

Ronghui Gu

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EDUCATION

B.S. Computer Science, Tsinghua University , Beijing, China	2011
M.S. Computer Science, Yale University , New Haven, CT	2013
M.Phil. Computer Science, Yale University , New Haven, CT	2013
Ph.D. Computer Science, Yale University , New Haven CT	2016

PROFESSIONAL APPOINTMENTS

Columbia University, New York, NY. Assistant Professor of Computer Science, since Jan. 2018.

CertiK, New York, NY. Co-founder, since Dec. 2017.

Yale University, New Haven, CT. Associate Research Scientist, Spet. 2017 - Nov. 2017; Research Assistant, Aug. 2012 - Aug. 2016. Designed and developed CertiKOS, the first fully verified concurrent OS kernel.

Google, Mountain View, CA. Software Engineer, Sept. 2016 - Sept. 2017.

SELECT HONORS

Columbia University's Final Nominee for the Packard Fellowship.	Mar. 2020
SOSP Best Paper Award.	Oct. 2019
Communications of the ACM (CACM) Research Highlights.	Oct. 2019
MIT Technology Review 35 Innovators Under 35 Semi-Finalist.	Feb. 2019
Distinction Dissertation, Yale University.	Dec. 2016
Yale Nominee, ACM Doctoral Dissertation Award.	Aug. 2016
Robert Willets Carle Scholarship, Yale University.	Feb. 2016
Graduation with Highest Distinction (top 1.9%), Tsinghua University.	Jul. 2011
Outstanding Student of Beijing City, China.	Jul. 2011
Honors Undergraduate Thesis (top 4%), Tsinghua University.	Jul. 2011

PUBLICATIONS

- [1] J. Yao, G. Ryan, J. Wong, S. Jana, and R. Gu, "Learning Nonlinear Loop Invariants with Gated Continuous Logic Networks." *Proceedings of the 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2020)*, June 2020.
- [2] G. Ryan, J. Wong, J. Yao, R. Gu, and S. Jana, "CLN2INV: Learning Loop Invariants with Continuous Logic Networks." *8th International Conference on Learning Representations (ICLR 2020)*, Apr. 2020.
- [3] M. Liu, L. Rieg, Z. Shao, R. Gu, D. Costanzo, J. Kim, and M. Yoon, "Virtual Timeline: A Formal Abstraction for Verifying Preemptive Schedulers with Temporal Isolation." *Proceedings of the 47th ACM Symposium on Principles of Programming Languages (POPL 2020)*, Jan. 2020.

- [4] R. Gu, Z. Shao, H. Chen, J. Kim, J. Koenig, X. Wu, V. Sjöberg, and D. Costanzo, “Building Certified Concurrent OS Kernels.” *Communications of ACM (CACM)*, 62(10), 89-99, 2019 (**Research Highlights**).
- [5] L. Nelson, J. Bornholt, R. Gu, A. Baumann, E. Torlak, and X. Wang. “Scaling Symbolic Evaluation for Automated Verification of Systems Code with Serval.” *Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019)*, Oct. 2019 (**Best Paper Award**).
- [6] M. Zou, H. Ding, D. Du, M. Fu, R. Gu, and H. Chen. “Using Concurrent Relational Logic with Helper for Verifying the AtomFS File System.” *Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019)*, Oct. 2019.
- [7] X. Yuan, J. Yang, and R. Gu, “Partial Order Aware Concurrency Sampling.” *Proceedings of the 30th International Conference on Computer Aided Verification (CAV 2018)*, July 2018.
- [8] C. Hao, X. Wu, Z. Shao, J. Lockerman, and R. Gu, “Toward Compositional Verification of Interruptible OS Kernels and Device Drivers.” *Journal of Automated Reasoning (JAR)*, 61(1-4), 141-189, 2018.
- [9] R. Gu, Z. Shao, J. Kim, X. Wu, J. Koenig, V. Sjöberg, H. Chen, D. Costanzo, and T.Ramananandro, “Certified Concurrent Abstraction Layers.” *Proceedings of the 39th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2018)*, June 2018.
- [10] J. Kim, V. Sjöberg, R. Gu, and Z. Shao, “Safety and Liveness of MCS Lock—Layer by Layer.” *Proceedings of the 15th Asian Symposium on Programming Languages and Systems (APLAS 2017)*, Nov. 2017.
- [11] E. Zhai, R. Piskac, R. Gu, X. Lao, and X. Wang, “An Auditing Language for Preventing Correlated Failures in the Cloud.” *Proceedings of the ACM on Programming Languages (OOPSLA 2017)*, Oct. 2017.
- [12] R. Gu, Z. Shao, H. Chen, X. Wu, J. Kim, V. Sjöberg, and D. Costanzo, “CertiKOS: An Extensible Architecture for Building Certified Concurrent OS Kernels.” *Proceedings of the 12th Symposium on Operating Systems Design and Implementation (OSDI 2016)*, Nov. 2016.
- [13] D. Costanzo, Z. Shao, and R. Gu, “End-to-End Verification of Information-Flow Security for C and Assembly Programs.” *Proceedings of the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2016)*, June 2016.
- [14] C. Hao, X. Wu, Z. Shao, J. Lockerman, and R. Gu, “Toward Compositional Verification of Interruptible OS Kernels and Device Drivers.” *Proceedings of the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2016)*, June 2016.
- [15] R. Gu, J. Koenig, T. Ramananandro, Z. Shao, X. Wu, S. Weng, H. Zhang, and Y. Guo, “Deep Specifications and Certified Abstraction Layers.” *Proceedings of the 42nd ACM Symposium on Principles of Programming Languages (POPL 2015)*, Jan. 2015.

PROFESSIONAL ACTIVITIES

Member of Program Committee, *15th USENIX Symposium on Operating Systems Design and Implementation (OSDI 2021)*.

Member of Program Committee, *41st annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI 2020)*.

Member of Program Committee, *2020 IEEE Security Development Conference (SecDev 2020)*.

Panelist, *National Science Foundation (NSF) Program on Quantum Idea Incubator for Transformational Advances in Quantum Systems (QII-TAQS)*, Alexandria, VA, June 2019.

Member of Program Committee, *16th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2019)*.

Member of Program Committee, *2019 ACM Symposium on Cloud Computing (SoCC 2019)*.

Member of Program Committee, *2019 IEEE Security Development Conference (SecDev 2019)*.

Member of Program Committee, *5th International Workshop on Coq for Programming Languages (CoqPL 2019)*.

Member of Program Committee, *2nd International Workshop on the use of Theorem Provers for Modelling and Verification at the Hardware-software Interface (ENTROPY 2019)*.

Member of External Review Committee, *39th annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI 2018)*.

Member of Student Research Competition Committee, *23rd ACM SIGPLAN International Conference on Functional Programming (ICFP 2018)*.

Member of Program Committee, *2018 IEEE Security Development Conference (SecDev 2018)*.

GRANTS

Formal Verification of Trusted Firmware on Arm (with Jason Nieh), Arm Research Gift, \$126,400, 2020.

A Secure and Verifiable Commodity Hypervisor (with Jason Nieh), National Science Foundation (NSF) Program on Formal Methods in the Field (FMitF), CCF-1918400, \$750,000, 2019 - 2023.

DeepSEA Framework for Building Certified Smart Contracts on IBM Hyperledger Platform, Columbia-IBM Center Seed Grant Award, \$200,000, 2019 - 2021.

Ethereum Foundation Research Gift (with Zhong Shao), 2019.

Qtum Foundation Research Gift, \$400,000, 2018.

Baidu USA Research Gift, 2017.

STUDENTS

Ph.D. Students: Runzhou Tao (2019 - present), John Zhuang Hui (2019 - present), Jianan Yao (2019 - present), Xupeng Li (2019 - present), Maxwell Levatich (2020 - present), and Xuheng Li (2020 - present).

Research Assistants: Xupeng Li (2018 - 2019), Justin Wong (2019 - present), and River Dillon Keefer (2019 - present).

Undergraduate students (advising their senior projects): Justin Wong (2019) and Jerry Lin (2020).

Research Interns: Han Zheng (2019), Amanda Liu (2019), and Linghan Kong (2019).

Member of the Ph.D. Thesis Committee: Xinhao Yuan (2019), Richard Townsend (2019), Jintack Lim (2020), and Lucas Paul.

TEACHING EXPERIENCE

COMS 4115 Programming Languages and Translators.

COMS E6998 Formal Verification of System Software.

COMS W3101 Programming Languages.

UNIVERSITY ACTIVITIES

Academic Advisor of SEAS Undergraduates, Columbia University, July 2019 - present.

Cybersecurity Affiliated Member, Data Science Institute, Columbia University, Feb. 2019 - present.