Sophia Yoo

Department of Computer Science
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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

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

Languages

English (Fluent, Native)
Korean (Proficient)

Publications

SmartCookie: Blocking Large-Scale SYN Floods with a Split-Proxy Defense on Programmable Data Planes
<u>Sophia Yoo</u>, Xiaoqi Chen, Jennifer Rexford. *USENIX Security,* August 2024.

On the Criticality of Integrity Protection in 5G Fronthaul Networks
<u>Sophia Yoo*</u>, Jiarong Xing*, Xenofon Foukas, Daehyeok Kim, Michael K. Reiter. USENIX Security, August 2024.

Tango: Secure Collaborative Route Control across the Public Internet
Henry Birge-Lee, <u>Sophia Yoo</u>, Benjamin Herber, Jennifer Rexford, Maria Apostolaki. *NSDI,* April 2024.

Sieve: Layered Network Defenses against Large-Scale Attacks
<u>Sophia Yoo</u>, Satadal Sengupta, Maria Apostolaki, Jennifer Rexford. *ONF P4 Workshop,* April 2023.

Distributed In-Network SYN Flooding Mitigation
<u>Sophia Yoo</u>, Xiaoqi Chen, Jennifer Rexford. *Princeton Research Day Poster*, April 2022.

Secure Keyed Hashing on Programmable Switches
<u>Sophia Yoo</u>, 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

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 - 2026
Applied Networking Research Prize (ANRP) for *Tango [NSDI'2024]*, Internet Research Task Force	2025
Wallace Memorial Fellowship, Highest Graduate Award in Engineering Research, Princeton University	2025
Graduate Student Award for Excellence in Service, Princeton University, ECE Department	2023, 2024
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
Diamond Award, Highest Undergraduate Academic Recognition, Temple University	2020
Iota Sigma Chapter of Eta Kappa Nu, International IEEE Honor Society	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 - 2024**
- 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 - 2024**
- 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 - 2023**
- 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 Executive Board Advisor   **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