

# Shidong Shen (申世东)

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## Education

### University of Chinese Academy of Sciences (UCAS)

Sep 2023 – Jul 2026 (expected)

[Institute of Software, Chinese Academy of Sciences \(ISCAS\)](#)

Beijing, China

Master of Computer Science and Technology (CS) | Advisor: Prof. [Zhilin Wu](#)

Research Focus: LLM4SE, Hardware Formal Verification and Fuzzing

### Northwestern Polytechnical University (NWPU)

Sep 2019 – Jun 2023

Bachelor of Computer Science and Technology (CS) (Honors Class) | GPA: 3.83/4.10

Xi'an, China

Courses: Computer Architecture: 100 Data Structures: 94 Algorithm Design and Analysis: 95 Compiler Principles: 93

## Publications

### BMCFuzz: Hybrid Verification of Processors by Synergistic Integration of Bound Model Checking and Fuzzing

44th International Conference on Computer-Aided Design (CCF B, Core A)

ICCAD 2025, Munich, Germany

[Shidong Shen](#), Jinyu Liu, Weizhi Feng, Fu Song, Zhilin Wu

[\[paper\]](#) [\[code\]](#)

- Designed the **BMCFuzz**, a novel two-way hybrid verification approach that synergistically integrates BMC and Fuzzing.
- Implemented a snapshot mechanism to capture processor states, expanding BMC state space exploration.
- Developed an algorithm to select snapshots, improving coverage and bug detection.
- Validated on three RISC-V processors, uncovering four new vulnerabilities.

### Formal Verification of RISC-V Processor Chisel Designs

10th Dependable Software Engineering. Theories, Tools, and Applications (CCF C)

SETTA 2024, Hong Kong, China

[Shidong Shen](#), Yicheng Liu, Lijun Zhang, Fu Song, Zhilin Wu

[\[paper\]](#) [\[code\]](#)

- Proposed the first end-to-end approach for formally verifying RISC-V processor designs fully at the Chisel high-level, leveraging Chisel's object-oriented and functional programming constructs.
- Developed a modular and parameterized reference model of RISC-V instructions in Chisel, enabling the generation of customized RISC-V ISA reference model.
- Introduced a novel queue-based synchronization mechanism to reduce correctness verification to a model-checking problem, enabling the use of several model-checkers.
- Validated the approach on two open-source RISC-V processor designs, discovering 7 real-world unknown bugs and demonstrating three-orders-of-magnitude efficiency improvement over state-of-the-art methods.
- Extend version submitted to Journal of Systems Architecture (CCF B, under review)

## Research Experiences & Projects

### First-Person Hand Action Recognition Based on Multi-Source Data Fusion Network

Dec 2021 – Apr 2022

Advisor: Assoc. Prof. [Guoqing Zhou](#) at [Computer Vision and Computational Photography Laboratory, NWPU](#)

- Researched first-person hand action recognition using a multi-source data fusion network.
- Integrated and analyzed data from RGB, optical flow, and depth images to enhance recognition accuracy.
- Designed and implemented a multi-stream Bi-LSTM network using PyTorch to model temporal dependencies across different data modalities.

### LLVM-based Interpreter and Analysis Tools

Oct 2023 – Jan 2024

Stack: C/C++, LLVM, Clang

- Developed as part of the Advanced Compilation Principles and Software Analysis and Testing courses.
- Implemented a basic interpreter based on Clang, supporting a subset of C language constructs.
- Developing custom Clang-Tidy checkers for automated rule checking.
- Implementing instrumentation for analyzing and debugging concurrent programs.
- Applied several flow analysis algorithms to optimize program performance.

### GenshinCPU - Seven-Stage Pipelined MIPS Architecture Processor [\[code\]](#)[\[report\]](#)

Sep 2020 – Aug 2021

Stack: Verilog/SystemVerilog, C/C++, FPGA

- A seven-stage single-issue processor based on the MIPS32 instruction set architecture.

- Contains instruction and data cache, with a frequency of 145MHz, and can run PMON, Ucore, and Linux systems normally
- Responsible for CPU micro-architecture design and Linux kernel adaptation.
- Built CI (Continuous Integration) and Verilator (Accelerated Compilation) infrastructure, saving 300 hours of local debugging time, designed and completed differential testing framework.
- Booted the Linux 2.6 kernel in 3 days, earning the **National First Prize** in the 5th Loongson Cup.

**SQL-OJ Database Online Evaluation System [\[code\]](#)**
Jan 2022 – Apr 2022

Stack: SQL, HTML, CSS, JavaScript and Python (Django)

- Developed an online SQL assessment platform for teaching, supporting exams, exercises, and student management.
- Designed and implemented front-end (Bootstrap) and back-end (Django) systems with answer analysis.
- Optimized system performance for high concurrency using Redis, Celery, and message queue mechanisms.
- Awarded National Second Prize in the Chinese Collegiate Computing Competition; adopted as the official evaluation system for “Database Principles” at NWPU since 2022.

**Intelligent Training Management Platform for Museum Volunteers**
Apr 2020 – Sep 2020

Stack: HTML, CSS, JavaScript and PHP

- Combined with my personal experience of volunteering at Shaanxi History Museum, I developed a one-stop platform for recruitment, training, management, communication, and guarantee for the museum volunteer groups.
- Currently, it has been used in Shaanxi History Museum with a total of 2,000 users.
- Won the National Second Prize of China Collegiate Computer Computing Contest (WeChat Mini Program Track).

## Honors & Awards

### Scholarships

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|--|------------|
| • <b>China National Scholarship (Graduate Student)</b>                                     | 2025       |
| • Academic Scholarship, University of Chinese Academy of Sciences                          | 2023, 2024 |
| • AVIC First Class Scholarship, Northwestern Polytechnical University                      | 2022       |
| • Top Student Award, Northwestern Polytechnical University ( <b>Top 20 Undergraduate</b> ) | 2021       |
| • <b>China National Scholarship (Undergraduate Student)</b>                                | 2020, 2021 |
| • Tencent Grand Prize Scholarship (Top 1 in School of Computer Science, NWPU)              | 2021       |

### Competitions

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|--|------------|
| • National Second Prize, Chinese Collegiate Computing Competition                            | 2022       |
| • National First Prize, National Student Computer System Capability Challenge (Loongson Cup) | 2021       |
| • Meritorious Winner (First Prize), Mathematical Modeling Competition for American Students  | 2020, 2021 |
| • National Second Prize, China Collegiate Computing Contest                                  | 2020, 2021 |

### Leadership & Recognition

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|--|-----------|
| • Merit Student, University of Chinese Academy of Sciences     | 2024,2025 |
| • Outstanding Graduate, Northwestern Polytechnical University  | 2023      |
| • Top 10 Class Monitors, Northwestern Polytechnical University | 2022      |