

# Linhai Song

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## RESEARCH INTERESTS

Improving the reliability, security and efficiency of AI systems and software systems

## EDUCATION

<b>University of Wisconsin–Madison</b> , Madison, WI, USA Ph.D., Computer Science (M.S. along the way) Advisor: Shan Lu	Nov. 2015
<b>Chinese Academy of Sciences</b> , Beijing, China M.S., Computer Science	Jun. 2010
<b>Huazhong University of Science and Technology</b> , Wuhan, Hubei, China B.E., Software Engineering	Jun. 2007

## EMPLOYMENT

<b>Institute of Computing Technology</b> , Beijing, China Professor	June 2025 - Now
<b>Pennsylvania State University</b> , State College, PA, USA Associate Professor at the College of Information Sciences and Technology	May 2023 - June 2024
<b>Pennsylvania State University</b> , State College, PA, USA Assistant Professor at the College of Information Sciences and Technology	Aug. 2017 - May 2023
<b>Kwai Inc.</b> , Seattle, WA, USA Consultant	Jun. 2021 - Aug. 2021
<b>ByteDance Ltd.</b> , Palo Alto, CA, USA Consultant	May 2019 - Aug. 2019
<b>FireEye, Inc.</b> , Milpitas, CA, USA Staff Research Scientist	Nov. 2015 - Jul. 2017
<b>NEC Laboratories America, Inc.</b> , Princeton, NJ, USA Research Intern	May 2013 - Aug. 2013
<b>Microsoft Research Asia</b> , Beijing, China Research Intern	May 2010 - Jul. 2010

## HONORS AND AWARDS

- NSF CAREER Award, 2022
- Mozilla Research Award, 2019

- MICRO'2014 Best Paper Runner Up for paper [C5], 2014
- ACM SIGPLAN Research Highlights @ PLDI for paper [C1], 2011

## PUBLICATIONS<sup>1</sup>

### Refereed Journal Articles

- [J4] Mengting He<sup>S</sup>, Shihao Xia<sup>S</sup>, Boqin Qin<sup>S</sup>, Nobuko Yoshida, Tingting Yu, Yiyang Zhang, and **Linhai Song**. “How to Save My Gas Fees: Understanding and Detecting Real-World Gas Issues in Solidity Programs.” In *Transactions on Software Engineering (TSE)*, 2025.
- [J3] Boqin Qin<sup>S</sup>, Yilun Chen, Haopeng Liu, Hua Zhang, Qiaoyan Wen, **Linhai Song**, and Yiyang Zhang. “Understanding and Detecting Real-World Safety Issues in Rust.” In *Transactions on Software Engineering (TSE)*, 2024.
- [J2] Boqin Qin<sup>S</sup>, Tengfei Tu<sup>S</sup>, Ziheng Liu<sup>S</sup>, Tingting Yu, and **Linhai Song**. “Algorithmic Profiling for Real-World Complexity Problems.” In *Transactions on Software Engineering (TSE)*, 2021. *Accepted as a Journal-First paper by ICSE'2022*
- [J1] Dongdong Deng, Guoliang Jin, Marc de Kruijf, Ang Li, Ben Liblit, Shan Lu, Shanxiang Qi, Jinglei Ren, Karthikeyan Sankaralingam, **Linhai Song**, Yongwei Wu, Mingxing Zhang, Wei Zhang, and Weimin Zheng. “Fixing, Preventing, and Recovering from Concurrency Bugs.” In *Science China Information Sciences volume*, vol. 58, pp. 1–18, April 2014.

### Refereed Conference Proceedings

- [C18] Wenzhang Yang, **Linhai Song**, and Yinxing Xue. “Rust-lancet: Automated Ownership-Rule-Violation Fixing with Behavior Preservation.” In *Proceedings of the 46th International Conference on Software Engineering (ICSE'2024)*, April 2024.
- [C17] Stephen Ellis\*, Shuofei Zhu\*<sup>S</sup>, Nobuko Yoshida, and **Linhai Song**. “Generic Go to Go: Dictionary-Passing, Monomorphisation, and Hybrid.” In *Proceedings of the 2022 ACM International Conference on Object Oriented Programming Systems Languages & Applications (OOPSLA'2022)*, Dec 2022. (Acceptance Rate: 31.3%, 92 out of 294) (\*: co-first authors)
- [C16] Shuofei Zhu\*<sup>S</sup>, Ziyi Zhang\*<sup>S</sup>, Boqin Qin<sup>S</sup>, Aiping Xiong, and **Linhai Song**. “Learning and Programming Challenges of Rust: A Mixed-Methods Study.” In *Proceedings of the 44th International Conference on Software Engineering (ICSE'2022)*, May 2022. (Acceptance Rate: 28.5%, 197 out of 691) (\*: co-first authors)
- [C15] Ziyi Zhang<sup>S</sup>, Shuofei Zhu<sup>S</sup>, Jaron Mink, Aiping Xiong, **Linhai Song**, and Gang Wang. “Beyond Bot Detection: Combating Fraudulent Online Survey Takers.” In *Proceedings of the ACM Web Conference 2022 (WWW'2022)*, April 2022. (Acceptance Rate: 17.7%, 323 out of 1822)
- [C14] Ziheng Liu\*<sup>S</sup>, Shihao Xia\*<sup>S</sup>, Yu Liang, **Linhai Song**, and Hong Hu. “Who Goes First? Detecting Go Concurrency Bugs via Message Reordering.” In *Proceedings of the 27th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'2022)*, March 2022. (Acceptance Rate: 20.1%, 80 out of 397) (\*: co-first authors)
- [C13] Ziheng Liu<sup>S</sup>, Shuofei Zhu<sup>S</sup>, Boqin Qin<sup>S</sup>, Hao Chen, and **Linhai Song**. “Automatically Detecting and Fixing Concurrency Bugs in Go Software Systems.” In *Proceedings of the 26th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'2021)*, April 2021. (Acceptance Rate: 18.8%, 75 out of 398)
- [C12] Boqin Qin<sup>S\*</sup>, Yilun Chen\*, Zeming Yu<sup>S</sup>, **Linhai Song**, and Yiyang Zhang. “Understanding Memory and Thread Safety Practices and Issues in Real-World Rust Programs.” In *Proceedings of*

<sup>1</sup>Students directly under my supervision are denoted by “S”.

- the 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI'2020**), June 2020. (Acceptance Rate: 22.5%, 77 out of 341) (\*: co-first authors)
- [C11] Shuofei Zhu<sup>S</sup>, Jianjun Shi<sup>S</sup>, Limin Yang, Boqin Qin<sup>S</sup>, Ziyi Zhang<sup>S</sup>, **Linhai Song**, and Gang Wang. "Measuring and Modeling the Label Dynamics of Online Anti-Malware Engines." In *Proceedings of the 29th USENIX Security Symposium (USENIX Security'2020)*, August 2020. (Acceptance Rate: 17.1%, 44 out of 256)
- [C10] Bangwen Deng, Wenfei Wu, and **Linhai Song**. "NFReducer: Redundant Logic Elimination in Network Functions." In *Proceedings of the 2020 ACM SIGCOMM Symposium on SDN Research (SOSR'2020)*, March 2020. (Acceptance Rate: 28.3%, 17 out of 60)
- [C9] Peng Peng, Limin Yang, **Linhai Song**, and Gang Wang. "Opening the Blackbox of VirusTotal: Analyzing Online Phishing Scan Engines." In *Proceedings of the 2019 ACM Internet Measurement Conference (IMC'2019)*, October 2019. (Acceptance Rate: 19.7%, 39 out of 197)
- [C8] Tengfei Tu<sup>S</sup>, Xiaoyu Liu, **Linhai Song**, and Yiyang Zhang. "Understanding Real-World Concurrency Bugs in Go." In *Proceedings of the 24th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'2019)*, April 2019. (Acceptance Rate: 21.1%, 74 out of 350)
- The second-most visited URL related to Golang in 2019. Featured on "a morning paper" and "Hacker News".*
- [C7] **Linhai Song** and Shan Lu. "Program Analysis for Inefficient Loops." In *Proceedings of the 39th International Conference on Software Engineering (ICSE'2017)*, May 2017. (Acceptance Rate: 16.4%, 68 out of 415)
- [C6] Rui Gu, Guoliang Jin, **Linhai Song**, Linjie Zhu, and Shan Lu. "What Change History Tells Us About Thread Synchronization." In *Proceedings of the 2015 10th Joint Meeting on Foundations of Software Engineering (FSE'2015)*, August 2015. (Acceptance Rate: 25.4%, 74 out of 291)
- [C5] **Linhai Song**, Min Feng, Nishkam Ravi, Yi Yang, and Srimat Chakradhar. "COMP: Compiler Optimizations for Manycore Processors." In *Proceedings of the 47th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO'2014)*, December 2014. (Acceptance Rate: 19.4%, 53 out of 273)
- MICRO'2014 Best Paper Runner Up.*
- [C4] **Linhai Song** and Shan Lu. "Statistical Debugging for Real-World Performance Problems." In *Proceedings of the 2014 ACM International Conference on Object Oriented Programming Systems Languages & Applications (OOPSLA'2014)*, October 2014. (Acceptance Rate: 28.4%, 53 out of 186)
- [C3] Adrian Nistor, **Linhai Song**, Darko Marinov, and Shan Lu. "Toddler: Detecting Performance Problems via Similar Memory-Access Patterns." In *Proceedings of the 2013 International Conference on Software Engineering (ICSE'2013)*, May, 2013. (Acceptance Rate: 18.5%, 85 out of 461)
- [C2] Guoliang Jin\*, **Linhai Song\***, Xiaoming Shi, Joel Scherpelz, and Shan Lu. "Understanding and Detecting Real-World Performance Bugs." In *Proceedings of the 33rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'2012)*, June 2012. (Acceptance Rate: 18.8%, 48 out of 255) (\*: co-first authors)
- [C1] Guoliang Jin, **Linhai Song**, Wei Zhang, Shan Lu, and Ben Liblit. "Automated Atomicity-Violation Fixing." In *Proceedings of the 32nd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'2011)*, June 2011. (Acceptance Rate: 23.3%, 55 out of 236)
- ACM SIGPLAN Research Highlights Award (Top 8 papers selected from all papers in 13 SIGPLAN conferences in 2011 for "high quality and broad appeal").*

[W4] Shihao Xia<sup>S</sup>, Mengting He<sup>S</sup>, **Linhai Song**, and Yiyang Zhang. “SC-Bench: A Large-Scale Dataset for Smart Contract Auditing.” In *Proceedings of the 2nd International Workshop on Large Language Models for Code (LLM4Code’2025)*, May 2025.

[W3] Yongheng Chen<sup>S</sup>, **Linhai Song**, Xinyu Xing, Fengyuan Xu, and Wenfei Wu. “Automated Finite State Machine Extraction.” In *Proceedings of the 3rd ACM Workshop on Forming an Ecosystem Around Software Transformation (FEAST’2019)*, November 2019. (Acceptance Rate: 87.5%, 7 out of 8)

[W2] **Linhai Song** and Xinyu Xing. “Fine-Grained Library Customization.” In *Proceedings of the First International Workshop on Software debLoading And Delaying (SALAD’2018)*, July 2018. (Acceptance Rate: 66.7%, 2 out of 3)

[W1] **Linhai Song**, Heqing Huang, Wu Zhou, Wenfei Wu, and Yiyang Zhang. “Learning from Big Malware.” In *Proceedings of the 7th ACM SIGOPS Asia-Pacific Workshop on Systems (APSys’2016)*, August 2016. (Acceptance Rate: 40.8%, 20 out of 49)

## Technical Reports

[T7] Shihao Xia<sup>S</sup>, Mengting He<sup>S</sup>, **Linhai Song**, and Yiyang Zhang. “SC-Bench: A Large-Scale Dataset for Smart Contract Auditing.” arXiv:2410.06176.

[T6] Shihao Xia<sup>S</sup>, Shuai Shao, Mengting He<sup>S</sup>, Tingting Yu, **Linhai Song**, and Yiyang Zhang. “Audit-GPT: Auditing Smart Contracts with ChatGPT.” arXiv:2404.04306.

[T5] Mengting He<sup>S</sup>, Shihao Xia<sup>S</sup>, Boqin Qin<sup>S</sup>, Nobuko Yoshida, Tingting Yu, **Linhai Song**, and Yiyang Zhang. “How to Save My Gas Fees: Understanding and Detecting Real-world Gas Issues in Solidity Programs.” arXiv:2403.02661.

[T4] Zeming Yu<sup>S</sup>, **Linhai Song**, and Yiyang Zhang. “Fearless Concurrency? Understanding Concurrent Programming Safety in Real-World Rust Software.” arXiv:1902.01906.

[T3] **Linhai Song** and Xinyu Xing. “Fine-Grained Library Customization.” arXiv:1810.11128.

[T2] **Linhai Song** and Shan Lu. “Program Analysis for Inefficient Loops.” UChicago CS Technical Report TR-2016-06.

[T1] **Linhai Song** and Shan Lu. “Statistical Debugging for Real-World Performance Problems.” UW-Madison CS Technical Report 1803.

## Posters

[P3] Ziyi Zhang<sup>S</sup> and **Linhai Song**. “Poster: Visualizing Critical Sections in Rust.” In *Student Research Competition at the 27th ACM Symposium on Operating Systems Principles (SOSP’2019)*.

[P2] Tengfei Tu<sup>S</sup>, Xiaoyu Liu, **Linhai Song**, and Yiyang Zhang. “Poster: Understanding Real-World Concurrency Bugs in Go.” In *the 13rd USENIX Symposium on Operating Systems Design and Implementation (OSDI’2018)*.

[P1] **Linhai Song** and Shan Lu. “Poster: Statistical Debugging for Real-World Performance Problems.” In *the 4th Greater Chicago Area Systems Research Workshop (GCASR’2015)*.

## Demonstrations

[D2] Ziyi Zhang<sup>S</sup>, Boqin Qin<sup>S</sup>, and **Linhai Song**. “Demo: VRLifeTime -- An IDE Tool to Avoid Concurrency and Memory Bugs in Rust.” In *the 27th ACM Conference on Computer and Communications Security (CCS’2020)*.

[D1] Shuofei Zhu<sup>S</sup>, Ziyi Zhang<sup>S</sup>, Limin Yang, **Linhai Song**, and Gang Wang. “Demo: Benchmarking Label Dynamics of VirusTotal Engines.” In *the 27th ACM Conference on Computer and Communications Security (CCS’2020)*.

## Software and Data Release

- [S8] A large-scale dataset for smart contract auditing, 2025.  
<https://github.com/charlesxsh/scbench>.
- [S7] A static Rust memory and concurrency bug detector, 2023.  
<https://github.com/BurtonQin/lockbud>. (504 GitHub stars)
- [S6] A dynamic Go concurrency bug detector, 2022.  
<https://github.com/system-pclub/GFuzz>. (133 GitHub stars)
- [S5] A static Go concurrency bug detector, 2021.  
<https://github.com/system-pclub/GCatch>. (436 GitHub stars)
- [S4] A production-run algorithmic profiler, 2021.  
<https://github.com/ComAirProject/ComAir>.
- [S3] Dataset of the daily snapshots of VirusTotal labels for 14,000 files over a year, 2020.  
<https://sfzhu93.github.io/projects/vt/index.html>.
- [S2] Dataset of 170 real-world Rust safety issues, 2020.  
<https://github.com/system-pclub/rust-study>. (96 GitHub stars)
- [S1] Dataset of 171 real-world Go concurrency bugs, 2019.  
<https://github.com/system-pclub/go-concurrency-bugs>. (256 GitHub stars)

## Patents

- [PA1] Min Feng, Srimat Chakradhar, and **Linhai Song**. “Compiler Optimization for Many Integrated Core Processors.” U.S. Patent No. 20150277877, October 1st, 2015.

## PROFESSIONAL ACTIVITIES

### Conference Program Committee Service

- USENIX Annual Technical Conference (**ATC**): 2024, 2025
- ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (**PPoPP**): 2024
- European Conference on Computer Systems (**EuroSys**): 2024
- International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**): 2022
- Workshop on Programming Languages and Operating Systems (**PLOS**): 2021, 2023
- Poster and Demonstration Session at ACM Conference on Computer and Communications Security (**CCS**): 2020
- Poster Session at International Conference on Software Engineering (**ICSE**): 2020
- Software Engineering in Practice at International Conference on Software Engineering (**ICSE**): 2019
- ACM SIGOPS Asia-Pacific Workshop on Systems (**APSys**): 2018, 2019, 2022, 2023
- Student Research Competition (**SRC**) at ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**FSE**): 2018
- Student Research Competition (**SRC**) at International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**): 2018

- Artifact Evaluation at ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI**): 2015
- Artifact Evaluation at ACM SIGSOFT International Symposium on Software Testing and Analysis (**ISSTA**): 2014

#### **Conference Reviewer**

- International Symposium on Code Generation and Optimization (**CGO**): 2024
- ACM SIGSOFT International Symposium on Software Testing and Analysis (**ISSTA**): 2018
- International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**): 2019, 2020, 2021
- ACM Conference on Computer and Communications Security (**CCS**): 2017, 2018
- USENIX Annual Technical Conference (**USENIX ATC**): 2017

#### **Journal Reviewer**

- ACM Computing Surveys
- ACM Transactions on Computer Systems
- Empirical Software Engineering Journal
- IEEE Computer Architecture Letters
- Transactions on Software Engineering
- Journal of Computer Science and Technology
- IEEE/ACM Transactions on Networking
- Automated Software Engineering
- ACM Transactions on Software Engineering and Methodology

#### **Journal Editor**

- EAI Transactions on Security and Safety

#### **Conference & Workshop Organization Service**

- Chair for Student Research Competition (**SRC**) at International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**): 2019

#### **Other Services**

- Hong Kong Research Grants Council (**RGC**) ad-hoc reviewer: 2023
- Dutch Research Council (**NWO**) ad-hoc reviewer: 2023, 2024
- National Science Foundation (**NSF**) ad-hoc reviewer: 2021
- National Science Foundation (**NSF**) Review Panel: 2018

## **TALKS**

- Understanding and Improving the Programmability of Rust
  - Peking University, April 2024
- Learning and Programming Challenges of Rust: A Mixed-Methods Study
  - Peking University, April 2023

- Detecting Concurrency Bugs in Go Software Systems
  - Yale University, June 2022
  - University of California, Santa Barbara, May 2022
  - University of Virginia, May 2022
  - Google, April 2022
  - University of Illinois Urbana-Champaign, April 2022
  - University of California, Merced, April 2022
  - Northwestern University, April 2022
  - Peking University, April 2022
- Who Goes First? Detecting Go Concurrency Bugs via Message Reordering
  - ASPLOS'2022, March 2022
- Combating Real-World Concurrency Bugs in Go
  - Bytedance, August 2021
  - Kwai, June 2021
  - Tsinghua University, May 2021
  - North Carolina State University, April 2021
- Measuring and Modeling the Label Dynamics of Online Anti-Malware Engines
  - Southern University of Science and Technology, January 2021
  - University of Science and Technology of China, December 2020
- Understanding Real-World Concurrency Bugs in Go
  - ASPLOS'2019, April 2019
- Understanding Real-World Concurrency Bugs in New Programming Languages
  - Carnegie Mellon University, October 2019
  - ByteDance, December 2018
  - Baidu X-lab, December 2018
- Fine-grained Library Customization
  - Salad'2018, July 2018
- Protocol Subsetting and Dialect Generation
  - Baidu X-lab, December 2017
- Performance Diagnosis for Inefficient Loops
  - ICSE'2017, May 2016
- Improve Software Security and Performance through Data Analytics
  - Pennsylvania State University, March 2016
- Learning from Big Malware
  - Baidu X-lab, May 2017
  - APSys'2016, August 2016
- Understanding, Detecting, and Diagnosing Real-World Performance Bugs
  - National University of Singapore, March 2016
  - Microsoft Research Asia, December 2015
  - Peking University, June 2015
  - Pivotal Labs, May 2015
- Statistical Debugging for Real-World Performance Problems
  - OOPSLA'2014, October 2014

- WISDOM Workshop II, May 2014
- Optimizing Memory Performance on Many Integrated Core Coprocessors
  - NEC Labs America, August 2013
- Understanding and Detecting Real-World Performance Bugs
  - PLDI'2012, June 2012
  - Programming Languages Seminar, University of Wisconsin-Madison, May 2012

## TALK VIDEOS

- “Algorithmic Profiling for Real-World Complexity Problems” presented by Boqin Qin
  - <https://www.youtube.com/watch?v=M1hfaHPB868> (38 views)
  - <https://www.bilibili.com/video/BV15Y4y187VQ> (97 views)
- “Learning and Programming Challenges of Rust: A Mixed-Methods Study” presented by Shuofei Zhu
  - <https://www.youtube.com/watch?v=STjQxTu3tS8> (**1121** views)
  - <https://www.bilibili.com/video/BV1RS4y1h7Nf> (**1276** views)
- “Who Goes First? Detecting Go Concurrency Bugs via Message Reordering” presented by Shihao Xia
  - <https://www.youtube.com/watch?v=sQbnzYPOcz4> (101 views)
  - <https://www.bilibili.com/video/BV1TF411b7nN> (**4190** views)
  - <https://www.bilibili.com/video/BV1om4y1d7Jn> (lightning talk) (**1484** views)
- “Automatically Detecting and Fixing Concurrency Bugs in Go Software Systems” presented by Ziheng Liu
  - <https://www.youtube.com/watch?v=qsjptcAWTWM> (112 views)
  - <https://www.bilibili.com/video/BV1Gb4y1D7QH> (187 views)
- “Measuring and Modeling the Label Dynamics of Online Anti-Malware Engines” presented by Shuofei Zhu
  - <https://www.youtube.com/watch?v=dhbcWx3HC64> (176 views)
  - <https://www.bilibili.com/video/BV1Rk4y127cQ> (588 views)
- “Understanding Memory and Thread Safety Practices and Issues in Real-World Rust Programs” presented by Yilun Chen
  - <https://www.youtube.com/watch?v=s5UqjOEaZ.8> (417 views)
  - <https://www.bilibili.com/video/BV17i4y1x7CM> (**1714** views)
  - <https://www.bilibili.com/video/BV1zA411t7ze> (lightning talk) (139 views)
- “Understanding Real-World Concurrency Bugs in Go” presented by Xiaoyu Liu
  - <https://www.youtube.com/watch?v=CIVrJcTM-lA> (347 views)
  - <https://www.bilibili.com/video/BV12b411b7Gt> (347 views)

## GRANTS

(Total project funding: **\$1.39 million**, total project funding from external sources: **\$1.24 million**, personal share from external sources: **\$1.01 million**)

- CAREER: Rethinking Toolchain Design for Rust



- Role: PI;
  - Total: \$550,193;
  - National Science Foundation (NSF);
  - 02/01/2022 to 01/31/2027.
- Avoiding Rust Deadlocks via Lifetime Visualization
  - Role: PI; with Yiyang Zhang from UC San Diego as Co-PI;
  - Total: \$60,000; Personal Share: \$30,000 (50%);
  - Web3 Foundation;
  - 09/01/2021 to 08/31/2022.
- GCatch++: Automatically Detecting Concurrency Bugs in Software Systems implemented in Go
  - Role: PI;
  - Total: \$30,000;
  - Ethereum Foundation;
  - 09/01/2021 to 08/31/2022.
- Learning and Programming Challenges of Rust: An Interdisciplinary Investigation
  - Role: PI; with Aiping Xiong from Penn State as Co-PI;
  - Total: \$55,000; Personal Share: \$27,500 (50%);
  - IST@PSU Seed Grant;
  - 09/01/2021 to 08/31/2022.
- SaTC: CORE: Small: Understanding and Detecting Memory Bugs in Rust
  - Role: PI; with Hao Chen from UC Davis as Co-PI;
  - Total: \$497,340; Personal Share: \$298,404 (60%);
  - National Science Foundation (NSF);
  - 07/01/2020 to 12/31/2025.
- Measuring and Modeling the Label Dynamics of Online Anti-Malware Engines
  - Role: Sole PI;
  - Total: \$9,966; Personal Share: \$9,966 (100%);
  - ICDS@PSU Seed Grant;
  - 05/01/2020 to 04/30/2021.
- Statically Detecting Memory Bugs in Rust Applications
  - Role: Sole PI;
  - Total: \$80,100; Personal Share: \$80,100 (100%);
  - Open Tech Fund;
  - 01/01/2020 to 06/30/2021.
- Benchmarking Generic Functions in Rust
  - Role: Sole PI;
  - Total: \$25,000; Personal Share: \$25,000 (100%);
  - Mozilla Research Award;
  - 09/01/2019 to 08/31/2020.
- Benchmarking, Detecting, and Diagnosing Real-World Performance Problems
  - Role: Sole PI;
  - Total: \$85,500; Personal Share: \$85,500 (100%);
  - IST@PSU Seed Grant;
  - 09/01/2018 to 08/31/2019.

## SELECTED PRESS

- **[Spectrum]** Scammers threaten quality of research survey data, 08/2023
- **[Software Engineering Daily]** Rust and Go Research with Linhai Song, 01/2021
- **[A Journey With Go]** Go: Concurrency Bugs in Go, 09/2019
- **[GTech Booster]** Is Rust the low-level-ish, 02/2019

## TEACHING

Term	Course	Enrollment	Course Quality	Instructor Quality
Spring 2022	IST 597 Advanced Software Testing	5	7/7	7/7
FALL 2021	SRA 221 Information Security (1)	59	6/7	6/7
Spring 2021	SRA 221 Information Security (1)	60	6.5/7	6.5/7
Fall 2020	SRA 221 Information Security (1)	68	6/7	6/7
Fall 2019	IST 451 Network Security (1)	72	4.78/7	5.03/7
Fall 2019	IST 451 Network Security (2)	66	5.23/7	5.57/7
Fall 2018	IST 451 Network Security (1)	71	5.69/7	5.66/7
Fall 2018	IST 451 Network Security (2)	45	5.59/7	5.59/7
Spring 2018	IST 451 Network Security (1)	48	5.68/7	5.8/7
Fall 2017	IST 451 Network Security (1)	71	5.16/7	5.19/7

- New Courses Developed and Taught: IST 597
- Course Committee Members: SRA 221, Cyber 362
- Course Committee Chairs: IST 451
- Course Innovations:
  - Designed in-class quizzes, a weekly learning survey, a final exam, and eight new labs for IST 451;
  - Designed in-class quizzes, a weekly learning survey, two mid-term exams, and two new labs for SRA 221.

## INTERNAL SERVICES

- Qualifying Exam Committee, Penn State, 2019, 2021, 2022, 2023, 2024
- Faculty Annual Review Committee, Penn State, 2022
- Faculty Search Committee, Penn State, 2020–2021
- Faculty Council, Penn State, 2019–2021
- Graduate Advisory Committee (GAC), Penn State, 2018–2019
- Graduate Recruiting Committee (GRC), Penn State, 2018–2020

## ADVISING

### Ph.D. Students

- Shihao Xia (co-advised with Hong Hu) (2021 – Present): [C14] [W4]
- Mengting He (2022 – Present) [W4]
- Shuofei Zhu (2018 – 2024): [C11] [C13] [C15] [C16] [C17] → Dr. Peng Liu's group

- Ziheng Liu (2018 – 2021): [C13] [C14] [J2] → Ph.D. at UCSD
- Li Wang (2021): → Assistant Professor at Fontbonne University

#### **Master Students**

- Tiffany Amigon (2022 – 2023)
- Shiqin Chen (2018 – 2021)

#### **Undergraduate Students**

- Edward Burke (2021)
- Erin Flannery (2020)
- Phil Reeves (2020)
- Tianchen Zhang (2019)

#### **Visiting Students**

- Boqin Qin (Ph.D. student from BUPT) (2018 – 2020): [C11] [C12] [C13] [C16] [J2] [J3] → China Telecom Cloud Computing
- Ziyi Zhang (Undergraduate from USTC) (2019 – 2021): [C11] [C15] [C16] → Ph.D. at Wisconsin-Madison
- Jianjun Shi (Ph.D. student from BIT) (2018 – 2019): [C11]
- Zeming Yu (2018 – 2019): [C12]
- Yongheng Chen (Undergraduate from NJU) (2019): [W3] → Ph.D. at Gatech
- Tengfei Tu (Ph.D. student from BUPT) (2017 – 2018): [C8] [J2] → faculty at BUPT

#### **Thesis Committee at Penn State**

- [Current] Siddhartha Balakrishna (PhD), Yu Liang (PhD).
- [2024] Lexiang Huang (PhD), Shuofei Zhu (PhD), Alexandar Devic (PhD), Zhixuan Huan (PhD).
- [2022] Saambhavi Baskaran (PhD).
- [2022] Minli Liao (PhD).
- [2021] Li Wang (PhD), Zhenpeng Lin (MS), Xian Wu (MS).

#### **Qualification Committee at Penn State**

- [2024] Yurui Chang, Zehao Liu, Zongyu Wu, Yaopei Zeng, Naixin Zhang.
- [2023] Song Liu, Yujia Wang, Hengkai Ye, Ziyi Yin.
- [2022] Zhimeng Guo, Geng Xiao, Junjie Xu, Huaisheng Zhu.
- [2021] Quan Li, Haizhou Wang, Tianrou Xia, Zhaohan Xi.
- [2019] Neisarg Dave, Ankur Mali, Shaurya Rohatgi, Rui Yu.

#### **Student Mentoring Programs at Top-Tier Conferences**

- [ASPLOS'2022] Xiang Cheng, Yuheng Yang.
- [SOSP'2021] Yuhan Liu, Hannah Atmer.
- [ASPLOS'2021] Shijia Wei, Jules Drean.