

Stanford



Keith Winstein

Associate Professor of Computer Science and, by courtesy, of Electrical Engineering

 Curriculum Vitae available Online

Bio

BIO

Keith Winstein is an associate professor of computer science and, by courtesy, of electrical engineering at Stanford University. His research group creates new kinds of networked systems by rethinking abstractions around communication, compression, and computing. Some of his group's research has found broader use, including the Mosh tool, the Puffer video-streaming site, the Lepton compression tool, the Mahimahi network emulators, and the gg lambda-computing framework. He has received the SIGCOMM Rising Star Award, the Sloan Research Fellowship, the NSF CAREER Award, the Usenix NSDI Community Award (2020, 2017), the Usenix ATC Best Paper Award, the Applied Networking Research Prize, the SIGCOMM Doctoral Dissertation Award, and a Sprowls award for best doctoral thesis in computer science at MIT. Winstein previously served as a staff reporter at The Wall Street Journal and worked at Ksplice, a startup company (now part of Oracle) where he was the vice president of product management and business development and also cleaned the bathroom. He did his undergraduate and graduate work at MIT.

ACADEMIC APPOINTMENTS

- Associate Professor, Computer Science
- Associate Professor (By courtesy), Electrical Engineering

Teaching

COURSES

2022-23

- Citizenship in the 21st Century: COLLEGE 102 (Win)
- Introduction to Computer Networking: CS 144 (Spr)

2021-22

- Citizenship in the 21st Century: COLLEGE 102 (Win)
- Introduction to Computer Networking: CS 144 (Aut)

2020-21

- Introduction to Computer Networking: CS 144 (Aut)
- Main Stage Theater Project: TAPS 122M (Win)
- Project Lab: Video and Audio Technology for Live Theater in the Age of COVID: CS 349T, EE 192T (Aut)

2019-20

- Computers, Ethics, and Public Policy: CS 181 (Spr)
- Computers, Ethics, and Public Policy (WIM): CS 181W (Spr)

- Introduction to Computer Networking: CS 144 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Bruce Spang

Master's Program Advisor

Aman Bansal, Yash Govil, George Hosono, Leif Jurvetson, Pura Peetathawatchai, Ani Vegesana, Yan Wang, Chendi Wu

Doctoral (Program)

Yuhan Deng

Publications

PUBLICATIONS

- **R2E2: Low-Latency Path Tracing of Terabyte-Scale Scenes using Thousands of Cloud CPUs** *ACM TRANSACTIONS ON GRAPHICS*
Fouladi, S., Shacklett, B., Poms, F., Arora, A., Ozdemir, A., Raghavan, D., Hanrahan, P., Fatahalian, K., Winstein, K.
2022; 41 (4)
- **Towards Retina-Quality VR Video Streaming: 15 ms Could Save You 80% of Your Bandwidth** *ACM SIGCOMM COMPUTER COMMUNICATION REVIEW*
Hsiao, L., Krajancich, B., Levis, P., Wetzstein, G., Winstein, K.
2022; 52 (1): 11-19
- **NetKernel: Making Network Stack Part of the Virtualized Infrastructure** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Niu, Z., Su, Q., Cheng, P., Xiong, Y., Han, D., Winstein, K., Xue, C., Xu, H.
2021
- **Revisiting Acknowledgment Mechanism for Transport Control: Modeling, Analysis, and Implementation** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Li, T., Zheng, K., Xu, K., Jadhav, R., Xiong, T., Winstein, K., Tan, K.
2021; 29 (6): 2678-2692
- **Learning in situ: a randomized experiment in video streaming**
Yan, F. Y., Ayers, H., Zhu, C., Fouladi, S., Hong, J., Zhang, K., Levis, P., Winstein, K., USENIX Assoc
USENIX ASSOC.2020: 495-511
- **NetKernel: Making Network Stack Part of the Virtualized Infrastructure**
Niu, Z., Xu, H., Cheng, P., Su, Q., Xiong, Y., Wang, T., Han, D., Winstein, K., USENIX Assoc
USENIX ASSOC.2020: 143-157
- **TIME-OF-FLIGHT SOIL MOISTURE ESTIMATION USING RF BACKSCATTER TAGS**
Josephson, C., Barnhart, B., Winstein, K., Katti, S., Chandra, R., IEEE
IEEE.2020: 5049-5052
- **Demo Abstract: RF Soil Moisture Sensing via Radar Backscatter Tags**
Josephson, C., Barnhart, B., Katti, S., Winstein, K., Chandra, R., IEEE
IEEE.2020: 365-66
- **Cracking open the DNN black-box: Video Analytics with DNNs across the Camera-Cloud Boundary**
Emmons, J., Fouladi, S., Ananthanarayanan, G., Venkataraman, S., Savarese, S., Winstein, K., ACM
ASSOC COMPUTING MACHINERY.2019: 27-32
- **From Laptop to Lambda: Outsourcing Everyday Jobs to Thousands of Transient Functional Containers**
Fouladi, S., Romero, F., Iyer, D., Li, Q., Chatterjee, S., Kozyrakis, C., Zaharia, M., Winstein, K., USENIX Assoc
USENIX ASSOC.2019: 475-88
- **Multidecadal observations of the Antarctic ice sheet from restored analog radar records.** *Proceedings of the National Academy of Sciences of the United States of America*

Schroeder, D. M., Dowdeswell, J. A., Siegert, M. J., Bingham, R. G., Chu, W. n., MacKie, E. J., Siegfried, M. R., Vega, K. I., Emmons, J. R., Winstein, K. n.
2019

- **Salsify: Low-Latency Network Video Through Tighter Integration Between a Video Codec and a Transport Protocol**
Fouladi, S., Emmons, J., Orbay, E., Wu, C., Wahby, R. S., Winstein, K., USENIX Assoc
USENIX ASSOC.2018: 267–82
- **Pantheon: the training ground for Internet congestion-control research**
Yan, F. Y., Ma, J., Hill, G. D., Raghavan, D., Wahby, R. S., Levis, P., Winstein, K., USENIX Assoc
USENIX ASSOC.2018: 731-743
- **Encoding, Fast and Slow: Low-Latency Video Processing Using Thousands of Tiny Threads**
Fouladi, S., Wahby, R. S., Shacklett, B., Balasubramaniam, K., Zeng, W., Bhalerao, R., Sivaraman, A., Porter, G., Winstein, K., USENIX Assoc
USENIX ASSOC.2017: 363–76
- **The Design, Implementation, and Deployment of a System to Transparently Compress Hundreds of Petabytes of Image Files For a File-Storage Service**
Horn, D., Elkabany, K., Lesniewski-Laas, C., Winstein, K., USENIX Assoc
USENIX ASSOC.2017: 1–15
- **The Case For Secure Delegation**
Kogan, D., Stern, H., Tolbert, A., Mazieres, D., Winstein, K., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2017: 15–21
- **Network Stack as a Service in the Cloud**
Niu, Z., Xu, H., Han, D., Cheng, P., Xiong, Y., Chen, G., Winstein, K., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2017: 65–71
- **Congestion-Control Throwdown**
Schapira, M., Winstein, K., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2017: 122–28
- **Panel: Privacy Protection in Online Multimedia**
Lu, Y., Cavallaro, A., Crump, C., Friedland, G., Winstein, K., ACM
ASSOC COMPUTING MACHINERY.2017: 457-459
- **Trust but Verify: Auditing the Secure Internet of Things**
Wilson, J., Wahby, R. S., Corrigan-Gibbs, H., Boneh, D., Levis, P., Winstein, K., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2017: 464-474