

# Zhaohui Wang

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## RESEARCH INTEREST

My research focuses on **IoT Security & 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

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### • 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

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### • 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

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- **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

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

## REFERENCES

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**Fengjun Li (Advisor):** fli@ku.edu *Deane E. Ackers Professor, University of Kansas*  
**Bo Luo (Co-advisor):** bluo@ku.edu *H.J. and Joan O. Wertz Professor, University of Kansas*  
**Yang Zhang:** yangzhang.cs@gmail.com *Sr Director of Engineering, Cyberhaven*