

Jialiang Chang

CONTACT

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Department of Computer Science
Western Michigan University, Kalamazoo, MI

RESEARCH INTERESTS

My research interest is in the broad areas of software verification with formal methods. The primary focus is to develop formal method based tools to support the debugging, analysis and verification of complex systems. My research vision is to bring universal proof of software security and solution to any area that are worried by the security issues.

EDUCATION

Doctor of Philosophy, Computer Science
Western Michigan University, Kalamazoo, MI August 2020

Master of Science, Computer Science
DePaul University, Chicago, IL June 2015

Master of Science, Information Resources Management
Wuhan University, Wuhan, China June 2011

Bachelor of Science, Information Management and Information System
Qingdao Technological University, Qingdao, China June 2009

PROFESSIONAL EXPERIENCE

Senior Software Engineer January 2020 – Present
Software Engineer May 2020 – Dec 2020
Certified Kernel Tech LLC

- Implemented CertiK Chain Ethereum blockchain project as develop team member with cosmos in golang, which was launched and has 32 million USD market cap.
- Created Ethereum smart contract vulnerability analyzer, which can detect all classical anti-patterns existing in the smart contract.
- Wrote more than 50 tech article to analyze hack incidents in smart contract security area and promoted company's projects at the same time.
- In charge of the smart contract audit service quality improvement project. Drafted audit knowledge base with essential knowledge to save research time for auditors.

Research Assistant September 2015 – August 2020
Western Michigan University

- Contributed to the **hyperledger fabric chaincode fuzz testing**. Implemented first-in-the-world Hyperledger Fabric chaincode fuzzing test engine to verify chaincode security issues, including all types common runtime crashes and 10 types static warnings.
- Contributed to the **smart contract formal verifier with automatic loop invariant learning**. Improved an Ethereum smart contract formal method verifier with loop invariant learning technique that applied to 4,741 smart contracts based on sCompile. Evaluation shows a better rate of 89.6% than that of 55.9% by SOLC-VERIFY with more than 100 transactions regarding to overflow.
- Contributed to the **symbolic testing on ethereum smart contract project**. Implemented sCompile, a ethereum smart contract formal method verification tool that applied to 36,099 smart contracts

and only cost 5 seconds each on average as well as shows that many known vulnerability can be captured if the user inspects as few as 10 program paths generated by sCompile. It can discover 224 unknown vulnerabilities with a false positive rate of 15.4%

- Contributed to **symbolic execution on GUI testing project** with formal method and cloud computing tool. The contributions brought the symbolic execution method in the GUI testing area for the first time, and introduced and implemented an online service to test GUI program in parallel.

Teaching Assistant

September 2017 – August 2020

Western Michigan University

- Teaching 60 undergraduates per semester about basic computer science knowledge in lab sessions, including Excel, Matlab and C programming language.
- Designed lab assignments and projects, graded assignments and generated lab reports.

Back End Web Developer

September 2014 – May 2015

Unscene Squared Inc Chicago

- Implemented the official website back end with NodeJS and frameworks like ExpressJS, PassportJS.
- Contributed to content administration, databases with MongoDB and mongooseJS framework.
- Written RESTful API to implement CRUD function of the project.
- Merged, organized, queried data sheets, pulling from factual API and google places API.

Full Stack Web Developer

September 2013 – September 2014

Department of Institutional Research and Market Analytics, DePaul University

- Implemented the official department website with HTML, CSS, JavaScript and SQL.
- Used Mercurial to control the code version and collaborate with the team.

SKILL SET

C/C++, Golang, Python, Solidity, Node.js, MongoDB, MySQL, AWS, Docker, Git

PUBLICATIONS

- Ethereum smart contract formal method verifier with loop invariant learning technique (anonymous title name due to under double blinded reviewing).
- **Jialiang Chang**, Bo Gao, Hao Xiao, Jun Sun, Yan Cai, and Zijiang Yang. sCompile: Critical path identification and analysis for smart contracts. International Conference on Formal Engineering Methods, pages 286–304. Springer, 2019.
- Hao Li, **Jialiang Chang**, Zijiang Yang and Steve Carr. Memory Distance Measurement for Concurrent Programs. The 30th International Workshop on Languages and Compilers for Parallel Computing (LCPC), October 11, 2017. College Station, Texas.
- Xiaodong Zhang, Zijiang Yang, Qinghua Zheng, Pei Liu, **Jialiang Chang**, Yu Hao and Ting Liu. Automated Testing of Definition-Use Data Flow for Multithreaded Programs. 10th IEEE International Conference on Software Testing, Verification and Validation (ICST), March 13, 2017. Tokyo, Japan.
- Lin Cheng, **Jialiang Chang**, Zijiang Yang and Chao Wang. GUICat: GUI Testing as a Service. The 31st IEEE/ACM International Conference on Automated Software Engineering (ASE), September 3, 2016. Singapore. Tool Paper.

HONORS

- Department Graduate Research Publication Award April 2018
- Department Graduate Research Publication and Creative Scholar April 2017
- Department Graduate Research Publication Award April 2017
- Recipient of the NSF Scholarship at 6th Summer School on Formal Techniques May 2016