

Xinrui Wang

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EDUCATION

Chongqing University B.E. of Communication Engineering	<i>Sep 2018 - Jun 2022</i> <i>GPA: 3.74/4.00</i>
Nanjing University Pursuing M.E. of Integrated Circuit (supervised by Lang Feng and Zhongfeng Wang) Research Area: Computer Architecture and Security	<i>Sep 2022 - Jun 2025 (Expected)</i>

ACADEMIC PROJECT

A configurable hardware-assisted security monitor Contributions: We abstracted and concluded the common conditions of conducting security monitoring, then proposed a flexible hardware monitor along with a monitor instruction set and security-assisting designs to perform a variety of monitor tasks. After conducting evaluations by SPEC2006, the results show the flexible monitor can be programmed to realize kinds of monitoring tasks with high performance. Publication: [TCAD23] <u>Xinrui Wang</u> , Lang Feng*, Zhongfeng Wang*, “ProMiSE: A High Performance Programmable Hardware Monitor for High Security Enforcement of Software Execution,” IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 2023.	<i>Jun 2022 - Mar 2023</i>
Customized instructions for transcendental functions in RISC-V Contributions: We proposed a configurable “Cordic” module along with custom instructions in a RISC-V core to conduct transcendental computations such as sin, cos, and arctan. Compared with using software to compute, the configurable module along with custom instructions can speed up 3.3x - 18x. Publication: [TC24] Yuxing Chen, <u>Xinrui Wang</u> , Suwen Song, Lang Feng, Zhongfeng Wang*, “RISC-V Custom Instructions of Elementary Functions for IoT Endpoint Devices,” IEEE Transactions on Computers, 2024.	<i>Mar 2023 - Nov 2023</i>
Performance improvement of SGX-style integrity trees Contributions: We proposed a novel design along with a prediction algorithm and dedicated data structures to predict the cryptography computations including decryption and hash in SGX-style trees. According to the evaluations on SPEC2017 and GAP, the performance is effectively improved. Publication: [TCAD] <u>Xinrui Wang</u> , Lang Feng*, Zhongfeng Wang*, “PreSIT: Predict Cryptography Computations in SGX-style Integrity Trees,” IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems. (under review)	<i>Apr 2023 - Feb 2024</i>
Side-channel attack in Chiplet and corresponding defense algorithm Contributions: We seek to reproduce a side-channel attack in Chiplet’s interconnecting system. Then we focus on how to design an effective defense algorithm with low performance and bandwidth overhead.	<i>Mar 2024 - present</i>

SKILLS & INTERESTS

Technical: C, CPP, Verilog, Python

Interests: Computer architecture, hardware-assisted security, trust execution environment (TEE)

AWARDS & SCHOLARSHIPS

National Inspiration Scholarship, China government	<i>Oct 2020</i>
The 3rd Prize of Intel Cup Undergraduate Electronic Design Contest, Intel Corporation	<i>Oct 2020</i>
The First Prize Scholarship of Graduate Student, Nanjing University	<i>Sep 2022 and Sep 2023</i>
Xiaomi Special Scholarship, Xiaomi Corporation	<i>Sep 2023</i>