

Shin Yoo

Assistant Professor
School of Computing
Korea Advanced Institute of Science and Technology
291 Daehak Ro, Yuseong Gu
Daejeon 34141
Republic of Korea

shin.yoo@kaist.ac.kr
+82 42 350 3567

Education and Employment

Assistant Professor, School of Computing, Korea Advanced Institute of Science and Technology, Republic of Korea, August 2015 - present
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, Kings College London, UK, October 2009 - July 2010
Developed an open-source multi-objective test suite minimisation tool and applied to Googles 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, Kings College London, UK, October 2006 - September 2009
Dissertation: Extending the Boundaries in Regression Testing: Complexity, Latency, and Expertise
Supervisor: Mark Harman

MSc., Software Engineering with Distinction, Kings 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, 1996 - 2000

Publications

Statistics

- Accumulated Citations: 1507
- h-index: 17

Peer-Reviewed Journal Articles¹

- *Observational slicing based on visual semantics*
Shin Yoo, David Binkley, and Roger Eastman
Journal Of Systems and Software, *to appear*
- *Practical Combinatorial Interaction Testing: Empirical Findings on Efficiency and Early Fault Detection*
Justyna Petke, Myra Cohen, Mark Harman, and Shin Yoo
IEEE Transactions on Software Engineering, 41(9):901-924, 2015
- *The Oracle Problem in Software Testing: A Survey*
Earl T. Barr, Mark Harman, Phil McMinn, Muzammil Shahbaz, and Shin Yoo
IEEE Transactions on Software Engineering, 41(5):507525, 2015
- *Exact Scalable Sensitivity Analysis for the Next Release Problem*
Mark Harman, Jens Krinke, Inmaculada Medina-Bulo, Francisco Palomo-Lozano, Jian Ren, and **Shin Yoo**
ACM Transactions on Software Engineering and Methodology, 23(2):19:1-19:31, 2013
- *Cloud Engineering is Search Based Software Engineering Too*
Mark Harman, Kiran Lakhota, Jeremy Singer, David White and **Shin Yoo**
Journal of Empirical Software Engineering, 86(9):2225-2241
- *GPGPU Test Suite Minimisation: Search Based Software Engineering Performance Improvement Using Graphics Cards*
Shin Yoo, Mark Harman and Shmuel Ur
Journal of Empirical Software Engineering, 18(3):550-593, 2013 **Invited Paper**
- *Fault Localisation Prioritisation: Comparing Information Theoretic and Coverage Based Approaches*
Shin Yoo, Mark Harman and David Clark
ACM Transactions on Software Engineering and Methodology, 22(3):19:1-19:29, 2013
- *Test Data Regeneration: Generating New Test Data From Existing Test Data*
Shin Yoo and Mark Harman
Journal of Software Testing, Verification and Reliability, 22(3):171-201, 2012
- *Regression Testing Minimisation, Selection and Prioritisation : A Survey*
Shin Yoo and Mark Harman
Journal of Software Testing, Verification and Reliability, 22(2):67-120, 2012
- *Using Hybrid Algorithm For Pareto Efficient Multi-Objective Test Suite Minimisation*
Shin Yoo and Mark Harman
Journal of Systems and Software, 83(4):689-701, 2010

Peer-Reviewed Conference and Workshop Papers

- *Test Set Diameter: Quantifying the Diversity of Sets of Test Cases*
Robert Feldt, Simon Poulding, David Clark, and Shin Yoo
Proceedings of the IEEE International Conference on Software Testing, Verification, and Validation, 2016

¹Citation statistics correct as of 23 May 2016.

- *Extended Mutation Adequacy Criterion for Improving Fault Detection Capability*
Donghwan Shin, Shin Yoo, and Doohwan Bae
Proceedings of the 10th IEEE International Conference on Software Testing, Verification and Validation Workshops, 2016
- *Information Transformation: An Underpinning Theory for Software Engineering*
David Clark, Robert Feldt, Simon Poulding, and Shin Yoo
International Conference on Software Engineering: New Ideas and Emerging Research (NIER), vol. 2, p599602, 2015
- *The Programming Game: Evaluating MCTS as an Alternative to GP for Symbolic Regression*
David White, Shin Yoo, and Jeremy Singer
Genetic and Evolutionary Computation Conference (GECCO 2015), p15211522, 2015
- *Empirical Evaluation of Pareto Efficient Multi Objective Regression Test Case Prioritisation*
Michael G. Epitropakis, Shin Yoo, Mark Harman, and Edmund Burke
International Symposium on Software Testing and Analysis (ISSTA 2015), p234-245, 2015
- *ORBS: Language-Independent Program Slicing*
David Binkley, Nicolas Gold, Mark Harman, Syed Islam, Jens Krinke, and Shin Yoo
The 22nd ACM SIGSOFT International Symposium on the Foundations of Software Engineering, (FSE 2014), p109-120, 2014
- *Seeing is Slicing: Observation Based Slicing of Picture Description Languages*
Shin Yoo, David Binkley, and Roger Eastman
The 14th IEEE Working Conference on Source Code Analysis and Manipulation, (SCAM 2014), p175-184, 2014
- *Ask the Mutants: Mutating Faulty Programs for Fault Localization*
Seokhyeon Moon, Yunho Kim, Moonzoo Kim, and **Shin Yoo**
The 7th International Conference on Software Testing, Verification, and Validation, (ICST 2014), p153-162, March 2014
- *Efficiency and Early Fault Detection with Lower and Higher Strength Combinatorial Interaction Testing*
Justyna Petke, Myra Cohen, Mark Harman, and **Shin Yoo**
The 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2013), p26-36, August 2013
- *TAO: Turing test As Objective function*
Shin Yoo
2nd International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering, 2013 **Invited Paper, Best Paper Award**
- *Provably Optimal and Human-Competitive Results in SBSE for Spectrum Based Fault Localisation*
Xiaoyuan Xie and Fei-Ching Kuo and Tsong Yueh Chen and **Shin Yoo** and Mark Harman
5th International Symposium on Search-Based Software Engineering(SSBSE 2013), p224-238, 2013
- *Evolving Human Competitive Spectra-Based Fault Localisation Techniques*
Shin Yoo
The 4th International Symposium on Search Based Software Engineering, p244-258, September 2012
- *Highly Scalable Multi Objective Test Suite Minimisation Using Graphics Cards*
Shin Yoo, Mark Harman, and Shmuel Ur
The 3rd International Symposium on Search Based Software Engineering, p219-236, September 2011
Best Paper Award Winner
- *Formal Concept Analysis on Graphics Hardware*
William Langdon, **Shin Yoo**, and Mark Harman
The 8th International Conference on Concept Lattices and Their Applications, p413-416, October 2011

- *Faster Fault Finding at Google using Multi-Objective Regression Test Optimisation*
Shin Yoo, Robert Nilsson and Mark Harman
ACM Symposium on the Foundations of Software Engineering, Industrial Track, September 2011
- *Transition coverage testing for Simulink/Stateflow models using messy genetic algorithms*
Jungsup Oh, Mark Harman, and Shin Yoo
Genetic and Evolutionary Computation Conference, p1851-1858, July 2011
- *A Novel Mask-Coding Representation for Set Cover Problems with Applications in Test Suite Minimisation*
Shin Yoo
The 2nd International Symposium on Search Based Software Engineering, p19-28, September 2010
- *Optimising for the Number of Tests Generated in Search Based Test Data Generation with an Application to the Oracle Cost Problem*
Mark Harman, Sung Gon Kim, Kiran Lakhotia, Phil McMinn, and Shin Yoo
The 3rd International Workshop on Search Based Software Testing, April 2010
- *Metamorphic Testing of Stochastic Optimisation*
Shin Yoo
The 3rd International Workshop on Search Based Software Testing, p192-201, April 2010
- *Clustering Test Cases to Achieve Effective and Scalable Prioritisation Incorporating Expert Knowledge*
Shin Yoo, Mark Harman, Paolo Tonella, and Angelo Susi
International Symposium on Software Testing Analysis, p201-211, July 2009
- *Search Based Data Sensitivity Analysis Applied to Requirement Engineering*
Jian Ren, Shin Yoo, Mark Harman, and Jens Krinke
Genetic and Evolutionary Computation Conference, p1681-1688, July 2009
- *Measuring and Improving Latency to Avoid Test Suite Wear-Out*
Shin Yoo, Mark Harman and Shmuel Ur
The 2nd International Workshop on Search Based Software Testing, April 2008
Best Paper Award Winner
- *Pareto-efficient Multi-objective Test Case Selection*
Shin Yoo and Mark Harman
ACM International Symposium on Software Testing and Analysis, p140-150, July 2007

Book Chapter

- *Search Based Software Engineering: Techniques, Taxonomy, Tutorial*
Mark Harman, Phil McMinn, Jefferson Teixeira de Souza, and Shin Yoo
In Empirical Software Engineering and Verification: LASER 2009-2010, LNCS v.7007, p1-59
Editors: Bertrand Meyer and Martin Nordio. Springer, 2012

Fast Abstracts and Posters

- *SBSE As Gaming*
Shin Yoo
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

- *TAO: Turing test As Objective function*
Shin Yoo
2nd International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering, 2013 **Best Paper Award**
- *Regression Testing: Past, Present & Future*
Shin Yoo
Training and Research on Testing (TAROT) Summer School, St. Petersburg, Russia, June 2011.
- *Search Based Regression Testing: A Story of Rapid Prototyping*
Shin Yoo
Google EMEA (Europe, Middle East & Africa) Faculty Summit, Zurich, Switzerland, May 2011.
- *Early Test Feedback by Test Prioritisation*
Shin Yoo, Mark Harman and Robert Nilsson
Google Test Automation Conference, Hyderabad, India, October 2010.

Grants (Total Amount: £32,535)

- **SCARTO Project:** Google Research Award 2011, wrote the proposal as the Principal Researcher, £27,431
- **MORETest Project:** Google Research Award 2010, wrote the proposal as the Principal Researcher, £5,103

Peer Esteem Indicators

Conference Organisation

- **Program Co-chair,** The 6th International Symposium on Search Based Software Engineering, 2014
- **General Chair,** The 2nd International Workshop on Regression Testing, 2012
- **Program 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

- International Conference on Software Testing, Verification, and Validation - Program Committee; 2016
- International Conference on Software Engineering - Review Board: 2015
- International Symposium on Software Testing and Analysis - Doctoral Symposium: 2014
- International Symposium on Software Testing and Analysis: 2013
- International Symposium on Search Based Software Engineering: 2009, 2010, 2011, 2012
- Korean Conference on Software Engineering: 2012
- International Workshop on Search Based Software Testing: 2010, 2011, 2012

Steering Committee

- International Symposium on Search Based Software Engineering: 2015-

Special Issue Editor

- Special Issue of SSBSE 2014, Journal of Empirical Software Engineering, *to appear*
- Special Issue on Regression Testing, Software Quality Journal, 2013

Awards

- Best Paper Award, International Workshop on Realizing Artificial Intelligence Synergy in Software Engineering, 2013
- 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, Kings College London, 2006

References

- **Prof. Lionel Briand** Facult des Sciences, de la Technologie et de la Communication
University of Luxembourg
4, rue Alphonse Weicker, L-2721 Luxembourg
Email: lionel.briand@uni.lu **Tel.:** +352 46 66 44 5223
- **Prof. Xin Yao** Natural Computation Group, School of Computer Science
University of Birmingham
Edgbaston, Birmingham B15 2TT, United Kingdom
Email: x.yao@cs.bham.ac.uk **Tel.:** +44 121 414 3747
- **Prof. Mark Harman** Department of Computer Science, University College London
Gower Street, London, WC1E 6BT, United Kingdom
Email: mark.harman@ucl.ac.uk **Tel.:** +44 20 7679 1305