Tong Wu

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Profile Summary

Security Researcher and Software Engineer specializing in formal verification, bug detection, and full-stack development. PhD candidate with expertise in Software Verification & Machine Learning for concurrent software. Proven ability to deliver high-impact improvements in verification accuracy and software performance, with multiple published papers in international conferences.

Experience

Researcher
The University of Manchester, Manchester Apr 2022 – Present

- Enhanced concurrency verification for ESBMC, achieving a 41% accuracy increase and 190% speed boost.
- Conducted research on software verification techniques, resulting in two accepted papers at top conferences.
- Collaborated with cross-functional teams to advance ESBMC's standing in the International Competition on Software Verification.

Research Intern
Arm, Cambridge Aug 2023 – Nov 2023

- Applied formal verification techniques to Arm RMM, boosting bug detection accuracy by 51%.
- Authored a paper accepted at SAS 2024, outlining key research findings.
- Collaborated with engineers to identify and resolve security issues in embedded systems.

Software Engineer
ICBC, Beijing Jul 2018 – May 2020

- Developed full-stack online banking solutions, improving user experience and system efficiency.
- Awarded A-Star Employee twice for outstanding contributions to product development.
- Led a team of developers to reduce transaction processing times by 30%.

Education

PhD in Computer Science (On going)
The University of Manchester, Manchester Apr 2022 – Present

- Full EPSRC and ARM Centre of Excellence scholarship recipient.
- Research focus: Improving software verification in concurrent systems using formal methods and machine learning techniques.

MSc in Computer Science
The University of Manchester, Manchester Oct 2020 – Nov 2021

- Final project "Wit4Java" became the first validation tool for Java verifiers used in SV-COMP since 2022.

BE in Software Engineering
Shandong University, Jinan Sep 2014 – Jun 2018

Skills

- **Programming Languages**: C++, C, Python, Java
- **Data Structures & Algorithms**: Complexity Analysis, Problem Solving, Optimization
- **Software Verification Tools**: ESBMC (Bounded Model Checking)
- **Development Skills**: Full Stack Development, Object-Oriented Design, Relational Databases, Linux
- **Research & Verification**: Formal Verification, Machine Learning, Concurrency Systems, Bug Detection
- **Soft Skills**: Team Collaboration, Communication

Projects

ESBMC
Collaborator on ESBMC (C++), contributing to the concurrency verification module. Achieved fourth place in the International Competition on Software Verification. (https://github.com/esbmc/esbmc)

Wit4Java
Lead developer of Wit4Java (Python), a first violation witness validator for Java verifiers in SV-COMP. Published paper at TACAS 2022. (https://github.com/wit4java)

Languages

- **English**: Fluent
- **Chinese**: Native

References

- Wu, T., Schrammel, P. & Cordeiro, L. Wit4Java: A Violation-Witness Validator for Java Verifiers (Competition Contribution). In *Tools and Algorithms for the Construction and Analysis of Systems - 28th International Conference, TACAS 2022, ETAPS 2022, Munich, Germany, April 2-7, 2022, Proceedings, Part II* (Vol. 13244, pp. 484-489). Springer Nature.
- Cheng, Z., Wu, T., Schrammel, P., Tihanyi, N., de Lima Filho, E. B. & Cordeiro, L. (2024). JCWIT: A Correctness-Witness Validator for Java Programs based on Bounded Model Checking. In *The ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)* (pp. 1831-1835).
- Wu, T., Xiong, S., Manino, E., Stockwell, G. & Cordeiro, L. (2024). Verifying components of Arm® Confidential Computing Architecture with ESBMC. In *31st Static Analysis Symposium (SAS 2024)*.
- Wu, T., Manino, E., Aljaafari, F., Petoumenos, P. & Cordeiro, L. LF-checker: Machine Learning Acceleration of Bounded Model Checking for Concurrency Verification. *arXiv preprint arXiv:2301.09142*.