

# **HYOJOON (JOON) KIM**

Department of Computer Science  
Princeton University

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## **RESEARCH INTEREST**

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My research focuses on making computer networks easier to monitor, understand, troubleshoot, and configure. I enjoy designing fast and accurate mechanisms that analyze real-world traffic and extract useful information for network practitioners. I am passionate about designing and implementing better tools and systems for next-generation applications and networks.

## **EDUCATION**

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**Georgia Institute of Technology, Atlanta, GA** **Aug. 2015**

Ph.D., Computer Science

Thesis: *Facilitating Dynamic Network Control with Software-Defined Networking*

Advisor: Dr. Nick Feamster

**Georgia Institute of Technology, Atlanta, GA** **May 2010**

M.S., Computer Science

Master Project: *Resonance: Dynamic Access Control for Enterprise Networks*

Advisor: Dr. Nick Feamster

**University of Wisconsin-Madison, Madison, WI** **Aug. 2005**

B.S., Computer Science

## **WORK EXPERIENCE**

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**Princeton University, Princeton, NJ** **Jun. 2015 – Present**

*Associate Research Scholar*, Department of Computer Science

Apr. 2020 – Present

- Research projects on measurement, security, and programmable networks [1, 2, 3, 4, 5, 6, 12, 13, 14, 15, 16]

*Cyber Infrastructure Engineer*, Princeton Institute for Computational Science and Engineering Jun. 2015 – Present

- Key member of the campus-wide network modernization project at Princeton
- Design and deployment of software-defined networking applications on the campus network

**Hewlett-Packard Research Labs, Palo Alto, CA** **Aug. 2014 – Jan. 2015 (part-time)**

*Research Intern*, Networking and Mobility Group

**Jan. 2014 – May 2014, May 2012 – Aug. 2012**

- Design and implementation of a fast failover system in software-defined networks [18]

**Future Systems, Inc., Seoul, South Korea** **Sep. 2005 – Apr. 2008**

*Research Engineer*, Research & Development Division

- Development and maintenance of company's Intrusion Prevention System (IPS)
- Research and development of High-Availability function with VRRP protocol

# RESEARCH PROPOSALS AND GRANTS

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## Tools for Programming Distributed Data-plane Measurements

- [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=2223515](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2223515)
- Sponsor: National Science Foundation
- Principal Investigator(s): David Walker (PI), **Hyojoon Kim (Co-PI)**, Jennifer Rexford (Co-PI)
- Total Award Amount: \$600,000
- Start and End Date: September 1, 2022 – August 31, 2024

## PUBLICATIONS

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Google Scholar link:

<https://scholar.google.com/citations?user=DUEglv4AAAAJ&hl=en>

## Conferences and Journals

- [1] Sherry Bai, **Hyojoon Kim**, and Jennifer Rexford. “Passive OS Fingerprinting on Commodity Switches”. In: *IEEE International Conference on Network Softwarization (NetSoft)*. 2022.
- [2] Oliver Michel, Satadal Sengupta, **Hyojoon Kim**, Ravi Netravali, and Jennifer Rexford. “Enabling Passive Measurement of Zoom Performance in Production Networks”. In: *ACM Internet Measurement Conference (IMC)*. 2022.
- [3] Satadal Sengupta, **Hyojoon Kim**, and Jennifer Rexford. “Continuous In-network Round-trip Time Monitoring”. In: *ACM SIGCOMM*. 2022.
- [4] Francesco Bronzino, Paul Schmitt, Sara Ayoubi, **Hyojoon Kim**, Renata Teixeira, and Nick Feamster. “Traffic Refinery: Cost-Aware Data Representation for Machine Learning on Network Traffic”. In: *ACM SIGMETRICS*. 2021.
- [5] **Hyojoon Kim**, Xiaoqi Chen, Jack Brassil, and Jennifer Rexford. “Experience-Driven Research on Programmable Networks”. In: *ACM SIGCOMM Computer Communication Review (CCR)*. 2021.
- [6] Jason Kim, **Hyojoon Kim**, and Jennifer Rexford. “Analyzing Traffic by Domain Name in the Data Plane”. In: *ACM Symposium on SDN Research (SOSR)*. 2021.
- [7] Marshini Chetty, **Hyojoon Kim**, Srikanth Sundaresan, Sam Burnett, Nick Feamster, and W Keith Edwards. “uCap: An Internet Data Management Tool For The Home”. In: *ACM CHI*. 2015.
- [8] **Hyojoon Kim**, Joshua Reich, Arpit Gupta, Muhammad Shahbaz, Nick Feamster, and Russ Clark. “Kinetic: Verifiable Dynamic Network Control”. In: *USENIX NSDI*. 2015.
- [9] Sarthak Grover, Mi Seon Park, Srikanth Sundaresan, Sam Burnett, **Hyojoon Kim**, Bharath Ravi, and Nick Feamster. “Peeking Behind the NAT: An Empirical Study of Home Networks”. In: *ACM Internet Measurement Conference (IMC)*. 2013.
- [10] **Hyojoon Kim** and Nick Feamster. “Improving Network Management with Software Defined Networking”. In: *IEEE Communications Magazine*. 2013.
- [11] **Hyojoon Kim**, Theophilus Benson, Aditya Akella, and Nick Feamster. “The Evolution of Network Configuration: A Tale of Two Campuses”. In: *ACM Internet Measurement Conference (IMC)*. 2011.

## Workshops

- [12] Satadal Sengupta, **Hyojoon Kim**, and Jennifer Rexford. “Fine-Grained RTT Monitoring Inside the Network”. In: *IETF Internet Architecture Board Workshop: Measuring Network Quality for End-Users*. 2021.
- [13] Liang Wang, **Hyojoon Kim**, Prateek Mittal, and Jennifer Rexford. “Programmable in-network obfuscation of DNS traffic”. In: *NDSS: DNS Privacy Workshop*. 2021.

- [14] Xiaoqi Chen, **Hyojoon Kim**, Javed M Aman, Willie Chang, Mack Lee, and Jennifer Rexford. “Measuring TCP Round-Trip Time in the Data Plane”. In: *ACM SIGCOMM Workshop on Secure Programmable Network Infrastructure (SPIN)*. 2020.
- [15] Xiaoqi Chen and **Hyojoon Kim**. “Measuring Queues in Campus Network via Link Tapping”. In: *Stanford University Workshop on Buffer Sizing*. 2019.
- [16] **Hyojoon Kim** and Arpit Gupta. “ONTAS: Flexible and Scalable Online Network Traffic Anonymization System”. In: *ACM SIGCOMM Workshop on Network Meets AI & ML (NetAI)*. 2019.
- [17] Andreas Voellmy, **Hyojoon Kim**, and Nick Feamster. “Procera: A Language for High-Level Reactive Network Control”. In: *ACM Hot Topics in Software Defined Networks (HotSDN)*. 2012.

## Posters & Demos

- [18] **Hyojoon Kim**, Mike Schlansker, Jose Renato Santos, Jean Tourrilhes, Yoshio Turner, and Nick Feamster. “CORO-NET: Fault tolerance for Software Defined Networks”. In: *IEEE International Conference on Network Protocols (ICNP)*. 2012.
- [19] Theophilus Benson, **Hyojoon Kim**, Aditya Akella, and Nick Feamster. “Network Configuration Analysis”. In: *USENIX NSDI*. 2011.
- [20] **Hyojoon Kim**, Srikanth Sundaresan, Marshini Chetty, Nick Feamster, and W Keith Edwards. “Communicating with Caps: Managing Usage Caps in Home Networks”. In: *ACM SIGCOMM*. 2011.
- [21] **Hyojoon Kim**, Ankur Nayak, Samantha Lo, Tim Upthegrove, Nick Feamster, and Russ Clark. “OpenFlow Campus Trials: Resonance”. In: *The 7th GENI Engineering Conference (GEC7)*. 2010.

## Miscellaneous

- [22] Yong-Beom Park, **Hyojoon Kim**, Han-Jun Lee, Suk-Ho Baek, Il-Youp Kwak, and Seong Hwan Kim. “The Clinical Application of Machine Learning Models for Risk Analysis of Ramp Lesions in Anterior Cruciate Ligament Injuries”. In: *The American Journal of Sports Medicine*. 2022.
- [23] Chul-Won Ha, Seong Hwan Kim, Dong-Hoon Lee, **Hyojoon Kim**, and Yong-Beom Park. “Predictive Validity of Radiographic Signs of Complete Discoid Lateral Meniscus in Children using Machine Learning Techniques”. In: *Journal of Orthopaedic Research®*. 2020.

## TEACHING AND MENTORING EXPERIENCE

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### Teaching

- **Instructor: Data Storage & Transfer: Basics and Best Practices**  
Research Computing mini course (2 hours), Princeton University  
Mar. 2017, Oct. 2017, Feb. 2018, Jan. 2020, Oct. 2020, Nov. 2021, Jan. 2022
- **Teaching Assistant: Software Defined Networking (by Professor Nick Feamster)**  
Massive Open Online Courses (MOOC). Coursera. 2014

### Student Mentoring/Advising

- Undergrad research and thesis (Princeton): Sherry Bai (2019), Jason Kim (2020-2021), Daniel Jubas (2020-2021)  
- Led to two conference publications [1, 6]
- Ph.D. students (Princeton): Satadal Sengupta (2019 - present), Mengying Pan (2020 - present)  
- Led to two conference publications [2, 3]

## INVITED TALKS

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### Detecting Nation-State Routing Attacks with Network Telemetry

- Research Experience for Undergraduates (REU) Seminar. Intel/Princeton University. July 2022

### Keynote Speech: Programmability in My Toolbox

- IEEE INFOCOM Computer and Networking Experimental Research using Testbeds (CNERT) Workshop. May 2022

### Princeton P4 Campus

- The Programmable Switches Workshop. University of South Carolina. February 2022
- The Network Programming Initiative. May 2020.
- The Cyber Infrastructure Engineering Lunch & Learn Series. Energy Sciences Network (ESnet). February 2020

### Software-Defined Border Router on Campus

- The Cyber Infrastructure Engineering Lunch & Learn Series. Host: Energy Sciences Network (ESnet). February 2020
- The 27th Korean American Scientists and Engineers Association Northeast Regional Conference. March 2018
- Internet2 Technology Exchange. October 2017

### Kinetic: Verifiable Dynamic Network Control

- USENIX Networked Systems Design and Implementation (NSDI). May 2015
- North American Network Operators' Group (NANOG) 62. October 2014

### The Evolution of Network Configuration: A Tale of Two Campuses

- ACM Internet Measurement Conference (IMC), November 2011
- Internet2 Fall Member Meeting. November 2010

## PROFESSIONAL SERVICES

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### Program Committee

- Euro P4, 2022
- ACM Symposium on SDN Research (SOSR), 2021, 2022
- ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS), 2021

### External Reviewer and Journal Review

- IEEE INFOCOM, IEEE/ACM Transactions on Networking (TON), ACM SIGCOMM Computer Communication Review (CCR), ACM Computing Surveys, IEEE Communications Magazine, IEEE Communications Letters

### Organizing and Leadership Roles

- **Organizer**, Open Networking Foundation NG-SDN Tutorial Workshop at Princeton, 2019
- **President**, Georgia Tech Computer Science Korean Student Association, 2011–2012

## REFERENCES

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**Dr. Nick Feamster**

*Neubauer Professor  
Department of Computer Science  
University of Chicago*  
feamster@uchicago.edu

**Dr. Jennifer Rexford**

*Gordon Y. S. Wu Professor & Chair  
Department of Computer Science  
Princeton University*  
jrex@cs.princeton.edu

**Dr. Nate Foster**

*Professor  
Department of Computer Science  
Cornell University*  
jnfoster@cs.cornell.edu

**Dr. Sujata Banerjee**

*Vice President of Research  
VMware Research  
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**Dr. Prateek Mittal**

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