

## Shin Hwei Tan

Assistant Professor

Southern University of Science and Technology

shinhwei@hotmail.com

Webpage: <http://www.shinhwei.com/>

DBLP: [https://dblp.uni-trier.de/pers/hd/t/Tan:Shin\\_Hwei](https://dblp.uni-trier.de/pers/hd/t/Tan:Shin_Hwei)

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

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<b>Research Interests</b>	My main research interest is on 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.
<b>Education</b>	<p><b>National University of Singapore</b>, Singapore Ph.D., School of Computing, August 2012-March 2018 <b>CAP: 4.38/5.00</b> <i>Thesis Topic:</i> Design of Repair Operators for Self-Healing Software Systems <i>Adviser:</i> Abhik Roychoudhury</p> <p><b>University of Illinois at Urbana-Champaign</b>, Champaign, IL M.S., Computer Science, May 2012 <b>GPA: 3.91/4.00</b> <i>Thesis Topic:</i> @tComment: Testing Javadoc Comments to Detect Comment-Code Inconsistencie <i>Advisers:</i> Darko Marinov, Lin Tan</p> <p>B.S. (Hons), Computer Science, May 2010 <b>GPA: 3.68/4.00</b> <i>Thesis Topic:</i> Theories/Parameterized tests for JUnit <i>Adviser:</i> Darko Marinov</p>
<b>Awards and Honors</b>	<ul style="list-style-type: none"><li>• Dean's Graduate Research Excellence Award (2016)</li><li>• Google Anita Borg Memorial Scholarship (2015) for encouraging female presence in computing and technology.</li><li>• Research Achievement Award (2015)</li><li>• David J. Kuck Outstanding MS Thesis Award (2013)</li><li>• Singapore International Graduate Award (2012-2015)</li><li>• ACM-W Scholarship (2012) for attendance of conference for female researchers</li><li>• Malaysian Government Scholarship (2006-2010)</li><li>• Rockwell Collins Scholarship (2009)</li><li>• Motorola Academic Scholarship (2008)</li></ul>
<b>Patents</b>	Hiroaki Yoshida, Shin Hwei Tan, Mukul R. Prasad. <i>Software program repair</i> . Patent No. US20170060735
<b>Services</b>	<ul style="list-style-type: none"><li>• Maintainer of a blog, <a href="https://cstrigirls.blogspot.sg/">https://cstrigirls.blogspot.sg/</a>, that focuses on giving academic advices to female computing students in Asia-Pacific countries.</li><li>• Mentor in Women in Engineering in University of Illinois at Urbana-Champaign</li><li>• Coach for National Student Contest for Software Testing Competition in China<ul style="list-style-type: none"><li>○ My student won first prize in the contest</li></ul></li></ul>
<b>Conference /Workshop Publications</b>	<ol style="list-style-type: none"><li>1. Y. Wang, M. Wen, R. Wu, Z. Liu, <u>S.H. Tan</u>, Z. Zhu, H. Yu and S.C Cheung. <i>Can I Have a Stack Trace to Examine the Dependency Conflict Issue?</i> In: International Conference on Software Engineering (ICSE 2019), May 2019. (acceptance: 20.6%)</li><li>2. X. Gao, <u>S.H. Tan</u>, Z. Dong, and A. Roychoudhury. <i>Android Testing via Synthetic Symbolic Execution</i>. In 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018). (acceptance: 19.9%)</li><li>3. <u>S. H. Tan</u>, Z. Dong, X. Gao, A. Roychoudhury. <i>Repairing Crashes in Android Apps</i>. In: International Conference on Software Engineering (ICSE 2018), May 2018. (acceptance:</li></ol>

20.9%)

4. 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%)
5. 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%)
6. S. H. Tan, A. Roychoudhury. *Relifix: Automated Repair of Software Regressions*. In: International Conference on Software Engineering (ICSE 2015), May 2015 (acceptance: 18.5%)
7. 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%)
8. 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%)

**Workshop/  
Poster  
Publications**

1. B. Baudry, N. Harrand, E. Schulte, C. Timperley, S. H. Tan, M. Selakovic, E. Ugherughe. *A spoonful of DevOps helps the GI go down*. In 4th International Genetic Improvement Workshop, May 2018.
2. S. H. Tan, 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.
3. B. Daniel, D. Dig, T. Gvero, V. Jagannath, J. Jiaa, D. Mitchell, J. Nogiec, S. H. Tan, 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%)

**Journal  
Publications**

1. S. Mechtaev, X. Gao, S. H. Tan, A. Roychoudhury. *Test-equivalence Analysis for Automatic Patch Generation*. In ACM Transactions on Software Engineering and Methodology (TOSEM), To appear, July 2018
2. J. Yi, S.H. Tan, S. Mechtaev, M. Boehme, A. Roychoudhury. A correlation study between automated program repair and test-suite metrics. In: Empirical Software Journal (EMSE 2018).
3. 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.

**Professional  
Activities**

- ICSE 2020, Program Committee
- ASE 2019, Program Committee
- ESEC/FSE 2019, Tool Demo Program Committee
- ICSE 2019, PC for Student Research Competition
- Genetic Improvement Workshop (GI 2019) @ ICSE2019, Co-organizer
- GECCO 2018, PC for Genetic Improvement Workshop
- ISSTA 2014, Artifact Evaluation Committee
- ICSE 2015 (NIER), Co-reviewer
- Transactions on Software Engineering and Methodology (TOSEM), Reviewer
- Empirical Software Engineering Journal (EMSE), Editorial Board Member
- Transactions on Software Engineering (TSE), Reviewer

**Teaching  
Experience**

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

#### 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

#### Conference Talks

**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**

**19 April 2012**

**Comment-Code Inconsistencies**

International Conference on Software Testing, Verification & Validation (*ICST*) 2012

#### Working 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,**  
*Undergraduate Assistant*

Champaign, IL, USA  
**Aug. 2007 to May 2009**

Carried out an independent project on automated web retrieval  
Maintained MS Access database for daily tank car accident reports  
Debugged and programmed using Visual Basic, Ruby and HTML

- 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