

Shin Yoo

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Education and Employment

Full Professor, School of Computing, KAIST, Republic of Korea, March 2025 - Now

KAIST ICT Endowed Chair Professor, School of Computing, KAIST, Republic of Korea, March 2024 - Now

Tenured Associate Professor, School of Computing, KAIST, Republic of Korea, February 2021 - February 2025

Associate Professor, School of Computing, KAIST, Republic of Korea, March 2018 - January 2021
Leading Computational Intelligence for Software Engineering (COINSE) Lab at KAIST.

Assistant Professor, School of Computing, KAIST, Republic of Korea, August 2015 - February 2018
Founded Computational Intelligence for Software Engineering (COINSE) Lab at KAIST.

Lecturer, Department of Computer Science, University College London, UK, October 2012 - July 2015
Worked on theoretical proof of the performance of GP-evolved fault localisation techniques. Developed a dynamic slicing tool and applied it as a novel slicing technique for visual programming languages.

Research Associate, Department of Computer Science, University College London, UK, August 2010 - September 2012
Developed theory and techniques to optimise fault localisation using information theory. Developed a General Purpose computation on Graphics Processing Unit (GPGPU) computation framework for regression test suite minimisation and applied to a case study from IBM.

Research Associate, Department of Computer Science, King's College London, UK, October 2009 - July 2010
Developed an open-source multi-objective test suite minimisation tool and applied to Google's testing framework. Performed a large scale survey of regression testing technique literature. Developed a metamorphic testing method for stochastic optimisation algorithms.

Ph.D., Computer Science, King's College London, UK, October 2006 - September 2009
Dissertation: Extending the Boundaries in Regression Testing: Complexity, Latency, and Expertise
Supervisor: Prof. Mark Harman

MSc., Software Engineering with Distinction, King's College London, UK, September 2005 - September 2006

Technical Sales Consultant, Oracle Korea, October 2004 - April 2005
Developed a monitoring/debugging tool for web application servers. Provided technical consultancy for enterprise markets.

Software Engineer, Xinics Inc., January 2000 - February 2004
Developed a content authoring tool for an e-Learning suite.

BSc., Computer Science, Seoul National University, Republic of Korea, March 1996 - February 2000

Publications

Statistics based on Google Scholar¹

- Accumulated Citations: 10,581
- h-index: 44

Peer-Reviewed Journal Articles

- Sungmin Kang, Bei Chen, Shin Yoo, and Jian-Guang Lou. Explainable automated debugging via large language model-driven scientific debugging. *Journal of Empirical Software Engineering*, 30(45):1–28, 2025
- Sungmin Kang, Juyeon Yoon, Nargiz Askarbekkyzy, and Shin Yoo. Evaluating diverse large language models for automatic and general bug reproduction. *IEEE Transactions on Software Engineering*, 50(10):2677–2694, 2024
- Seongmin Lee, Dave Binkley, Robert Feldt, Nicolas Gold, and Shin Yoo. Causal program dependence analysis. *Science of Computer Programming*, page 103208, 2024
- Sungmin Kang, Robert Feldt, and Shin Yoo. Deceiving humans and machines alike: Search-based test input generation for dnns using variational autoencoders. *ACM Transactions on Software Engineering Methodologies*, 33:103:1–24, dec 2024
- Jinhan Kim, Gabin An, Robert Feldt, and Shin Yoo. Learning test-mutant relationship for accurate fault localisation. *Information and Software Technology*, 162:107272, June 2023
- Jeongju Sohn, Sungmin Kang, and Shin Yoo. Arachne: Search based repair of deep neural networks. *ACM Transactions on Software Engineering Methodology*, 32(4):85:1–26, 2023
- Jinhan Kim, Robert Feldt, and Shin Yoo. Evaluating surprise adequacy for deep learning system testing. *ACM Transactions on Software Engineering and Methodology*, 32(2):42:1–29, June 2023
- Jinhan Kim, Juyoung Jeon, Shin Hong, and Shin Yoo. Predictive mutation analysis via natural language channel in source code. *ACM Transactions on Software Engineering and Methodology*, 31(4):1–27, 2022
- Jeongju Sohn and Shin Yoo. Empirical evaluation of fault localisation using code and change metrics. *IEEE Transactions on Software Engineering*, 47(8):1605–1625, 2021
- Seongmin Lee, David Binkley, Robert Feldt, Nicolas Gold, and Shin Yoo. Observation-based approximate dependency modeling and its use for program slicing. *Journal of Systems and Software*, 179:110988, 2021
- Paul Ralph, Sebastian Balthes, Gianisa Adisaputri, Richard Torkar, Vladimir Kovalenko, Marcos Kalinowski, Nicole Novielli, Shin Yoo, Xavier Devroey, Xin Tan, Minghui Zhou, Burak Turhan, Rashina Hoda, Hideaki Hata, Gregorio Robles, Amin Milani Fard, and Ran Alkadhi. Pandemic programming. *Empirical Software Engineering*, 25(6):4927–4961, 2020
- Seongmin Lee, David Binkley, Nicolas Gold, Syed Islam, Jens Krinke, and Shin Yoo. Evaluating lexical approximation of program dependence. *Journal of Systems and Software*, 160:110459, 2020
- Yunho Kim, Seokhyeon Mun, Shin Yoo, and Moonzoo Kim. Precise learn-to-rank fault localization using dynamic and static features of target programs. *ACM Transactions on Software Engineering and Methodology*, 28(4):23:1–23:34, October 2019
- David Binkley, Nicolas Gold, Syed Islam, Jens Krinke, and Shin Yoo. A comparison of tree- and line-oriented observational slicing. *Empirical Software Engineering*, 24:3077–3113, 2018
- D. Shin, S. Yoo, and D. H. Bae. A theoretical and empirical study of diversity-aware mutation adequacy criterion. *IEEE Transactions on Software Engineering*, 44(10):914–931, July 2018

¹Citation statistics correct as of 02 March 2025.

- K. Liu, D. Kim, T. F. Bissyande, S. Yoo, and Y. Le Traon. Mining fix patterns for FindBugs violations. *IEEE Transactions on Software Engineering*, 47(1):165–188, 2021
- Shin Yoo, Xiaoyuan Xie, Fei-Ching Kuo, Tsong Yueh Chen, and Mark Harman. Human competitiveness of genetic programming in sbfl: Theoretical and empirical analysis. *ACM Transactions on Software Engineering and Methodology*, 26(1):4:1–4:30, July 2017
- Shin Yoo, David Binkley, and Roger Eastman. Observational slicing based on visual semantics. *Journal of Systems and Software*, 129:60–78, 2016
- Justyna Petke, Myra B. Cohen, Mark Harman, and Shin Yoo. Practical combinatorial interaction testing: Empirical findings on efficiency and early fault detection. *IEEE Transactions on Software Engineering*, 41(9):901–924, September 2015
- Earl Barr, Mark Harman, Phil McMinn, Muzammil Shahbaz, and Shin Yoo. The oracle problem in software testing: A survey. *IEEE Transactions on Software Engineering*, 41(5):507–525, May 2015
- Mark Harman, Jens Krinke, Inmaculada Medina-Bulo, Francisco Palomo-Lozano, Jian Ren, and Shin Yoo. Exact scalable sensitivity analysis for the next release problem. *ACM Transactions on Software Engineering and Methodology*, 23(2):19:1–19:31, 2014
- Mark Harman, Kiran Lakhota, Jeremy Singer, David R. White, and Shin Yoo. Cloud engineering is search based software engineering too. *Journal of Systems and Software*, 86(9):2225 – 2241, 2013
- Shin Yoo, Mark Harman, and Shmuel Ur. GPGPU test suite minimisation: Search based software engineering performance improvement using graphics cards. *Empirical Software Engineering*, 18(3):550–593, 2013
- Shin Yoo, Mark Harman, and David Clark. Fault localization prioritization: Comparing information-theoretic and coverage-based approaches. *ACM Transactions on Software Engineering and Methodology*, 22(3):19:1–19:29, July 2013
- Shin Yoo and Mark Harman. Test data regeneration: Generating new test data from existing test data. *Journal of Software Testing, Verification and Reliability*, 22(3):171–201, 2012
- Shin Yoo and Mark Harman. Regression testing minimisation, selection and prioritisation: A survey. *Journal of Software Testing, Verification and Reliability*, 22(2):67–120, March 2012
- Shin Yoo and Mark Harman. Using hybrid algorithm for pareto efficient multi-objective test suite minimisation. *Journal of Systems and Software*, 83(4):689–701, April 2010

Peer-Reviewed Conference and Workshop Papers

- Somin Kim and Shin Yoo. DANDI: Diffusion as normative distribution for deep neural network input. In *Proceedings of the 6th International Workshop on Deep Learning for Testing and Testing for Deep Learning*, DeepTest 2025, 2025
- Hyunjoon Cho, Sungmin Kang, Gabin An, and Shin Yoo. COSMosFL: Ensemble of small language models for fault localisation. In *Proceedings of the Second International Workshop on Large Language Models for Code*, LLM4Code 2025, 2025
- Naryeong Kim, Sungmin Kang, Gabin An, and Shin Yoo. Lachesis: Predicting llm inference accuracy using structural properties of reasoning paths. In *Proceedings of the 6th International Workshop on Deep Learning for Testing and Testing for Deep Learning*, DeepTest 2025, 2025
- Hyeonseok Lee, Gabin An, and Shin Yoo. METAMON: Finding inconsistencies between program documentation and behavior using metamorphic LLM queries. In *Proceedings of the Second International Workshop on Large Language Models for Code*, LLM4Code 2025, 2025

- Louis Milliken, Sungmin Kang, and Shin Yoo. Beyond pip install: Evaluating LLM agents for the automated installation of Python projects. In *Proceedings of the IEEE International Conference on Software Analysis, Evolution and Reengineering*, SANER 2025, 2025
- Gabin An, Juyeon Yoon, Thomas Bach, Jingun Hong, and Shin Yoo. Just-in-time flaky test detection via abstracted failure symptom matching. In *Proceedings of the 40th International Conference on Software Maintenance and Evolution*, ICSME 2024 Industry Track, 2024
- Jaeyong Lee, Sungmin Kang, Juyeon Yoon, and Shin Yoo. The github recent bugs dataset for evaluating llm-based debugging applications. In *Proceedings of the IEEE Conference on Software Testing, Verification and Validation - Tools and Demonstratin Track*, ICST 2024, pages 442–444, 2024
- Jinsu Choi, Gabin An, and Shin Yoo. Iterative refactoring of real-world open-source programs with large language models. In *Proceedings of the 16th International Symposium on Search-Based Software Engineering*, volume 14767 of *Lecture Notes in Computer Science*, pages 49–55. Springer Nature, July 2024
- Sungmin Kang, Gabin An, and Shin Yoo. A quantitative and qualitative evaluation of llm-based explainable fault localization. *Proceedings of the ACM on Software Engineering*, 1(FSE):1424–1446, 7 2024
- Juyeon Yoon, Robert Feldt, and Shin Yoo. Intent-driven mobile gui testing with autonomous large language model agents. In *Proceedings of the 16th IEEE International Conference on Software Testing, Verification and Validation*, ICST 2024, pages 129–139, 2024
- A. Fan, B. Gokkaya, M. Harman, M. Lyubarskiy, S. Sengupta, S. Yoo, and J. M. Zhang. Large language models for software engineering: Survey and open problems. In *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering: Future of Software Engineering*, ICSE-FoSE, pages 31–53. IEEE Computer Society, May 2023
- Jinhan Kim, Nargiz Humbatova, Gunel Jahangirova, Paolo Tonella, and Shin Yoo. Repairing dnn architecture: Are we there yet? In *Proceedings of the 16th IEEE International Conference on Software Testing, Verification and Validation*, ICST 2023, pages 234–245, 2023
- Sungmin Kang, Juyeon Yoon, and Shin Yoo. Large language models are few-shot testers: Exploring llm-based general bug reproduction. In *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering*, ICSE 2023, pages 2312 – 2323, 2023
- Sungmin Kang, Wonkeun Choi, and Shin Yoo. A bayesian framework for automated debugging. In *Proceedings of the 32nd International Symposium on Software Testing and Analysis*, ISSTA 2023, pages 880–891, 2023
- Gabin An, Jingun Hong, Naryeong Kim, and Shin Yoo. Fonte: Finding bug inducing commits from failures. In *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering*, ICSE 2023, pages 589 – 601, 2023
- Seungjun Chung and Shin Yoo. Augmenting equivalent mutant dataset using symbolic execution. In *Proceedings of the 2022 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW)*, pages 150–159. IEEE Computer Society, April 2022
- Gabin An and Shin Yoo. FDG: A precise measurement of fault diagnosability gain of test cases. In *Proceedings of the 31st ACM SIGSOFT International Symposium on Software Testing and Analysis*, ISSTA 2022, pages 14–26, 2022
- Sungmin Kang and Shin Yoo. Language models can prioritize patches for practical program patching. In *Proceedings of the 3rd International Workshop on Automated Program Repair*, APR 2022, pages 8–15, 2022
- Juyeon Yoon, Seungjoon Chung, Kihyuck Shin, Jinhan Kim, Shin Hong, and Shin Yoo. Repairing fragile gui test cases using word and layout embedding. In *Proceedings of the 15th IEEE International Conference on Software Testing, Verification and Validation, Industry Track*, ICST 2022, pages 291–301, 2022

- Gabin An, Juyeon Yoon, Jeongju Sohn, Jingun Hong, Dongwon Hwang, and Shin Yoo. Automatically identifying shared root causes of test breakages in sap hana. In *Proceedings of the 44th IEEE/ACM International Conference on Software Engineering - Software Engineering In Practice Track*, ICSE SEIP 2022, pages 65–74, 2022
- Gabin An, Juyeon Yoon, and Shin Yoo. Searching for multi-fault programs in defects4j. In *Proceedings of the 13th International Symposium on Search Based Software Engineering*, pages 136–150, 2021
- Gabin An and Shin Yoo. Reducing the search space of bug inducing commits using failure coverage. In *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ESEC/FSE (Ideas, Visions, and Reflections Track), pages 1459–1462, 2021
- Junghyun Lee, Chani Jung, Yoo Hwa Park, Dongmin Lee, Juyeon Yoon, and Shin Yoo. Preliminary evaluation of SWAY in permutation decision space via a novel euclidean embedding. In *Proceedings of the 13th International Symposium on Search Based Software Engineering*, SSBSE 2021, pages 26–40, 2021
- Jinhan Kim, Gabin An, Robert Feldt, and Shin Yoo. Ahead of time mutation based fault localisation using statistical inference. In *Proceedings of the 32nd International Symposium on Software Reliability Engineering*, ISSRE 2021, pages 253–263, 2021
- Juyeon Yoon and Shin Yoo. Enhancing lexical representation of test coverage for failure clustering. In *Proceedings of the 36th IEEE/ACM International Conference on Automated Software Engineering Workshops (NLP-SEA 2021)*, pages 232–238, 2021
- Seah Kim and Shin Yoo. Multimodal surprise adequacy analysis of inputs for natural language processing dnn models. In *Proceedings of the 2nd ACM/IEEE International Conference on Automated Software Testing*, AST 2021, pages 80–89, 2021
- Jeongju Sohn, Gabin An, Jingun Hong, Dongwon Hwang, and Shin Yoo. Assisting bug report assignment using automated fault localisation: An industrial case study. In *Proceedings of the 14th IEEE International Conference on Software Testing, Verification and Validation*, pages 284–294, 2021
- Jeongju Sohn, Yasutaka Kamei, Shane McIntosh, and Shin Yoo. Leveraging fault localisation to enhance defect prediction. In *Proceedings of the 28th IEEE International Conference on Software Analysis, Evolution and Reengineering*, SANER 2021, pages 284–294, 2021
- Saeyoon Oh, Seongmin Lee, and Shin Yoo. Effectively sampling higher order mutants using causal effect. In *Proceedings of the 16th International Workshop on Mutation Analysis*, Mutation 2021, pages 19–24, 2021
- Seunghee Han, Jaeuk Kim, Geon Kim, Jaemin Cho, Jiin Kim, and Shin Yoo. Preliminary evaluation of path-aware crossover operators for search-based test data generation for autonomous driving. In *Proceedings of the 14th International Workshop on Search Based Software Testing*, SBST 2021, pages 44–47, 2021
- Jinhan Kim, Jeongil Ju, Robert Feldt, and Shin Yoo. Reducing dnn labelling cost using surprise adequacy: An industrial case study for autonomous driving. In *Proceedings of ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE Industry Track)*, ESEC/FSE 2020, pages 1466–1476, 2020
- Sungmin Kang, Robert Feldt, and Shin Yoo. Sinvad: Search-based image space navigation for dnn image classifier test input generation. In *Proceedings of the International Workshop on Search Based Software Testing*, SBST 2020, pages 521–528, 2020
- Seah Kim and Shin Yoo. Evaluating surprise adequacy for question answering. In *Proceedings of The 2nd International Workshop on Testing for Deep Learning and Deep Learning for Testing (DeepTest 2020)*, pages 197–202, 2020
- S. Lee, S. Hong, J. Yi, T. Kim, C. Kim, and S. Yoo. Classifying false positive static checker alarms in continuous integration using convolutional neural networks. In *2019 12th IEEE Conference on Software Testing, Validation and Verification (ICST)*, pages 391–401, April 2019

- Gabin An, Aymeric Blot, Justyna Petke, and Shin Yoo. Pyggi 2.0: Language independent genetic improvement framework. In *Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ESEC/FSE 2019, pages 1100–1104, New York, NY, USA, 2019
- Seongmin Lee, David Binkley, Robert Feldt, Nicolas Gold, and Shin Yoo. MOAD: Modeling observation-based approximate dependency. In *19th IEEE International Working Conference on Source Code Analysis and Manipulation*, SCAM 2019, pages 12–22, 2019
- Jeongju Sohn and Shin Yoo. Why train-and-select when you can use them all? Ensemble model for fault localisation. In *Proceedings of the Annual Conference on Genetic and Evolutionary Computation*, GECCO 2019, pages 1408–1416, 2019
- Jinhan Kim, Robert Feldt, and Shin Yoo. Guiding deep learning system testing using surprise adequacy. In *Proceedings of the 41th International Conference on Software Engineering*, ICSE 2019, pages 1039–1049. IEEE Press, 2019
- Mike Papadakis, Donghwan Shin, Shin Yoo, and Doo-Hwan Bae. Are mutation scores correlated with real fault detection? a large scale empirical study on the relationship between mutants and real faults. In *Proceedings of the 40th International Conference on Software Engineering*, ICSE 2018, pages 537–548, May 2018
- Kabdo Choi, Jeongju Sohn, and Shin Yoo. Learning fault localisation for both humans and machines using Multi-Objective GP. In *Proceedings of the 10th International Symposium on Search Based Software Engineering*, SSBSE 2018, pages 349–355, 2018
- Junhwi Kim, Minhyuk Kwon, and Shin Yoo. Generating test input with deep reinforcement learning. In *Proceedings of International Workshop on Search Based Software Testing*, SBST 2018, pages 51–58, 2018
- Gabin An, Jinhan Kim, and Shin Yoo. Comparing line and ast granularity level for program repair using pyggi. In *Proceedings of the 4th Genetic Improvement Workshop*, GI@ICSE 2018, pages 19–26, 2018
- Byeonghyeon You, Junhwi Kim, Minhyuk Kwon, Phil McMinn, and Shin Yoo. C 언어 테스트 입력 생성에 대한 CAVM, Austin, CodeScroll의 비교 및 분석. In *Proceedings of the 20th Korea Conference on Software Engineering*, number 1 in KCSE 2018, pages 14–22, 2018
- Gabin An, Jinhan Kim, Seongmin Lee, and Shin Yoo. PyGGI: Python General framework for Genetic Improvement. In *Proceedings of Korea Software Congress*, KSC 2017, December 2017
- Dave Binkley, Nicolas Gold, Mark Harman, Syed Islam, Jens Krinke, and Shin Yoo. Tree-oriented vs. line-oriented observation-based slicing. In *Proceedings of the 17th International Working Conference on Source Code Analysis and Manipulation*, SCAM 2017, September 2017
- Jinhan Kim, Junhwi Kim, and Shin Yoo. Gpgpgpu: Evaluation of parallelisation of genetic programming using gpgpu. In *Proceedings of the International Symposium on Search Based Software Engineering*, SSBSE 2017, pages 137–142, September 2017
- Junhwi Kim, Byeonghyeon You, Minhyuk Kwon, Phil McMinn, and Shin Yoo. Evaluating CAVM: a new search based test data generation tool for C. In *Proceedings of the International Symposium on Search Based Software Engineering*, SSBSE 2017, pages 143–149, September 2017
- Nicolas Gold, David Binkley, Mark Harman, Syed Islam, Jens Krinke, and Shin Yoo. Generalized observational slicing for tree-represented modelling languages. In *Proceedings of the 11th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, ESEC/FSE 2017, pages 547–558, September 2017
- Shin Yoo. Embedding Genetic Improvement into programming languages. In *Proceedings of the Genetic and Evolutionary Computation Conference Companion*, GECCO '17, pages 1551–1552, New York, NY, USA, July 2017. ACM

- Dahyun Kang, Jeongju Sohn, and Shin Yoo. Empirical evaluation of conditional operators in GP based fault localization. In *Genetic and Evolutionary Computation, GECCO 2017*, pages 1295–1302, July 2017
- Seongmin Lee and Shin Yoo. Hyperheuristic observation based slicing of guava. In *Proceedings of the International Symposium on Search Based Software Engineering, SSBSE 2017*, pages 175–180, July 2017
- Jeongju Sohn and Shin Yoo. FLUCCS: Using code and change metrics to improve fault localisation. In *Proceedings of International Symposium on Software Testing and Analysis, ISSTA 2017*, pages 273–283, July 2017
- Donghwan Shin, Shin Yoo, and Doo-Hwan Bae. Diversity-aware mutation adequacy criterion for improving fault detection capability. In *Ninth IEEE International Conference on Software Testing, Verification and Validation Workshops, ICSTW 2016*, pages 122–131, April 2016
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- Robert Feldt, Simon Poulding, David Clark, and Shin Yoo. Test set diameter: Quantifying the diversity of sets of test cases. In *Proceedings of the IEEE International Conference on Software Testing, Verification, and Validation, ICST 2016*, pages 223–233, 2016
- Jeongju Sohn, Seongmin Lee, and Shin Yoo. Amortised deep parameter optimisation of gpgpu work group size for opencv. In *Search-Based Software Engineering, Lecture Notes in Computer Science*. Springer International Publishing, 2016
- Jinsuk Lim and Shin Yoo. Field report: Applying monte carlo tree search for program synthesis. In *Search-Based Software Engineering, Lecture Notes in Computer Science*, pages 304–310. Springer International Publishing, 2016
- Shin Yoo. Amortised optimisation of non-functional properties in production environments. In Márcio Barros and Yvan Labiche, editors, *Search-Based Software Engineering*, volume 9275 of *Lecture Notes in Computer Science*, pages 31–46. Springer International Publishing, 2015
- Michael G. Epitropakis, Shin Yoo, Mark Harman, and Edmund K. Burke. Empirical evaluation of pareto efficient multi-objective regression test case prioritisation. In *Proceedings of the 2015 International Symposium on Software Testing and Analysis, ISSTA 2015*, pages 234–245, New York, NY, USA, 2015. ACM
- David Clark, Robert Feldt, Simon Poulding, and Shin Yoo. Information transformation: An underpinning theory for software engineering. In *Proceedings of the 37th International Conference on Software Engineering - Volume 2, ICSE '15*, pages 599–602, Piscataway, NJ, USA, 2015. IEEE Press
- David Binkley, Nicolas Gold, Mark Harman, Syed Islam, Jens Krinke, and Shin Yoo. ORBS and the limits of static slicing. In *Proceedings of the 15th IEEE International Working Conference on Source Code Analysis and Manipulation*, 2015
- David R. White, Shin Yoo, and Jeremy Singer. The programming game: Evaluating mcts as an alternative to gp for symbolic regression. In *Proceedings of the Companion Publication of the 2015 on Genetic and Evolutionary Computation Conference, GECCO Companion '15*, pages 1521–1522, New York, NY, USA, 2015. ACM
- Seokhyeon Moon, Yunho Kim, Moonzoo Kim, and Shin Yoo. Ask the mutants: Mutating faulty programs for fault localization. In *Proceedings of the 7th International Conference on Software Testing, Verification and Validation, ICST 2014*, pages 153–162, 2014
- David Binkley, Nicolas Gold, M. Harman, Syed Islam, Jens Krinke, and Shin Yoo. ORBS: Language-independent program slicing. In *Proceedings of the 22nd ACM SIGSOFT International Symposium on the Foundations of Software Engineering, FSE 2014*, pages 109–120, 2014
- Shin Yoo, David Binkley, and Roger Eastman. Seeing is slicing: Observation based slicing of picture description languages. In *Proceedings of the 14th IEEE International Working Conference on Source Code Analysis and Manipulation*, pages 175–184, 2014

- Justyna Petke, Myra Cohen, Mark Harman, and Shin Yoo. Efficiency and early fault detection with lower and higher strength combinatorial interaction testing. In *Proceedings of the 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, 2013
- Xiaoyuan Xie, Fei-Ching Kuo, Tsong Yueh Chen, Shin Yoo, and Mark Harman. Provably optimal and human-competitive results in sbse for spectrum based fault localisation. In Günther Ruhe and Yuanyuan Zhang, editors, *Search Based Software Engineering*, volume 8084 of *Lecture Notes in Computer Science*, pages 224–238. Springer Berlin Heidelberg, 2013
- Shin Yoo. Evolving human competitive spectra-based fault localisation techniques. In Gordon Fraser and Jefferson Teixeira de Souza, editors, *Search Based Software Engineering*, volume 7515 of *Lecture Notes in Computer Science*, pages 244–258. Springer Berlin Heidelberg, 2012
- Shin Yoo, Robert Nilsson, and Mark Harman. Faster fault finding at Google using multi objective regression test optimisation. In *8th European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE '11)*, Szeged, Hungary, September 5th - 9th 2011. Industry Track
- Shin Yoo, Mark Harman, and Shmuel Ur. Highly scalable multi-objective test suite minimisation using graphics card. In *LNCS: Proceedings of the 3rd International Symposium on Search-Based Software Engineering*, volume 6956 of *SSBSE*, pages 219–236, September 2011
- Jungsup Oh, Mark Harman, and Shin Yoo. Transition coverage testing for Simulink/Stateflow models using messy genetic algorithms. In *Proceedings of the 13th annual conference on Genetic and evolutionary computation, GECCO '11*, pages 1851–1858, New York, NY, USA, 2011. ACM
- M. Harman, Sung Gon Kim, K. Lakhotia, P. McMinn, and Shin Yoo. Optimizing for the number of tests generated in search based test data generation with an application to the oracle cost problem. In *Proceedings of the 3rd International Workshop on Search-Based Software Testing (SBST 2010)*, pages 182 –191, apr. 2010
- Shin Yoo. A novel mask-coding representation for set cover problems with applications in test suite minimisation. In *Proceedings of the 2nd International Symposium on Search-Based Software Engineering (SSBSE 2010)*, 2010
- Shin Yoo. Metamorphic testing of stochastic optimisation. In *Proceedings of the 3rd International Workshop on Search-Based Software Testing (SBST 2010)*, pages 192–201, 2010
- Shin Yoo, Mark Harman, Paolo Tonella, and Angelo Susi. Clustering test cases to achieve effective & scalable prioritisation incorporating expert knowledge. In *Proceedings of International Symposium on Software Testing and Analysis (ISSTA 2009)*, pages 201–211. ACM Press, July 2009
- Shin Yoo, Mark Harman, and Shmuel Ur. Measuring and improving latency to avoid test suite wear out. In *Proceedings of the International Conference on Software Testing, Verification and Validation Workshop (ICSTW 2009)*, pages 101–110. IEEE Computer Society Press, April 2009
- Mark Harman, Jens Krinke, Jian Ren, and Shin Yoo. Search based data sensitivity analysis applied to requirement engineering. In *Proceedings of the 11th Annual Conference on Genetic and Evolutionary Computation (GECCO '09)*, pages 1681–1688, Montreal, Canada, 8-12 July 2009. ACM
- Shin Yoo and Mark Harman. Pareto efficient multi-objective test case selection. In *Proceedings of International Symposium on Software Testing and Analysis*, pages 140–150. ACM Press, July 2007

Book Chapter

- Mark Harman, Phil McMinn, Jefferson Teixeira de Souza, and Shin Yoo. *Empirical Software Engineering and Verification*, volume 7007 of *Lecture Notes in Computer Science*, chapter Search Based Software Engineering: Techniques, Taxonomy, Tutorial. Springer–Verlag, 2012

Book

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Fast Abstracts and Posters

- Shin Yoo. SBSE As Gaming. In *Proceedings of the 3rd International Symposium on Search-Based Software Engineering*, 2011
- *Controlled Redundancy: Avoiding Test Suite Wear-Out*
Shin Yoo, Mark Harman and Shmuel Ur
ACM International Symposium on Software Testing and Analysis, July 2008

Invited Talks

- **Invited Keynote:** *Executing one's way out of Chinese Room*
The 13th International Workshop on Genetic Improvement (GI 2024)
- **Invited Keynote:** *대규모언어모델과 소프트웨어 공학 - 역사, 현황, 전망*
The 26th Korea Conference on Software Engineering 2024 (KCSE 2024)
- **Invited Keynote:** *Lessons from 10 years of Automated Debugging Research*
The 4th ACM/IEEE International Conference on Automated Software Testing (AST 2023)
- **Invited Keynote:** *Searching for Cost Effective Test Inputs for DNN Testing*
The 2nd International Workshop on Testing for Deep Learning and Deep Learning for Testing (DeepTest 2020)
- *Testing in the Age of Deep Neural Networks*
Technical Seminar, Samsung Research, December 2019
- *Breaking Things to Learn about Dependency*
Technical Seminar, Facebook UK, October 2019
- *The Role of SBSE in the Age of Deep Neural Networks*
The 61th CREST Open Workshop, University College London, October 2019
- *Automated Programming via Evolutionary Computation: Are we there yet?*
Kavli Frontiers of Science, National Academy of Science, June 2019
- **Invited Keynote:** *Testing of AI Systems - Challenges Ahead*
The 1st International Workshop on Machine Learning and Software Testing, April 2019
- **Invited Keynote:** *SBST in the age of AI Systems - Challenges Ahead*
The 12th International Workshop on Search Based Software Testing, May 2019
- *Hammer and Nails in Genetic Improvement*
The 58th CREST Open Workshop, University College London, UK, February 2018
- *Learning How to Localise Faults Automatically*
University of Sheffield, February 2018
- *Search-Based Software Engineering: Tutorial*
Shonan Meeting - "Data-Driven Search-Based Software Engineering", December 2019
- *Learning How to Localise Faults Automatically*
Technical Seminar, Software Centre, Samsung Electronics, November 2017
- *Amortised Optimisation as a Means to Achieve Genetic Improvement*
The 50th CREST Open Workshop, University College London, UK, January 2017
- *AI, or what does it mean to fly?*
 - 과학교사 모임 가꿈, 2016
 - Kookmin University (a special lecture for "ICT and Creative Thinking"), 2016, 2017

- Colloquium, Korean Association for Posthuman Society, 2016
- Go-Venture Forum, 2016
- Art Space Nabi / Singularity 99, 2016
- *Introduction to Search Based Software Engineering*
 - Colloquium, Department of Industrial and Systems Engineering, KAIST, 2016
 - Suresoft Technology, 2016
 - Colloquium, Software Engineering Programme, KAIST, 2016
 - Naver Labs, 2016
 - Korean Conference on Software Engineering, 2015
 - LG SDET Programme Graduation Seminar, 2015
- *Materials for Software*
 - Colloquium, School of Computing, KAIST, 2015
- *ORBS: Observation Based Program Slicing and Beyond*
 - Kyungpook University, 2015
 - Chunnam University, 2014
- *Spectrum Based Fault Localisation: Entropy and Evolution*
 - Hong Kong University of Science and Technology, 2013
 - University of Luxembourg, 2013
- *TAO: Turing test As Objective function*
 - The 2nd International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering, 2013 **Best Paper Award**
- *Regression Testing: Past, Present & Future*
 - Training and Research on Testing (TAROT) Summer School, St. Petersburg, Russia, June 2011.
- *Search Based Regression Testing: A Story of Rapid Prototyping*
 - Google EMEA (Europe, Middle East & Africa) Faculty Summit, Zurich, Switzerland, May 2011.
- *Early Test Feedback by Test Prioritisation*
 - Google Test Automation Conference, Hyderabad, India, October 2010.

PhD Supervision

As of March 2025, I have been, or current am, the PhD supervisor for seven PhD students; five of them, who are listed below, have graduated.

- **Jeongju Sohn** (<https://jjsohn92.github.io>)
Currently an assistant professor in Kyungpook National University, Republic of Korea
- **Seongmin Lee** (<http://nimgnoseel.github.io>)
Currently a post-doctoral researcher at Max-Planck Institute Security & Privacy, Germany
- **Jinhan Kim** (<https://jinhan.me>)
Currently a post-doc researcher at Università della Svizzera Italiana, Switzerland)
- **Gabin An** (<https://agb94.github.io>)
Currently a software engineer at Roku Korea, Republic of Korea
- **Sungmin Kang** (<https://smkang96.github.io>)
Currently a post-doctoral researcher at KAIST, Republic of Korea

Community Services and Recognition

Conference Organisation

- **General Chair:** IEEE/ACM International Conference on Automated Software Engineering (ASE), 2025
- **Area Co-Chair:** IEEE/ACM International Conference on Software Engineering (ICSE), Testing and Program Analysis Area, 2024
- **Tutorials Co-Chair:** ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), 2023
- **Workshop Co-Chair:** ACM International Symposium on Software Testing and Analysis (ISSTA), 2022
- **General Chair:** The 14th International Symposium on Search Based Software Engineering (SSBSE), 2022
- **Student Research Competition Chair:** ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), 2022
- **Program Chair:** Korean Conference on Software Engineering (KCSE), 2021
- **Artifact Evaluation Track Co-chair:** The 37th International Conference on Software Maintenance and Evolution (ICSME), 2021
- **Workshop Co-chair:** The 8th International Workshop on Genetic Improvement, 2020
- **Workshop Co-chair:** The 8th International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering, 2020
- **Program Co-chair:** The 42th International Conference on Software Engineering, New Ideas and Emerging Results Track, 2020
- **Program Co-chair:** The 11th International Conference on Software Testing, Verification, and Validation, 2018
- **Program Co-chair:** The 6th International Symposium on Search Based Software Engineering, 2014
- **General Chair:** The 2nd International Workshop on Regression Testing, 2012
- **Track Chair:** Genetic and Evolutionary Computation Conference, SBSE Track, 2012
- **Program Chair:** The 1st International Workshop on Regression Testing, 2011
- **Graduate Student Chair:** The 4th International Symposium on Search Based Software Engineering, 2012

Program Committee Membership

- 2025: ICSE, ISSTA, ICST
- 2024: ICSE, ISSTA, SSBSE, AST, KCSE
- 2023: ISSTA, ICST, DeepTest, ICSME, APSEC
- 2022: ISSTA, FSE, KCSE, APR
- 2021: ICSE (New Ideas and Emerging Results Track), FSE, AST, ICTSS
- 2020: ICSE, FSE, SBST, ASE, AST
- 2019: ICSE (New Ideas and Emerging Results Track), ASE, ICSME, SANER, KCSE (Short Papers), MSR, RAISE, Mutation
- 2018: ICSE, FSE (New Ideas and Emerging Results Track), SSBSE, RAISE
- 2017: ICST, SSBSE, APSEC (Doctoral Symposium), ICSE (Poster Track)
- 2016: ICST, SSBSE, ISSRE (Fast Abstract Track)
- 2014: ISSTA (Doctoral Symposium), SBST, CMSEBA
- 2013: ISSTA, SBST, CMSBSE, Regression
- 2012: SSBSE, KCSE, SBST, GECCO (SBSE Track)
- 2011: SSBSE
- 2010: SSBSE, SBST
- 2009: SSBSE

Steering Committee

- International Conference on Software Testing, Verification, and Validation (ICST): 2017 - 2023
- International Symposium on Search Based Software Engineering (SSBSE): 2015 -

Editorial Board Membership

- Journal of Software Testinv, Verification and Reliability, 2024-
- Journal of Genetic Programming and Evolvable Machines, 2021-
- ACM Transactions on Software Engineering and Methodology, 2019-
- Journal of Empirical Software Engineering, 2018-
- IET Software Journal, 2017-2020

Special Issue Editor

- Special Issue of ICST 2018, Journal of Software Testing, Verification and Reliability
- Special Issue of SSBSE 2014, Journal of Empirical Software Engineering
- Special Issue on Regression Testing, Software Quality Journal

Awards and Recognition

- Best Industry Paper Award, IEEE International Conference on Software Maintenance & Evolution 2024
- IEEE TCSE Most Influential Paper Award, International Conference on Software Testing, Verification & Validation, 2024
- Best Paper Award, International Wokshop on Mutation Testing, 2023
- Distinguished Reviewer, Foundations on Software Engineering, 2022
- Technical Innovation Award, College of Engineering, KAIST, 2019
- Distinguished Reviewer, International Conference on Software Engineering, 2018
- ACM SIGEVO HUMIES - Human Competitiveness Award, Silver Medal, 2017
- Best Paper Award, IEEE Working Conference on Source Code Analysis and Manipulation, 2017
- Distinguished Reviewer, ACM Transactions on Software Engineering and Methodology, 2015-2016
- Distinguished Reviewer, ACM Transactions on Software Engineering and Methodology, 2013-2014
- Best Paper Award, International Workshop on Realizing Artificial Intelligence Synergy in Software Engineering, 2013
- Distinguished Reviewer, ACM Transactions on Software Engineering and Methodology, 2011-2012
- Best Paper Award, International Symposium on Search Based Software Engineering, 2011
- Best Paper Award, International Workshop on Search Based Software Testing, 2008
- Overseas Research Student Grant Award, Higher Education Funding Council for England, 2007
- Best MSc Project Award, King's College London, 2006

Teaching Experience

Subject	Level	Class Size	Institution	Feedback	Years
CS454 AI-based Software Engineering	BSc/MSc	32	KAIST	4.31	2024 Fall
CS489 Computer Ethics and Social Issues	BSc/MSc	25	KAIST	4.46	2024 Fall
CS453 Automated Software Testing	BSc/MSc	40	KAIST	4.52	2024 Spring
CS454 AI-based Software Engineering	BSc/MSc	56	KAIST	4.39	2023 Fall
CS489 Computer Ethics and Social Issues	BSc/MSc	30	KAIST	4.43	2023 Fall

CS453 Automated Software Testing	BSc/MSc	29	KAIST	4.80	2023 Spring
CS350 Introduction to Software Engineering	BSc	82	KAIST	4.19	2023 Spring
CS489 Computer Ethics and Social Issues	BSc/MSc	35	KAIST	4.59	2021 Fall
CS454 AI-based Software Engineering	BSc/MSc	40	KAIST	4.65	2021 Fall
SEP592 AI-based Software Engineering	MSc	16	KAIST	4.67	2021 Summer
CS453 Automated Software Testing	BSc/MSc	31	KAIST	4.41	2021 Spring
CS101 Introduction to Programming (G)	BSc	48	KAIST	4.46	2021 Spring
CS101 Introduction to Programming (H)	BSc	46	KAIST	4.62	2021 Spring
CS489 Computer Ethics and Social Issues	BSc/MSc	50	KAIST	4.51	2020 Fall
CS454 AI-based Software Engineering	BSc/MSc	110	KAIST	4.34	2020 Fall
SEP592 AI-based Software Engineering	MSc	15	KAIST	4.69	2020 Summer
CS453 Automated Software Testing	BSc/MSc	39	KAIST	4.47	2020 Spring
CS492 Introduction to Research	BSc/MSc	29	KAIST	4.90	2019 Spring
CS489 Computer Ethics and Social Issues	BSc/MSc	50	KAIST	4.35	2019 Fall
CS454 AI-based Software Engineering	BSc/MSc	62	KAIST	4.34	2019 Fall
CS492 Introduction to Research	BSc/MSc	25	KAIST	4.69	2019 Spring
CS453 Automated Software Testing	BSc/MSc	32	KAIST	4.24	2019 Spring
CS492 Introduction to Research	BSc/MSc	29	KAIST	4.65	2018 Fall
CS454 AI-based Software Engineering	BSc/MSc	50	KAIST	4.24	2018 Fall
CS453 Automated Software Testing	BSc/MSc	26	KAIST	4.37	2018 Spring
CS402 Introduction to Logic in Computer Science	BSc/MSc	55	KAIST	4.07	2018 Spring
CS454 AI-based Software Engineering	BSc/MSc	34	KAIST	4.33	2017 Fall
CS402 Introduction to Logic in Computer Science	BSc/MSc	38	KAIST	4.07	2017 Spring
CS101 Introduction to Programming	BSc	40	KAIST	4.31	2017 Spring
CS492 Search Based Software Engineering	BSc/MSc	23	KAIST	4.37	2016 Fall
CS402 Introduction to Logic in Computer Science	BSc/MSc	70	KAIST	3.90	2016 Spring
CS492 Search Based Software Engineering	BSc/MSc	10	KAIST	4.78	2015 Fall
COMPGC03 Architecture and Hardware	MSc	≈ 40	UCL	-	2013 - 2015
COMP2010 Compiler	BSc	≈ 50	UCL	-	2013 - 2015
COMPGS03 Validation & Verification	MSc	≈ 30	UCL	-	2011 - 2015
