

Kaixin Yang

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Education

Viterbi School of Electrical and Computer Engineering, University of Southern California
Los Angeles, CA 90089, U.S.

Sept. 2019 – Present

Ph.D. student in Computer Engineering

Viterbi School of Electrical and Computer Engineering, University of Southern California
Los Angeles, CA 90089, U.S.

Sept. 2019 – May. 2021

M.S. in Electrical Engineering

School of Electronics Engineering and Computer Science, Peking University
Beijing, China

Sept. 2015 – Jul. 2019

B.S. in Electronic and Information Science and Technology

Research Experience

Research on Hardware Security and Sequential Logic Encryption

Aug. 2019 – Present

Advisor: Prof. Pierluigi Nuzzo

Affiliation: Cyber-Physical System Design Group

- Systematically summarized the assumptions and metrics of current sequential logic attack methods.
- Evaluated several sequential logic encryption methods, proposed potential strategies to attack on sequential logic encryption methods, developed an unrolling-based SAT attack and compared with existing methods in literature.
- Developed a graph neural network-based approach to retrieve correct key values from encrypted netlists.
- Explored unrolling-based approach to attack a latch-based logic locking technique.
- Explored evaluation metrics to capture the vulnerability and risk of logic locking techniques.

Teaching Experience

Mentor for 2022 USC Viterbi SHINE Program

Jun. 2022 – Jul. 2022

Topic: State Register Identification for Circuit Reverse Engineering

Mentee: Aidan Wong

Teaching Assistant for EE577a: VLSI System Design

Jan. 2022 – May 2022

Instructor: Prof. Akhilesh Jaiswal, Prof. Sandeep Gupta, and Dr. Sridhar Narayanan

Teaching Assistant for EE477L: MOS VLSI Circuit Design

Aug. 2021 – Dec. 2021

Instructor: Prof. Massoud Pedram

Publication

Book Chapter

- Hu, Y., Yang, K., Nazarian, S., Nuzzo, P., 2021. SANS-Crypt: Sporadic-Authentication-Based Sequential Logic Encryption, VLSI-SoC: Design Trends, Springer.

Conference Papers

- Chowdhury, S., Yang, K., Nuzzo, P., 2021. ReIGNN: State Register Identification Using Graph Neural Networks for Circuit Reverse Engineering. ICCAD 2021.
- Hu, Y., Zhang, Y., Yang, K., Chen, D., Beerel, P., Nuzzo, P., 2021. Fun-SAT: Functional Corruptibility-Guided SAT-Based Attack on Sequential Logic Encryption. HOST 2021.
- Hu, Y., Yang, K., Chowdhury, S. and Nuzzo, P., 2020. Risk-Aware Cost-Effective Design Methodology for Integrated Circuit Locking. DATE 2021.
- Hu, Y., Yang, K., Nazarian, S. and Nuzzo, P., 2020. SANS-Crypt: A Sporadic-Authentication-Based Sequential Logic Encryption Scheme. VLSI-SoC 2020.

Honor and Award

2022 59th Design Automation Conference Young Fellows

2019 Annenberg Fellowship

2018 Excellent Presentation in The Sixth Peking University Young Scientists Symposium on Informatics

2018 Third Prize in 2018 Intel Cup Undergraduate Electronic Design Contest

2017 Award for Academic Excellence of Peking University in academic year

2016 First Prize in College Physics Contest awarded by Beijing Physics Society in year 2016

Campus Experience

Piano Association of Peking University

Mar. 2017 – Jun. 2019

Designed posters and edited essays.

Member of Publicity Department

Student Affairs Office, EECS, Peking University

Mar. 2016 – Jul. 2018

Dealt with daily affairs of EECS undergraduate students.

Student Assistant

Intel Cup Undergraduate Electronic Design Contest

Apr. 2017 – Jul. 2018

Topic: Lost and Found Cabinet with Personal Information Protection

Third Prize

Teammates: Qinglong Yang, Cunguang Feng

- Designed *Lost and Found Cabinet with Personal Information Protection* based on Intel embedded platform *UP²* board, which aims at facilitating retrieving the lost property.
- Established the database of the system and implemented the Web server based on Flask framework.

Skill

- Programming Languages: Verilog, Python, C++, C
- Softwares & platforms: Synopsys (Design Compiler, VCS), Cadence (Virtuoso, Genus), MATLAB, LaTeX, Linux
- Languages: Chinese (Native), English (Proficient)
Standard English Test: TOEFL 102 (R27, L27, S20, W28); GRE 323 (V153, Q170, W3.5)