Ming Fu

CONTACT INFORMATION

No. 188 Ren'ai Road
Suzhou Institute for Advanced Study
University of Science and Technology of China (USTC)
Suzhou, JiangSu, 215123, China

Voice: (86) 18550018351
Fax: (86) 0512-87161326
E-mail: fuming@ustc.edu.cn
WWW: staff.ustc.edu.cn/~fuming

EXPERTISE

OS kernel verification, real-time embedded operating systems, concurrency verification, formal methods, program logics, and interactive theorem proving.

EDUCATION

University of Science and Technology of China (USTC), Hefei, Anhui, China

Ph.D. in Computer Science, University of Science and Technology of China, July 2010.

- Dissertation Topic: "Formal Verification of Concurrent Assembly Code (Chinese)"
- Advisors: Yu Zhang & Yiyun Chen.

University of Science and Technology of China, Hefei, Anhui, China

B.S. in Computer University of Science and Technology of China, July 2004.

ACADEMIC EXPERIENCE

Post Doc. Researcher at **USTC**, **Januaray, 2011 - present**

- Developing refinement verification techniques for verifying fine-grained concurrency.
- Applying refinement verification techniques to verify software transactional memory (STM) algorithms.
- Leading a verification group (one Ph.D and five master students) to apply refinement verification techniques to formally verify a commercial real-time embedded OS kernel μC/OS-II in Coq.

Advisor: Xinyu Feng.

Visiting assistant in research at **Yale University**, **November, 2009 - October, 2010**
Developing program logic to verify optimistic concurrent programs. Advisor: Zhong Shao

PUBLICATIONS

Fengwei Xu[s], **Ming Fu**[*], Xinyu Feng, Xiaoran Zhang, Hui Zhang and Zhaohui Li. A Practical Verification Framework for Preemptive OS Kernels. Proc. 28th International Conference on Computer Aided Verification (***CAV'16***), Toronto, Ontario, Canada (to appear).

Jingyuan Cao[s], **Ming Fu**[*] and Xinyu Feng. Practical Tactics for Verifying C Programs in Coq Proc. 4th ACM-SIGPLAN Conference on Certified Programs and Proofs (***CPP'15***), Mumbai, India, pages 97–108, January, 2015.

Xiaoxiao Yang, Yu Zhang, **Ming Fu** and Xinyu Feng. A Temporal Programming Model with Atomic Blocks Based on Projection Temporal Logic Frontiers of Computer Science (***FCS***) 8(6):958–967, 2014.

Hongjin Liang, Xinyu Feng and **Ming Fu**. Rely-Guarantee-Based Simulation for Compositional Verification of Concurrent Program Transformations. ACM Transactions on Programming Languages and Systems(***TOPLAS***), Volume 36, Issue 1, Article No. 3, March 2014.

Yanni Kouskoulas, **Ming Fu**, Zhong Shao and Peter Kazanzides. Applying Mathematical Logic to Create Zero-Defect Software. JOHNS HOPKINS APL TECHNICAL DIGEST, VOLUME 32, NUMBER 2 (2013).

Xiaoxiao Yang, Yu Zhang, **Ming Fu** and Xinyu Feng. A Concurrent Temporal Programming Model with Atomic Blocks Proc. 14th International Conference on Formal Engineering Methods (***ICFEM'12***) Kyoto, Japan, pages 22–37, November, 2012

Hongjin Liang, Xinyu Feng and **Ming Fu**. A Rely-Guarantee-Based Simulation for Verifying Concurrent Program Transformations. Proc. 39th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (***POPL'12***), pages 455-468, January 2012.

Zipeng Zhang, Xinyu Feng, **Ming Fu**, Zhong Shao and Yong Li. A Structural Approach to Prophecy Variables. Proc. 9th annual conference on Theory and Applications of Models of Computation (***TAMC'12***), pages 61-71, 2012.

Yanni Kouskoulas, **Ming Fu**, Zhong Shao and Peter Kazanzides. Certifying the Concurrent State Table Implementation in a Surgical Robotic System. Proc. 3rd Joint Workshop on High Confidence Medical Devices, Software, and Systems& Medical Device Plug-and-Play Interoperability, Chicago, USA. June 2011.

Ming Fu, Yong Li, Xinyu Feng, Zhong Shao, and Yu Zhang. Reasoning about optimistic concurrency using a program logic for history, Proc. of 21st International Conference on Concurrency Theory (***CONCUR'10***), Paris, France, August 2010. Lecture Notes in Computer Science Vol.6269, pages 388-402, 2010 Springer-Verlag.

Yong Li, Yu Zhang, Yiyun Chen and **Ming Fu**. Formal reasoning about lazy-STM programs. *Journal of Computer Science and Technology* (***JCST***) , 25(4):841-852, 2010

Ming Fu, Yu Zhang and Yong Li. Formal verification of concurrent programs with read-write locks. Frontiers of Computer Science (***FCS***) , 4(1): 65-77, Jan, 2010.

Ming Fu, Yu Zhang and Yong Li. Formal reasoning about concurrent assembly code with reentrant locks. Proc. of 3rd IEEE International Symposium on Theoretical Aspects of Software Engineering(***TASE'09***) , July 29-31, 2009, Tianjin, China, pages 233-240.

Yong Li, Yu Zhang, Yiyun Chen and **Ming Fu**. On the verification of strong atomicity in programs using STM. Proc. of 3rd IEEE International Conference on Secure Software Integration and Reliability Improvement(***SSIRI'09***), July 8-10, 2009, Shanghai, China, pages 117-125.

Ming Fu and Yu Zhang. Homomorphism resolving of XPath trees based on automata. Proc. of a joint conference of the 9th 9th Asia-Pacific Web Conference and the 8th International Conference on Web-Age Information Management (***APWeb/WAIM'07***), June16-18, Huang Shan, China.

(s: students supervised by me, $*$: corresponding author)

Papers in preparation

Ming Fu and Xinyu Feng. A refinement-based verification framework for lock-based software transactional memory.

Conference Presentations

Practical Tactics for Verifying C Programs in Coq. Presented at ***CPP'15***, Tata research institute, Mumbai, India, 2015.

A refinement-based verification framework for lock-based software transactional memory. Presented at ***SAVE'14***, Beijing, China, 2014.

Reasoning about optimistic concurrency using a program logic for history. Presented at ***CONCUR'10***, IBM programming language day, and Yale programming language seminar, 2010.

Service

- Reviewer for journals: Journal of Software (***JOS***), Frontiers of Computer Science (***FCS***).
- Reviewer for conferences: ***LICS'15***, ***ESOP'13***.

Teaching Experience

Instructor for the graduate level course, **Multicore Programming**, college of software, USTC, 2012, 2013, 2014, 2015, 2016.

Instructor for the under graduate level course, **Frontier of Research on High-Confidence Software**, USTC, summer, 2012.

Skills

- separation logic, concurrent program logic, refinement-based program logic.
- Interactive theorem proving (Coq).
- Familiar with Java, C/C++, OCaml, LaTex.

Honors and Awards

Student fellowship for attending CONCUR'10, 2010.

Fellowship of the China Scholarship Council for visiting Yale University, 2009-2010.

Third prize fellowship of University of Science and Technology of China, 2000.

New student fellowship of University of Science and Technology of China, 1999

Grants

Verifying lock-free concurrent data structures. National Science Foundation of China. Grant No.61103023 (RMB 315,000), 2012.1-2014.12. (PI)

Refinement-based verification framework for software transactional memory. Fundamental Research Funds for the Central Universities. Grant No. WK0110000031 (RMB 75,000), 2012.1-2013.12. (PI)

China Postdoctoral Science Foundation, Grant No.2012M511420 (RMB 50,000), 2012.8- 2013.8. (PI)