# Batu Guan

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## Education

**Huazhong University of Science and Technology** Sept. 2021 – Present
*Beng. in Computer Science and Technology* ***Current GPA: 91.0/100***

## Relevant Course and Grades

Probability Theory and Mathematical Statistics(98), Calculus(95), Physics(99), Circuit Theory(99), Data Structure(94), Machine Learning(95), Foundation of Computer System(95), Assembly Language Programming(93), Principles of Functional Programming(94), Operating System(95), Compiler Principles(92), Computer Architecture(97)

## Publications

- **(EMNLP'24 Findings) Batu Guan**, Yao Wan, Zhangqian Bi, Zheng Wang, Hongyu Zhang, Yulei Sui, Pan Zhou, Lichao Sun. 2024. CodeIP: A Grammar-Guided Multi-Bit Watermark for Large Language Models of Code. Findings of the Association for Computational Linguistics EMNLP 2024. [URL]
- **(ACL'24 Findings)** Zhangqian Bi, Yao Wan, Zheng Wang, Hongyu Zhang, **Batu Guan**, Fangxin Lu, Zili Zhang, Yulei Sui, Xuanhua Shi, Hai Jin. 2024. Iterative Refinement of Project-Level Code Context for Precise Code Generation with Compiler Feedback. Findings of the Association for Computational Linguistics ACL 2024. [URL]

## Experience

**Purdue University** May 2024 – Present
*Prof. Jingbo Wang, Elmore Family School of Electrical and Computer Engineering* *Remote*
- Learn the basic knowledge of Datalog and formal method.
- Focus on the algorithm for constructing online Problog and the dynamic maintenance of binary decision diagrams.

**University of New South Wales** Mar. 2024 – Present
*Prof. Yulei Sui, Programming Languages and Compilers Group* *Remote*
- Learn the basic knowledge of static analysis and abstract interpretation.
- Contribute to the refinement and proofreading of course slides, assignments and lab codes for COMP6131 Software Security Analysis.
- Concentrate on the simplification and refinement of pertinent data structures within SVF, as well as the expansion and adaptation to multilingual environments.

**Huazhong University of Science and Technology** Mar. 2023 – Mar. 2024
*Prof. Yao Wan, CGCL/SCTS/BDTS Lab* *Wuhan, China*
- Learn the basic knowledge related to compiler and natural language processing.
- Focus on the synergy between large language models and software engineering.
- Conduct research on watermarks for Code LLMs. Propose a novel multi-bit watermarking technique that embeds additional information to generated code while also ensures the utility of it.
- Participate in research on CoCoGen, an approach that integrates compiler feedback and static analysis to iteratively improve LLM-generated code, significantly enhancing the accuracy of project-context-dependent code generation.

**National University of Singapore** July 2023
*NUS SOC 2023 Summer Workshop* *Singapore*
- Focus on detecting code vulnerabilities by combining Abstract Syntax Trees.
- Lead the research group and read relevant papers.
- Evaluate the plan, process the data, and train the model.

## Projects

**Double Sudoku Solver Based on SAT** | *C/C++* Sept. 2022
- Implemented an SAT problem solver and used it to solve Sudoku and Double Sudoku.

**Rotten Tomatoes Movie Review** | *Python, Pytorch* Dec. 2022
- Used machine learning and deep learning methods to conduct sentiment analysis on movie reviews.

**Implementation of "Kaleidoscope"** | *C/C++* Aug. 2023
- Developed a language named "Kaleidoscope" using LLVM under the instruction of official tutorial.

**Five-stage pipeline CPU design** | *Logisim* Sept. 2023
- Developed a five-stage pipeline CPU based on RISC-V architecture with support for operand forwarding and multi-level interrupts.

## Awards

- Scholarship for Academic Excellence, HUST 2022, 2023
- Asia and Pacific Mathematical Contest in Modeling, Second Prize 2023

## Extracurricular Activities

**Baidu Club, HUST** | *Group Leader*
- Organized club members to learn machine learning knowledge and give lectures.

## Skills

**Programming Languages**: C/C++, Python, Rust, Stantard ML, Coq
**Natural Languages**: Chinese(native), English(fluent), Japanese(beginner)