Ronghui Gu

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EDUCATION

Ph.D. Computer Science, **Yale University**, New Haven CT Dec. 2016

- Thesis: An Extensible Architecture for Building Certified Sequential and Concurrent OS Kernels.
- Advisor: Prof. Zhong Shao.
- Distinction Dissertation of Yale Graduate School of Art and Science.
- Yale Nominee of the ACM Doctoral Dissertation Award.

B.S. Computer Science, **Tsinghua University**, Beijing, China June 2011

- Rank: 4 / 140
- Graduation with Highest Distinction, top 1.9% (3 among 140).
- Honors Undergraduate Thesis of Tsinghua University, top 4% (5 among 140).
- Outstanding Student of Beijing City.

PROFESSIONAL APPOINTMENTS

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

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

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

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

Tsinghua University, Beijing, China. Research Assistant for Prof. Yuan Dong and Prof. Shengyuan Wang, 2010-2011. Verified the preemptive scheduler and nested interrupt handler of μC/OS-II.

SELECT PUBLICATIONS

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**).

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.

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**).

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.

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.

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.

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.

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.

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.

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.

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, *41st annual ACM SIGPLAN conference on Programming Language Design and Implementation (**PLDI 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**)*.

Reviewer for *Transactions on Computers*, *IET Software*, *Science China Information Sciences*. 2015 - present.

SELECT HONORS

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
Columbia-IBM Center Seed Grant Award.	Dec. 2018

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

GRANTS

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, $100,000, 2019 - 2020.

Ethereum Foundation Research Gift (with Zhong Shao), 2019 - 2020.

Qtum Foundation Research Gift, $400,000, 2018 - 2020.

Baidu USA Research Gift, 2017 - 2018.

STUDENTS

Ph.D. Students: Runzhou Tao (2019 - present), John Zhuang Hui (2019 - present), Jianan Yao (2019 - present), and Xupeng Li (2019 - 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), and Lucas Paul.

TEACHING EXPERIENCE

COMS 4115 Programming Languages and Translators.

COMS E6998 Formal Verification of System Software.

COMS W3101 Programming Languages.

Graduate Seminar on Systems.

UNIVERSITY ACTIVITIES

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

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