Colin Scott

Curriculum Vitae

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Education

2011-2016 **Ph.D. Computer Science (ICTD minor)**, *University of California, Berkeley*.

2007–2011 **B.S. Computer Science (Philosophy minor)**, *University of Washington*.
GPA 3.95/4.0; Graduated Magna Cum Laude With College Honors.

Research Focus

Current: Technology for Emerging Markets (ICTD), HCI, Internet Access.
Previous: Distributed Systems, Networking, Testing & Debugging, Measurement.

Work Experience

2018 - *Software Engineer*, Google Next Billion Users Org.

2016 - 2018 *Postdoctoral Researcher*, Microsoft Research India Technology for Emerging Markets Group.
I spent most of my time at MSR working on Sneakernet, a project I conceived of together with Bill Thies. Sneakernet seeks to bolster the ecosytem (1B+ users worldwide) of device-to-device file transfers, by providing services such as content discovery, automatic proximity detection, and user incentives.
I wore a variety of hats in my efforts to turn Sneakernet into a real product: software architect and engineer, software tester, UX researcher, product manager, people manager, recruiter, salesman, evangelist. I was invited to **present Sneakernet to Satya Nadella and the senior leadership team** at Microsoft. Microsoft is continuing to pursue deployment of Sneakernet as an Azure product.

Summer 2014 *Software Development Intern*, Google Mobile Performance Team.
Published a paper on Google's data compression proxy & modified Chrome to selectively route requests through the proxy depending on cost/benefit.

Summer 2013 *Software Development Intern*, Google Mobile Performance Team.
Evaluated and deployed experimental protocol optimizations to Google's data compression proxy for mobile clients.

Summer 2012 *Software Development Intern*, Nicira. *(Acquired by VMware, July 2012)*.
Developed a framework for tracking down bugs in Nicira's distributed systems, by aggregating logs, inferring anomalous behavior, and interactively displaying diagnostics.

Summer 2010 *Software Development Intern*, Amazon Web Services CloudFront Team.
Developed a system for identifying, prioritizing and diagnosing network problems affecting latency between client networks and CloudFront PoPs.

Software Artifacts

In addition to internship projects, I have designed, implemented, and maintained six substantial software systems:

- Distributed Record Route Prober: (Ruby) 7,000 LoC
- Internet Fault Localizer: (Ruby) 16,000 LoC
- SDN Troubleshooting System (STS): (Python) 24,000 LoC
- Distributed Execution Minimizer (DEMi): (Scala) 14,000 LoC
- Sneakernet Android App: (Java) 24,000 LoC
- Sneakernet Azure Service: (Javascript & SQL) 6,000 LoC

STS has been used as part of the development process for two major SDN controllers: ON.Lab's ONOS & BigSwitch. It also served as the basis for the SDNRacer tool.

DEMi inspired Salesforce to fuzz (and find bugs in!) their consensus implementation.

Sneakernet currently has ∼50 active users in rural Chhattisgarh (in partnership with CGNet Swara). Microsoft is in the process of partnering with other content providers (e.g. HotStar and Khan Academy) to bring the technology into the hands of a much larger audience.

Publications

Y. Jin, *C. Scott*, A. Dhamdhere, V. Giotsas, A. Krishnamurthy, and S. Shenker. *Stable and Practical AS Relationship Inference with ProbLink*. NSDI '19.

M. Chopra, I. Medhi Thies, J. Pal, *C. Scott*, W. Thies, and V. Sheshadri. *Exploring Crowdsourced Work in Low-Resource Settings*. CHI '19.

S. Singanamalla, V. Potluri, *C. Scott*, and I. Medhi-Thies. *PocketATM: Understanding and Improving ATM Accessibility in India*. ICTD '19.

S. Singanamalla, W. Thies, and *C. Scott*. *Avatar: Enabling Immersive Collaboration via Live Mobile Video*. AltMM '18.

C. Scott. *Crowd Powered Media Delivery: Facilitating Ubiquitous Device-To-Device File Transfers*. (Extended abstract) ACM DEV '16.

J. Vesuna, *C. Scott*, M. Buettner, M. Piatek, A. Krishnamurthy, and S. Shenker. *Caching Doesn't Improve Mobile Web Performance (Much)*. ATC '16.

C. Scott, A. Panda, V. Brajkovic, G. Necula, A. Krishnamurthy, and S. Shenker. *Minimizing Faulty Executions of Distributed Systems*. NSDI '16.

V. Agababov, M. Buettner, V. Chudnovsky, M. Cogan, B. Greenstein, S. McDaniel, M. Piatek, *C. Scott*, M. Welsh, and B. Yin. *Flywheel: Google's Data Compression Proxy for the Mobile Web*. NSDI '15.

C. Scott, A. Wundsam, B. Raghavan, Z. Liu, S. Whitlock, A. El-Hassany, A. Or, J. Lai, E. Huang, H. B. Acharya, K. Zarifis, and S. Shenker. *Troubleshooting SDN Control Software with Minimal Causal Sequences*. SIGCOMM '14.

A. Panda, *C. Scott*, A. Ghodsi, T. Koponen, and S. Shenker. *CAP for Networks*. HotSDN '13.

B. Heller, *C. Scott*, N. Mckeown, S. Shenker, A. Wundsam, H. Zeng, S. Whitlock, V. Jeyakumar, N. Handigol, M. McCauley, K. Zarifis, and P. Kazemian. *Leveraging SDN Layering to Systematically Troubleshoot Networks*. HotSDN '13.

S. Whitlock, *C. Scott*, and S. Shenker. *Brief Announcement: Techniques for Programmatically Troubleshooting Distributed Systems*. PODC '13.

J. Sherry, S. Hasan, *C. Scott*, A. Krishnamurthy, S. Ratnasamy, and V. Sekar. *Making Middleboxes Someone Else's Problem: Network Processing as a Cloud Service*. SIGCOMM '12.

E. Katz-Bassett, *C. Scott*, D. Choffnes, Í. Cunha, V. Valancius, N. Feamster, H. Madhyastha, T. Anderson, and A. Krishnamurthy. *LIFEGUARD: Practical Repair of Persistent Route Failures*. SIGCOMM '12.

S. Hasan, Y. B. David, *C. Scott*, E. Brewer, and S. Shenker. *Enabling Rural Connectivity with SDN*. Technical report, UCB EECS Department '12.

E. Katz-Bassett, D. Choffnes, Í. Cunha, *C. Scott*, T. Anderson, and A. Krishnamurthy. *Machiavellian Routing: Improving Internet Availability with BGP Poisoning*. HotNets '11.

E. Katz-Bassett, H. Madhyastha, V. Adhikari, *C. Scott*, J. Sherry, P. Van Wesep, T. Anderson, and A. Krishnamurthy. *Reverse Traceroute.* **Best Paper Award.** NSDI '10.

Theses

Reducing Faulty Executions of Distributed Systems. UC Berkeley PhD Dissertation, 2016.

LIFEGUARD: Locating Internet Failure Events and Generating Usable Alternate Routes Dynamically. UW Senior Thesis, 2011. **Best Senior Thesis Award.**

Selected Talks

Sneakernet.
Microsoft Research India Annual Lab Review '18 [20 minute talk]

Minimizing Faulty Executions of Distributed Systems.
NSDI '16 [17 minute talk], Microsoft Research Redmond [60 minute talk], Microsoft Research India, RICON, Google, Salesforce, VMware, Cornell, USC, University of Washington, UC Berkeley.

Flywheel: Google's Data Compression Proxy for the Mobile Web.
NSDI '15 [20 minute talk], University of Washington, Google, UC Berkeley.

Troubleshooting SDN Control Software with Minimal Causal Sequences.
SIGCOMM '14, Google, BigSwitch Networks, Intel, Forward Networks, OpenDayLight Meetup, Stanford CTO Summit, University of Washington.

CAP for Networks.
Stanford CTO Summit, University of Washington.

Awards

2012-2016 National Science Foundation Graduate Research Fellow.

2016 Best Student Presentation Award. MSR Student Summit.

2015 My Flywheel talk tied for second most votes for 'favorite talk' at NSDI.

2011 Best Senior Thesis Award, UW CSE.

2010 NSDI Best Paper.

2010 Honorable Mention, CRA Outstanding Undergraduate Research Award.

2010 Gary Kildall Scholarship.

Technical Skills

Languages.
Scala, Python, Java, Go, C/C++, Ruby, Javascript, OCaml, Scheme, SQL, R, Bash, LaTeX.

Technologies.
Azure, AWS, Android, Spark, Dremel, Akka, AspectJ, SQLite, LevelDB, MySQL, Apache, Raft, Node.js, D3.js, Bootstrap, RoR, Google Charts, Colab, SPDY, Chrome internals, Verilog, MIPS, Click, Vyatta, DOT, SciPy, Gnuplot.

Expertise.
Human computer interaction, distributed algorithms, bug finding & debugging tools, networking protocols, Internet measurement, web performance optimization, data analysis.

Mentorship

Throughout my PhD I advised UC Berkeley undergraduates on research and software-development projects related to distributed systems. One of my previous students joined EPFL's PhD program, another joined Princeton's PhD program, another joined Box, and another joined VMware.

At Microsoft Research India I have mentored seven interns and research fellows on research and software-development projects related to technology for emerging markets (ICTD).

Teaching

Fall 2013 Teaching Assistant for Sylvia Ratnasamy, UC Berkeley Undergraduate Networking.

Fall 2012 Teaching Assistant for Scott Shenker, UC Berkeley Undergraduate Networking.

Service

Summer 2018 ICTD '18 Program Committee Member.

Spring 2018 ACM CompaSS '18 Program Committee Member.

Summer 2017	ICTD '17 Program Committee Member.
Spring 2014	Scribe for SIGCOMM '14 TPC Meeting.
2011-2015	Delegate reviewer for SIGCOMM, NSDI and OSDI.