

Xi Tan

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EDUCATION

- Ph.D.*, Computer Science and Engineering University at Buffalo, Buffalo, NY, USA
• Advisor: Zimng Zhao August 2020 - June 2024
- Ph.D Student*, Computer and Information Sciences Rochester Institute of Technology, NY, USA
• Advisor: Ziming Zhao August 2019 - August 2020
- M.S.*, Computer Technology Institute of Information Engineering, CAS, Beijing, China
• Advisor: Bibo Tu August 2016 - June 2019
- B.S.*, Computer Science and Technology Jilin University, Changchun, China June 2016

PROFESSIONAL EXPERIENCE

- Assistant Professor*, University of Colorado Colorado Springs August 2024 – Present
• Research interests: Systems and Software Security
- Graduate Research Assistant*, Cacti Lab, University at Buffalo August 2020 – Present
• Systematically analyzing the security of Arm Cortex-M-based embedded systems; enhancing memory safety on embedded systems; discovering new attack surfaces on Cortex-M architecture.
- Course Instructor*, Department of Computer Science and Engineering, University at Buffalo Fall 2023
• Taught CSE 565 Computer Security, a core graduate course with an enrollment of 58 students.
- Graduate Research Assistant*, Cacti Lab, Rochester Institute of Technology August 2019 – August 2020
• Built background on Arm Cortex-M architecture and compartmentalization approaches.
- Graduate Research Assistant*, Institute of Information Engineering 2016 – 2019
• Virtual machine introspection based malware detection.

PUBLICATIONS

- Xi Tan**, Zheyuan Ma, Sandro Pinto, Le Guan, Ning Zhang, Jun Xu, Zhiqiang Lin, Hongxin Hu, Ziming Zhao. “Where’s the” up”?! A Comprehensive (bottom-up) Study on the Security of Arm Cortex-M Systems”. *USENIX WOOT Conference on Offensive Technologies*, 2024. [[code link](#)]
- Ziming Zhao, Md Armanuzzaman, **Xi Tan**, and Zheyuan Ma. “Trusted Execution Environments in Embedded and IoT Systems: A CactiLab Perspective”. *IEEE International Symposium on Secure and Private Execution Environment Design (SEED)*, 2024.
- Yujie Wang, Cailani Lemieux Mack, **Xi Tan**, Ning Zhang, Ziming Zhao, Sanjoy Baruah, and Bryan C. Ward. “InsectACIDE: Debugger-Based Holistic Asynchronous CFI for Embedded System”. *EEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, 2024.
- Xi Tan**, Sagar Mohan, Md Armanuzzaman, Zheyuan Ma, Gaoxiang Liu, Alex Eastman, Hongxin Hu, and Ziming Zhao. “Is the Canary Dead? On the Effectiveness of Stack Canaries on Microcontroller-based Systems”. *ACM/SIGAPP Symposium On Applied Computing (SAC)* 2024.
- Xi Tan** and Ziming Zhao. “SHERLOC: Secure and Holistic Control-Flow Violation Detection on Embedded Systems”. *ACM Conference on Computer and Communications Security (CCS)* 2023.

Acceptance rate: $234/1222 = 19.16\%$. [[code link](#)]

6. Zheyuan Ma, **Xi Tan**, Lukasz Ziarek, Ning Zhang, Hongxin Hu, and Ziming Zhao. “Return-to-Non-Secure Vulnerabilities on ARM Cortex-M TrustZone: Attack and Defense”. *ACM/IEEE Design Automation Conference (DAC) 2023*. Acceptance rate: $263/1156 = 22.7\%$. [[code link](#)]
7. Wenlin Yang, **Xi Tan**, Junchen Guo, Shuo Wang. “The Vulnerability Analysis and Security Enhancement of Docker”. *Information Security and Technology 4*, 2016.

PATENT

1. Bibo Tu, **Xi Tan**, Kun Zhang. “Methods and System for Detecting Malware Behavior of Virtual Machine”. *Beijing: CN109597675A*, 2019-04-09.

SELECTED AWARDS AND HONORS

- Won the 2nd place at Russell L. Agrusa CSE Student Innovation Competition @ UB 2023.12
- MITRE eCTF, team member of Cacti @ UB 2023
 - Ranked 4 among 60 teams. Developed a secure key fob system for car door locks, safeguarding against unauthorized access, replay attacks, and key fob duplication. [[code link](#)]
- MITRE eCTF, team captain of Cacti @ UB 2022
 - Ranked 5 among 28 teams. Designed a secure firmware update and bootloader for an avionic device, safeguarding intellectual property and mission secrets against untrusted environments and supply-chain threats like hardware trojans. [[code link](#)]
- MITRE eCTF, team captain of Cacti @ UB 2021
 - Ranked 9 at final among 20+ teams in MITRE eCTF. Best write-up award. Designed a secure communication system for an unmanned aerial vehicle (UAV) package delivery, safeguarding against unauthorized network access and disruptions. [[code link](#)]
- MITRE eCTF, team member of Cacti @ UB 2020
 - Ranked 6 at final among 20+ teams. Developed a secure audio digital rights management (DRM) module for a Digilent Cora Z7 multimedia player, ensuring protection against piracy, region restrictions, and cloned device production. [[code link](#)]
- Merit student at Institute of Information Engineering, Chinese Academy of Sciences 2017

TRAVEL GRANTS

- 2024 Travel Grants at WOOT 2024 (Aug. 12-13, Philadelphia)
- 2023 Grants at DAC Young Fellow program 2023 (Jul. 9-13, San Francisco)
- 2023 Travel grants at NDSS VehicleSec workshop 2023 (Feb. 27, San Diego).
- 2021 Travel Grants at CCS iMentor 2021 (Nov. 14-19, virtual)
- 2021 Travel grants at NDSS 2021 (Feb. 21-25, virtual).
- 2020 Travel grants at USENIX Security 2020 (Aug. 12-14, virtual).
- 2020 Travel grants at CODASPY CyberW 2020 (Mar. 18, virtual).

PROFESSIONAL SERVICES

- *Student Advising and Mentoring*: Junzhe Li (undergraduate), Sagar Mohan (master) 2023
- *Artifact Evaluation Committee Member, USENIX Security* 2022 – 2023
- *Young Fellows Program Participant, DAC* Jul. 2023
- *Student Volunteer, VehicleSec, NDSS Workshop* Feb. 2023
- *CTF Training, University at Buffalo/Rochester Institute of Technology* 2019 – 2022
- *External Reviewer*: IEEE International Conference on Trust, Security, and Privacy in Computing and Communications (TrustCom), IEEE Conference on Communications and Network Security (CNS), Re-design Industrial Control Systems with Security (RICSS), IEEE Latin America Transactions, IEEE International Conference on Application-specific Systems, Architectures, and Processors (ASAP), ACM Conference on Data and Application Security and Privacy (CODASPY), IEEE Access.

PRESENTATIONS

- Poster presentation @ *Great Lake Security Day (GLSD)* Spring 2023
 - A Peak of the Security Landscape of Cortex-M Based Systems.
- Poster presentation @ *Great Lake Security Day (GLSD)* Winter 2021
 - Practical Control-Flow Integrity Enforcement on IoT Devices.
- **Invited Talk** @ *UB CSE 501 course*: Security landscape on embedded systems. Fall 2022
- **Invited Talk** @ *UB CSE 501 course*: Embedded Capture the Flag (eCTF). Fall 2021
- **Presentation**: Research-in-progress presentation at SKM. Fall 2021

INTERESTS

calligraphy, drawings, novels, poets, and tech blogs