**Shin Hwei Tan**
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| **Research Interests** | My main research interest is in the field of software engineering, specifically on automated bug-fixing and software testing. I have proposed new methods and developed tools to facilitate dynamic code-comment analysis using test generation tool and automated repair of software regressions and Android apps. I am currently looking at methods in building the next generation automated bug-fixing approach. |

**Education**

**National University of Singapore**, Singapore
Ph.D., School of Computing, August 2012-March 2018 **CAP: 4.38/5.00**
*Thesis Topic:* Design of Repair Operators for Self-Healing Software Systems
*Adviser:* Abhik Roychoudhury
**University of Illinois at Urbana-Champaign**, Champaign, IL
M.S., Computer Science, May 2012 **GPA: 3.91/4.00**
*Thesis Topic:* @tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencies
*Advisers:* Darko Marinov, Lin Tan
B.S. (Hons), Computer Science, May 2010 **GPA: 3.68/4.00**
*Thesis Topic:* Theories/Parameterized tests for JUnit
*Adviser:* Darko Marinov

**Grants**

- "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

**Awards and Honors**

- 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)

**Services**

- Founder and Advisor for Women in Engineering in SUSTech
- Maintainer of a blog, https://cstrigirls.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 @ICSE 2019
  - My student won bronze metal in the competition
- Coach for National Student Contest for Software Testing Competition in China
  - My student won first prize in the contest

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| **Conference /Workshop Publications** | 1. M. Wu, L. Zhang, C. Liu, <u>S. H. Tan</u>, Y. Zhang. *Automating CUDA Synchronization via Program Transformation* In: Automated Software Engineering (ASE 2019), Nov 2019. (acceptance: 20.9%)<br><br>2. Y. Wang, M. Wen, R. Wu, Z. Liu, <u>S.H. Tan</u>, 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%)<br><br>3. X. Gao, <u>S.H. Tan</u>, Z. Dong, and A. Roychoudhury. *Android Testing via Synthetic Symbolic Execution.* In 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018). (acceptance: 19.9%)<br><br>4. <u>S. H. Tan</u>, Z. Dong. X. Gao, A. Roychoudhury. *Repairing Crashes in Android Apps*. In: International Conference on Software Engineering (ICSE 2018), May 2018. (acceptance: 20.9%)<br><br>5. J. Yi, U.Z. Ahmed, A. Karkare, <u>S.H. Tan</u>, 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%)<br><br>6. <u>S. H. Tan</u>, 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%)<br><br>7. <u>S. H. Tan</u>, A. Roychoudhury. *Relifix: Automated Repair of Software Regressions*. In: International Conference on Software Engineering (ICSE 2015), May 2015 (acceptance: 18.5%)<br><br>8. J. Yi, D. Qi, <u>S. H. Tan</u>, 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%)<br><br>9. <u>S. H. Tan</u>, 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%) |
| **Journal Publications** | 1. S. Mechtaev, X. Gao, <u>S. H. Tan</u>, A. Roychoudhury. *Test-equivalence Analysis for Automatic Patch Generation*. In ACM Transactions on Software Engineering and Methodology (TOSEM), To appear, July 2018<br><br>2. J. Yi, <u>S.H. Tan</u>, S. Mechtaev, M. Boehme, A.Roychoudhury. A correlation study between automated program repair and test-suite metrics. In: Empirical Software Journal (EMSE 2018).<br><br>3. J. Yi, D. Qi, <u>S. H. Tan</u>, A. Roychoudhury. *Software Change Contracts*. In ACM Transactions on Software Engineering and Methodology (TOSEM), pages 18:1-18:43, May 2015. |
| **Workshop/ Poster Publications** | 1. B. Baudry, N. Harrand, E. Schulte, C. Timperley, <u>S. H. Tan</u>, M. Selakovic, E. Ugherughe. *A spoonful of DevOps helps the GI go down.* In 4th International Genetic Improvement Workshop, May 2018.<br><br>2. <u>S. H. Tan</u>, J. Yi, Yulis, S. Mechtaev, A. Roychoudhury. *Codeflaws: A Programming Competition Benchmark for Evaluating Automated Program Repair Tools*. In: International Conference on Software Engineering (ICSE 2017 Poster), May 2017.<br><br>3. B. Daniel, D. Dig, T. Gvero, V. Jagannath, J. Jiaa, D. Mitchell, J. Nogiec, <u>S. H. Tan</u>, and D. Marinov. *ReAssert: A Tool for Repairing Broken Unit Tests*. In: International Conference on Software Engineering, Demonstrations Track (ICSE Demo 2011), pages 1010-1012, Honolulu, HI, May 2011. (acceptance: 37%) |
| **Patents** | ● Software program repair, H. Yoshida, <u>S. H. Tan</u>, M. R. Prasad, US20170060735A1 |

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| **Professional Activities** | <ul><li>ISSTA 2020, Student Volunteer Co-Chair</li><li>FSE 2020, Program Committee</li><li>International Workshop for Automated Program Repair @ ICSE2020, Co-Organizer</li><li>ASE 2019, Configuration and Variability, Session Chair</li><li>First International Workshop on Software Engineering Intelligence 2019,   PC</li><li>Workshop on Intelligent Bug Fixing @ SANER 2019, PC</li><li>ICSE 2020, Program Committee</li><li>ASE 2019, Program Committee</li><li>ESEC/FSE 2019, Tool Demo Program Committee</li><li>ICSE 2019, PC for Student Research Competition</li><li>Genetic Improvement Workshop (GI 2019) @ ICSE2019, Co-organizer</li><li>GECCO 2018, PC for Genetic Improvement Workshop</li><li>ISSTA 2014, Artifact Evaluation Committee</li><li>ICSE 2015 (NIER), Co-reviewer</li><li>Transactions on Software Engineering and Methodology (TOSEM), Reviewer</li><li>Empirical Software Engineering Journal (EMSE), Reviewer</li><li>Transactions on Software Engineering (TSE), Reviewer</li></ul> |

**Teaching Experience**

**Southern University of Science and Technology**, China

*Sole Instructor* for *CS 304 Software Engineering*　　　　　　　**Feb. 2019 to . June 2019**
- Conduct lectures and labs for 156 students
- Prepared teaching materials for 2 hours weekly lectures and 2 hours weekly labs

Design course project for finding bugs in open-source Android apps

*Sole Instructor* for *CS 409 Software Testing*　　　　　　　**Aug. 2018 to Dec. 2018**
- Proposed the first course in Software Testing in SUSTech
- Design course syllabus and prepared teaching materials for 29 students
- Design course project for finding bugs in open-source Android apps

**National University of Singapore**, Singapore

*Teaching Assistant* for *CS 4218 Software Testing*　　　　　**Aug. 2012 to May 2013**
- Designed courses structure and prepared material for first software testing class
- Graded weekly programming homework

**University of Illinois at Urbana-Champaign**, Champaign, IL

*Teaching Assistant* for CS242: Programming Studio Laboratory **Aug. 2011 to May 2012**
- Supervised programming assign`       ments presentation for 5-6 students per section

*Teaching Assistant for CS427: Software Engineering I*　　　　**Aug. 2010 to May 2011**
Fall 2010 and Fall 2011
- Advised students for course project for Eclipse refactoring engines
- Graded bi-weekly programming assignments for 20 groups of students

*Teaching Assistant for CS428: Software Engineering II*　　　　**Jan. 2010 to Dec. 2011**
Spring 2011
- Provided support for online students through the Illinois Internet Computer Science Program (I2CS)
- Conduct bi-weekly meeting with students for course projects to develop games, mobile applications, websites.

*Laboratory Helper for CS 102: Little Bits to Big Ideas*　　　　**Aug. 2009 to May 2009**
- Assisted non-majors in two consecutive laboratory sessions
- Graded student programming assignments

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| **Invited Talks** | **Repairing crashes in Android apps** | **24 Nov. 2018** |
| | Program Repair Workshop@NASAC | |
| | **Repairing crashes in Android apps** | **17 Nov. 2018** |
| | Chinese Search-based Software Engineering Workshop | |
| | **Repairing crashes in Android apps** | **16 Nov. 2018** |
| | Peking University | |
| | **Repairing crashes in Android apps** | **22 June 2018** |
| | 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 | |

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| **Conference Talks** | **Test-equivalence Analysis for Automatic Patch Generation** | **29 May. 2019** |
| | International Conference on Software Engineering (ICSE) 2019 | |
| | **Anti-patterns in Search-based Program Repair** | **17 Nov. 2016** |
| | Foundations of Software Engineering (FSE) 2016 | |
| | **Relifix: Automated Repair of Software Regressions** | **21 May 2015** |
| | International Conference on Software Engineering (ICSE) 2015 | |
| | **@tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencies** | **19 April 2012** |
| | International Conference on Software Testing, Verification & Validation (*ICST) 2012* | |

**Work Experience**

**NUS-Singtel Cyber Security Research and Development Lab, Singapore**
*Research Assistant*                                              **Nov. 2017 to May 2018**
- Core developer and inventor for automated repair of crashes for Android apps

**Fujitsu Laboratories of America**, Sunnyvale, CA, USA
*Research Intern*                                                 **Feb. 2015 to May 2015**
- Conduct study of the common characteristics of automatically generated patches
- Developed techniques for improving search-based automated program repair

**Intel Corporation**, Penang, Malaysia
*Summer Intern for Testing Hole Resolution (THR)*     **June 2011 to Aug. 2011**
- Developed automation for improving efficiency in running automated tests
- Implemented features and developed error handling for program in Perl and Tcl

**Railroad Department**, Champaign, IL, USA
*Undergraduate Assistant*                                         **Aug. 2007 to May. 2009**
- Maintained MS Access database for daily tank car accident reports
- Debugged and programmed using Visual Basic, Ruby, and HTML

**Current Students**
- Hsu Myat Win - Co-advised with Prof. Yulei Sui (SUSTECH-UTS Joint PhD program)
- Zhiyu Fan - Co-advised with Prof. Abhik Roychoudhury at NUS
- Ziqiang Li - SUSTech Master program 2019
- Xiaowen Zhang - SUSTech Master program 2019

**Software Skills**
- Computer Programming: Java, Python, C, C++, OCAML
- Version Control: DVCS (Mercurial, Git), and VCS (CVS, SVN )
- Software Testing: Randoop, JUnit, KLEE

**Language Skills**    Fluent in Mandarin, Cantonese, English and Malay

## References

**Abhik Roychoudhury (thesis advisor)**
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