August Shi

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Research Interests

My research interests are in Software Engineering, with a focus on Software Testing

Education

2013 – now **Ph.D. Computer Science**, *University of Illinois at Urbana-Champaign (UIUC).* Adviser: Darko Marinov

2009 – 2013 **B.S. Computer Science**, *The University of Texas at Austin (UT Austin).*

2009 – 2013 **B.S. Electrical and Computer Engineering**, *UT Austin.*

Honors and Awards

2019 Huawei Midwest Research Summit Best Poster Award

2018 ISSTA/ECOOP 2018 Summer School Scholarship

2017 **ACM SIGSOFT Distinguished Paper Award** at ICSE 2017

2014 NSF Travel Grant for FSE

2014 Conference Travel Grant, UIUC

2013 – 2014 Ray Ozzie Computer Science Fellowship, UIUC

2009 – 2013 Turing Scholars Honors Computer Science Program, UT Austin

2009 – 2013 Engineering Honors Program, UT Austin

2009 – 2013 Virginia and Ernest Cockrell, Jr. Scholarship in Engineering, UT Austin

2009 – 2013 The University of Texas at Austin College Scholar, UT Austin

Publications

[1] Chenguang Zhu, Owolabi Legunsen, **August Shi**, and Milos Gligoric. A Framework for Checking Regression Test Selection Tools. *International Conference on Software Engineering **(ICSE 2019)***, pages to-appear, Montreal, Canada, May 2019. Acceptance rate: 21%, (109/529)

[2] Wing Lam, Reed Oei, **August Shi**, Darko Marinov, and Tao Xie. iDFlakies: A Framework for Detecting and Partially Classifying Flaky Tests. *IEEE International Conference on Software Testing, Verification and Validation **(ICST 2019)***, pages to-appear, Xi'an, China, April 2019. Acceptance rate: 28% (31/110)

[3] Farah Hariri, **August Shi**, Vimuth Fernando, Suleman Mahmood, and Darko Marinov. Comparing Mutation Testing at the Levels of Source Code and Compiler Intermediate Representation. *IEEE International Conference on Software Testing, Verification and Validation **(ICST 2019)***, pages to-appear, Xi'an, China, April 2019. Acceptance rate: 28% (31/110)

[4] Farah Hariri and **August Shi**. SRCIROR: A Toolset for Mutation Testing of C Source Code and LLVM Intermediate Representation. *IEEE/ACM Conference on Automated Software Engineering, Tool Demo **(ASE DEMO 2018)***, pages 860–863, Montpellier, France, September 2018. Acceptance rate: 36% (16/44)

[5] **August Shi**, Alex Gyori, Suleman Mahmood, Peiyuan Zhao, and Darko Marinov. Evaluating Test-Suite Reduction in Real Software Evolution. *International Symposium on Software Testing and Analysis* ***(ISSTA 2018)***, pages 84–94, Amsterdam, Netherlands, July 2018. Acceptance rate: 23% (31/130)

[6] Alex Groce, Josie Holmes, Darko Marinov, **August Shi**, and Lingming Zhang. An Extensible, Regular-Expression-Based Tool for Multi-Language Mutant Generation. *International Conference on Software Engineering, Tool Demo* ***(ICSE DEMO 2018)***, pages 25–28, Gothenburg, Sweden, May–June 2018. Acceptance rate: 42% (30/72)

[7] Farah Hariri, **August Shi**, Owolabi Legunsen, Milos Gligoric, Sarfraz Khurshid, and Sasa Misailovic. Approximate Transformations as Mutation Operators. *IEEE International Conference on Software Testing, Verification and Validation* ***(ICST 2018)***, pages 285–296, Västerås, Sweden, April 2018. Acceptance rate: 25% (30/119)

[8] Owolabi Legunsen, **August Shi**, and Darko Marinov. STARTS: STAtic Regression Test Selection. *IEEE/ACM International Conference on Automated Software Engineering, Tool Demo* ***(ASE DEMO 2017)***, pages 949–954, Urbana-Champaign, Illinois, November 2017. Acceptance rate: 63% (20/32)

[9] Milos Gligoric, Sarfraz Khurshid, Sasa Misailovic, and **August Shi**. Mutation Testing Meets Approximate Computing. *International Conference on Software Engineering, New Ideas and Emerging Results Track* ***(ICSE NIER 2017)***, pages 3–6, Buenos Aries, Argentina, May 2017. Acceptance rate: 16%, (14/85)

[10] **August Shi**, Suresh Thummalapenta, Shuvendu Lahiri, Nikolaj Bjørner, and Jacek Czerwonka. Optimizing Test Placement for Module-Level Regression Testing. *International Conference on Software Engineering* ***(ICSE 2017)***, pages 689–699, Buenos Aries, Argentina, May 2017. Acceptance rate: 16% (68/415)
This paper won an ACM SIGSOFT Distinguished Paper Award

[11] Alex Gyori, Ben Lambeth, **August Shi**, Owolabi Legunsen, and Darko Marinov. NonDex: A tool for detecting and debugging wrong assumptions on Java API specifications. *ACM SIGSOFT International Symposium on the Foundations of Software Engineering, Tool Demo* ***(FSE DEMO 2018)***, pages 993–997, Seattle, Washington, November 2016. Acceptance rate: 41% (13/32)

[12] Owolabi Legunsen, Farah Hariri, **August Shi**, Yafeng Lu, Lingming Zhang, and Darko Marinov. An Extensive Study of Static Regression Test Selection in Modern Software Evolution. *ACM SIGSOFT International Symposium on the Foundations of Software Engineering* ***(FSE 2016)***, pages 583–594, Seattle, Washington, November 2016. Acceptance rate: 27% (74/273)

[13] Farah Hariri, **August Shi**, Hayes Converse, Darko Marinov, and Sarfraz Khurshid. Evaluating the Effects of Compiler Optimizations on Mutation Testing at the Compiler IR Level. *IEEE International Symposium on Software Reliability Engineering* ***(ISSRE 2016)***, pages 105–115, Ottawa, Canada, October 2016. Acceptance rate: 35% (45/130)

[14] Mohammad Amin Alipour, **August Shi**, Rahul Gopinath, Darko Marinov, and Alex Groce. Evaluating Non-adequate Test-Case Reduction. *IEEE/ACM Conference on Automated Software Engineering* ***(ASE 2016)***, pages 16–26, Singapore, Singapore, September 2016. Acceptance rate: 19% (57/298)

[15] **August Shi**, Alex Gyori, Owolabi Legunsen, and Darko Marinov. Detecting Assumptions on Deterministic Implementations of Non-deterministic Specifications. *IEEE International Conference on Software Testing, Verification and Validation* ***(ICST 2016)***, pages 80–90, Chicago, Illinois, April 2016. Acceptance rate: 27% (34/130)

[16] **August Shi**, Tifany Yung, Alex Gyori, and Darko Marinov. Comparing and Combining Test-Suite Reduction and Regression Test Selection. *ACM SIGSOFT Symposium on the Foundations of Software Engineering **(FSE 2015)***, pages 237–247, Bergamo, Italy, September 2015. Acceptance rate: 25% (74/291)

[17] Alex Gyori, **August Shi**, Farah Hariri, and Darko Marinov. Reliable Testing: Detecting State-Polluting Tests to Prevent Test Dependency. *International Symposium on Software Testing and Analysis **(ISSTA 2015)***, pages 223–233, Baltimore, Maryland, July 2015. Acceptance rate: 27% (33/119)

[18] **August Shi**, Alex Gyori, Milos Gligoric, Andrey Zaytsev, and Darko Marinov. Balancing Trade-Offs in Test-Suite Reduction. *ACM SIGSOFT Symposium on the Foundations of Software Engineering **(FSE 2014)***, pages 246–256, Hong Kong, November 2014. Acceptance rate: 22% (61/273)

[19] Ruben Gran Tejero, **August Shi**, Ehsan Totoni, and María Jesús Garzarán. Evaluation of a Feature Tracking Vision Application on a Heterogeneous Chip. *IEEE International Symposium on Computer Architecture and High Performance Computing **(SBAC-PAD 2014)***, pages 246–253, Paris, France, October 2014. Acceptance rate: 33% (43/132)

Research Mentoring

*Mentored and co-advised the research of **four** graduate students and **four** undergraduate students.*

- James Gao (BS, UIUC)
- Qianyang Peng (MS, UIUC)
- Reed Oei (BS, UIUC; co-authored [2])
- Peiyuan Zhao (MS, UIUC; co-authored [5])
- Milica Hadzi-Tanovic (MS, UIUC)
- Benjamin Lambert (BS, UIUC; co-authored [11])
- Tifany Yung (MCS, UIUC; co-authored [16])
- Andrey Zaytsev (BS, UIUC; co-authored [18])

Teaching Experience

UIUC, Fall 2015 — Teaching Assistant for CS 427: Software Engineering I (176 students)

Open-Source Software Contributions

My GitHub ID — `https://github.com/august782`

iDFlakies — iDFlakies is a framework for detecting and partially classifying flaky tests [2]. iDFlakies reruns tests in different orders and considers any tests that fail (but did pass in a previous run) as flaky. iDFlakies further classifies each detected flaky test as order-dependent or non-order-dependent flaky tests. iDFlakies is at `https://github.com/idflakies/iDFlakies`. The dataset of flaky tests we detected is at `https://sites.google.com/view/flakytestdataset/home`.

NonDex — NonDex detects flaky tests caused by developers' wrong assumptions about under-determined specification [11],[15]. Flaky tests non-deterministically pass or fail for the same code. NonDex was adopted by CheckStyle. NonDex is at `https://github.com/TestingResearchIllinois/nondex`.

STARTS (STAtic Regression Test Selection) — STARTS is a tool to reduce regression testing costs by rerunning only tests that can change behavior due to code changes. STARTS saves up to 80% of testing time on medium-sized open-source projects [1],[8],[12]. STARTS is at `https://github.com/TestingResearchIllinois/starts`.

SRCIROR — SRCIROR is a mutation testing tool for both the src and IR levels for C [3],[4],[13]. SRCIROR implements conceptually the same mutation operators at both levels, allowing for fairer comparisons of mutation testing between the two levels. SRCIROR is at `https://github.com/TestingResearchIllinois/srciror`.

Experience with Research Grants

Assisted in the preparation of the proposals for the following research grants/gift:

2018 – 2020 — *EAGER: Preserve/Destroy Decisions for Simulation Data in Computational Physics and Beyond*, National Science Foundation. Funded amount: $300,000

2016 — *Improving Regression Testing Efficiency*, Qualcomm. Funded amount: $50,000

2015 — *Combating Flaky Tests*, Google Faculty Research Awards. Funded amount: $51,000

2014 – 2017 — *SHF: Medium: Collaborative Research: Improved Performance Testing and Debugging*, National Science Foundation. Funded amount: $616,000

Service to Professional Community

PC Member — PLDI 2017 Artifact Evaluation Committee

Reviewer — STVR 2018, ICSE SEIP 2018, STVR 2017

Co-Reviewer — ASE 2017, TACAS 2017, ASE 2016, ICST 2016, ASE 2015, CAV 2015, HVC 2014, ICSE 2014

Student Volunteer — ASE 2017, ICST 2016, FSE 2014

Co-organizer — Brett Daniel Software Engineering Seminar for, UIUC, Fall 2016

Co-teacher — Taught one class on "Software Testing for Fun, Fame and maybe even Profit" to 19 high school students, UIUC, Spring 2015

Presentations

9 conference talks, 3 guest talks, 5 guest lectures, and 4 poster presentations

Poster Presentation — *Optimizing Test Placement for Module-Level Regression Testing*, Huawei Midwest Research Summit, March 2019, Champaign, Illinois

Poster Presentation — *SRCIROR: A Toolset for Mutation Testing of C Source Code and LLVM Intermediate Representation*, ASE 2018, September 2018, Montpellier, France

Conference Talk — *SRCIROR: A Toolset for Mutation Testing of C Source Code and LLVM Intermediate Representation*, ASE 2018, September 2018, Montpellier, France

Guest Lecture — *Mutation Testing*, CS 598DM (Software Testing for All), UIUC, September 2018

Conference Talk — *Evaluating Test-Suite Reduction in Real Software Evolution*, ISSTA 2018, July 2018, Amsterdam, Netherlands

Conference Talk — *An Extensible, Regular-Expression-Based Tool for Multi-Language Mutant Generation*, ICSE DEMO 2018, May 2018, Gothenburg, Sweden

Guest Talk — *Optimizing Test Placement for Module-Level Regression Testing*, Beihang University, December 2017, Beijing, China

Poster Presentation — *Approximate Transformations as Mutation Operators*, Huawei Research, October 2017, Urbana-Champaign, Illinois

Guest Lecture	*Optimizing Test Placement for Module-Level Regression Testing*, CS 527 (Topics in Software Engineering), UIUC, September 2017
Guest Lecture	*Regression Testing*, CS 498ST (Software Testing), UIUC, September 2017
Conference Talk	*Optimizing Test Placement for Module-Level Regression Testing*, ICSE 2017, May 2017, Buenos Aires, Argentina
Guest Talk	*Optimizing Test Placement for Module-Level Regression Testing*, UT Austin, January 2017, Austin, Texas
Poster Presentation	*NonDex: A tool for detecting and debugging wrong assumptions on Java API specifications*, FSE DEMO 2016, November 2016, Seattle, Washington
Conference Talk	*NonDex: A tool for detecting and debugging wrong assumptions on Java API specifications*, FSE DEMO 2016, November 2016, Seattle, Washington
Conference Talk	*Evaluating Non-adequate Test-Case Reduction*, ASE 2016, September 2016, Singapore, Singapore
Conference Talk	*Detecting Assumptions on Deterministic Implementations of Non-deterministic Specifications*, ICST 2016, April 2016, Chicago, Illinois
Conference Talk	*Comparing and Combining Test-Suite Reduction and Regression Test Selection*, FSE 2015, September 2015, Bergamo, Italy
Guest Lecture	*Jenkins Demonstration*, CS 427 (Software Engineering I), UIUC, September 2015
Guest Talk	*Comparing and Combining Test-Suite Reduction and Regression Test Selection*, Microsoft, August 2015, Redmond, Washington
Conference Talk	*Balancing Trade-Offs in Test-Suite Reduction*, FSE 2014, November 2014, Hong Kong
Guest Lecture	*Balancing Trade-Offs in Test-Suite Reduction*, CS 527 (Topics in Software Engineering), UIUC, October 2014

Industry Experience

2015	Research Intern, Microsoft and Microsoft Research
2014	Software Development Intern, Google
2013	Software Development Intern, Amazon
2011 and 2012	Software Development Intern, Intel
2010	Software Development Intern, USAA