

# Zeyu Chen

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## EDUCATION

### University of Delaware

Newark, DE

Ph.D. candidate in Electrical and Computer Engineering

Expected by 2023

Advised by Dr. Haining Wang

### University of Delaware

Newark, DE

*M.S. in Electrical and Computer Engineering*

*May 2017*

### University of Science and Technology of China

Hefei, China

*B.S. in physics and Electronics*

*July 2015*

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## RESEARCH EXPERIENCE

### Evaluate Fuzz Testing on Use-After-Free Vulnerabilities

*May 2022 – May 2023*

- Conducted fuzz testing on 30 use-after-free (UAF) bugs with 10 distinct patterns, using eight state-of-the-art fuzzers.
- Assessed each fuzzer's performance in terms of time and memory overhead, as well as their success rates in detecting the identified bugs.
- Developed optimization techniques to enhance fuzzer detection capabilities based on our analysis of the root causes of the bugs, aimed to improve the coverage and efficiency of the fuzzing process.

### An Empirical Study on Real-World Use-After-Free Vulnerabilities

*May 2019 – May 2022*

- Conducted the first comprehensive study on real-world UAF bugs, examining their patterns, manifestations, and fix strategies among other features.
- Investigated a sample of 150 randomly selected UAF bugs collected from 41 large and mature open-source projects.
- Designed a pattern-based static UAF detector Palfrey, which identified nine new UAF bugs in seven open-source projects.
- Established a new UAF benchmark and made our dataset and tools publicly available.

### A Study of Account Recovery in the Wild and Its Security Implications

*Feb. 2019 – Nov. 2019*

- Conducted in-depth examination of account recovery protocols and authentication schemes adopted by the Alexa top 500 websites.
- Designed and implemented secure email account recovery (SEAR) protocol to defend against password recovery attacks, validated with CISP experiments, highlighting its efficacy in mitigating attacks.

### A Process-In-Memory Implementation of SHA-3 Using a Voltage-Gated Spin Hall-Effect Driven MTJ-based Crossbar

*June 2018 – May 2019*

- Innovated a processing-in-memory accelerator for SHA-3 residing in main memory, significantly reducing data transfer time.
- Proposed two optimization techniques, parallel execution for XOR gates and a pre-charge instruction, further enhancing efficiency.

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## TEACHING EXPERIENCE

### *Teaching Assistant at University of Delaware*

- CPEG 695: Digital Forensics 2018, 2019, 2022 and 2023
- ELEG 222: Microprocessor System 2018
- ELEG 312: Circuit Analysis 2019
- CPEG 650: Advanced Cybersecurity 2022 and 2023

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## WORK EXPERIENCE

### **Kryptowire Lab**

Arlington, Virginia

#### *Summer research intern*

June 2023 – August 2023

- Built the prototype for vehicle-to-vehicle (V2V) 5G communication using Quectel AG215 chips.
- Monitored network packages and identified vulnerabilities in the current V2V model.

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## PUBLICATIONS

- **Zeyu Chen**, Daiping Liu, Jidong Xiao, Haining Wang, “All Use-After-Free Vulnerabilities Are Not Created Equal: An Empirical Study on Their Characteristics and Detectability” in 26th International Symposium on Research in Attacks, Intrusions and Defenses (RAID), 2023 (**best practical paper**)
- Shariful Alam, Le Guan, Zeyu Chen, Haining Wang, and Jidong Xiao, "CAUSEC: Cache-based Secure Key Computation with (Mostly) Deprivileged Execution" in 43rd IEEE International Conference on Distributed Computing Systems (ICDCS), 2023
- **Zeyu Chen** and Chengmo Yang, “A Processing-In-Memory Implementation of SHA-3 Using a Voltage-Gated Spin Hall-Effect Driven MTJ-based Crossbar,” in Great Lakes Symposium on VLSI (GLSVLSI), May 2019.
- Yue Li, **Zeyu Chen**, Haining Wang, Kun Sun, and Sushil Jajodia, “A Study of Account Recovery in the Wild and Its Security Implications” in IEEE Transactions on Dependable and Secure Computing (TDSC), June 2019.

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## SERVICES

### **Extenal Conference and Journal Reviewer**

May 2017 – now

DSC '17, LCTES '17, ICCD '18, VLSISOC '18, CCS '19, TCC '19, SECREPT '19 '20, ACNS '20, ICICS '21, INFOCOM '21 CODASPY '21 '22, ICDCS '22, ESORICS '22 '23

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## TECHNICAL SKILLS

- **Programming languages:** C, C++, Python, MATLAB, HTML/CSS, JavaScript, SQL
- **Tools:** Git, Latex, Docker