ETHAN KATZ-BASSETT
ethan@ee.columbia.edu
http://www.columbia.edu/~ebk2141/

Research Interests

networking: Internet reliability and performance, Internet measurement, routing, content delivery, Internet-scale distributed systems, system design and deployment

I design systems to improve the reliability and performance of Internet services. To understand the problems, I look to the needs of operators and providers, and I conduct measurements. Based on what I learn, I design deployable systems to improve the Internet and services that run over it.

Education

Ph.D., Computer Science and Engineering, University of Washington, Seattle, WA (March 2012)
Advisors: Tom Anderson and Arvind Krishnamurthy
Dissertation: *Systems for Improving Internet Availability and Performance*
Won the department's 2012 William Chan Memorial Dissertation Award

B.A., Computer Science & Mathematics, Williams College, Williamstown, MA (June 2001)
Magna Cum Laude

Employment

Columbia University, Electrical Engineering Department, New York, NY
Associate Professor [tenure track but without tenure] (2017-current)
Affiliate, Computer Science Department (2017-current)

University of Southern California, Computer Science Department, Los Angeles, CA
Adjunct Research Associate Professor (2018-current)
Associate Professor [with tenure at USC] (2018)
Andrew and Erna Viterbi Early Career Chair (2016-2017)
Assistant Professor (2012-2018)

Google Inc., Seattle, WA
Software Engineer, mobile performance (2011-2012)

University of Massachusetts, Lab for Advanced Software Engineering Research, Amherst, MA
Department Research Assistant, (summers & falls, 2001-2003)

Honors and Awards

· SIGCOMM Rising Star Award, 2019

· Applied Networking Research Prize, IRTF/IETF, *Edge Fabric*, 2019

· Top Prize: Enabling Technology, NYC Media Lab, *Requet*, 2019

· Best of SIGCOMM CCR, *Towards a Methodology for Measuring Adoption of RPKI*, 2018

· Andrew and Erna Viterbi Early Career Chair, 2016

· Facebook Faculty Award, 2016, 2017

· Google Faculty Research Award, 2013, 2014, 2015, 2016

· Applied Networking Research Prize, IRTF/IETF, *TCP Gentle Aggression*, 2014

· NSF CAREER Award, *Routing for the Emerging Topologies of Modern Internet Services*, 2014

· William Chan Memorial Dissertation Award, 2012

· Best Paper Award, *Reverse Traceroute*, NSDI 2010

· Best Paper Award, *Consensus Routing*, NSDI 2008

· Highest Rated Paper, *Hubble*, NSDI 2008

Honors and Awards Received by My Students

· Facebook Fellowship Finalist (top 40 of 800), Yi-Ching Chiu, 2017

· Facebook Fellow in Networking & Operating Systems, Brandon Schlinker, 2016

· Honorable Mention, CRA Outstanding Undergraduate Researcher Award, Colin Scott, 2011

· CRA Outstanding Female Undergraduate Researcher Award, Justine Sherry, 2010

Publications

Note: The SIGCOMM and NSDI conferences are the leading venues (considering both conferences and journals) for publishing research on computer networks, with acceptance rates of 14%-20%. OSDI and SOSP play the same role for systems research. HotNets is the leading workshop for hot topics and new or controversial ideas in computer networks, with acceptance rates of 20%-22%. IMC is the leading venue focused specifically on Internet measurement, with acceptance rates of 20%-26%, while PAM is the next best venue on Internet measurement, with shorter papers and higher acceptance rates than IMC. Given my research areas, these conferences and workshops, rather than any journals, are the best places for me to publish my work, in terms of both prestige and dissemination.

In computer networks, student authors are typically listed first in descending order of contribution. However, there are not consistent conventions for the order of faculty authors: sometimes they are alphabetical, sometimes they are in decreasing order of significance, and sometimes the last author was the leading faculty member. I put a * next to the names of the lead senior author(s) of each publication. I underlined the names of students/postdocs who I advise and italicized the names of students who conducted the project initiated and mentored by me while in one of my classes or while a visitor to my group. Citation counts from Google Scholar as of 11/11/2019.

Refereed Conference Publications

2020

1. **(How Much) Does a Private WAN Improve Cloud Performance?**
   T. Arnold, E. Gurmericliler, G. Essig, A. Gupta, M. Calder*, V. Giotsas*, **E. Katz-Bassett***.
   INFOCOM 2020 (IEEE International Conference on Computer Communications), (20% acceptance rate, Google Scholar H5-index: 74).

2. **DISCO: Sidestepping RPKI's Deployment Barriers.**
   T. Hlavacek, I. Cunha, Y. Gilad*, A. Herzberg*, E. Katz-Bassett, M. Schapira*, H. Shulman*.
   NDSS 2020 (Network and Distributed System Security Symposium), (18% acceptance rate, Google Scholar H5-index: 65).

2019

3. **Internet Performance from Facebook's Edge.**
   B. Schlinker, I. Cunha*, Y. Chiu, S. Sundaresan, **E. Katz-Bassett***.
   IMC 2019 (Internet Measurement Conference), (20% acceptance rate, Google Scholar H5-index: 36).

4. **PEERING: Virtualizing BGP at the Edge for Research.**
   B. Schlinker, T. Arnold, I. Cunha*, **E.Katz-Bassett***.
   CoNEXT 2019 (ACM Conference on emerging Networking EXperiments and Technologies), (17% acceptance rate, Google Scholar H5-index: 33).

5. **Requet: Real-time QoE Detection for Encrypted YouTube Traffic.** (5 citations)
C. Gutterman, K. Guo*, S. Arora, X. Wang, L. Wu, **E. Katz-Bassett**, G. Zussman*.
MMSys 2019 (ACM Multimedia Systems Conference), (40% acceptance rate, Google Scholar H5-index: 31).
Top Prize: Enabling Technology, NYC Media Lab, 2019.

2018

6. **Oboe: Auto-tuning Video ABR Algorithms to Network Conditions.** (38 citations)
Z. Akhtar, Y. Nam, R. Govindan*, S. Rao*, J. Chen, **E. Katz-Bassett**, B. Ribeiro, J. Zhan, H. Zhang.
SIGCOMM 2018 (ACM Special Interest Group on Data Communication), (14% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

7. **Odin: Microsoft's Scalable Fault-Tolerant CDN Measurement System.** (13 citations)
M. Calder, R. Gao, M. Schroder, R. Stewart, J. Padhye, R. Mahajan, G. Ananthanarayanan, **E. Katz-Bassett***.
NSDI 2018 (USENIX Symposium on Networked Systems Design & Implementation), (16% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).

8. **Understanding Video Management Planes.** (1 citation)
Z. Akhtar, Y. Nam, J. Chen, R. Govindan*, **E. Katz-Bassett**, S. Rao*, J. Zhan, H. Zhang.
IMC 2018 (Internet Measurement Conference), (25% acceptance rate, Google Scholar H5-index: 36).

2017

9. **Engineering Egress with Edge Fabric: Steering Oceans of Content to the World.** (63 citations)
B. Schlinker, H. Kim, T. Cui, **E. Katz-Bassett***, H. Madhyastha, I. Cunha, J. Quinn, S. Hasan, P. Lapukhov, H. Zeng.
SIGCOMM 2017 (ACM Special Interest Group on Data Communication), (14% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).
Awarded Applied Networking Research Prize, IRTF/IETF, 2019.

10. **The Record Route Option is an Option!** (5 citation)
B. Goodchild, Y. Chiu, H. Lu, *R. Hansen*, M. Calder, D. Choffnes, W. Lloyd, M. Luckie, **E. Katz-Bassett***.
IMC 2017 (Internet Measurement Conference), (23% acceptance rate, Google Scholar H5-index: 36).

2016

11. **An Internet-Wide Analysis of Traffic Policing.** (45 citations + 1 for tech report)
T. Flach, P. Papageorge, A. Terzis, L. Pedrosa, Y. Cheng, T. Karim, **E. Katz-Bassett***, R. Govindan*.
SIGCOMM 2016 (ACM Special Interest Group on Data Communication), (17% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

12. **Sibyl: A Practical Internet Route Oracle.** (19 citations + 2 for preliminary version)
I. Cunha, *P. Marchetta*, M. Calder, Y. Chiu, B. Schlinker, B. Machado, A. Pescapè, V. Giotsas, H. Madhyastha, **E. Katz-Bassett***.
NSDI 2016 (USENIX Symposium on Networked Systems Design & Implementation), (20% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).

13. **Modeling HTTP/2 Speed from HTTP/1 Traces.** (22 citations)
K. Zarifis, M. Holland, M. Jain, **E. Katz-Bassett***, R. Govindan*.
PAM 2016 (Passive and Active Measurements Conference), (32% acceptance rate).

2015

14. **Condor: Better Topologies Through Declarative Design.** (23 citations)
B. Schlinker, R. N. Mysore, S. Smith, J. C. Mogul*, A. Vahdat, M. Yu, **E. Katz-Bassett**, M. Rubin.
SIGCOMM 2015 (ACM Special Interest Group on Data Communication), (16% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

15. **Are We One Hop Away from a Better Internet?** (56 citations)
Y. Chiu, B. Schlinker, A. B. Radhakrishnan, **E. Katz-Bassett***, R. Govindan.
IMC 2015 (Internet Measurement Conference), (26% acceptance rate, Google Scholar H5-index: 36).

16. **Analyzing the Performance of an Anycast CDN.** (81 citations)
M. Calder, A. Flavel, **E. Katz-Bassett***, R. Mahajan, J. Padhye*.
IMC 2015 (Internet Measurement Conference), (26% acceptance rate, Google Scholar H5-index: 36).

17. **Investigating Interdomain Routing Policies in the Wild.** (37 citations)
R. Anwar, H. Niaz, D. Choffnes, I. Cunha, P. Gill*, **E. Katz-Bassett**.
IMC 2015 (Internet Measurement Conference), (26% acceptance rate, Google Scholar H5-index: 36).

18. **Investigating Transparent Web Proxies in Cellular Networks.** (70 citations + 1 for poster)
X. Xu, *Y. Jiang*, *T. Flach*, **E. Katz-Bassett***, D. Choffnes, R. Govindan.
PAM 2015 (Passive and Active Measurements Conference), (27% acceptance rate).

2014

19. **SDX: A Software Defined Internet Exchange.** (348 citations)
A. Gupta, L. Vanbever, M. Shahbaz, S. P. Donovan, B. Schlinker, N. Feamster*, J. Rexford*, S. Shenker, R. Clark, **E. Katz-Bassett**.
SIGCOMM 2014 (ACM Special Interest Group on Data Communication), (19% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

20. **DIBS: Just-in-time Congestion Mitigation for Data Centers.** (26 citations + 6 for poster)
K. Zarifis, R. Miao, M. Calder, **E. Katz-Bassett**, M. Yu*, J. Padhye*.
EuroSys 2014 (European Conference on Computer Systems), (18% acceptance rate, Google Scholar H5-index: 38).

21. **Diagnosing Path Inflation of Mobile Client Traffic.** (43 citations)
K. Zarifis, *T. Flach*, *S. Nori*, D. Choffnes, R. Govindan, **E. Katz-Bassett***, Z. M. Mao, M. Welsh.
PAM 2014 (Passive and Active Measurements Conference), (32% acceptance rate).

22. **Peering at the Internet's Frontier: A First Look at ISP Interconnectivity in Africa.** (83 citations)
A. Gupta, M. Calder, N. Feamster*, M. Chetty, E. Calandro, **E. Katz-Bassett**.
PAM 2014 (Passive and Active Measurements Conference), (32% acceptance rate).

23. **The Need for End-to-End Evaluation of Cloud Availability.** (24 citations)
Z. Hu, *L. Zhu*, *C. Ardi*, **E. Katz-Bassett***, H. Madhyastha, J. Heidemann*, M. Yu.
PAM 2014 (Passive and Active Measurements Conference), (32% acceptance rate).

24. **Mobile Network Performance from User Devices: A Longitudinal, Multidimensional Analysis.** (83 citations)
A. Nikravesh, D. Choffnes*, **E. Katz-Bassett**, Z. M. Mao*, M. Welsh.
PAM 2014 (Passive and Active Measurements Conference), (32% acceptance rate).

25. **Dissecting Round Trip Time on the Slow Path Using a One-Packet Approach.** (24 citations)
P. Marchetta*, A. Botta, **E. Katz-Bassett**, A. Pescape.
PAM 2014 (Passive and Active Measurements Conference), (32% acceptance rate).

2013

26. **Reducing Web Latency: the Virtue of Gentle Aggression.** (193 citations)
T. Flach, N. Dukkipati*, A. Terzis, B. Raghavan, N. Cardwell, Y. Cheng*, A. Jain, S. Hao, **E. Katz-Bassett**, R. Govindan.
SIGCOMM 2013 (ACM Special Interest Group on Data Communication), (16% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).
Awarded Applied Networking Research Prize, IRTF/IETF, 2014.

27. **PoiRoot: Investigating the Root Cause of Interdomain Path Changes.** (58 citations)
U. Javed, I. Cunha, D. R. Choffnes, **E. Katz-Bassett**, A. Krishnamurthy*, T. Anderson.
SIGCOMM 2013 (ACM Special Interest Group on Data Communication), (16% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

28. **SPANStore: Cost-Effective Geo-Replicated Storage Spanning Multiple Cloud Services.** (202 citations + 4 for short version)
Z. Wu, M. Butkiewicz, D. Perkins, **E. Katz-Bassett**, H. Madhyastha*.
SOSP 2013 (ACM Symposium on Operating Systems Principles), (19% acceptance rate, 18.91 impact factor in 2010).

29. **Mapping the Expansion of Google's Serving Infrastructure.** (177 citations)
M. Calder, *X. Fan*, Z. Hu, R. Govindan, J. Heidemann, **E. Katz-Bassett***.
IMC 2013 (ACM Internet Measurement Conference), (24% acceptance rate, Google Scholar H5-index: 36).

2012

30. **LIFEGUARD: Practical Repair of Persistent Route Failures.** (89 citations)
E. Katz-Bassett, C. Scott, D. R. Choffnes, *I. Cunha*, V. Valancius, N. Feamster, H. V. Madhyastha, T. Anderson, A. Krishnamurthy.
SIGCOMM 2012 (ACM Special Interest Group on Data Communication), (14% acceptance rate, 21.05 impact factor in 2010, Google Scholar H5-index: 72).

31. **Quantifying Violations of Destination-based Forwarding on the Internet.** (30 citations)
T. Flach, **E. Katz-Bassett***, R. Govindan.
IMC 2012 (ACM Internet Measurement Conference), (25% acceptance rate, Google Scholar H5-index: 36).

Published before 2012

32. **Reverse Traceroute.** (170 citations)
E. Katz-Bassett, H. V. Madhyastha, V. K. Adhikari, C. Scott, J. Sherry, *P. van Wesep*, T. Anderson, A. Krishnamurthy.
NSDI 2010 (USENIX Symposium on Networked Systems Design & Implementation), (17% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).
Awarded Best Paper.

33. **Resolving IP Aliases with Prespecified Timestamps.** (46 citations)
J. Sherry, **E. Katz-Bassett***, M. Pimenova, H. V. Madhyastha, T. Anderson, A. Krishnamurthy.
IMC 2010 (ACM Internet Measurement Conference), (22% acceptance rate, Google Scholar H5-index: 36).

34. **iPlane Nano: Path Prediction for Peer-to-Peer Applications.** (124 citations)
H. V. Madhyastha, **E. Katz-Bassett**, T. Anderson, A. Krishnamurthy, A. Venkataramani.
NSDI 2009 (USENIX Symposium on Networked Systems Design & Implementation), (20% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).

35. **Studying Black Holes in the Internet with Hubble.** (164 citations)
E. Katz-Bassett, H. V. Madhyastha, J. P. John, A. Krishnamurthy*, D. Wetherall, T. Anderson*.
NSDI 2008 (USENIX Symposium on Networked Systems Design & Implementation), (18% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).
Highest Rated Paper in Conference, based on anonymized average ratings from conference reviews.

36. **Consensus Routing: The Internet as a Distributed System.** (175 citations)
J. P. John, **E. Katz-Bassett**, A. Krishnamurthy*, T. Anderson*, A. Venkataramani*.
NSDI 2008 (USENIX Symposium on Networked Systems Design & Implementation), (18% acceptance rate, 11.85 impact factor in 2010, Google Scholar H5-index: 62).
Awarded Best Paper.

37. **Towards IP Geolocation using Delay and Topology Measurements.** (356 citations)
E. Katz-Bassett, J. P. John, A. Krishnamurthy*, D. Wetherall*, T. Anderson, Y. Chawathe*.
IMC 2006 (ACM Internet Measurement Conference), (22% acceptance rate, Google Scholar H5-index: 36).

Refereed Workshop / Short Publications and Presentations

2019

38. **Beating BGP is Harder than We Thought.**
T. Arnold, M. Calder, A. Gupta, I. Cunha, H. Madhyastha, M. Schapira, **E. Katz-Bassett***.
HotNets 2019 (ACM Workshop on Hot Topics in Networks), (Google Scholar H5-index: 25).

2016

39. **BingeOn Under the Microscope: Understanding T-Mobile's Zero-Rating Implementation.** (32 citations)
A. M. Kakhki, F. Li, D. Choffnes*, A. Mislove, **E. Katz-Bassett**.
ACM SIGCOMM Workshop on Internet Quality of Experience, (48% acceptance rate).

2015

40. **Assessing Affinity Between Users and CDN Sites.** (28 citations)
X. Fan, **E. Katz-Bassett***, J. Heidemann*.
TMA 2015 (Workshop on Traffic Monitoring and Analysis), (30% acceptance rate).

2014

41. **PEERING: An AS for Us.** (38 citations)
B. Schlinker, K. Zarifis, I. Cunha, N. Feamster, **E. Katz-Bassett***.
HotNets 2014 (ACM Workshop on Hot Topics in Networks), (22% acceptance rate, Google Scholar H5-index: 25).

42. **Flexible Internet Routing for Cloud Tenants and Cloud Researchers.**
E. Katz-Bassett*, B. Schlinker*.
NSFCloud Workshop on Experimental Support for Cloud Computing, 2014.

43. **Impactful Routing Research with the PEERING Testbed.**
E. Katz-Bassett*.
NANOG 61 Lightning Talk, 2014 (North American Network Operators Group Conference).

44. **Try Before you Buy: SDN Emulation with (Real) Interdomain Routing.** (17 citations)
B. Schlinker, K. Zarifis, I. Cunha, N. Feamster, **E. Katz-Bassett***, M. Yu.
ONS 2014 (Open Networking Summit).

2013

45. **Don't Trust Traceroute (Completely).** (26 citations)
*P. Marchetta**, V. Persico, **E. Katz-Bassett**, A. Pescape.
CoNEXT Student Workshop 2013 (ACM Conference on emerging Networking EXperiments and Technologies Student Workshop).
Awarded Best Paper.

46. **Towards Impactful Routing Research: Running Your Own (Emulated) AS on the (Real) Internet.**
*B. Schlinker**, K. Zarifis, I. Cunha, N. Feamster, **E. Katz-Bassett**, M. Yu.
CoNEXT Student Workshop 2013 (ACM Conference on emerging Networking EXperiments and Technologies Student Workshop).

47. **Diagnosing Slow Web Page Access at the Client Side.** (4 citations)
T. Flach*, **E. Katz-Bassett**, R. Govindan.
CoNEXT Student Workshop 2013 (ACM Conference on emerging Networking EXperiments and Technologies Student Workshop).

Published before 2012

48. **Machiavellian Routing: Improving Internet Availability with BGP Poisoning.** (9 citations)
E. Katz-Bassett, D. R. Choffnes, *I. Cunha*, C. Scott, T. Anderson, A. Krishnamurthy.
HotNets 2011 (ACM Workshop on Hot Topics in Networks), (20% acceptance rate, Google Scholar H5-index: 25).

49. **Measuring the Internet by Coordinating Distributed Vantage Points (extended abstract).**
E. Katz-Bassett.
SIGMETRICS 2009 Student Thesis Panel.

50. **Reverse Traceroute.**
E. Katz-Bassett.
RIPE 58, 2009 (Réseaux IP Européens Network Operator Conference).

51. **Practical Reverse Traceroute.** (7 citations)
E. Katz-Bassett.
NANOG 45, 2009 (North American Network Operators Group Conference).

52. **Real-time Blackhole Analysis with Hubble.**
E. Katz-Bassett.
NANOG 40, 2007 (North American Network Operators Group Conference).

Refereed Journal Publications

53. **Towards a Rigorous Methodology for Measuring Adoption of RPKI Route Validation and Filtering.** (15 citations)
A. Reuter, R. Bush*, I. Cunha*, **E. Katz-Bassett***, T. Schmidt, M. Wahlisch*.
SIGCOMM Computer Communications Review (CCR), 2018.
Awarded Best of SIGCOMM CCR.

54. **Helping Conference Attendees Better Understand Research Presentations.** (3 citations)
E. Katz-Bassett*, J. Sherry, T.-Y. Huang, M. Kazandjieva, C. Partridge, F. Dogar.
Communications of the ACM (CACM), 2016.

55. **DBit: Assessing Statistically Significant Differences in CDN Performance.** (6 citations + 1 for tech report)
Z. Akhtar, A. Hussain, **E. Katz-Bassett**, R. Govindan*.
Computer Networks 107, 2016.
Originally in TMA (Workshop on Traffic Monitoring and Analysis) 2016, (34% acceptance rate).

56. **Increasing Patient Safety and Efficiency in Transfusion Medicine Using Process Formalization.** (63 citations)
E. A. Henneman*, R. Cobleigh, K. Frederick, **E. Katz-Bassett**, G. S. Avrunin, L. A. Clarke*, L. J. Osterweil*, C. Andrzejewski Jr., K. Merrigan, P. L. Henneman.
Transfusion Medicine Reviews, 21(1):49-57. January 2007.

Invited Presentations

- **Teaching Old Protocols New Tricks:**
  A Measurement-Driven Approach to Improving the Internet.
  University of Pennsylvania, 2018
  Pomona College, 2017.
  Columbia University, 2016.
  Cornell University, 2016.
  Microsoft Research, NYC, 2016.
  Microsoft Research, Redmond, 2016.
  Northwestern University, 2016.
  Rutgers University, 2016.
  University of California, Berkeley, 2016.
  University of Utah, 2016.
- **Towards Impactful Internet Measurement.**
  Keynote, IRTF/ISOC Workshop on Research and Applications of Internet Measurements, 2015.
- **PEERING: An AS for Us.**
  National Institute of Standards and Technology, 2015.
  University of Washington, 2014.
- **Sibyl: A Practical Internet Route Oracle.**
  Microsoft Research, 2015.
  Princeton University, 2015.
- **Making the Internet Fast.**
  University of California, Riverside, 2014.
  University of California, San Diego, 2014.
- **How I Will Measure Routes in 2014.**
  Workshop on Critical Internet Infrastructure, Dagstuhl, Germany, 2013.
- **Reverse Traceroute.**
  Microsoft, 2014.
  EdgeCast, 2013.
  Williams College, 25th Anniversary of Computer Science Department, 2013.
- **Improving the Internet's Performance and Availability.**
  Montana State University, 2013.
  AT&T Research, 2011.
  Boston University, 2011.
  Microsoft Research, 2011.
  New York University, 2011.
  Northeastern University, 2011.
  Ohio State University, 2011.
  University of Southern California, 2011.
- **LIFEGUARD: Practical Repair of Persistent Route Failures.**
  Google, 2012.
- **Reverse Traceroute & Hubble: Systems to Troubleshoot Internet Performance and Reliability.**
  Laboratoire d'informatique de Paris 6, University Pierre et Marie Curie, 2009.
  University of Massachusetts, 2008.
- **How I Learned to Stop Worrying and Love to Spoof.**
  ISMA AIMS 2009 (Internet Statistics and Metrics Analysis Workshop on Active Internet Measurements).
- **Measuring Reverse Paths.**
  10th CAIDA-WIDE Workshop, 2008.

- **Hubble: Monitoring Internet Reachability in Real Time.**
  RIPE 56, 2008 (Réseaux IP Européens Network Operator Conference).
  10th CAIDA-WIDE Workshop, 2008.
  Gnomedex 2008 (Technology Conference).

Former Postdocs

Arpit Gupta: 2018-2019. First job: Assistant Professor, UC Santa Barbara.

Graduated Ph.D. Students

Tobias Flach (co-advised with Ramesh Govindan), 2016. First job: Google.
Dissertation: *Detecting and Mitigating Root Causes for Slow Web Transfers*
Chapters of dissertation published at SIGCOMM 2016, PAM 2014, and SIGCOMM 2013

Kyriakos Zarifis (co-advised with Ramesh Govindan), 2018. First job: Boingo Wireless.
Dissertation: *Making Web Transfers More Efficient*
Chapters of dissertation published at PAM 2016 and PAM 2014

Matt Calder, 2019. First job: Microsoft Azure.
Dissertation: *Measuring the Impact of CDN Design Decisions*
Chapters of dissertation published at NSDI 2018, IMC 2015, and IMC 2013

Current Ph.D. Students

Brandon Schlinker (USC): started 2013, dissertation proposal 2018.

Chris Hodsdon (USC/Princeton, co-advised with Wyatt Lloyd): started 2016, general exam 2019.

Theano Stavrinos (USC/Princeton, co-advised with Wyatt Lloyd): started 2016, general exam 2019.

Brian Goodchild (Columbia CS, co-advised with Roxana Geambasu): started 2017.

Todd Arnold (Columbia EE): started 2017, qualifying exam 2018.

Ege Gurmericliler (Columbia CS): started 2018.

Tom Koch (Columbia EE): started 2019.

Graduated M.S. Students

Srikanth Nori (USC), 2013. First job: Amazon.

Nitish Krishna (USC), 2014. First job: Juniper Networks.

Christopher Hanford (USC), 2015. First job: Bitglass, Inc.

Mohsin Ali (USC, co-advised with Wyatt Lloyd), 2016. First job: Facebook.

Abhishek Balaji Radhakrishnan (USC), 2016. First job: Cisco.

Aqib Nisar (USC, co-advised with John Heidemann), 2018. First job: NetApp.

Yi-Ching Chiu (USC, co-advised with Ramesh Govindan), 2018. First job: Google.

Alex Stein (Columbia), 2019. First job: ThousandEyes.

Current M.S. Students

Jia He (Columbia), 2019-current.

Siwei Chen (Columbia), 2019-current.

Previous Undergraduate Students

Justine Sherry (University of Washington). Winner CRA Outstanding Researcher Award 2010.
Ph.D., Berkeley. First job: Assistant Professor, CMU.

Colin Scott (University of Washington). Honorable Mention CRA Outstanding Researcher 2011.
Ph.D., Berkeley. First job: Microsoft Research India.

Ashoat Tevosyan (University of Washington). First job: Facebook.

Mary Pimenova (University of Washington). First job: Facebook.

Brian Goodchild (Rutgers, Camden). Pursuing Ph.D. at Columbia University.

Georgia Essig (Columbia).

Current Undergraduate Students

Kevin Lee (Northeastern), 2018-current.

Graduated High School Students

Adriana Beltran Andrade, 2016-2019. Pursuing bachelors at Smith College.

Ph.D. Dissertation Committees

Da Tong (USC EE), 2016. Advisor: Viktor K. Prasanna.
Dissertation: *High Performance Network Traffic Measurement and Analysis*

Marcel Flores (Northwestern CS), 2016. Advisor: Aleksandar Kuzmanovic.
Dissertation: *Improving Existing Protocols by Enabling Added Communication*

Xun Fan (USC CS), 2015. Advisor: John Heidemann.
Dissertation: *Efficient service enumeration through smart selection of measurements*

Lin Quan (USC CS), 2013. Advisor: John Heidemann.
Dissertation: *Learning about the Internet through efficient sampling and aggregation*

Ph.D. Qualifying and Proposal Committees (excluding overlap with Dissertation Committees above)

Yiwen Shen (Columbia EE): dissertation proposal 2018. Advisor: Keren Bergman.

Craig Gutterman (Columbia EE): dissertation proposal 2018. Advisor: Gil Zussman.

Liang Zhu (USC CS): dissertation proposal 2017. Advisor: John Heidemann.

Zahaib Akhtar (USC CS): qualifying exam 2017. Advisor: Ramesh Govindan.

Rui Miao (USC CS): qualifying exam 2017. Advisor: Minlan Yu.

Khiem Ngo (USC CS): qualifying exam 2017. Advisor: Wyatt Lloyd.

Lan Wei (USC CS): qualifying exam 2017. Advisor: John Heidemann.

Sumita Barahmand (USC CS): dissertation proposal 2013. Advisor: Shahram Ghandeharizadeh.

Sangwon Lee (USC CS): dissertation proposal 2013. Advisors: Murali Annavaram and Bhaskar Krishnamachari.

Yanting Wu (USC EE): dissertation proposal 2013. Advisor: Bhaskar Krishnamachari.

Teaching

Fall 2019 (Columbia) Undergrad/M.S. Course: CSEE4119 Computer Networks
- M.S./Ph.D. Seminar: ELEN6774 Internet Measurement

Fall 2018 (Columbia) Undergrad/M.S. Course: CSEE4119 Computer Networks
(instructor rating 4.28/5, course rating 4.12/5, 95 students)
- M.S./Ph.D. Seminar: ELEN6775 Delivering Modern Services on the Internet *(instructor rating 4.75/5, course rating 4.75/5, 5 students)*

Fall 2017 (Columbia) Undergrad/M.S. Course: CSEE4119 Computer Networks
(instructor rating 3.82/5, course rating 3.56/5, 89 students)

Fall 2016 (USC) M.S. Course: CSCI551 Computer Networking
(instructor rating 4.67/5, course rating 4.67/5, 17 students)
- Ph.D. Course: CSCI651 Advanced Computer Networking
(instructor rating 4.33/5, course rating 4.00/5, 7 students)

Fall 2014 (USC) Ph.D. Seminar: CSCI590 Reading, Writing, and Reviewing Papers
(instructor rating 4.50/5, course rating 4.00/5, 30 students)

- M.S. Course: CSCI551 Computer Networking
  (instructor rating 4.80/5, 13 students)
- Ph.D. Course: CSCI651 Advanced Computer Networking
  (instructor rating 4.13/5, course rating 4.00/5, 20 students)

Fall 2013 (USC) M.S./Ph.D. Seminar: CSCI694a Delivering Services on Today's Internet
(instructor rating 4.75/5, course rating 4.63/5, 8 students)

- M.S. Course: CSCI551 Computer Networking
  (instructor rating 4.46/5, course rating 4.21/5, 38 students)
- NSDI Shadow Program Committee, informal seminar

Spring 2013 (USC) Ph.D. Seminar: CSCI599 Internet Measurement
(instructor rating 4.75/5, course rating 4.67/5, 12 students)

Fall 2012 (USC) NSDI Shadow Program Committee, informal seminar

Professional Service

Technical Program Committee Co-Chair: IMC 2018

Technical Program Committee Member: SIGCOMM 2014-2016, 2019; IMC 2013, 2015-2018; NSDI 2013-2015; NSF NeTS Early Career Workshop 2017; PAM 2015; MobiSys 2014 (external review committee); AIMS 2014; SIGCOMM 2013 Posters and Demos; COST TMA 2011

General Co-Chair: HotNets 2014

Topic Preview Lectures Chair: SIGCOMM 2015-2017

Co-organizer: BGP hackathon (90 participants from academia, industry, and other institutions)

Shadow PC Co-Chair: IMC 2017 (50+ PC members around the world)

Shadow PC Coordinator: NSDI 2014 (organized 6 shadow PCs around the world)

Mentor, N2Women SIGCOMM 2014, mentoring four junior scholars

Session Chair and Discussion Leader: AIMS 2013

External Reviewer: NSDI 2008-2010, SIGCOMM 2010-2011, IEEE/ACM Transactions on Networking, Computer Networks Journal, ACM SIGCOMM Computer Communications Review

Departmental Service

Member, Departmental Faculty Search/Recruitment Committee: 2018-2019

Member, Departmental Ph.D. Admissions and Recruiting Committee: 2018-2019

Member, Departmental Ph.D. Monitoring Committee: 2017-2018

Organizer, Networking and Systems Talk Series: Fall 2018

Member, Departmental DQE Committee: 2018, 2019

Member, Departmental Ph.D. Fellowship Committee: 2013

Member, Departmental Ph.D. Admissions Committee: 2012, 2013, 2018

Member, Departmental Faculty Evaluation Committee: 2014

Member, Department Systems Hiring Committee: 2016, 2017

Organizer, Departmental Colloquium and Distinguished Lecture Series: 2012-2013

Public Service

Organizer and Moderator, Net Neutrality Panel: December 2017

Grants ($3.4M individual share, $7M total budget including collaborators, plus $0.1M as Columbia PI on $20M NSF FABRIC Mid-Scale Research Infrastructure)

1. **NSF Mid-Scale RI-1 (M1:IP): FABRIC: Fabric is Adaptive programmaBle networked Research Infrastructure for Computer science.**
   $100,000. 2019-2023. PI on Columbia subcontract (0.3 month effort per year).
   With project PIs project PIs Ilya Baldin (RENCI/UNC), James Griffioen (UKY), KC Wang (Clemson), Anita Nikolich, Inder Monga (ESnet) and collaborators. ($20M total budget).
   Summary: Few research investments have had as dramatic an impact on science, technology, and our daily lives as the Internet. However, the Internet's original programming abstractions and foundational building blocks have become dated and are severely hampering innovation. We propose to build an 'everywhere programmable' nationwide testbed infrastructure called FABRIC. FABRIC will enable experimentation with completely new network architectures with significant built-in intelligence and protocols that perform complex application-specific processing anywhere in the network.

2. **NSF EAGER: USBRCCR: Researching Internet Routing Security in the Wild.**
   $300,000. 2017-2019. CNS-1740883. PI (0.6 month effort per year).
   With Italo Cunha, UFMG, Brazil ($600K total budget).
   Summary: The Internet routing protocols lack authentication, so hosts can claim that their traffic came from a different source (source spoofing), and networks can claim ownership of routes to other networks' addresses in order to siphon traffic (hijacking). However, researchers struggle to perform routing security experiments that are both realistic and controlled, as both measurements and simulations have serious limitations. This project aims to (1) enable classes of security-focused routing research, via extending our PEERING testbed, and to (2) develop techniques that use it to identify which networks allow unauthorized traffic or routes.

3. **NSF CSR: NeTS: Medium: Collaborative Research: Cloud Support for Latency-Sensitive Web Services.**
   $475,094. 2016-2020. CNS-1564242. PI (0.25 month effort per year).
   Transferred from USC to Columbia with budget $414,407. 2018-2020. CNS-1835253.
   With Harsha Madhyastha, University of Michigan ($875K total budget).
   Summary: Many web services deploy in the cloud and use content delivery networks (CDNs), yielding access to servers around the world that can serve clients locally. However, these services struggle to realize the potential of this infrastructure because the shared nature of the infrastructure limits their visibility and control. We are developing solutions that a cloud platform can deploy to aid tenant applications in minimizing user-perceived latency.

4. **NSF CI-New: Collaborative Research: An Open Platform for Internet Routing Experiments.**
   $887,347. 2015-2019. CNS-1406042. PI (0.5 month effort per year).
   Transferred from USC to Columbia with budget $684,182. 2018-2019. CNS-1835252.
   With Nick Feamster, Princeton; David Choffnes, Northeastern University ($1.3M total budget).
   Summary: Routing is central to the Internet's functioning, but available testbed vantage points provide little visibility into how the Internet's independently operated networks interconnect, making it difficult to assess factors including the resilience and performance of Internet paths. Further, researchers lack the control to change actual routing to experiment with alternate paths, topologies, and business models in situ. To address this need, in this infrastructure project, we are building (1) an open testbed for Internet routing experiments that alter real Internet routes to explore alternates paths; and (2) measurement systems that capture the resulting routes.

5. **NSF NeTS: Large: Collaborative Research: Programmable Inter-domain Observation and Control.**
   $599,496. 2014-2020. CNS-1413978. PI (0.5 month effort per year).
   Subcontracted from USC to Columbia with budget $360,000. 2018-2020.
   With Ramesh Govindon, USC; Minlan Yu, Yale; Nate Foster, Cornell University; Arjun Guha, UMass ($3M total budget).
   Summary: This project proposes a unified interface for network operators to make observations about Internet paths and topology, and a rich control interface that allows cooperating participants to issue requests to steer traffic along preferred paths. The proposed system will collect information from participating networks and make active measurements from distributed vantage points, without requiring "forklift" upgrades to existing infrastructure. It will encourage operators to share network information by providing mechanisms that enable controlled sharing.

6. **NSF CAREER: Routing for the Emerging Topologies of Modern Internet Services.**
   $622,959. 2014-2020. NSF CNS-1351100. Single PI (1 month effort per year).
   Transferred from USC to Columbia with budget $380,272. 2018-2020. CNS-1836872.
   Summary: This project aims to provide unprecedented visibility into the topologies of major content providers by developing techniques to map their serving infrastructures and interconnections to other networks, then using those techniques to quantify inefficiencies in current routing and characterize opportunities for improvement. The project is also designing a testbed for routing experiments that capture important aspects of these providers.

7. **RIPE NCC Community Projects Fund Award: Intelligent RIPE Atlas Resource Allocation.**
   $26,679. 2018. Co-PI.
   With Vasileios Giotsas, Lancaster University, UK; Italo Cunha, UFMG, Brazil ($56K total budget).

8. **Google Chrome University Research Program: Speeding the Web by Anticipating Client Content Requests.**
   $0 (all budget with my co-PI at USC, where we co-advise students). 2017. Co-PI.
   With Ramesh Govindan, USC ($92K total budget).

9. **Facebook Faculty Award.**
   $50,000. 2017. Single PI.

10. **Comcast Innovation Fund Research Award.**
    $73,786. 2016. PI.
    With Italo Cunha, UFMG, Brazil ($100K total budget).

11. **Facebook Faculty Award.**
    $30,000. 2016. Single PI.

12. **Google Faculty Research Award: Longitudinal Study of RPKI-Based Route Filtering.**
    $59,726. 2016. Single PI.

13. **Google Faculty Research Award: Flexible Internet Routing for Cloud Tenants.**
    $53,945. 2015. Single PI.

14. **Google Faculty Research Award: Measuring and Improving Web Performance.**
    $54,322. 2014. Single PI.

15. **Google Faculty Research Award: Mapping Today's Internet.**
    $53,934. 2013. Single PI.

16. **Google/M-Lab Network Research Grant: Disentangling the Causes of Mobile Network Performance.**
    $99,690. 2013. PI.
    With David Choffnes, Northeastern University ($99,690 total budget, all at USC).

Selected Press

Microsoft Shines at NSDI '18.
Victor Bahl, Microsoft Research Blog. April 2018.
https://www.microsoft.com/en-us/research/blog/microsoft-shines-nsdi-18/

Making Facebook Faster.
Kieran Sweeney, USC Viterbi News. February 2018.
https://viterbischool.usc.edu/news/2018/02/making-facebook-faster/

Prof. Ethan Katz-Bassett Hosts Panel on Upcoming Net Neutrality Rules Repeal.
Linda Crane. September 2017.
https://www.ee.columbia.edu/katz-bassett-hosts-panel-net-neutrality-rules-repeal

Improving Internet performance in an open, collaborative environment.
Facebook Research Blog. September 2017.
https://research.fb.com/the-2017-facebook-phd-fellows-workshop/

Study: T-Mobile's Binge On not what it seems.
Truman Lewis, ConsumerAffairs. June 2016.
https://www.consumeraffairs.com/news/study-t-mobiles-binge-on-not-what-it-seems-061716.html

Facebook Fellow Works on Upgrading the Internet. [about my student Brandon Schlinker]
Daniel Druhora, USC Viterbi News. April 2016.
http://viterbi.usc.edu/news/news/2016/facebook-awards-graduate-fellowship.htm

Fixing the Internet.
Marc Ballon, USC Viterbi Magazine. Spring 2015.
http://magazine.viterbi.usc.edu/spring-2015-2/features/fixing-the-internet/

'Eye in the sky' will bypass Internet traffic jams.
Bill Steele, Cornell Chronicle. October 2014.
http://www.news.cornell.edu/stories/2014/10/eye-sky-will-bypass-internet-traffic-jams

Researchers Stumble On Growing Google Firepower.
Rolfe Winkler, Wall Street Journal. October 2013.
http://blogs.wsj.com/digits/2013/10/23/researchers-stumble-on-growing-google-firepower

Internet Full of 'Black Holes.'
Clara Moskowitz, LiveScience. Also on nbcnews.com, foxnews.com, and others. April 2008.
www.livescience.com/technology/080411-cyber-black-holes.html

Connected, news show interview.
Kevin Ebi, 95.7 KJR-FM. April 2008.

Researchers Chart Internet's 'Black Holes'.
Ryan Singel, Wired.com. June 2007.