

Zhaohui Wang

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RESEARCH INTEREST

My research focuses on **IoT security and privacy** and **system security**. I study cross-app privacy leakage and rule conflicts in IoT platforms, developing formal models, reasoning frameworks, and user-facing tools for risk detection and mitigation. On the system side, I investigate rowhammer-based memory attacks and Linux kernel vulnerabilities, focusing on kernel level exploitation techniques and the analysis of cross-privilege boundary attacks.

EDUCATION

- **University of Kansas** Lawrence, Kansas, United States
Ph.D. candidate in Computer Science, Advisor: Prof. Fengjun Li & Prof. Bo Luo Aug. 2019 – Present
- **Harbin Institute of Technology** Harbin, Heilongjiang, P.R.China
M.S. in Computer Engineering, advisor: Prof. Yubin Xu Aug. 2013 – Jul. 2015
- **University of Electronic Science and Technology of China** Chengdu, Sichuan, P.R.China
B.S. in Computer Engineering Aug. 2008 – Jul. 2012

PUBLICATIONS

- [1] **Zhaohui Wang**, Bo Luo, and Fengjun Li. **InteractionShield: Harnessing Event Relations for Interaction Threat Detection and Resolution in Smart Homes**. (Accepted to appear in the *Proceedings of ACSAC 2025*).
- [2] **Zhaohui Wang**, Bo Luo, and Fengjun Li. **PrivacyGuard: Exploring Hidden Cross-App Privacy Leakage Threats In IoT Apps**. *Proceedings on Privacy Enhancing Technologies (PETS)*, 2025, 776-791.
- [3] Kevin Li, **Zhaohui Wang**, Ye Wang, Bo Luo, and Fengjun Li. **Poster: Ethics of Computer Security and Privacy Research - Trends and Standards from a Data Perspective**. *Proceedings of the 2023 ACM SIGSAC Conference on Computer and Communications Security (CCS)*, 2023, 3558-3560.
- [4] **Zhaohui Wang**, Bo Luo, and Fengjun Li. **Poster: SmartAppZoo: a Repository of SmartThings Apps for IoT Benchmarking**. *Proceedings of the 8th ACM/IEEE Conference on Internet of Things Design and Implementation (IoTDI)*, 2023, 448-449.
- [5] Xin Hao, Qiuyu Wu, **Zhaohui Wang**, Changxing Lin. **Parallel Timing Synchronization Algorithm and Its Implementation in High Speed Wireless Communication Systems**. *2019 International Conference on Electronics, Information, and Communication (ICEIC)*, 2019, 1-6.
- [6] Xin Hao, **Zhaohui Wang**, Qiuyu Wu, Changxing Lin. **A refined phase estimation based parallel carrier recovery algorithm in high speed wireless communication systems**. *2018 IEEE 18th International Conference on Communication Technology (ICCT)*, 2018, 732-735.
- [7] **Zhaohui Wang**, Xin Hao, Changxing Lin, Qiuyu Wu. **An efficient hardware LDPC encoder based on partial parallel structure for CCSDS**. *2018 IEEE 18th International Conference on Communication Technology (ICCT)*, 2018, 136-139.
- [8] Qiuyu Wu, Changxing Lin, Bin Lu, Li Miao, Xin Hao, **Zhaohui Wang**, Yi Jiang, Wenqiang Lei, Xianjing Den, Hongbin Chen, Jun Yao, Jian Zhan. **A 21 km 5 Gbps real time wireless communication system at 0.14 THz**. *2017 42nd International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, 2017, 1-2.

TEACHING EXPERIENCE

- **University of Kansas** Lawrence, Kansas, United States
Teaching Assistant
 - EECS 330: Data Structures and Algorithms Fall 2025
 - EECS 268: Programming II Spring 2025
 - EECS 569: Computer Forensics Fall 2024
 - EECS 565: Introduction to Information and Computer Security Fall 2024
 - EECS 447: Introduction to Database Systems Spring 2024
 - EECS 565: Introduction to Information and Computer Security Fall 2023

PROFESSIONAL EXPERIENCE

• University of Kansas

Lawrence, Kansas, United States

Research Assistant

May. 2019 – Present

– Rowhammer-based Memory Attacks and Defenses

- * Implemented a tool to reverse-engineer DRAM address mappings across diverse CPU microarchitectures
- * Exploited page-table walks to perform rowhammer attacks, enabling controlled bit-flips for privilege escalation
- * Conducting research on kernel-level program exploitation, exploring cross-privilege boundary vulnerabilities

– Rule Conflicts Detection and Resolution

- * Developed a comprehensive framework leveraging logic reasoning to detect and resolve rule conflicts
- * Formalized event relationships and systematically identified event interferences to categorize rule conflicts
- * Employed model checking and SMT solving techniques to identify potential rule conflicts
- * Implemented a genetic algorithm-based method to resolve detected rule conflicts efficiently
- * Provided a GUI integrating real-world environmental factors and physical constraints

– Privacy Leakage Detection

- * Identified a novel cross-app privacy leakage risk in IoT apps and conducted a systematic study on inference threats
- * Formalized cross-app chaining problems and defined trigger-condition-action relations to model interactions between apps
- * Inferred device profiles based on usage context, ensuring accurate modeling for devices with varying sensitivity levels
- * Quantified privacy inference probabilities to assess both direct exposure and implicit inference risks
- * Developed a GUI to provide users with visual insights into privacy risks and enable better decision-making

– Large-Scale Real-World IoT App Dataset

- * Collected and cleaned a large-scale dataset of real-world open-source IoT apps from diverse sources
- * Filtered out invalid apps using regular-expression matching and symbolic execution techniques
- * Eliminated identical and near-duplicate apps by computing fuzzy hashes and applying clustering algorithms

• Normalyze, Inc.

Los Altos, California, United States

Security Engineer Intern

May. 2022 – Aug. 2022

Software Engineer Intern

May. 2021 – Aug. 2021

– Intelligent Document Analytics and Scalable Cloud Deployment

- * Developed and implemented a clustering system to group similar documents into distinct clusters
- * Designed and built a document classification system to assign documents to predefined categories
- * Created methods to identify structurally and semantically similar databases or tables
- * Deployed real-time prediction and clustering modules integrated with AWS for scalable data processing
- * Implemented database operations using Javascript and Python, with PostgreSQL as the backend database
- * Wrote automated unit tests for functions and REST APIs using Javascript and Python
- * Composed and optimized Dockerfiles to containerize and streamline system deployment

• Microsystem & Terahertz Research Center

Chengdu, Sichuan, P.R.China

Electronic Engineer

Jul. 2015 – Jul. 2019

– High-Throughput LDPC Encoder and Decoder

- * Proposed a fully parallel LDPC encoder based on the Richardson–Urbanke method for high-throughput coding.
- * Designed novel partially parallel LDPC decode algorithms optimized for performance and hardware efficiency.
- * Implemented LDPC encoders on Xilinx Virtex-7 FPGAs, achieving >10 Gbps via pipelined recursive coding.
- * Developed an LDPC decoder with LUT-based layered decoding, sustaining 5 Gbps throughput.

SERVICE AND ACTIVITY

• Presentations

- PrivacyGuard: Exploring Hidden Cross-App Privacy Leakage Threats In IoT Apps, 25th Privacy Enhancing Technologies Symposium (PETS), Jul. 15, 2025, Washington, DC, United States

• External Paper Review

- 2023 53rd Annual IEEE IFIP International Conference on Dependable Systems and Networks (DSN)
- 2022 52nd Annual IEEE IFIP International Conference on Dependable Systems and Networks (DSN)
- 2022 IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom)

• Volunteer

- Session Moderator, EAI SecureComm 2022, Oct. 17-19, 2022, Kansas City, MO, United States
- Competition Observer, National Collegiate Cyber Defense Competition, Feb. 11, 2022, Lawrence, KS, United States

HONORS AND AWARDS

- **University of Kansas** *Lawrence, Kansas, United States*
 - Graduate Engineering Association Award Jul. 2025
 - David D. and Mildred H. Robb Award Jun. 2025
 - CANSec Travel Grant Award Oct. 2022
- **Harbin Institute of Technology** *Harbin, Heilongjiang, P.R.China*
 - Third-Class Academic Scholarship Oct. 2014
 - First-Class Academic Scholarship Oct. 2013
- **University of Electronic Science and Technology of China** *Chengdu, Sichuan, P.R.China*
 - Outstanding Undergraduate Award Jul. 2012
 - National Encouragement scholarship Sep. 2011
 - MediaTek First-Class Scholarship Sep. 2010
 - Second Prize in Chinese Mathematics Competition Oct. 2009
 - National Encouragement scholarship Sep. 2009

SKILLS

Programming: Python, Java, C, C++, SQL, Assembly, Shell, MATLAB, R, Lua, Nix, Groovy, Javascript, Go, Verilog, VHDL
Tools: AWS, BeautifulSoup, Docker, Git, \LaTeX , Matplotlib, NumPy, Pandas, PyTorch, scikit-learn, SciPy, Seaborn, Selenium, spaCy, SymPy, TikZ

REFERENCES

Fengjun Li (Advisor): fli@ku.edu *Professor of EECS, University of Kansas*
Bo Luo (Co-advisor): bluo@ku.edu *Professor of EECS, University of Kansas*
Yang Zhang: yangzhang.cs@gmail.com *Sr Director of Engineering, Cyberhaven*