

# Dr. Srinivas Narayana

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## EDUCATION

**Massachusetts Institute of Technology**, Postdoctoral research in Computer Science ..... Jul '18  
Supervised by Prof. Hari Balakrishnan and Prof. Mohammad Alizadeh

**Princeton University**, Ph.D. in Computer Science ..... May '16  
Thesis "Declarative network path queries" advised by Prof. Jennifer Rexford

**Princeton University**, M.A. in Computer Science ..... May '12  
GPA 3.97/4

**Indian Institute of Technology Madras**, B.Tech in Computer Science with Minor in Physics ..... May '10  
GPA 9.66/10. Thesis "Stability of rate control protocols" advised by Prof. Gaurav Raina

## WORK EXPERIENCE

**Rutgers University**, New Brunswick, NJ ..... Sep '18–at present  
Assistant Professor, Department of Computer Science

**Microsoft**, Redmond, WA ..... Jul–Sep '14  
Software engineering intern, Azure network security

**Google**, Mountain View, CA ..... Jun–Dec '12  
Software engineering intern, Wide-area networking

**Princeton University**, Princeton, NJ ..... '11–'12  
Teaching assistant for Operating systems (COS 318) and Advanced programming techniques (COS 333)

**IBM Research**, Bangalore, India ..... Jun–Aug '09  
Research intern, Next-generation telecommunications

## CONFERENCE PUBLICATIONS

- Qiongwen Xu, Michael Dean Wong, Tanvi Wagle, Srinivas Narayana, and Anirudh Sivaraman, "Synthesizing safe and efficient kernel extensions for packet processing," in ACM SIGCOMM, 2021.
- Xiangyu Gao, Taegyun Kim, Michael Dean Wong, Divya Raghunathan, Aatish Kishan Varma, Pravein Govindan Kannan, Anirudh Sivaraman, Srinivas Narayana, and Aarti Gupta, "Switch Code Generation using Program Synthesis," in ACM SIGCOMM, 2020.
- Akshay Narayan, Frank Cangialosi, Deepti Raghavan, Prateesh Goyal, Srinivas Narayana, Radhika Mittal, Mohammad Alizadeh, and Hari Balakrishnan, "Restructuring endpoint congestion control," in ACM SIGCOMM, 2018.
- Srinivas Narayana, Anirudh Sivaraman, Vikram Nathan, Prateesh Goyal, Venkat Arun, Mohammad Alizadeh, Vimalkumar Jeyakumar, and Changhoon Kim, "Language-directed hardware design for network performance monitoring," in ACM SIGCOMM, 2017. **Winner of the best paper award.**
- Vibhaalakshmi Sivaraman, Srinivas Narayana, Ori Rottenstreich, S. Muthukrishnan, and Jennifer Rexford, "Heavy-hitter detection entirely in the data plane," in ACM Symposium on SDN Research (SOSR), 2017.
- Srinivas Narayana, Mina Tashmasbi, Jennifer Rexford, and David Walker, "Compiling path queries," in Usenix Symposium on Networked Systems Design and Implementation (NSDI), 2016.
- Divjyot Sethi, Srinivas Narayana, and Sharad Malik, "Abstractions for model checking SDN controllers," in Formal methods in Computer-Aided Design (FMCAD), 2013.

## WORKSHOP PUBLICATIONS

- Xiangyu Gao, Taegyun Kim, Aatish Kishan Varma, Anirudh Sivaraman, Srinivas Narayana, “Autogenerating fast packet-processing code using program synthesis,” in ACM Hot Topics in Networks (HotNets), 2019.
- Akshay Narayan, Frank Cangialosi, Prateesh Goyal, Srinivas Narayana, Mohammad Alizadeh, and Hari Balakrishnan, “The case for moving congestion control out of the datapath,” in ACM Hot Topics in Networks (HotNets), 2017.
- Srinivas Narayana, Anirudh Sivaraman, Vikram Nathan, Mohammad Alizadeh, David Walker, Jennifer Rexford, Vimalkumar Jeyakumar, and Changhoon Kim, “Hardware-software co-design for network performance measurement,” in ACM Hot Topics in Networks (HotNets), 2016.
- Srinivas Narayana, Jennifer Rexford, and David Walker, “Compiling path queries in software-defined networks,” in ACM Hot Topics in Software-Defined Networks (HotSDN), 2014.
- Srinivas Narayana, Joe Wenjie Jiang, Jennifer Rexford, and Mung Chiang, “Joint server selection and routing for geo-replicated services,” in Workshop on Distributed Cloud Computing (DCC), 2013. **Invited paper.**

## ISSUED PATENT

- Anupam Joshi, Srinivas Narayana, and Aaditeshwar Seth, “Systems and methods for transactions on the spoken web,” US patent 8463705, granted in 2013.

## OTHER ARTICLES

- Akshay Narayan, Frank Cangialosi, Deepti Raghavan, Prateesh Goyal, Srinivas Narayana, Mohammad Alizadeh, and Hari Balakrishnan, “Restructuring endpoint congestion control,” in Linux Network Developers (netdev) conference 0x12, 2018.
- Prateesh Goyal, Akshay Narayan, Frank Cangialosi, Deepti Raghavan, Srinivas Narayana, Mohammad Alizadeh, and Hari Balakrishnan, “Elasticity detection: A building block for delay-sensitive congestion control,” Preprint 2018.
- Srinivas Narayana, “Declarative network path queries.” Ph.D. thesis, Princeton University, 2016.
- Srinivas Narayana, Joe Wenjie Jiang, Jennifer Rexford, and Mung Chiang, “To coordinate or not to coordinate? Wide-Area traffic management for data centers.” Technical report, Princeton University, 2012.

## DEMONSTRATIONS

- Vikram Nathan, Srinivas Narayana, Anirudh Sivaraman, Prateesh Goyal, Venkat Arun, Mohammad Alizadeh, Vimalkumar Jeyakumar, and Changhoon Kim, “Demonstration of the Marple System for Network Performance Monitoring,” at ACM SIGCOMM, 2017.
- Srinivas Narayana, Anirudh Sivaraman, Vikram Nathan, Mohammad Alizadeh, David Walker, Prateesh Goyal, Venkat Arun, Vimalkumar Jeyakumar, and Changhoon Kim, “Language-directed hardware design for network performance monitoring,” at P4 Workshop, 2017.
- Srinivas Narayana, “Tools for hands-on networking,” at IIT Madras, Feb 2010.

## RESEARCH WORKSHOPS

- US-Japan NSF workshop on programmable networking, Nov 2020
- NSF CSR/NeTS PI meeting, Oct 2019
- NSF workshop on programmable networks, Oct 2018
- NII Shonan workshop, Feb 2018

## ACCEPTED FUNDING PROPOSALS

- Synthesizing safe and efficient kernel extensions for packet processing (2021, Network Programming Initiative, \$25,000) as PI
- Formally Verified Sandboxing for Packet-Processing Programs (2020 NSF FMitF 2019302, \$749,356): Srinivas Narayana (PI) and Santosh Nagarakatte
- Facebook Networking and Systems Research Award (2019, unrestricted \$50,000 gift): Srinivas Narayana (PI) and Santosh Nagarakatte
- Democratizing network hardware offloads (2019 NSF CNS 1910796, \$387,990) as PI
- Rutgers University Next-Generation Edge Testbed (RU-NET) (2019 NSF CC\* 1925482, \$999,024): Barr Von Oehsen (PI), Srinivas Narayana, Rich Martin, Thu Nguyen, and Ivan Seskar

## RESEARCH PRESENTATIONS

- “Restructuring endpoint congestion control”, at IIT Madras, Chennai, India (Aug ’19).
- “Restructuring endpoint congestion control”, at Columbia University systems seminar, NYC (Nov ’18).
- “Monitoring with programmable data planes”, at NII Shonan workshop, held at Shonan village, Japan (Feb ’18).
- “Elasticity detection”, at DARPA PI summit, held at Los Angeles, CA (Feb ’18).

### **Turning the network into a streaming database for better monitoring** (job talk)

- Tufts University, Medford, MA, Feb ’18 (successful)
- Northeastern University, Boston, MA, Mar ’18 (successful)
- Rutgers University, New Brunswick, NJ, Mar ’18 (successful)
- Microsoft Research, Redmond, WA, Apr ’18 (successful)

### **Marple: Fine-grained performance monitoring**

- ACM SIGCOMM, at Los Angeles, CA, Aug ’17.
- Google, Mountain View, CA, May ’16.
- Cisco Networks (PI summit), May ’16.
- Barefoot Networks, May ’16.
- P4 workshop, at Stanford, CA, May ’16.
- Hot topics in networking (HotNets), at Atlanta, GA, Nov ’16.
- New England Networking and Systems summit, at Boston, MA, Oct ’16.

### **Path queries: Measuring traffic over network paths**

- Tufts university (CS department colloquium), Oct ’16.
- Microsoft Research graduate student summit on networks, mobility and systems, Feb ’16.
- Princeton University (Ph.D. thesis defense), May ’16.
- Usenix Symposium on Networked Systems Design and Implementation (NSDI), at Santa Clara, CA, Apr ’16.
- Indian Institute of Technology, Madras (CS department colloquium), Jan ’16.
- Indian Institute of Technology, Bombay, Dec ’15.
- Indian Institute of Science, Bengaluru, Dec ’15.
- Microsoft Research India, Bengaluru, Dec ’15.
- University of Delaware (SIGNET department seminar series), Dec ’15.
- AT&T Research, Sep ’15.
- Hot topics in Software-Defined Networks (HotSDN), at Chicago, IL, Aug ’14.

### **Measuring the impact of network reconfiguration**

- Google, Mountain View, CA, Sep ’12.
- Princeton University (EDGE lab meeting), Feb ’13.

### **Wide-area traffic engineering for large online service providers**

- Workshop on Distributed Cloud Computing (DCC), at Dresden, Germany, Dec ’13.
- Technische Universität (TU) Berlin, Germany, Dec ’13.
- Princeton University (general examination seminar), Jan ’12.

## PH.D. STUDENTS ADVISED

- Qiongwen Xu (Rutgers University, ’19–)
- Bala Murali Komanduri (Rutgers University, ’18–)
- Bhavana Shobhana (Rutgers University, ’21–)
- Harishankar Vishwanathan (Rutgers University, ’21–)

## STUDENT MENTORING

- Tanvi Wagle (undergraduate at Rutgers), ’20–
- Songyuan Zhang (undergraduate at Rutgers), ’20–
- Michael Dean Wong, ’20– (now graduate student at Princeton)
- Sukumar Gaonkar (M.S. student at Rutgers, now at Bloomberg), ’19–’20
- Frank Cangialosi (graduate student at MIT), ’16–
- Akshay Narayan (graduate student at MIT), ’16–’18
- Prateesh Goyal (graduate student at MIT), ’16–’18
- Michael Chang (undergraduate at Princeton, now a graduate student at UC Berkeley), ’15–’16
- Vibhaa Sivaraman (undergraduate at Princeton, now a graduate student at MIT), ’15–’16
- Mina Tashmasbi (graduate student at Princeton, now postdoc at Cornell), ’14–’16

- Anshuman Mohan (undergraduate at Yale/National University of Singapore), '15

## RECOGNITION AND HONORS

- Winner of Facebook Networking and Systems Research Award '19
- Invited to Japan's NII Shonan meeting on theory and practice of data plane programming '18
- Best paper award, ACM SIGCOMM '17
- Honorable mention, Microsoft Research graduate student summit on networks, mobility, and systems '16
- Runner-up, Open Networking Users Group (ONUG) hackathon '14
- Usenix NSDI student travel grant, '14
- Usenix NSDI student travel grant, '12
- Usenix NSDI student travel grant, '11
- Princeton Graduate Fellowship '10-'11
- Undergraduate attendee of Microsoft Research India's summer school on networking '09
- Winner, Shaastra math modeling contest '09
- 7th place (of  $\approx 50$ ), Regional ACM International Collegiate Programming Contest (ICPC), Kanpur '08
- Finalist, Google India Product Prodigy Contest '08
- Winner, Shaastra C Code Obfuscation Contest '08
- Winner, Shaastra math modeling contest '08
- 20th place (of  $\approx 50$ ), Regional ACM International Collegiate Programming Contest (ICPC), Amritapuri '07
- Winner, Shaastra C Code Obfuscation Contest '07
- Merit-cum-means scholarship (top 25% of admitted students), IIT Madras, '06-'07
- Merit certificates in Math, Physics, and Chemistry, India's Central Board of Secondary Education (CBSE), '06

## PROFESSIONAL SERVICE

- Editorial Board, Journal of Systems Research (JSys), 2021-22
- Technical Program Committee, Symposium on Cloud Computing, ACM SoCC'21
- Technical Program Committee, ACM HotNets'21
- Expert roundtable series, P4 and Programmable Forwarding Summit '20
- Technical Program Committee, P4 and Programmable Forwarding Summit '20
- Reviewer, ACM/IEEE Transactions on Networking (ToN) '20
- Reviewer, Journal of Parallel and Distributed Computing (JPDC) '19
- Reviewer, IEEE Transactions on Network Science and Engineering '19
- Reviewer, ACM/IEEE Transactions on Networking (ToN) '19
- Technical Program Committee, ACM CoNext student workshop '19
- Technical Program Committee, New England Networking and Systems (NENS) day, '19
- Technical Program Committee, IEEE Sarnoff Symposium '19
- Organizing Committee (web and publicity chair), ACM SIGCOMM '20
- Technical Program Committee (Light), ACM SIGCOMM '19
- Reviewer, ACM/IEEE Transactions on Networking (ToN) '18
- Reviewer, IEEE Transactions on Parallel and Distributed Systems (TPDS) '18
- Technical Program Committee, ACM CoNext '18
- Technical Program Committee, ACM CoNext student workshop '18
- Technical Program Committee, ACM SIGCOMM '18 posters and demos
- Technical Program Committee, Workshop on Self-Driving Networks, ACM SIGCOMM '18
- Technical Program Committee, IEEE International Conference on High Performance Switching and Routing (HPSR) '18
- Technical Program Committee, ACM Symposium on SDN Research (SOSR) '18
- Reviewer, ACM/IEEE Transactions on Networking (ToN) '17
- Technical Program Committee, ACM CoNext student workshop '17
- Technical Program Committee, ACM CoNext student workshop '16
- Reviewer, ACM/IEEE Transactions on Networking (ToN) '16
- Reviewer, IEEE INFOCOM '16
- Reviewer, Formal Methods in Computer-Aided Design (FMCAD) '16
- Reviewer, IEEE Transactions on Dependable and Secure Computing (TDSC) '16
- Reviewer, IEEE Transactions on Network and Service Management (TNSM) '16
- Reviewer, IEEE Transactions on Parallel and Distributed Systems (TPDS) '16
- Reviewer, ACM Symposium on SDN research (SOSR) '15
- Reviewer, Formal Methods in Computer-Aided Design (FMCAD) '15

## PROFESSIONAL DEVELOPMENT

- Graduate of Barefoot Academy (hands-on programming of Barefoot Networks switches), '17
- Kaufman teaching certificate program (KTCP), MIT, '17
- Postdoc leadership workshop, MIT, '16
- New York Academy of Sciences “Speaking Science” workshop, New York city, '16
- Head of Web Operations, shaastra.org, '09

## OUTREACH ACTIVITIES

- Research Experiences for Undergraduates at the Louis Stokes Alliance for Minority Participation (LSAMP), '20-'21
- Research Experiences for Undergraduates at Rutgers/DIMACS, '20, '21
- New York Academy of Sciences (NYAS) STEM Mentor '19
- Organizer of networking research reading group at IIT Madras, Chennai, India, '17
- Teaching volunteer for Boston STEM week, '16
- Internship coordinator for Computer Science at IIT Madras, '08-'09
- Organizer of the Shaastra Online Programming Contest, '08
- Volunteer for the National Service Scheme (NSS), India, '06-'07

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