

Sophia Yoo

Department of Computer Science
35 Olden Street, Princeton, NJ 08540
sophiayoo@princeton.edu
<https://cs.princeton.edu/~sy6/>

Education

- Princeton University**, Ph.D. in Electrical and Computer Engineering September 2020 - Current
Advisors: Prof. Jennifer Rexford (COS) and Prof. Maria Apostolaki (ECE)
- Princeton University**, Master of Arts in Engineering May 2022
- Temple University**, Bachelor of Science in Electrical Engineering May 2020
Computer Engineering Concentration, Minors in Computer Science and Music
summa cum laude (4.0 GPA)

Research Interests

Programmable Data Planes, Software-Defined Networking, Hardware-Software Co-Design, Network Security

Selected Publications

SmartCookie: Blocking Large-Scale SYN Floods with a Split-Proxy Defense on Programmable Data Planes

Sophia Yoo, Xiaoqi Chen, Jen Rexford. *USENIX Security*, August 2024.

Sieve: Layered Network Defenses against Large-Scale Attacks

Sophia Yoo, Satadal Sengupta, Maria Apostolaki, Jen Rexford. *ONF P4 Workshop*, April 2023.

Distributed In-Network SYN Flooding Mitigation

Sophia Yoo, Xiaoqi Chen, Jen Rexford. *Princeton Research Day Poster*, April 2022.

Secure Keyed Hashing on Programmable Switches

Sophia Yoo, Xiaoqi Chen. *ACM SIGCOMM Workshop on Secure Programmable Network Infrastructure*, August 2021.

Relevant Professional Experience

Microsoft Research, AFO - Graduate Research Intern (Advisor: Daehyeok Kim) 5.2022 - 5.2023

- Explore vulnerabilities and new attack vectors in emerging next-generation 5G cellular infrastructure
- Discover novel denial-of-service attacks to user devices over the O-RAN fronthaul interface
- Design new countermeasures and leverage programmable data planes to defend against newly discovered attacks

NASA Jet Propulsion Laboratory - Graduate Software Computing Systems Intern 5.2020 - 8.2020

- Programmed in C the gimbal drive electronics unit emulator for the Multi-Angle Imager for Aerosols (MAIA) mission
- Modified command and telemetry dictionaries for MAIA instrument electronics flight software to coordinate with AMMOS Instrument Toolkit (AIT), tested uplink/downlink command and telemetry processing
- Performed black-box system testing with AIT from an east-coast Linux platform to a west-coast flight electronics box

Temple University Engineering Department - Undergraduate Research Assistant 8.2019 - 12.2019

- Conducted independent research on embedded systems under Dr. Dennis Silage of Temple's ECE department
- Executed analysis of PYNQ Linux operating system on Xilinx PYNQ-Z1 board

Honeywell System Sensors - Firmware Engineer Intern 5.2019 - 8.2019

- Modified electric circuit design of fire alarm strobe to use existing integrated microcontroller comparator, removed external comparator component, and reduced production cost of boards by over \$250,000 yearly
- Programmed firmware in C and Assembly for compatibility with product specs in newly designed embedded system
- Created design flowcharts, constructed system test plan, debugged firmware, tested product performance

Relevant Teaching Experience

- Princeton University, Information Security - Assistant Instructor** 1.2022 - 5.2022
- Weekly office hours and precept instruction throughout the semester
 - Logistical management of hands-on security assignments and grading for 300 students per semester
- Temple University, Principles of Electric Circuits - Diamond Peer Teacher** 1.2020 - 5.2020
- Independently planned, designed, & led weekly recitations/assessments for 2 sections of Principles of Electric Circuits
 - Engaged and instructed students in group settings and individually with weekly office hours
- Temple University, Intro to Engineering - Undergraduate Teaching Assistant** 1.2018 - 5.2019
- Organized and restructured curriculum; reduced grade disputes by 80%
 - Designed quizzes for testing and improving understanding of 300 students per semester
- Temple University Student Success Center - STEM Tutor** 10.2017 - 10.2019
- Tutored peers in Physics, Chemistry, Math, Computer Science, and Engineering courses
 - Developed students' problem solving skills, devised learning strategies, documented individualized progress reports

Notable Awards & Academic Honors

- Graduate Research Fellowships Program Award (DGE-2039656), National Science Foundation 2022 - 2025
- Graduate Student Award for Excellence in Service, Princeton University ECE Department 2023
- Pramod Subramanian *17 Early Career Graduate Award, Princeton University 2022
- Princeton Research Day Innovation & Entrepreneurial Mindset Award, Princeton University 2022
- Top Honors Recognition, Temple University, ECE Department 2020
- Iota Sigma Chapter of Eta Kappa Nu, International IEEE Honor Society 2020
- Diamond Award, Highest Academic Recognition, Temple University 2020
- PECO Scholars Program Award, Philadelphia 2019 - 2020
- Korean American Scholarship Foundation Award, Eastern Regional Chapter 2019 - 2020
- President's Scholar Full Scholarship Award, Temple University 2016 - 2020

Leadership & Volunteer Engagement

- Princeton ECE Graduate Social Committee Co-Founder and Member, Princeton University** 2022 - present
- Propose and establish the inaugural ECE Social Committee on behalf of all ECE grad students & postdocs
 - Run weekly social hangouts and larger events to grow department-wide community, diversity, & inclusion
- Princeton Lakeside Graduate Housing External Relations Delegate, Princeton University** 2022 - present
- Advocate on behalf of ~700 graduate students & families in the Lakeside community to the university
 - Act as a liaison between students and the Graduate School, Facilities, Housing, Transpo, Public Safety, etc.
- Princeton/Intel Research Experience for Undergraduates, Princeton University** 2022
- Mentor undergraduate students in network security research, programmable switch DDoS defenses
- Princeton Pre-Application Support Program, Princeton University** 2021 - present
- Mentor Ph.D. applicants from underrepresented backgrounds, guide their application process
- Institute of Electrical & Electronics Engineers** 2018 - present
- Active member, support organization members for continual professional development
- Joy Music Studio, Music Instructor and Associate Director** 2011 - present
- Train children and adults with tailored lesson plans for each student in violin, piano, harp, and music theory
- Joyful Sound of Music, Musician and Program Coordinator** 2008 - present
- Share music (violin, piano, harp, voice) at local elderly communities, weddings, funerals, parties, banquets
- Society of Women Engineers, Temple University Chapter** 2017 - 2020
- Engage in community and youth outreach, serve on planning committee, attend national SWE conference