

## Shin Hwei Tan

Assistant Professor

Southern University of Science and Technology (SUSTech)

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Google Scholar: <https://scholar.google.com/citations?user=1eFjFs8AAAAJ&hl=en>

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<b>Research Interests</b>	<p>My research interest lies in the intersections between Software Engineering, Nature-inspired Artificial Intelligence Algorithms (including genetic algorithm and evolutionary algorithm), and Software Security. Specifically, it includes:</p> <ul style="list-style-type: none"><li>• <b>Software Engineering:</b> Automated Program Repair, Software Testing, Mobile App Analysis, Program Analysis, Program Synthesis</li><li>• <b>Nature-inspired Artificial Intelligence Algorithms:</b> Genetic Improvement, Search-based Software Engineering, Self-healing Software System</li><li>• <b>Software Security:</b> Finding and fixing security vulnerabilities</li></ul>
<b>Education</b>	<p><b>National University of Singapore</b>, Singapore Ph.D., School of Computing, August 2012-March 2018 <i>Thesis Topic:</i> Design of Repair Operators for Automated Program Repair <i>Adviser:</i> Abhik Roychoudhury</p> <p><b>University of Illinois at Urbana-Champaign</b>, Champaign, IL M.S., Computer Science, May 2012 <i>Thesis Topic:</i> @tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencies (<b>Won David J. Kuck Outstanding MS Thesis Award</b>) <i>Advisers:</i> Darko Marinov, Lin Tan</p> <p>B.S. (Hons), Computer Science, May 2010 <i>Thesis Topic:</i> Theories/Parameterized tests for JUnit <i>Adviser:</i> Darko Marinov</p>
<b>Work Experience</b>	<p><b>Southern University of Science and Technology, Shenzhen, China</b> <i>Assistant Professor (Tenure-Track)</i> <b>June 2018 to Present</b></p> <ul style="list-style-type: none"><li>• Participated in several internal services including, faculty recruitment committee, postdoc thesis proposal committee, and master thesis proposal committee</li><li>• Supervised 8 undergraduate students for their senior thesis. One of them won the best senior thesis.</li></ul> <p><b>NUS-Singtel Cyber Security Research and Development Lab, Singapore</b> <i>Research Assistant</i> <b>Nov. 2017 to May 2018</b></p> <ul style="list-style-type: none"><li>• Developed and invented techniques for automated repair of crashes for Android apps</li></ul> <p><b>Fujitsu Laboratories of America, Sunnyvale, CA, USA</b> <i>Research Intern</i> <b>Feb. 2015 to May 2015</b></p> <ul style="list-style-type: none"><li>• Conducted a study of the common characteristics of automatically generated patches</li><li>• Developed techniques for improving search-based automated program repair</li></ul> <p><b>Intel Corporation, Penang, Malaysia</b> <i>Summer Intern for Testing Hole Resolution (THR)</i> <b>June 2011 to Aug. 2011</b></p> <ul style="list-style-type: none"><li>• Developed automation for improving efficiency in running automated tests for CPU caches</li><li>• Implemented features and developed error handling for program in Perl and Tcl</li></ul> <p><b>Railroad Department, Champaign, IL, USA</b> <i>Undergraduate Assistant</i> <b>Aug. 2007 to May 2009</b></p> <ul style="list-style-type: none"><li>• Maintained MS Access database for daily tank car accident reports</li><li>• Debugged and programmed using Visual Basic, Ruby, and HTML</li></ul>

## Grants

- “Research on Automated Repair of GUI test scripts” (GUI自动化测试技术合作项目一界面变更自动化修复脚本), *Huawei*, \$40k
- “Research on patch generation algorithm and automated repair system for Android apps”, Young Researcher Fund 2019, *National Natural Science Foundation of China*, Grant No. 61902170, \$270k
- “Automated Testing and Repair for Android Apps”, PI for General Program 2020, *Natural Science Foundation of Guangdong Province*, \$100k
- “3D fast simulation and imaging software for marine controlled source electromagnetic exploration”, Main Participant for General Program 2020, *Natural Science Foundation of Guangdong Province*, \$100k
- “Sifakis Trustworthy Autonomous System Research Institute”, Member of the Nobel Prize Key Laboratory of Shenzhen Top Ten Action Plans, \$100m

## Awards and Honors

- ICSE NIER 2022 Best Reviewer Award
- ISSSTA 2021 Distinguished Artifact Award
- FSE 2020 Distinguished Reviewer Award
- ASE 2020 Distinguished PC Member
- Winner of the World Teacher Day Challenge 2020 (The GitHub Fixit project)
- Participants of Heidelberg Laureate Forum 2019, Nominated by Joseph Sifakis
- SIGSOFT Caps for attending ASE 2019
- Finalist for Human Competitive Awards @ GECCO 2018
- Dean's Graduate Research Excellence Award (2016)
- Google Anita Borg Memorial Scholarship (2015) for encouraging female presence in computing and technology.
- Research Achievement Award (2015)
- David J. Kuck Outstanding MS Thesis Award (2013)
- Singapore International Graduate Award (2012-2015)
- ACM-W Scholarship (2012) for attendance of conference for female researchers
- Malaysian Government Scholarship (2006-2010)
- Rockwell Collins Scholarship (2009)
- Motorola Academic Scholarship (2008)

## Internal Services

- Founder and Advisor for *Women in Engineering* in SUSTech
- Maintainer of a blog, <https://cstrgirls.blogspot.sg/>, that focuses on giving academic advice to female computing students in Asia-Pacific countries.
- Mentor in *Women in Engineering* in University of Illinois at Urbana-Champaign
- ACM Student Research Competition @ASE 2020
  - My undergraduate student won the first prize in the competition
- ACM Student Research Competition @ICSE 2019
  - My undergraduate student won a bronze medal in the competition
- Coach for National Student Contest for Software Testing Competition in China
  - My student won first prize in the contest

## Conference Publications

1. R. Shariffdeen, X. Gao, G. Duck, S. H. Tan (corresponding author), J. Lawall, A. Roychoudhury. *Automated Patch Backporting in Linux (Experience Paper)*. In: ACM SIGSOFT International Symposium on Software Testing and Analysis, July 2021. (acceptance: 21.8%), **Won Distinguished Artifact Award**.
2. G. Ye, Z. Tang, S. H. Tan, S. Huang, D. Fang, X. Sun, L. Bian, H. Wang, Z. Wang. *Automated Conformance Testing for JavaScript Engines via Deep Compiler Fuzzing*. In: ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2021), June 2021.
3. S. H. Tan, Z. Li, *Collaborative Bug Finding for Android Apps*. In: International Conference

- on Software Engineering (ICSE 2020), July 2020. (acceptance: 23.5%)
4. M. Wu, L. Zhang, C. Liu, S. H. Tan, Y. Zhang. *Automating CUDA Synchronization via Program Transformation*. In: Automated Software Engineering (ASE 2019), Nov 2019. (acceptance: 20.9%)
  5. Y. Wang, M. Wen, R. Wu, Z. Liu, S.H. Tan, Z. Zhu, H. Yu and S.C Cheung. *Can I Have a Stack Trace to Examine the Dependency Conflict Issue?* In: International Conference on Software Engineering (ICSE 2019), May 2019. (acceptance: 20.6%)
  6. X. Gao, S.H. Tan, Z. Dong, and A. Roychoudhury. *Android Testing via Synthetic Symbolic Execution*. In: 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018), Nov 2018. (acceptance: 19.9%)
  7. S. H. Tan, Z. Dong, X. Gao, A. Roychoudhury. *Repairing Crashes in Android Apps*. In: International Conference on Software Engineering (ICSE 2018), May 2018. (acceptance: 20.9%)
  8. J. Yi, U.Z. Ahmed, A. Karkare, S.H. Tan, A. Roychoudhury. *A Feasibility Study of Using Automated Program Repair for Introductory Programming Assignments*. In: Foundations of Software Engineering (FSE 2017), Sept 2017. (acceptance: 24.4%)
  9. S. H. Tan, H. Yoshida, M. Prasad and A. Roychoudhury. *Anti-patterns in Search-based Program Repair*, In: Foundations of Software Engineering (FSE 2016), Nov 2016. (acceptance: 27.1%)
  10. S. H. Tan, A. Roychoudhury. *Relifix: Automated Repair of Software Regressions*. In: International Conference on Software Engineering (ICSE 2015), May 2015. (acceptance: 18.5%)
  11. J. Yi, D. Qi, S. H. Tan, A. Roychoudhury. *Expressing and Checking Intended Changes via Software Change Contracts*. In: International Symposium on Software Testing and Analysis (ISSTA 2013), Lugano, Switzerland, July 2013. (acceptance: 26%)
  12. S. H. Tan, D. Marinov, L. Tan, and G. T. Leavens. *@tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencies*. In: International Conference on Software Testing, Verification, and Validation (ICST 2012), pages 260-269, Montreal, Canada, April 2012. (acceptance: 27%), **Won David J. Kuck Outstanding MS Thesis Award**.

#### Journal Publications

1. H. Wang, G. Ye, Z. Tang, S. H. Tan, S. Huang, D. Fang, Y. Feng, L. Bian, and Z. Wang. *Combining Graph-based Learning with Automated Data Collection for Code Vulnerability Detection*. In: IEEE Transactions on Information Forensics and Security, Dec 2020.
2. R. Shariffdeen, S. H. Tan (corresponding author), M. Gao, A. Roychoudhury. *Automated Patch Transplantation*. In: ACM Transactions on Software Engineering and Methodology (TOSEM), July 2020.
3. S. Mehtaev, X. Gao, S. H. Tan (corresponding author), A. Roychoudhury. *Test-equivalence Analysis for Automatic Patch Generation*. In: ACM Transactions on Software Engineering and Methodology (TOSEM), pages 15:1-15:37, July 2018
4. J. Yi, S.H. Tan, S. Mehtaev, M. Boehme, A. Roychoudhury. *A correlation study between automated program repair and test-suite metrics*. In: Empirical Software Journal (EMSE 2018), pages 2948--2979, Oct 2018.
5. J. Yi, D. Qi, S. H. Tan, A. Roychoudhury. *Software Change Contracts*. In: ACM Transactions on Software Engineering and Methodology (TOSEM), pages 18:1-18:43, May 2015.

#### Education Publications

1. S. H. Tan, Z. Li, C. Hu, Z. Li, X. Zhang, Y. Zhou. *GitHub-OSS Fixit: Fixing bugs at scale in a Software Engineering Course*. In: International Conference on Software Engineering, Joint Track on Software Engineering Education and Training (ICSE-JSEET 2021), May 2021. (acceptance: 33.3%)
2. S. Yu, Bo Tang, S. H. Tan, 将开源和企业引入计算机课程教学——“把教学场景用起来”模式探讨. *CCF Article*. 2020, Vol 9.
3. S. H. Tan, 将开源和企业引入计算机课程教学——“把教学场景用起来”模式探讨. *CCF Article*. 2020, Vol 9, **Selected as the cover article**.

<b>Workshop/ Poster Publications</b>	<ol style="list-style-type: none"> <li>1. Z. Li, <u>S. H. Tan</u> (corresponding author). <i>Bugine: a bug report recommendation system for Android apps</i>. In: International Conference on Software Engineering (ICSE 2020 Poster), July 2020.</li> <li>2. B. Baudry, N. Harrand, E. Schulte, C. Timperley, <u>S. H. Tan</u>, M. Selakovic, E. Ugherughe. <i>A spoonful of DevOps helps the GI go down</i>. In: 4th International Genetic Improvement Workshop, May 2018.</li> <li>3. <u>S. H. Tan</u>, J. Yi, Yulis, S. Mechtaev, A. Roychoudhury. <i>Codeflaws: A Programming Competition Benchmark for Evaluating Automated Program Repair Tools</i>. In: International Conference on Software Engineering (ICSE 2017 Poster), May 2017.</li> <li>4. B. Daniel, D. Dig, T. Gvero, V. Jagannath, J. Jiaa, D. Mitchell, J. Nogiec, <u>S. H. Tan</u>, and D. Marinov. <i>ReAssert: A Tool for Repairing Broken Unit Tests</i>. In: International Conference on Software Engineering, Demonstrations Track (ICSE Demo 2011), pages 1010-1012, Honolulu, HI, May 2011. (acceptance: 37%)</li> </ol>
<b>Patents</b>	<ul style="list-style-type: none"> <li>• Software program repair, H. Yoshida, <u>S. H. Tan</u>, M. R. Prasad, US20170060735A1</li> </ul>
<b>Program Committees</b>	<ul style="list-style-type: none"> <li>• MobileSoft 2022, <i>Student Research Competition Co-chair</i></li> <li>• 3rd International Workshop for Automated Program Repair @ ICSE 2022, <i>Co-Organizer</i></li> <li>• ICSE New Faculty Symposium, <i>Invited Panelist</i></li> <li>• FSE 2022, <i>Program Committee</i></li> <li>• ASE 2022, <i>Program Committee</i></li> <li>• ISSTA 2022, <i>Program Committee</i></li> <li>• ICSE-NIER 2022, <i>Program Committee</i></li> <li>• ASE 2021, <i>Program Committee</i></li> <li>• 2nd International Workshop for Automated Program Repair @ ICSE 2021, <i>Co-Organizer</i></li> <li>• 1st International Workshop for Automated Program Repair @ ICSE 2020, <i>Founder and Co-Organizer</i></li> <li>• ISSTA 2020, <i>Student Volunteer Co-Chair</i></li> <li>• ASE 2020, <i>Program Committee</i></li> <li>• FSE 2020, <i>Program Committee</i></li> <li>• ICSE 2020, <i>Program Committee</i></li> <li>• Genetic Improvement Workshop (GI 2019) @ ICSE 2019, <i>Co-organizer</i></li> <li>• International Workshop on Software Engineering Intelligence 2019 @ ASE 2019, <i>Program Committee</i></li> <li>• Workshop on Intelligent Bug Fixing @ SANER 2019, <i>Program Committee</i></li> <li>• ASE 2019, <i>Program Committee</i></li> <li>• ESEC/FSE 2019, Tool Demo, <i>Program Committee</i></li> <li>• ICSE 2019, Student Research Competition, <i>Program Committee</i></li> <li>• Genetic Improvement Workshop @ GECCO 2018 <i>Program Committee</i></li> <li>• ISSTA 2014, <i>Artifact Evaluation Committee</i></li> </ul>
<b>Other Activities</b>	<ul style="list-style-type: none"> <li>• CCF Open Source Development Committee</li> <li>• Linux Foundation Open Source Software Talent Plan 2022</li> <li>• ACM TOSEM Board of Distinguished Reviewers</li> <li>• Transactions on Dependable and Secure Computing (TDSC), <i>Reviewer</i></li> <li>• Empirical Software Engineering Journal (EMSE), <i>Member of Review Board 2019</i></li> <li>• ASE 2019, Configuration and Variability, <i>Session Chair</i></li> <li>• Transactions on Software Engineering and Methodology (TOSEM), <i>Reviewer</i></li> <li>• Empirical Software Engineering Journal (EMSE), <i>Reviewer</i></li> <li>• Transactions on Software Engineering (TSE), <i>Reviewer</i></li> <li>• IEEE Transactions on Evolutionary Computation 2018, <i>Reviewer</i></li> <li>• ICSE 2015 (NIER), <i>Co-reviewer</i></li> </ul>

<b>Teaching Experience</b>	<b>Southern University of Science and Technology, China</b>	
	<i>Instructor for CS 304 Software Engineering</i>	<b>Feb. 2019 to Present</b>
	<ul style="list-style-type: none"> <li>Conducted lectures and labs for up to 156 students</li> <li>Prepared teaching materials for 2 hours weekly lectures and 2 hours weekly labs</li> <li>Designed the GitHub-OSS project for fixing bugs in Java and Android projects <ul style="list-style-type: none"> <li>154 students have submitted 214 pull requests to 24 different projects in GitHub</li> <li>Project adapted by CS427 Fall 2021 in UIUC</li> </ul> </li> </ul>	
	<i>Instructor for CS 409 Software Testing</i>	<b>Aug. 2018 to Present</b>
	<ul style="list-style-type: none"> <li>Proposed the first course in Software Testing in SUSTech</li> <li>Prepared teaching materials for 2 hours weekly lectures and 2 hours weekly labs</li> <li>Designed course syllabus and prepared teaching materials for 50 students</li> <li>Designed course project for finding bugs in open-source Android apps <ul style="list-style-type: none"> <li>29 students found and reported 17 new bugs</li> </ul> </li> </ul>	
	<b>National University of Singapore, Singapore</b>	
	<i>Teaching Assistant for CS 4218 Software Testing</i>	<b>Aug. 2012 to May 2013</b>
	<ul style="list-style-type: none"> <li>Designed courses structure and prepared material for first software testing class</li> <li>Graded weekly programming homework</li> </ul>	
	<b>University of Illinois at Urbana-Champaign, Champaign, IL</b>	
	<i>Teaching Assistant for CS242: Programming Studio Laboratory</i>	<b>Aug. 2011 to May 2012</b>
<b>Invited Talks</b>	<ul style="list-style-type: none"> <li>Supervised programming assignments presentation for 5-6 students per section</li> </ul>	
	<i>Teaching Assistant for CS427: Software Engineering I</i>	<b>Aug. 2010 to May 2011</b>
	Fall 2010 and Fall 2011	
	<ul style="list-style-type: none"> <li>Advised students for course project for Eclipse refactoring engines</li> <li>Graded bi-weekly programming assignments for 20 groups of students</li> </ul>	
	<i>Teaching Assistant for CS428: Software Engineering II</i>	<b>Jan. 2010 to Dec. 2011</b>
	Spring 2011	
	<ul style="list-style-type: none"> <li>Provided support for online students through the Illinois Internet Computer Science Program (I2CS)</li> <li>Conducted bi-weekly meetings with students for course projects to develop games, mobile applications, websites.</li> </ul>	
	<i>Laboratory Helper for CS 102: Little Bits to Big Ideas</i>	<b>Aug. 2009 to May 2009</b>
	<ul style="list-style-type: none"> <li>Assisted non-CS majors in two consecutive laboratory sessions per week</li> <li>Graded student programming assignments</li> </ul>	
	<b>GitHub-OSS Fixit: Fixing bugs at scale in a Software Engineering Course</b>	<b>19 June 2021</b>
	6th workshop on Software Engineering Education	
	<b>Collaborative bug finding and bug-fixing for Android Apps</b>	<b>20 January 2020</b>
	62nd CREST Open Workshop- Automated Program Repair and Genetic Improvement	
	<b>Selecting a research topic: Reflection and Lessons from My Research Journey</b>	<b>16 July 2019</b>
	Ada workshop @ISSTA 2019	
	<b>Repairing crashes in Android apps</b>	<b>24 Nov. 2018</b>
	Program Repair Workshop@NASAC	
	<b>Repairing crashes in Android apps</b>	<b>17 Nov. 2018</b>
	Chinese Search-based Software Engineering Workshop	
	<b>Repairing crashes in Android apps</b>	<b>16 Nov. 2018</b>
	Peking University	
	<b>Repairing crashes in Android apps</b>	<b>22 June 2018</b>

Wuhan University  
**Repairing crashes in Android apps** 30 Jan. 2018  
 GI-Dagstuhl Seminars, Germany  
**Design of Repair Operators for Automated Program Repair** 30 Jan. 2017  
 50th CREST Open Workshop, University of College London  
**Anti-patterns in Search-based Program Repair** 20 Sept. 2016  
 Microsoft PhD Forum 2016, Microsoft Research Asia, Beijing, China

<b>Conference Talks</b>	<b>Collaborative bug finding for Android Apps</b>	<b>10 July 2020</b>
	International Conference on Software Engineering (ICSE) 2020	
	<b>Test-equivalence Analysis for Automatic Patch Generation</b>	<b>29 May 2019</b>
	International Conference on Software Engineering (ICSE) 2019	
	<b>Anti-patterns in Search-based Program Repair</b>	<b>17 Nov. 2016</b>
	Foundations of Software Engineering (FSE) 2016	
	<b>Relifix: Automated Repair of Software Regressions</b>	<b>21 May 2015</b>
	International Conference on Software Engineering (ICSE) 2015	
<b>@tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencies</b>	<b>19 April 2012</b>	
	International Conference on Software Testing, Verification & Validation ( <i>ICST</i> ) 2012	

<b>Current Graduate Students</b>	• Huairen Zhang - Co-advised with Prof. Yu Pei (SUSTech-The Hong Kong Polytechnic University Joint PhD program)
	• Haibo Wang - Co-advised with Prof. Zheng Wang (SUSTech-University of Leeds Joint PhD program)
	• Hsu Myat Win - Co-advised with Prof. Yulei Sui (SUSTech-UTS Joint PhD program)
	• Zhiyu Fan - Co-advised with Prof. Abhik Roychoudhury at National University of Singapore
	• Ziqiang Li - SUSTech Master program 2019
	• Xiaowen Zhang - SUSTech Master program 2019
	• Yuanzhang Lin - SUSTech-Huawei Joint Master Program 2020
	• Ying Li - SUSTech - Huawei Joint Master Program 2020
	• Zhicheng Zhang - SUSTech Master program 2021

<b>Language Skills</b>	Fluent in Mandarin, Cantonese, English and Malay
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## References

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