

XUENING XU

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EDUCATION

Stevens Institute of Technology <i>Ph.D. in Computer Engineering</i>	Jan 2022 - Expected Dec 2024
Temple University (Continued at Stevens Institute of Technology) <i>Ph.D. Program in Computer and Information Sciences</i>	Sep 2019 - Dec 2021
Temple University (Dual Bachelor's Master's Degree program) <i>M.S. in Computer Science</i>	Sep 2017 - May 2019
University of Science and Technology of China <i>B.S. in Mathematics and Applied Mathematics</i>	Sep 2014 - Jun 2018

SKILLS

- **Programming Languages:** Python, Java, JavaScript/Node.js, C/C++, HTML/CSS, Lua, SQL, Swift
- **Frameworks:** Flask, Express.js, PyTorch, Scikit-learn, OAuth 2.0, SmartThings SDKs, nRF5 SDK, Z-Stack, Alexa Skills Kit
- **Tools & Services:** Docker, Wireshark, tcpdump, Linux CLI Tools, Postman, Git, Firebase, AWS Lambda, Amazon EC2

SELECTED RESEARCH PROJECTS

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|---|---------------------|
| Discovering and Exploiting Vulnerability on Zigbee Devices | Nov 2022 - Feb 2023 |
| <ul style="list-style-type: none">• Revealed a vulnerability - <i>Zigbee Hidden Attributes</i> on commodity Zigbee devices and implemented an end-to-end attack by developing a customized Zigbee device in C on an nRF52840 DK using nRF5 SDK to exploit the vulnerability.• Disclosed this vulnerability to device manufacturers and received acknowledgements from Samsung, Amazon, and Connectivity Standards Alliance (CSA). Amazon awarded a \$2,500 bounty for the valuable findings.• The paper <i>The Hidden Gems or Hidden Germs? Demystifying and Exploiting Zigbee Hidden Attributes</i> has been submitted to a top conference on security and privacy. | |
| Defensive System against the Delay Attacks in Smart Homes | Jan 2022 - Jun 2022 |
| <ul style="list-style-type: none">• Built an one-stop-for-all system on Ubuntu to add support for various types of IoT devices to two IoT cloud platforms (i.e., IFTTT and Samsung SmartThings) using JavaScript with OAuth 2.0. A database was implemented using SQLite.• Proposed a timeout-based approach to detect the delay attacks and creatively used OpenVPN to handle them.• The paper <i>MP-Mediator: Detecting and Handling the Stealthy IoT Event and Command Delay Attacks</i> has been published in RAID 2023. | |
| Detection of Malicious Local Attacks on IoT Devices | Apr 2021 - Dec 2021 |
| <ul style="list-style-type: none">• Built an OpenWrt Wi-Fi router on a Raspberry Pi and adopted tcpdump to remotely capture network traffic. Used Python scripts to analyze network layer information to detect malicious local attacks based on communication patterns.• Simulated malicious attacks by developing an iOS app to send malicious commands to the victim IoT devices.• The paper <i>IoTTracer: Detecting Malicious Local Attacks on IoT Devices by Utilizing IoT System-level Traffic Patterns</i> has been submitted to a top conference on security and privacy. | |
| End-to-End Smart Speaker Protection System | Sep 2020 - Mar 2021 |
| <ul style="list-style-type: none">• Developed an Android app with Firebase Cloud Messaging integrated to measure the proximity of the user to the smart speaker without manual operation every time the smart speaker is invoked.• Built an end-to-end protection system in Python to detect and block unauthorized voice commands using traffic analysis.• The paper <i>VoiceGuard: An Effective and Practical Approach for Detecting and Blocking Unauthorized Voice Commands to Smart Speakers</i> has been published in DSN 2023. | |

PUBLICATIONS

- **Xuening Xu**, Chenglong Fu, and Xiaojiang Du. "MP-Mediator: Detecting and Handling the New Stealthy Delay Attacks on IoT Events and Commands." In 26th International Symposium on Research in Attacks, Intrusions and Defenses (RAID), pp. 46-62. ACM, 2023. (Acceptance rate: 23.5%)
- **Xuening Xu**, Chenglong Fu, Xiaojiang Du, and E. Paul Ratazzi. "VoiceGuard: An Effective and Practical Approach for Detecting and Blocking Unauthorized Voice Commands to Smart Speakers." In 53rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), pp. 582-596. IEEE, 2023. (Acceptance rate: 20%)
- **Xuening Xu**, Xiaojiang Du, and Qiang Zeng. "Attacking Graph-Based Classification without Changing Existing Connections." In Annual Computer Security Applications Conference (ACSAC), pp. 951-962. 2020. (Acceptance rate: 23%)
- **Xuening Xu**, Chenglong Fu, Xiaojiang Du, and E. Paul Ratazzi. "Effective UAV and Ground Sensor Authentication." In 2019 IEEE Global Communications Conference (GLOBECOM), pp. 1-6. IEEE, 2019.