rapid Recovery. In *ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets)*, Atlanta, GA, October 2007.
Acceptance rate: 18%

[232]   David G. Andersen, Hari Balakrishnan, Nick Feamster, and Scott Shenker. Holding the Internet Accountable. In *ACM SIGCOMM Workshop on Hot Topics in Networking*, pages 1–6, November 2007.
Acceptance rate: 18%

[233]   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.

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[236]   Nick Feamster, Hari Balakrishnan, and Jennifer Rexford. Some foundational problems in interdomain routing. In *ACM SIGCOMM Workshop on Hot Topics in Networking*, pages 41–46, November 2004.

[237]   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, August 2004.

[238]   Nick Feamster and Roger Dingledine. Location diversity in anonymity networks. In *ACM Workshop on Privacy in the Electronic Society*, pages 66–76, Washington, DC, October 2004.

[239]   Nick Feamster, Magdalena Balazinska, Winston Wang, Hari Balakrishnan, and David Karger. Thwarting Web censorship with untrusted messenger discovery. In *Privacy Enhancing Technologies*, pages 125–140, Dresden, Germany, March 2003.

[240]   Nick Feamster. Practical Verification Techniques for Wide-Area Routing. In *ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets)*, pages 87–92, Cambridge, MA, 2003.

[241]   Nick Feamster and Hari Balakrishnan. Towards a Logic for Wide-Area Internet Routing. volume 33, pages 289–300, 2003.

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Acceptance rate: 42%

[243]   Nick Feamster and Hari Balakrishnan. Packet loss recovery for streaming video. In *Proc. 12th International Packet Video Workshop (PV 2002)*, pages 9–16, Pittsburgh, PA, April 2002.

[244]   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*, pages 1–10, Kyongju, Korea, May 2001.

Software

My research group regularly releases software and makes a practice of releasing source code with most published papers. As a supplement to the descriptions below, my research group's Github page is available at: `https://github.com/noise-lab/`.

Ongoing and Maintained Software

- *Netrics.* The Netrics platform is an open-source software framework for computer network measurement and analysis that has been under development since 2021. It supports a variety of network measurement tests, and is designed in an extensible way to make it easy to add new tests. The platform aims to provide robust, granular measurements on internet speed, reliability, local network bandwidth, and utilization. An initial pilot deployment of Netrics platform was deployed in 31 distinct community areas in Chicago in 2023 to measure internet speed, reliability, and equity in Internet performance across the city. The pilot study and deployment demonstrate the feasibility of the observational instrument of this type and pave the way for many of the deployment, logistical, and technical solutions that need to be put in place to deploy it. The software is publicly available on Github: `https://github.com/chicago-cdac/nm-exp-active-netrics`.

- *netML.* `netml` is a network anomaly detection tool and library written in Python. We have designed, implemented, and released a public, open-source Python library, `netml`, that takes network packet traces as input, transforms these packet traces into the various data representations. We have released the open-source code for the library and packaged the library on PyPi for easy installation. The `netml` library is written in Python and contains two sub-modules: (1) a `pcap` parser to produce flows using Scapy/dpkt; (2) a novelty detection module that applies the novelty detection algorithms. The `netml` functionality can be incorporated as a Python library or invoked directly from the command line. The entire library consists of approximately 11,000 lines of Python, with the packet parsing module comprising approximately 3,500 lines of Python, the implementations of various novelty detection modules comprising another 3,000 lines, another 3,000 lines in support of the `netml` command-line utility, and the rest of the code in support of various utilities (e.g., testing). The library is publicly available on Github: `https://github.com/chicago-cdac/netml`.

- *pcapML.* pcapML is a system for improving the reproducability of traffic analysis tasks. pcapML leverages the pcapng file format to encode metadata directly into raw traffic captures, removing any ambiguity about which packets belong to any given traffic flow, application, attack, etc., while still being compatiable with popular tools such as tshark and tcpdump. pcapML is publicly available on Github: `https://github.com/nprint/pcapml`

- *nPrint.* nPrint is a standard data representation for network traffic meant to be directly usable with machine learning algorithms, replacing feature engineering for a wide array of traffic analysis problems. We have also created nPrintML, which integrates nPrint with a fully automated AutoML pipeline. Source code and toolkit available at: `https://github.com/nprint/nprint`.

- *IoT Inspector.* IoT Inspector is a standalone desktop application that lets users analyze the traffic from home IoT devices. It allows users to determine: what Internet destinations IoT devices are communicating with, when the communication happens, and how many bytes are sent and received over time. These features identify potential problems on a home network, including: security problems (e.g.,camera sending out lots of traffic even when not in use); privacy problems (e.g., smart TV contacting advertising or tracking companies as a user watches TV); performance problems (e.g., identifying who is using up the most bandwidth in a home network). More details, including video demonstrations, papers, and source code, are available at `https://iot-inspector.princeton.edu`. We are working with journalists to have thousands of users around the world to run this software to analyze smart home traffic.

- *NetMicroscope.* We have developed a system that supports passive measurement for a wide variety of services and network scenar- ios based on the above requirements. The system has two components: (1) a packet processing module that measures flow statistics and tracks their state at line rate; ; and (2)'a quality inference module that queries the flow cache to obtain flow statistics and derive the service quality for tracked applications. We have deployed this software in 50 user homes in the United States and France and are working with journalists to publish investigations from the tool, including how video quality relates to access ISP speed.

- *Interconnection Measurement Project.* Participating Internet Service Providers have installed a common tool to measure traffic at their interconnects, the points where ISPs exchange traffic with the greater Internet. This effort includes multiple ISPs, providing direct information on the capacity and utilization of interconnect links. All data

and visualizations are of ingress capacity and utilization. Across the 1,200+ links included in the data set, which represent the diverse and broadly substitutable routes available for Internet traffic flows, the Project reveals that capacity is roughly 50% utilized during peak periods, and that capacity continues to grow to address continued traffic growth. Further segmentation and analysis of the data is available, which will be regularly refreshed to provide a dynamic picture of how the Internet is evolving.

Older Projects

- *Project BISmark: An Application Platform for Home Networks.* Project BISmark (Broadband Internet Service Benchmark) is a platform for developing network management applications for home networks. The BISmark firmware is based on OpenWrt, an open-source operating system for home routers. Currently, BISmark includes a suite of passive and active network measurements that allows a home Internet user to continuously monitor various performance metrics, such as upstream and downstream throughput, latency, and packet loss. As of Spring 2013, BISmark is deployed in nearly 300 homes around the world in more than 20 countries. We are currently working both to expand the deployment and to extend the capabilities of the platform, to allow other researchers to use the platform for their own measurements.
  See `https://projectbismark.net` for details.

- *MySpeedTest: A Tool for Mobile Performance Measurement.* Building on the success of BISmark, my students Sachit Muckaden, Abhishek Jain, and I have developed a tool to measure performance from mobile cellular handsets. The application collects a variety of data, including latency and throughput measurements to a variety of servers around the world, hosted by Measurement Lab. The application is now deployed on more than 4,000 handsets in over 130 countries. Some of the most significant deployments are in developing countries, and we are currently collaborating with ResearchICTAfrica, a policy organization in Africa, to study the performance of both fixed and mobile broadband across the continent. Software is available at `https://goo.gl/28tx3`.

- *Sonata: Query-Driven Network Telemetry.* Sonata is a query-driven streaming network telemetry system that uses a declarative query interface to drive the joint collection and analysis of network traffic. It takes advantage of two emerging technologies–streaming analytics platforms and programmable network devices—to facilitate query-driven telemetry. Sonata allows operators to directly express queries for a range network telemetry applications using a high level declarative language. Under the hood, Sonata partitions each query into a portion that runs in the switch and another that runs on the streaming analytics platform, iteratively refines the queries to efficiently capture only the traffic that satisfies the respective queries. We have released Sonata open-source on Github (`https://github.com/Sonata-Princeton`); more details are available at the project page at `https://sonata.cs.princeton.edu/`.

- *iSDX: An Industrial-Scale Software Defined Internet Exchange Point.* iSDX (Software-Defined IXP) Software brings the merits of SDN to interdomain routing. Today's networks can only forward traffic based on the destination IP prefixes and routes offered by their immediate neighbors. SDN can give direct control over packet-processing rules that match on multiple header fields and perform a variety of actions. Internet Exchange Points (IXPs) are a compelling place to deploy these changes, given their role in interconnecting many networks and their growing importance in bringing popular content closer to end users.

  SDX does more than simply replace an IXP's switches with their OpenFlow counterparts. SDX's capabilities enable new applications, such as application- specific peering—where two networks peer only for (say) streaming video traffic. We also developed new programming abstractions that allow participating networks to create and run these applications and a runtime that both behaves correctly when interacting with BGP and ensures that applications do not interfere with each other. Finally, we also ensured that the system scales, both in terms of table size and computational overhead. We are involved in several trial deployments of the SDX controller at various IXPs around the world, in collaboration with network operators. Software and more information is available through the Open Source SDN website, which is part of the Open Networking Foundation: `https://opensourcesdn.org/projects/isdx-a-software-defined-internet-exchange-point/`.

- *Bobble: Bursting Online Filter Bubbles.* With students Xinyu Xing, Dan Doozan and colleaguge Wenke Lee, I have designed and developed Bobble, a Chrome extension that allows users to see how their Web searches appear from different vantage points. The filter bubble is a concept developed by Internet activist Eli Pariser in his book to describe a phenomenon in which websites use algorithms to predict what information a user may like to see based on the user's location, search history, etc. As a result, a website may only show information which agrees with the user's past viewpoints. A typical example is Google's personalized search results. To "pop" the bubbles

created by Google search (also called de-personalization), our research group in the Georgia Tech Information Security Center is conducting ground-breaking research and developing software, Filter Bubble. Filter Bubble is a chrome extension that uses hundreds of nodes to distribute a user's Google search queries world wide each time the user performs a Google search. Using Filter Bubble, a user can easily see differences between his and others' Google search returns. The plugin has been installed by more than 100 users around the world and is available at `https://bobble.gtisc.gatech.edu/`.

- *Appu: Measuring Online Privacy Footprints.* With so many web applications and sites in the current time, it's hard for a user to keep track of where does her personal information reside. With Appu, we aim to make this job easier for the end user. Appu keeps track of personal information such as passwords, username, birthdate, address, credit card numbers, and social security number so that a user can find out all sites that store a particular bit of personal information. In the current beta release, Appu downloads personal information from sites where you have account and also tries to prevent password reuse across websites by warning users about it.

- *Transit Portal.* We developed software for the NSF-Sponsored GENI Project Office that (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.

  This project contributed to the 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. This project has since been handed off to Professor Ethan Katz-Bassett at the University of Southern California and is still an actively maintained testbed. See `https://peering.usc.edu/` for more details.

- *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 first demonstrated the function of this network at the 7th GENI Engineering Conference in March 2010, and recently demonstrated a version on Resonance that facilitates various home network management tasks at the 2011 Open Network Summit. See `https://groups.geni.net/geni/wiki/BGPMux` for details.

- *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.

- *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.

- *Infranet.* System for circumventing Web censorship firewalls (*e.g.*, those in China, Saudi Arabia, etc.). Available on Sourceforge. Featured in articles in *Technology Review*, *New Scientist*, and *Slashdot*. See `https://nms.lcs.mit.edu/projects/infranet/`.

- *The Datapository.* Originally the "MIT BGP Monitor", the Datapository 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.

- *Secure BGP Implementation.* Implementation of S-BGP in the Quagga software router. Our implementation was considered by Randy Bush and Geoff Huston for their project to develop a certificate infrastructure for secure

routing protocols.

- *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.

Research Proposals and Grants

[1] **VeriWeird: Formal Verification of Weird Networks**
Sponsor: Defense Advanced Projects Research Agency (DARPA)
Investigator(s): N. Feamster (PI)
Amount: *$$2,000,000 for 3 years.*
Awarded: February 2025.

[2] **Evaluating the Effects of Active Queue Management on Speed Test Accuracy**
Sponsor: Comcast Tech Research Fund
Investigator(s): N. Feamster (PI)
Amount: *$35,000 for 1 year.*
Awarded: March 2025.

[3] **Support for Network Measurement Research**
Sponsor: Comcast Tech Research Fund
Investigator(s): N. Feamster (PI)
Amount: *$50,000 for 1 year.*
Awarded: December 2024.

[4] **CPS: Data Augmentation and Model Transfer for the Internet of Things**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), S. Kpotufe
Amount: *$300,000 for 2 years.*
Awarded: March 2024.

[5] **IMR: MM-1A: Measuring Internet Access Networks Across Space and Time**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), N. Marwell
Amount: *$500,000 for 3 years.*
Awarded: July 2023.

[6] **SAI: Data-Driven Governance for Broadband Infrastructure**
Sponsor: National Science Foundation
Investigator(s): N. Marwell (PI), N. Feamster
Amount: *$750,000 for 3 years.*
Awarded: July 2023.

[7] **IMR: MT: A Community Platform for Controlled Experiments on Internet Access Networks**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$600,000 for 2 years.*
Awarded: July 2022.

[8] **SaTC: CORE: Small: Understanding Practical Deployment Considerations for Decentralized, Encrypted DNS**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$500,000 for 3 years.*
Awarded: August 2022.

[9] **IMR: RI-P: Programmable Closed-loop Measurement Platform for Last-Mile Networks**
Sponsor: National Science Foundation
Investigator(s): A. Gupta (PI), N. Feamster (PI)
Amount: *$100,000 for 1 year.*
Awarded: August 2022.

[10] **CCRI: Medium: FLOTO: A Discovery Testbed for Measurement of Internet Access Networks**
Sponsor: National Science Foundation

Investigator(s): K. Keahey (PI), N. Feamster
Amount: *$1,565,166 for 3 years.*
Awarded: July 2022.

[11] **Continuously and Automatically Discovering and Remediating Internet-Facing Security Vulnerabilities**
Sponsor: C3.ai Digital Transformation Institute
Investigator(s): N. Feamster (PI), Zakir Durumeric, Prateek Mittal
Amount: *$1,000,000 for 1 year.*
Awarded: March 2022.

[12] **Development of Open-Source Measurement Tests for Broadband Access Networks**
Sponsor: Comcast Innovation Fund
Investigator(s): N. Feamster (PI)
Amount: *$50,000 for 1 year*
Awarded: January 2022.

[13] **CISE-ANR: Modeling Modern Network Traffic: From Data Representation to Automated Machine Learning**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), Zakir Durumeric, Francesco Bronzino
Amount: *$750,000 for 3 years*
Awarded: October 2021.

[14] **P50 Chicago Chronic Condition Equity Network (C3EN) R01: Voice-Activated Technology to Improve Mobility and Reduce Health Disparities: EngAGEing African American Older Adult-Care Partner Dyads**
Sponsor: National Institutes of Health
Investigator(s): M. Chetty, N. Feamster, L. Hawkley, and M. Huisingh-Scheetz
Amount: *$4,100,000 for 5 years.*
Awarded: August 2021.

[15] **CC* Integration-Large: Democratizing Networking Research in the Era of AI/ML**
Sponsor: National Science Foundation
Investigator(s): A. Gupta (PI), T. Gupta, E. Belding, N. Feamster (PI)
Amount: *$999,913 for 2 years.*
Awarded: August 2021.

[16] **AI-Driven Measurement and Inference for Tracking Nation-State Censorship**
Sponsor: DARPA AIE Program
Investigator(s): N. Feamster (PI)
Amount: *$1,500,000 for 2 years.*
Awarded: August 2021.

[17] **Mapping and Mitigating the Urban Digital Divide**
Sponsor: data.org Innovation Challenge
Investigator(s): N. Feamster (PI)
Amount: *$1,200,000 for 2 years.*
Awarded: January 2021.

[18] **Longitudinal Traffic Ratio Trends in Service Provider Networks**
Sponsor: Comcast Innovation Fund
Investigator(s): N. Feamster (PI)
Amount: *$75,000 for 1 year.*
Awarded: October 2020.

[19] **SaTC-EDU: Training Mid-Career Security Professionals in Machine Learning and Data-Driven Cybersecurity**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), Y. Chen, B. Ur

Amount: *$299,945 for 3 years*
Awarded: September 2020.

[20] **NSF Convergence Accelerator: AI-Enabled, Privacy-Preserving Information Sharing for Securing Network Infrastructure**
Sponsor: National Science Foundation
Investigator(s): G. Fanti (PI), N. Feamster, M. Reiter, V. Sekar, L. Strahelevitz
Amount: *$968,013 for 3 years.*
Awarded: September 2020.

[21] **RAPID: Measuring the Effects of the COVID-19 Pandemic on Broadband Access Networks to Inform Robust Network Design**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$187,395 for 1 year.*
Awarded: May 2020.

[22] **DESTINI: Dynamically Encoding and Stochastically Transmitting Information over Nation-state Infrastructures**
Sponsor: DARPA Resilient Anonymous Communications for Everyone (RACE)
Investigator(s): N. Feamster (PI), P. Mittal
Amount: *$1,800,000 for 4 years.*
Awarded: November 2018.

[23] **CPS: Medium: Detecting and Controlling Unwanted Data Flows in the Internet of Things**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), S. Kpotufe, A. Narayanan
Amount: *$987,000 for 3 years.*
Awarded: September 2018.

[24] **Artificial Intelligence in the Public Interest**
Sponsor: MacArthur Foundation
Investigator(s): N. Feamster, E. Felten (PI), A. Narayanan
Amount: *$750,000 for 3 years.*
Awarded: September 2017.

[25] **Global Internet Censorship Measurement Consortium**
Sponsor: Department of State
Investigator(s): N. Feamster (PI)
Amount: *$300,000 for 2 years.*
Awarded: August 2017.

[26] **Workshop on Self-Driving Networks**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), J. Rexford
Amount: *$49,900 for 1 year.*
Awarded: July 2017.

[27] **NeTS: Medium: From Packets to Insights: Programmable Streaming Analytics for Networks**
Sponsor: National Science Foundation
Investigator(s): N. Feamster, J. Rexford (PI)
Amount: *$1,000,000 for 4 years.*
Awarded: June 2017.

[28] **CITP Technology Policy Consortium on Internet of Things Security and Privacy**
Sponsor: Amazon, Microsoft, Comcast, Cisco, CableLabs, Hewlett Foundation
Investigator(s): N. Feamster (PI)
Amount: *$1.7M for 3 years*
Awarded: Fall 2016.

[29] **Interconnection Measurement Project**
Sponsor: Kyrio, Inc.
Investigator(s): N. Feamster (PI)
Amount: *$200,000 for 2 years.*
Awarded: March 2016, March 2017.

[30] **Securing the Internet of Things with Traffic Analysis and Software Defined Networking**
Sponsor: Siemens Corporation
Investigator(s): N. Feamster (PI)
Amount: *$142,000 for 1 year.*
Awarded: November 2016

[31] **Detecting Abnormal Activity on the Internet of Things**
Sponsor: Siebel Energy Institute
Investigator(s): N. Feamster (PI)
Amount: *$50,000 for 1 year.*
Awarded: April 2016

[32] **TWC: TTP Option: Towards a Science of Censorship Resistance**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), V. Paxson, P. Gill, J. Crandall, R. Dingledine
Amount: *$3,000,000 for 4 years.*
Awarded: November 2015

[33] **Software-Defined Security for the Internet of Things**
Sponsor: Google Faculty Research Award
Investigator(s): N. Feamster, J. Rexford
Amount: *$100,000 for 1 year.*
Awarded: August 2015

[34] **Traffic Demand Response to Service-Plan Increases**
Sponsor: Comcast Tech Research Fund
Investigator(s): N. Feamster
Amount: *$45,000 for 1 year.*
Awarded: March 2015

[35] **Software-Defined Networking**
Sponsor: AT&T Labs – Research Gift
Investigator(s): N. Feamster
Amount: *$25,000 for 1 year.*
Awarded: March 2015

[36] **A Software Defined Internet Exchange**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), J. Rexford, S. Shenker
Amount: *$500,000 for 3 years.*
Awarded: August 2014

[37] **Studying and Improving the Performance of Access Networks**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), A. Snoeren
Amount: *$281,364 for 3 years.*
Awarded: August 2014

[38] **EPICA: Empowering People to Overcome Information Controls and Attacks**
Sponsor: National Science Foundation
Investigator(s): W. Lee (PI), N. Feamster, H. Klein, M. Bailey, M. Chetty
Amount: *$750,000 for 4 years.*
Awarded: August 2014

[39] **An Open Platform for Internet Routing Experiments**
Sponsor: National Science Foundation
Investigator(s): N. Feamster, E. Katz-Bassett, D. Choffnes (PI)
Amount: *$361,617 for 3 years.*
Awarded: August 2014

[40] **An Open Observatory for the Internet's Last Mile**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), S. Banerjee, J. Cappos
Amount: *$399,879 for 3 years.*
Awarded: June 2014

[41] **Improving the Performance and Security of Home Networks with Programmable Home Routers**
Sponsor: Comcast
Investigator(s): N. Feamster (PI)
Amount: *$65,000 for 1 year*
Awarded: September 2013

[42] **Demand Characterization and Management for Access Networks**
Sponsor: Cisco Systems
Investigator(s): N. Feamster (PI) and R. Johari
Amount: *$99,766 for 1 year*
Awarded: April 2013

[43] **Personal Information Fusion with In Situ Sensing Infrastructure**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$75,000 for 1 year.*
Awarded: July 2012

[44] **Characterizing and Exposing Bias in Social and Mainstream Media**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$175,000 for 1 year.*
Awarded: July 2012

[45] **I-Corps: Helping Users and ISPs Manage Home Networks with BISmark**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI)
Amount: *$50,000 for 1 year.*
Awarded: June 2012

[46] **Optimizing Network Support for Cloud Services: From Short-Term Measurements to Long-Term Planning**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), J. Rexford
Amount: *$574,996.00 for 4 years.*
Awarded: April 2012

[47] **Facilitating Free and Open Access to Information on the Internet**
Sponsor: National Science Foundation
Investigator(s): R. Dingledine, N. Feamster (PI), E. Felten, M. Freedman, H. Klein, W. Lee
Amount: *$1,500,000 for 4 years*
Awarded: March 2011

[48] **Measurement Infrastructure for Home Networks**
Sponsor: National Science Foundation
Investigator(s): K. Calvert, W.K. Edwards, N. Feamster (PI), R. Grinter
Amount: *$1,200,000 for 4 years*
Awarded: February 2011

[49] **Monitoring Free and Open Access to Information on the Internet**
Sponsor: Google Focus Grant
Investigator(s): N. Feamster and W. Lee
Amount: *$1,500,000 for 3 years*
Awarded: February 2011

[50] **GENI OpenFlow Campus Buildout**
Sponsor: GENI Project Office
Investigator(s): N. Feamster (PI), Russ Clark
Amount: *$64,675 for 1 year*
Awarded: October 2010

[51] **Architecting for Innovation**
Sponsor: National Science Foundation
Investigator(s): H. Balakrishnan, N. Feamster, B. Godfrey, N. McKeown, J. Rexford, S. Shenker (PI)
Amount: *$200,000 for 1 year*
Awarded: September 2010

[52] **Aster*x: Load-Balancing Web Traffic over Wide-Area Networks**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), Russ Clark
Amount: *$75,000 for 1 year*
Awarded: August 2010

[53] **Network-Wide Configuration Testing and Synthesis**
Sponsor: National Science Foundation
Investigator(s): N. Feamster (PI), A. Akella
Amount: *$500,000 for 3 years*
Awarded: June 2010

[54] **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

[55] **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

[56] **Studying DNS Traffic Patterns**
Sponsor: Verisign
Investigator(s): N. Feamster
Amount: *$30,000 for 1 year*
Awarded: November 2009

[57] **CIFellowship for Cristian Lumezanu**
Sponsor: National Science Foundation
Investigator(s): C. Lumezanu, N. Feamster (PI)
Amount: *$140,000 for 1 year*
Awarded: November 2009

[58] **Military Network Protocol**
Sponsor: DARPA Subcontract
Investigator(s): N. Feamster
Amount: *$37,000 for 1 year*
Awarded: November 2009

[59] **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

[60] **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

[61] **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

[62] **Bringing Experimenters and External Connectivity to GENI**
Sponsor: GENI Project Office
Investigator(s): N. Feamster
Amount: *$320,000 for 3 years*
Awarded: September 2008

[63] **Routing Without Recomputation**
Sponsor: Cisco Systems
Investigator(s): N. Feamster
Amount: *$96,019 for 1 year*
Awarded: September 2008

[64] **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

[65] **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

[66] **Sloan Research Fellowship**
Sponsor: Alfred P. Sloan Foundation
Investigator(s): N. Feamster
Amount: *$45,000 for 2 years*
Awarded: February 2008

[67] **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

[68] **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

[69] **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

[70] **Spam Filtering Research**
Sponsor: IBM Faculty Award
Investigator(s): N. Feamster
Amount: *$ 7,500 (unrestricted gift)*
Awarded: June 2007

[71] **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

[72] **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

[73] **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

[74] **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

[75] **Equipment Donation for Network Operations Research**
Sponsor: Intel Corporation
Investigator(s): N. Feamster
Amount: *$30,000*
Awarded: October 2006

[76] **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

[77] **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

Service

Awards Committees

- ACM Doctoral Dissertation Awards Committee: 2016–2020
- Internet Research Task Force Applied Networking Research Prize: 2015–2020

Organizing Roles

- Co-Organizer, NSF/UChicago/UCSB Internet Frontiers and Opportunities Workshop: 2021
- Founder, Chair, and Steering Committee, USENIX Workshop on Free and Open Communication on the Internet: 2011–Present
- Steering Committee, Internet Engineering Task Force Applied Networking Research Workshop: 2021–Present
- Steering Committee, USENIX Symposium on Networked Systems Design and Implementation (NSDI): 2012–2021
- Steering Committee, ACM SIGCOMM Workshop on Networking Meets AI/ML: 2019–Present
- Steering Committee, ACM SIGCOMM Conference on SDN Research (SOSR): 2012–2016
- Program Committee Co-Chair, Internet Engineering Task Force Applied Networking Research Workshop (ANRW): 2021
- Program Committee Co-Chair, USENIX Symposium on Networked Systems Design and Implementation (NSDI): 2013
- Program Committee Co-Chair, ACM SIGCOMM Internet Measurement Conference (IMC): 2020
- Program Committee Co-Chair, Internet Research Task Force (IRTF) Applied Networking Research Workshop: 2020
- Poster and Demo Committee Co-Chair, ACM SIGCOMM: 2009, 2013
- Program Committee Co-Chair, CoNext Student Workshop: 2006
- General Chair, ACM SIGCOMM Hot Topics in Networking (HotNets): 2019
- Co-organizer, NSF Workshop on Self-Running Networks: 2018
- Co-organizer, NSF/FCC Workshop on Quality of Experience on the Internet: 2016
- Co-organizer, NSF Workshop on Software Defined Infrastructure: 2016
- Co-organizer, Boston Freedom in Online Communications (BFOC) Day: 2013
- Panel Organizer, IEEE Computer and Communications Workshop (CCW): 2011
- Program Committee Co-Chair, ACM SIGCOMM Workshop on Hot Topics in Software Defined Networking (HotSDN): 2012
- Editor, IEEE Journal on Network and Systems Management
- Co-Organizer, DIMACS Workshop Series on Internet Security: 2007
- Organizer, Workshop on Internet Routing Evolution and Design: 2006
- Program Committee Co-Chair, ACM/USENIX Workshop on Networks meet Databases (NetDB): 2007
- Program Committee Co-Chair, Workshop on the Economics of Networked Systems (NetEcon): 2006

Program Committees

- ACM SIGCOMM Internet Measurement Conference: 2006, 2008, 2012, 2013, 2020 (Chair), 2022, 2024, 2025
- USENIX Security Symposium: 2018, 2019, 2020, 2021, 2023*
- IEEE Symposium on Security and Privacy: 2006, 2010, 2011, 2012, 2013, 2018, 2019, 2020
- ACM Conference on Computer and Communication Security (CCS): 2008, 2011, 2020, 2022, 2023*
- ISOC Network and Distributed Security Symposium (NDSS): 2011, 2014
- ACM SIGCOMM: 2008, 2013, 2016, 2022, 2023*, 2025
- ACM/USENIX Symposium on Networked Systems Design and Implementation (NSDI): 2009, 2012, 2015

- USENIX Technical Conference: 2007, 2009
- ACM SIGCOMM CoNext: 2006, 2007, 2014
- ACM SIGMETRICS: 2008, 2009, 2010
- Internet Research Task Force Applied Networking Research Workshop: 2016, 2017, 2018, 2019, 2020, 2021 (Chair)
- Research Conference on Communication, Information and Internet Policy (TPRC): 2014, 2015
- ACM SIGCOMM Workshop on Hot Topics in Networking (HotNets): 2012, 2022
- USENIX Workshop on Free and Open Communications on the Internet (FOCI): 2012–2023
- USENIX Workshop on Hot Topics in Security (HotSec): 2012
- ACM SIGCOMM First Workshop on Systems and Infrastructure for the Digital Home (HomeSys): 2012
- ACM SIGCOMM Workshop on Medical Communication (MedCOMM): 2012
- ACM SIGCOMM COMSNETS: 2012
- ACM SIGCOMM Workshop on Home Networks (HomeNets): 2011
- Program Committee USENIX Workshop on Large-Scale Exploits and Emergent Threats: 2009, 2010, 2011
- ACM SIGCOMM Poster and Demo Session: 2011
- ACM SIGCOMM Workshop on Internet Network Management: 2006, 2007, 2008, 2009, 2010
- USENIX Workshop on Hot Topics in Management of Internet, Cloud, and Enterprise Networks and Services (HotICE): 2011
- ACM SIGCOMM Workshop on Virtualized Infrastructure Systems and Architectures (VISA): 2010
- ACM SIGCOMM Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO): 2008, 2009
- USENIX International Workshop on Real Overlays & Distributed Systems: 2008
- ACM SIGCOMM Workshop on Economics of Networked Systems (NetEcon): 2008
- International World Wide Web Conference (Security/Privacy Track): 2008
- IEEE LAN/MAN Workshop: 2008
- ACM SIGCOMM Student Poster Session: 2007
- ACM SIGMETRICS Workshop on Mining Internet Data (MineNet): 2007
- Conference on Email and Anti-Spam (CEAS): 2007
- USENIX Workshop on Steps to Reduce Unwanted Traffic on the Internet (SRUTI): 2007
- International World Wide Web Conference (Security/Privacy Track): 2007
- North American Network Operators Group (NANOG): 2006–2009
- IEEE Infocom Student Poster Session: 2006
- IEEE International Conference on Internet Surveillance and Protection: 2006
- Workshop on Data and Algorithmic Transparency (DAT): 2016

Early career: External reviewer for *IEEE/ACM Transactions on Networking*, *SIGCOMM* (2002, 2003, 2004, 2006, 2007), *SOSP* (2001, 2003), *ACM SIGPLAN Programming Language Design and Implementation (PLDI)* (2016), *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).

Public Policy Activities

Panels and Leadership Roles

- Leader, AI & Tech Policy Pillar: 2025
- Director of Research and Tech Policy, University of Chicago Data Science Institute: 2024–Present
- Director, Internet Equity Initiative: 2020–Present
- Director of Research, University of Chicago Data Science Institute: 2021–2024
- Director, University of Chicago Center for Data and Computing: 2019–2021
- Panelist, State of the Net Conference: 2017
- Working Group Co-Chair, Association for Computing Machinery (ACM) Public Policy Council Internet of Things Working Group: 2016–Present
- Testified before General Accountability Office (GAO) panel on Internet of Things Security: 2016
- Community Member, Broadband Internet Technical Advisory Group (`https://bitag.org/`): 2014–Present
- Advisory Board, Center for Democracy and Technology: 2015–2019
- Director, Princeton University Center for Information Technology Policy: 2015–2018
- Deputy Director, Princeton University Center for Information Technology Policy: 2018–2019
- Co-Editor, Broadband Internet Technical Advisory Group (BITAG) report on Security and Privacy Recommendations for the Internet of Things (IoT): 2016
- Co-Editor, Broadband Internet Technical Advisory Group (BITAG) report on Privacy and Data Retention: 2017–2018
- Commenter and contributor to FCC rulemaking on privacy and ISPs: 2016
- Commenter on FCC rulemaking on net neutrality: 2018
- Advisor to the Federal Communications Commission on Measuring Broadband America Project: 2010–2012

Public Writing and Influence

- **Internet Service Providers and Customer Privacy.** Over the past two years, through public comments and policy activities, I have served as a technical expert in the technology policy community on Internet data and privacy, through various activities.

  - Filed multiple public comments on the Federal Communications Commission (FCC) Privacy Rulemaking. **My comments are cited extensively in the final report, available on the FCC Website.** `https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-148A1.pdf`. (*My comments and inputs are cited more than 30 times in the rulemaking.*)
    * My letter to FCC Chairman Tom Wheeler: `https://goo.gl/Q2UI3n`
    * Public commentary on WC-106, the FCC's notice of proposed rulemaking: `https://goo.gl/J2P397`, `https://goo.gl/AcU6Dg`, `https://goo.gl/qaPIuj`. I led a group of stakeholders from the research community to preserve a researcher exemption to the FCC's privacy rulemaking, to ensure that researchers would continue to have access to data from Internet service providers to work on topics related to Internet security and performance.
  - I was the co-editor for the ongoing Broadband Internet Technical Advisory Group (BITAG) report on Internet Data Collection, Retention, and Privacy. Press release: `https://goo.gl/6rfH5v`.

- **Internet of Things Security and Privacy.** I have been actively involved in policymaking activities around security and privacy for the Internet of Things (IoT) at the state and federal levels over the past year. Activities include:

  - Co-editor of the Broadband Internet Technology Advisory Group (BITAG) report on security and privacy recommendations for the Internet of Things:
    `https://bitag.org/report-internet-of-things-security-privacy-recommendations.php`. In addition to the report itself, Jason Livingood and I presented to many policymakers in Washington, D.C., including the current chairwoman of the Federal Trade Commission, Maureen Ohlhausen.

– Co-editor of the USACM documents (reply comments, etc.) on Internet of Things. (Several documents, such as a response to the NTIA's request for comments, are forthcoming in early 2017.)

University Leadership and Service

Research Director, University of Chicago Data Science Institute

Research and Education Activities

- Launched research initiative for mapping and mitigating the urban digital divide. $1.2M data.org-funded project to generate and curate "full stack" measurements concerning Internet access, deployability, affordability, and performance.
- Developed new online course sequence, Machine Learning for Cybersecurity, with University of Chicago Office of Continuing and Professional Education (UCPE).

Center Building and Fundraising

- Launched postdoctoral fellows program (6 fellows in first two years).
- Launched Ph.D. Fellows Program (8 fellows in first two years).
- Created Internet of Things Laboratory setup and events.
- Executive and online education program in machine learning and security: design and planning.

Center Activity Support

- Distinguished Speaker Series. Hosted speaker series in Fall 2019, led team to create Distinguished Speaker Series in Spring 2021 on socially responsible machine learning.
- Organized and administered seed grant (2019–2020), developed, organized and administered new Discovery Challenge Grant (2020–2021), for larger center-building activities.
- Served on Data Science Faculty Search Committee (Spring 2020, 2021)
- Organized Seed Grant Speaker Series (Spring 2020)
- Judge for Uncommon Hacks (Spring 2020)

Director, University of Chicago Internet Equity Initiative

Activities

- Launched Internet Equity Initiative (May 2022)
- Secured more than $2M in new research funding to support center operations (2022)
- Managed the release of a large-scale open-source software package (Netrics), as well as the deployment of this software throughout the City of Chicago.
- Published five papers in top-tier research conferences related to research.
- Project launch included the largest University of Chicago media news story of 2022 (see below for media).

Center Media

- Need for Internet Access Support in Chicago, Video interview with Chicago Tonight and Nicole Marwell (Aired Dec. 22, 2022), `https://internetequity.uchicago.edu/resource/need-for-internet-access-support-in-chicago/` Internet Disconnect, DSI News (Sept. 13, 2022),
- https://datascience.uchicago.edu/news/internet-disconnect/. Inaugural Data Science Institute Summit Highlights Impact Across and Beyond Campus, DSI News (June 10, 2022), `https://datascience.uchicago.edu/news/inaugural-data-science-institute-summit-highlights-impact-across-and-beyond-campus/`.
- The Five Keys to Unlocking Internet Equity, Podcast interview with Kelsey Kusterer Ziser, Senior Editor at Light Reading, and Nick Feamster (Aired June 8, 2022), `https://www.lightreading.com/digital-divide/the-five-keys-to-unlocking-internet-equity/v/d-id/778079`.

- New Survey Shows Some Teens Struggled More with Remote Leaning than Others, Podcast interview with Brenda Ruiz, WBEZ Chicago, and Nicole Marwell (Aired June 8, 2022), `https://www.wbez.org/stories/n ew-survey-shows-some-teens-struggled-more-with-remote-learning-than-other s/1537fd04-9bb6-4e59-88d5-673013b937ef`
- Growing Push to Bridge Digital Divide as University of Chicago Study Highlights Deep Disparities, WTTW News (May 15, 2022), `https://news.wttw.com/2022/05/15/growing-push-bridge-digit al-divide-university-chicago-study-highlights-deep-disparities`
- University of Chicago's Data Science Institute Comes Forward with Years of Research on Internet Equity; The Reality Isn't Good for Those Living on South, West Sides, Chicago Tribune (May 10, 2022), `https://www. chicagotribune.com/people/ct-uchicago-data-science-institute-internet-equ ity-initiative-tt-0509-20220510-ry4asybwsnfojdeid73n4er5si-story.html`
- Biden Creates Program to Make Internet More Affordable, Crain's Chicago Business (May 10, 2022), `https: //www.chicagobusiness.com/technology/biden-creates-program-make-internet-m ore-affordable`
- Deep Disparities in Internet Access Found Across Chicago in New Analysis, Chicago Sun Times (May 9, 2022), `https://chicago.suntimes.com/2022/5/9/23060604/uchicago-internet-access-con nectivity-chicago-equity-initiative-data-web`
- South, West Side Households Have Lowest Rates of Internet Service, New Data Shows, Video interview with ABC 7 News, Nicole P. Marwell, and Nick Feamster (Aired May 9, 2022), `https://abc7chicago.com/ low-income-high-speed-internet-affordable-connectivity-program-comcast-fre e-for/11832284/`
- Digital Divide: Data Portal Highlights Internet Inequities in Chicago, SciTechDaily (May 9, 2022), `https: //scitechdaily.com/digital-divide-data-portal-highlights-internet-inequit ies-in-chicago/`
- New Study Highlights Disparities in Internet Access Across Chicago Neighborhoods, Podcast interview with Brenda Ruiz, WBEZ Chicago, Nicole P. Marwell, Nick Feamster, and Claiborne Wade (Aired May 9, 2022), `https://www.wbez.org/stories/new-study-shows-internet-disparities-across-c hicago/41859b79-a923-40bf-8910-e3c6331fe007`
- The University of Chicago Looks to Close Digital Divide in Their Backyard and Beyond, Data.org (May 1, 2022), `https://data.org/stories/the-university-of-chicago/`
- Digital Divide: Data Highlights Internet Inequities in Chicago, DSI News (May 09, 2022), `https://datasc ience.uchicago.edu/news/digital-divide-data-highlights-internet-inequitie s-in-chicago/`

Other Internal Service

- Advisory Board, University of Chicago Forum on Free Expression (2023–Present)
- Board of Computing Activities and Services (2022–Present)
- Faculty Quality of Life Committee (Chair) (2023–Present)
- Awards Nominations Committee (2023–Present)
- Data Science Institute Leadership Committee (2021–Present)
- Junior Faculty Mentor (2019–Present)
- Humanities Dean Search Committee (2022–2023)
- Physical Sciences Division Technical Advisory Committee (2021–2022)
- Ph.D. Admissions Committee (2019–2022)

Activities as Director of Princeton Center for IT Policy

External Events

- Organized IoT security and privacy hackathon in new Princeton Smart Home Lab facility on Prospect Street (2016). Hackathon took place in April 2017.
- Organized Internet speed test hackathon, co-organized with Comcast (November 2016)
- Organized CITP conference on Security and Privacy for the Internet of Things (IoT) (October 2016)
- Organized CITP conference on Internet Interconnection (March 2016)
- Organized CITP conference on Internet Censorship and Information Control (October 2015)
- Organized and hosted joint NSF/FCC conference on Internet Quality of Experience (October 2015)
- Hosted visits for several prominent guest speakers: Matt Devlin, Director of Global Policy at Uber; David Clark, Senior Research Scientist at MIT. (October 2015)
- Organizing first-ever CITP hackathon, in cooperation with Code for Princeton and New Jersey Bike and Walk Coalition. (hackathon in February 2016)

Fundraising Activities and Results

- Engaged in ongoing discussions with Ford Foundation, Open Society Foundation, and MacArthur Foundation in efforts to raise awareness and funding opportunities for CITP. (2016) Made face-to-face visits to MacArthur Foundation (June 2016) and Ford Foundation (February 2017).
- Secured funding on IoT cybersecurity from the Hewlett Foundation and other corporate partners, including Amazon, Cisco, and Comcast. Total funding for CITP IoT cybersecurity is currently $1.7M, through a combination of gifts and in-kind donations. (2016)
- Secured $100k funding from CableLabs to support CITP's ongoing work on measurement of Internet interconnection (2016).
- Secured $300k donation from Microsoft for new CITP seed grant fund, to encourage collaboration between SEAS and WWS researchers. The initial seed grant program is now providing funding for four new cross-disciplinary projects. (2015)
- Secured endowment from Princeton alum Ron Lee: the Jerome Blum Memorial Fund, to support a CITP "on the road" speaker series, for tech policy events around the country. (Current funds transferred to date are approximately $200k.) (2015)
- Gave outreach/CITP fundraising talks to Intel, Cisco, and Yahoo on SDX and censorship measurement. (November/December 2015)
- Delivered talk to Princeton Development office about CITP and met with development office to prepare materials for next capital campaign. (November 2015)
- With Joanna Huey, prepared CITP annual report, to be used in fundraising activities. (Fall 2015)

Internal Activities

- Reconstituted executive committee and created CITP Advisory Council (required by Nassau Hall, though none had previously existed), including Princeton alums Paul Misener, Nuala O'Connor, Anne-Marie Slaughter. (2016)
- Led a complete redesign of center website. (2016–2019)
- Organized and ran three-day tech policy "boot camp" for 15 Princeton undergraduates, who visited approximately ten different venues in Washington, DC (FCC, FTC, White House, Senator Booker's office, CRA, etc.) (November 2015, November 2016)
- Served on organizing committee for WWS Fung Forum, whose focus for 2016 will be cybersecurity. (Fall 2015–Spring 2017)
- Worked with director of Law and Public Affairs to host a joint CITP/LAPA fellow for 2016–2017.
- Blogging on Freedom to Tinker (three blog posts in 2015, four blog posts in 2016).
- Updated courses in the Technology and Society Certificate program (Fall 2015).

Teaching

Courses

Term	Year	Course Number & Title	Enrollment	Comments
Fall	2025	CMSC 33260 Internet Censorship and Online Speech	30	
Fall	2025	CMSC 30350 Security, Privacy, and Consumer Protection	60	
Fall	2025	CMSC 30254 Machine Learning for Computer Systems	60	
Fall	2024	CMSC 33260 Internet Censorship and Online Speech	30	
Fall	2024	CMSC 30350 Security, Privacy, and Consumer Protection	45	
Fall	2024	CMSC 30254 Machine Learning for Computer Systems	45	
Summer	2024	CMSC 33260 Internet Censorship and Online Speech	15	
Winter	2024	CMSC 33260 Internet Censorship and Online Speech	30	
Fall	2023	CAPP 30350 Security, Privacy, and Consumer Protection	15	
Fall	2023	CMSC 30254 Machine Learning for Computer Systems	45	
Summer	2023	CMSC 33260 Internet Censorship and Online Speech	15	
Winter	2023	CAPP 30350 Security, Privacy, and Consumer Protection	15	
Winter	2022	CMSC 33260 Internet Censorship and Online Speech	30	
Fall	2022	CMSC 30254 Machine Learning for Computer Systems	35	New Course
Winter	2022	CAPP 30350 Security, Privacy, and Consumer Protection	20	New Course
Winter	2022	CMSC 33260 Internet Censorship and Online Speech	20	
Spring	2021	CAPP 30254 Machine Learning for Public Policy	60	Hybrid Course
Winter	2021	CMSC 33260 Internet Censorship and Online Speech	15	
Spring	2020	CAPP 30254 Machine Learning for Public Policy	60	Course Re-Design
Winter	2020	CMSC 33260 Internet Censorship and Online Speech	10	New Course
Spring	2019	COS 461 Computer Networking	42	
Spring	2018	COS 461 Computer Networking	102	Most Popular Undergrad Elective
Fall	2017	WWS 593C Online Speech and Information Control	12	New Course, Top-Rated
Fall	2017	COS 497 Security and Privacy in the Internet of Things	7	5 Published Papers
Spring	2017	COS 461 Computer Networking	95	Redesigned, Top-Rated
Fall	2016	COS 432 Information Security	84	
Summer	2015	Software Defined Networking (Coursera)	50,000+	
Spring	2016	COS 461 Computer Networking	87	
Spring	2015	COS 461 Computer Networking	72	
Fall	2014	CS 4270/8803 Software Defined Networking	30	New Course
Fall	2014	OMS CS 6250 Computer Networking	223	Online MS
Fall	2014	CS 7001 Introduction to Graduate Studies	51	
Summer	2014	Software Defined Networking (Coursera)	50,000+	
Spring	2014	CS 6250 Computer Networking	50	
Spring	2014	OMS CS 6250 Computer Networking	300	Online MS
Fall	2013	CS 8001 Software Defined Networking	15	Flipped classroom
Fall	2013	CS 7001 Introduction to Graduate Studies	36	10k Blog Readers/Month
Summer	2013	Software Defined Networking (Coursera)	50,000+	First SDN Course
Spring	2013	CS 3251 Computer Networking	82	
Fall	2012	CMSC 330 Programming Languages (Univ. of Maryland)	100	
Fall	2011	CS 6250 Computer Networking	51	
Fall	2011	CS 4235 Computer Security	44	
Fall	2010	CS 6250 Computer Networking	92	
Spring	2010	CS 3251 Computer Networking I	53	
Spring	2010	CS 8803 NGN Next Generation Networking	50	New Course
Fall	2009	CS 7001 Introduction to Graduate Studies	39	
Spring	2009	CS 6262 Network Security	45	Updated Syllabus
Fall	2008	CS 4251 Computer Networking II	16	
Fall	2008	CS 7001 Introduction to Graduate Studies	44	
Spring	2008	CS 4251 Computer Networking II	14	New Syllabus
Fall	2007	CS 7001 Introduction to Graduate Studies	53	
Spring	2007	CS 7260 Internetworking Protocols and Architectures	29	
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	2006	CS 7260 Internetworking Protocols and Architectures	27	New Syllabus

Other Teaching Highlights:

- Taught a 20-person course in the University of Chicago Upward Bound program in Summer 2022, Introduction to Computer Networking, which resulted in mentoring a high school student from Walter Payton College Prep on an Advanced Placement Research project.
- Developed new course in Machine Learning for Computer Systems, offered as part of the introductory data science sequence and a computer science elective. The course had large enrollment and very positive reviews. (2022)

- Developed new course in Security, Privacy, and Consumer Protection, to extend offerings in the University of Chicago Masters in Computation and Public Policy Program. (2021)
- Developed new online course sequence, Machine Learning for Cybersecurity, with University of Chicago Office of Continuing and Professional Education (UCPE).
- Developed new course in Internet censorship and online speech, in preparation for new book (CMSC 33260). (2020)
- Developing new ethics modules to teach ethics in undergraduate Princeton computer science courses across the curriculum, to start with Computer Networking (COS 461) and Information Security (COS 432). (2017)
- Developed new course at Woodrow Wilson School on Censorship and Free Expression Online for Woodrow Wilson School Masters in Public Policy program. (2017)
- Completely redesigned course format and assignments for Computer Networking (COS 461) including adding videos to course material, seven new modernized programming assignments, and new in-class activities. With help from Alan Kaplan and an undergraduate, integrated autograding and feedback facilities into programming assignments. (2017)
- Began revisions for a new edition of *Computer Networks*, undergraduate computer networking textbook; next edition due out late 2018. (2017)
- Guest lecture in Woodrow Wilson School of Public Policy graduate course on Security Studies (WWS 550): 2015, 2017
- Prepared and delivered a tutorial to the USENIX Large Installation Systems Administration (LISA) conference on Software Defined Networking in 2015 and 2016.
- Taught a computer science undergraduate honors course to 20 masters students at the University of Cape Town on Measuring Internet Performance in Summer 2016.
- Created the first-ever course on Software Defined Networking (SDN), and delivered it on Coursera to over 50,000 enrolled students.
- Tutorial on network measurement at African Network Operators Group (AfNOG) in Summer 2013.
- Guest lecture on Internet censorship in Georgia Tech CS 4001 in October 2011.
- Tutorial on software-defined networking at African Network Operators Group (AfNOG) in Summer 2011.
- Tutorials on BGP Multiplexer at GENI Experimenters Workshop and GENI Engineering Conference in Summer 2010.
- Tutorial on network security at African Network Operators Group (AfNOG) in Summer 2010.
- Tutorial on Internet routing at Simposio Brasileiro de Redes de Computadores (SBRC) in Summer 2008.
- Lecture for DIMACS Tutorial on Next-Generation Internet Routing Algorithms in August 2007.
- Guest lecture for MIT Course 6.829 (Computer Networking) in Fall 2005.

Curriculum Development

Development of a New Course on Machine Learning for Computer Systems: Starting in 2022, I developed a course that covers the intersection of machine learning and systems, with a focus on applying machine learning to computer systems. The course covered a variety of topics, including the application of machine learning models to security, performance analysis, and prediction problems in systems, as well as data preparation, feature selection, and feature extraction. Additionally, we discussed the design, development, and evaluation of machine learning models and pipelines, and the principles of fairness, interpretability, and explainability of these models. The course also delved into the challenges of testing and debugging machine learning models. While many of the examples we covered were focused on computer networking, the principles and concepts we discussed apply broadly to all computer systems. The course was designed to be a practical, hands-on introduction to machine learning models and concepts, with the goal of allowing students to apply these models to real-world datasets and to help computer systems operate better.

Development of New Course on Security, Privacy, and Consumer Protection: Starting in 2021, I developed a new course on Security, Privacy, and Consumer Protection as part of the University of Chicago Masters of Science in Computation in Public Policy (MSCAPP) program. The course teaches concepts in computer security and privacy, including network security, web privacy and security, online data collection and tracking, privacy law, and consumer protection issues such as network neutrality. The first offering was popular, taken by students in CAPP, computer science, economics, computational social science, and other departments.

Development of New Course on Machine Learning and Public Policy: Starting in 2020, I developed a new course on Machine Learning and Public Policy as part of the University of Chicago Masters of Science in Computation in Public Policy (MSCAPP) program. Course development involved the creation of both a completely online course, complete with video lectures (2020) and a hybrid (i.e., half-online) version of the course; and development of a series of public policy-oriented assignments and labs.

Development of New Course in Internet Censorship: In 2020 and 2021, I developed a new course in Internet censorship and online speech, for which I have a book deal with Princeton University Press. The course covered a range of technical topics, from the operation of the Great Firewall and various circumvention tools (Tor, virtual private networks) to legal aspects (e.g., Communications Decency Act, Digital Millennium Copyright Act). In 2021, I developed a series of online lectures for the course, which will be developed into a more significant online offering as part of a global course in the University of Chicago Office of Continuing and Professional Education.

Authorship and Revision of Seminal Textbook in Computer Networking: In 2019, I undertook a large-scale effort to revise the canonical *Computer Networking* textbook, originally authored by Andrew Tanenbaum, now entering its 6th Edition. The book was released in 2020. The book needed significant revision, including updates toe the wireless and cellular technologies (including content on WiFi 6, 6G, etc.), programmable and software defined networking, new transport protocols (e.g., QUIC), and new applications, from streaming video to the Internet of Things (IoT). (The last revision of the textbook was in 2012.)

Integration of Ethics into the Computer Science Curriculum: Many aspects of computer science—ranging from the measurement of Internet censorship to the design of automated algorithms for decision-making—now require some understanding and consideration of ethics. To this end, I am working with experts in ethics to design several modules that teach ethics to undergraduates that are appropriate for the Princeton Computer Science curriculum's courses. These modules were incorporated into Computer Networking (COS 461), and later into Information Security (COS 432) and a new course on fairness in artificial intelligence. Some of these case studies will also be published in columns in *ACM Computer Communications Review (CCR)* and *USENIX ;login:*.

Assignment Development in Princeton Undergraduate Courses: The undergraduate Computer Networks (COS 461) and Information Security (COS 432) courses had assignments that had not been updated in many years. In each offering of the course in 2016 (Spring 2016 for COS 461 and Fall 2016 for COS 432), I worked with course staff to completely redesign and implement assignments that teach modern course topics. In the Computer Networks course, we modernized the assignments to use commonly used systems programming languages (Go, Python), as well as new Internet measurement assignments written in distributed programming analysis frameworks (e.g., Spark). In COS 432, we modernized the assignments to include hands-on activities on a variety of concepts, including Web security and network security.

Coursera and Online Masters Program Development: I have developed an online Coursera course for the topic of Software Defined Networking (SDN), an emerging topic in computer networking that is reshaping how networks are defined. In the course, students learn about the history of SDN and develop hands-on experience with tools to develop technologies and applications for SDN. The course had approximately 50,00 students enrolled, and had about 4,000 students actively participating on the forums and in lectures. Nearly 1,000 students successfully completed the programming assignments for the course, qualifying as a pass "with distinction". The course reviewed extremely favorably from students, as we have documented here: `https://goo.gl/So7Uis`. Additionally, the success of the course was covered on many technical forums, including the Mininet blog (`https://goo.gl/ZqfL1N`), the Packet Pushers blog (`https://goo.gl/okzd44`), and the sFlow blog (`https://goo.gl/qSMCq0`). Based on its overwhelming success, the course will be offered again in May 2014.

Georgia Tech Online Masters Program: I served on the committee to develop a Master of Science in Computer Science degree based on Massive Open Online Course (MOOC) offerings and took an active role in ensuring the creation of the online degree at Georgia Tech. As of October 2013, I am currently working with Udacity and Georgia Tech to create the first online graduate course in computer networking, which will launch in January 2014 and become an integral part of the Georgia Tech online degree program.

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*. We have developed a website for the course, `greatresearch.org`, which makes the material generally available for use at other universities and by other researchers. **The website and blog have more than 25,000 views since its launch in mid-August 2013, and it has been receiving about 10,000 views every month.**

CS 6250 Graduate Computer Networking: In Fall 2011, I redesigned the graduate computer networking course to focus more on current technologies and hands-on assignments. Conventional networking courses treat today's protocols and mechanisms as fixed artifacts, rather than as part of a continually evolving system. To prepare students to think critically about Internet architecture, Jennifer Rexford and I created a graduate networking course that combines "clean slate" networking research with hands-on experience in analyzing, building, and extending real networks. My goal was to prepare students to create and explore new architectural ideas, while teaching them the platforms and tools needed to evaluate their designs in practice. The course, with offerings at both Georgia Tech and Princeton, focuses on network management as a concrete way to explore different ways to split functionality across the end hosts, network elements, and management systems. I have refined the course in Fall 2011 to include more hands-on assignments ad refactored the course around networking problems in different types of networks: transit networks, home networks, content hosting networks, and mobile and wireless networks. **Our work on the course received the best paper at the *ACM SIGCOMM Workshop on Networking Education (NetEd)* in 2011**.

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 and again in Spring 2011. 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 college to exchange ideas.

CS 8803 Next-Generation Networking: I developed a 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.

Postdoctoral Researchers

Current

- **Jonatas Marques**.   *Fall 2023 - Present.*
  Publications: [41], [55], [67]

Completed

- **Nguyen Phong Hoang**.   *Fall 2022 - Fall 2024.*
  Publications: [3], [52], [62], [71]
  First job: Professor at University of British Columbia..

- **Arjun Nitin Bhagoji**.   *Fall 2020 - Fall 2024.*
  Publications: [43], [54], [57], [58], [62], [63]
  First job: Assistant Professor at IIT Delhi.

- **Tarun Mangla**.   *Fall 2020 - Fall 2023.*
  Publications: [69], [72], [76], [80]
  First job: Assistant Professor at IIT Delhi.

- **Jamie Saxon**.   *Fall 2020 - Fall 2022.*
  Publications: [77], [80], [82]
  First job: Research Scientist at Mapbox.

- **Paul Schmitt**.   *Fall 2017 - Spring 2021.*
  Publications: [78], [81], [82], [83], [84], [86], [89], [92], [96], [99], [192], [194]
  First job: Research Assistant Professor at USC/ISI

- **Kevin Borgolte**.   *Fall 2018 - Spring 2020.*
  Publications: [86], [87], [92], [194], [196], [198],
  First job: Assistant Professor at TU Delft

- **Danny Huang**.   *Fall 2017 - Spring 2020.*
  Publications: [6], [85], [90], [95], [97], [201]
  First job: Assistant Professor at New York University

- **Philipp Winter**.   *Fall 2015 - Spring 2017.*
  Publications: [103], [112], [117], [126]
  First job: Research Scientist at Center for Applied Internet Data Analysis (CAIDA).

- **Roya Ensafi**.   *Fall 2015 - Spring 2017.*
  Publications: [13], [14], [105], [107], [109], [117]
  First job: Assistant Professor at University of Michigan

- **Dave Levin**.   *Fall 2012 - Fall 2014.*
  Publications: [131], [214], [215]
  First job: Assistant Professor at University of Maryland

- **Cristian Lumezanu**.   *Fall 2010 - Fall 2012.*
  Publications: [149], [151], [155]
  First job: Researcher at NEC Research Labs

- **Nazanin Magharei**.   *Fall 2010 - Fall 2012.*
  Publications: [22], [146]
  First job: Software Engineer at Cisco

Ph.D. Students

Current

- **Taveesh Sharma**.   *Fall 2023 - Present.*
  Publications: [49], [66], [67]

- **Andrew Chu**.   *Fall 2021 - Present.*
  Publications: [43], [54]
- **Chase Jiang**.   *Fall 2021 - Present.*
  Publications: [42], [43], [54], [56], [64], [71]
- **Siddhant Ray**.   *Fall 2021 - Present.*
  Publications: [38]
- **Anna Lorimer**.   *Fall 2021 - Present*
- **Van Tran**.   *Fall 2021 - Present.*
  Publications: [71], [59], [48]
- **Kyle MacMillan**.   *Fall 2020 - Present.*
  Publications: [72], [75], [80], [193]
- **Synthia Wang**.   *Fall 2020 - Present.*
  Publications: [44] [60], [65]

Graduated

- **Shinan Liu**.   *Fall 2020 - Fall 2025.*
  Publications: [41], [42], [43], [46], [56], [64], [63], [69], [68], [82], [84],
  First job: Assistant Professor at University of Hong Kong.

- **Jordan Holland**.   *Fall 2018 - Spring 2022.*
  Publications: [81], [86], [92], [196], [198]
  First job: Software Engineer at Netflix.

- **Austin Hounsel**.   *Fall 2017 - Spring 2022.*
  Publications: [73], [79], [83], [86], [92], [192], [194], [196], [198], [199]
  First job: Software Engineer at Apple.

- **Hooman Mohajeri**.   *Fall 2015 - Spring 2022.*
  Publications: [90]
  First job: Postdoctoral Researcher at UC Santa Barbara.

- **Noah Apthorpe**.   *Fall 2015 - Spring 2020.*
  Publications: [5], [91], [94], [95], [101], [102], [200], [203], [204], [206]
  First job: Assistant Professor at Colgate.

- **Muhammad Shahbaz**.   *Fall 2012 - Fall 2018.*
  Publications: [16], [93], [118], [130], [132], [138]
  First job: Postdoc at Stanford University. Now Assistant Professor at Purdue University.

- **Arpit Gupta**.   *Fall 2013 - Summer 2018.*
  Publications: [104], [120], [124], [140], [207]
  First job: Assistant Professor at UC Santa Barbara.

- **Annie Edmundson**.   *Summer 2015 - Spring 2018.*
  Publications: [96], [103], [105]
  First job: Software Engineer at Squarespace.

- **Abhinav Narain**.   *Fall 2011 - Summer 2017.*
  Publications: [136]
  First job: Software Engineer at Mailchimp.

- **Yogesh Mundada**.   *Fall 2007 - Summer 2016.*
  Publications: [119], [143], [220]
  First job: Software Developer at Samsara.

- **Bilal Anwer**.   *Fall 2008 - Fall 2015.*
  Publications: [29], [158], [221], [224]
  First job: Research Scientist at AT&T Labs – Research.

- **Hyojoon Kim**.   *Fall 2009 - Summer 2015.*
  Publications: [132], [133], [145], [153]
  First job: Research Scientist at Princeton University.

- **Maria Konte**.   *Fall 2007 - Summer 2015.*
  Publications: [128], [152], [167]
  First job: Research Scientist at Georgia Tech.
- **Xinyu Xing**.   *Fall 2011 - Spring 2015.*
  Publications: [141], [147]
  First job: Assistant Professor at Penn State University.
- **Shuang Hao**.   *Fall 2007 - Fall 2014.*
  Publications: [144], [154], [166]
  First job: Assistant Professor at University of Texas – Dallas.
- **Sam Burnett**.   *Fall 2008 - Spring 2014.*
  Publications: [127], [145], [159]
  First job: Google.
- **Srikanth Sundaresan**.   *Fall 2008 - Spring 2014.*
  Publications: [21], [121], [134], [139], [146], [156], [218]
  First job: Research Scientist at UC Berkeley International Computer Science Institute.
- **Vytautas Valancius**.   *Summer 2007 - Spring 2012.*
  Publications: [148], [150], [155], [161], [226], [227]
  First job: Software Engineer at Google.
- **Murtaza Motiwala**.   *Fall 2006 - Spring 2012.*
  Publications: [24], [169], [231]
  First job: Software Engineer at Google.
- **Anirudh Ramachandran**.   *Spring 2006 - Spring 2011.*
  Publications: [37], [157] [173], [178], [230], [233], [234], [235]
  First job: Founded Nouvou, security startup (sold). Now at Facebook.
- **Mukarram Bin Tariq**.   *Spring 2007 - Spring 2010.*
  Publications: [20] [163], [164], [170], [228]
  First job: Software Engineer at Google.

Patents

Patent Number	Title	Filing Date
US 20250267105 A1	Adaptive Ensemble Classification for Network Traffic Identification	Feb 20, 2024
US 2018/0278500 A1	Scalable Streaming Analytics Platform for Network Monitoring	Mar 23, 2018
US 10,044,748 B2	Methods and Systems for Detecting Compromised Computers	Feb 9, 2016
US 8,893,300 B2	Network-Wide Security Policy Management System	May 10, 2012
US 8,713,676 B2	Detecting Malicious Behavior on a Network	Aug 3, 2009

Expert Engagements

Date	Filing Date	Location of Court	Case	Case #	Description	Outcome	Testimony	# Reports
2025-	Mar 5, 2019	Central District of CA	**DivX** v. Netflix	2:19-cv-01602	Code review, infringement/validity analysis.	Ongoing		1
2025-	Jan 14, 2024	Eastern District of Texas	Valtrus v. **SAP**	2:2024cv00021	Code review, infringement/validity analysis.	Ongoing	Deposition	2
2025-	Dec 30, 2023	Paris judicial court	Canal+ v. **Cloudflare**, Google, and Cisco	TBD	DNS infrastructure analysis.	Ongoing		2
2024-	Apr 24, 2023	Northern District of California	McClung v. **AddShoppers**	No. 23-cv-01996-VC	Review of targeted advertising and code.	Won	Deposition	2
2024	Feb 5, 2023	Delaware Court of Chancery	Gemedy Inc. v. **The Carlyle Group**	C.A. No. 2023-0066-SG	Trade secrets and extensive code review.	Settled	Deposition	1
2023-2024	Nov 30, 2022	Northern District of California	Splunk, Inc. v. **Cribl, Inc.**	C 22-07611 WHA	Code and operational review of Splunk.	Won	Trial	3
2017-2023	Mar 10, 2014	District of Utah	**ClearPlay, Inc.** v. Dish Network Corp.	2:14-cv-00191	Code review for video stream filtering.	Won	Trial	7
2019	Jun 15, 2018	Eastern District of Virginia	Sony Music Entertainment et al. v. **Cox Communications Inc.**	1:18-cv-00950	Accuracy of copyright detection tools.	Won	Trial	2
2022-2023	Aug 18, 2022	Eastern District of Texas	Liberty Access Technologies Licensing LLC v. **Marriott International, Inc.**	2:22-cv-00318	Mobile-based door access review.	Settled		
2018	2018	Confidential	**Confidential** v. Confidential	Confidential	Online reputation system analysis.	Settled		
2017-2019	Jan 31, 2017	Supreme Court of the State of New York, County of New York	People by Schneiderman v. **Charter**	1:16-cv-00759	Network speed test accuracy.	Settled		1
2018-2019	2017	U.S. Patent Trial and Appeal Board	Trend Micro v. **Security Profiling, LLC**	IPR 2017-02193	Patent validity on intrusion detection.	Settled		1
2017	2014	Northern District of California	**Finjan, Inc.** v. Symantec Corp.	4:14-cv-02998	Operation of censorship circumvention.	Settled		
2016-2017	2016	Confidential	**Confidential** v. Confidential	Confidential	Mobile phone traffic analysis.	Settled		
2013	2013	Confidential	**Confidential** v. Confidential Matter	Confidential	Flash cookies usage investigation.	Settled		
2006	2006	Confidential	**Confidential** v. Confidential Matter	Confidential	Prior art research on cryptography.	Settled		