

Sergey Mechtaev

Lecturer (Assistant Professor), University College London

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RESEARCH INTERESTS

- **Software engineering:** automated program repair, software testing.
- **Formal methods:** symbolic execution, constraint solving, software verification.
- **Programming languages:** program synthesis, program analysis.

EDUCATION

- **National University of Singapore, School of Computing** Singapore
Doctor of Philosophy
August 2012–July 2018
Thesis: Semantic program repair; Supervisor: Abhik Roychoudhury; GPA: 4.4
- **Saint Petersburg State University, Mathematics & Mechanics Faculty** Saint Petersburg, Russia
Specialist
September 2006–July 2011
Thesis: Generic programming library for OCaml; Supervisor: Dmitry Boulytchev; GPA: 4.7

EMPLOYMENT

- **University College London** London, United Kingdom
Lecturer
February 2019–Present
Software System Engineering group, CREST centre
- **National University of Singapore** Singapore
Research Assistant
March 2017–January 2019
TSUNAMi centre
- **Fondazione Bruno Kessler** Trento, Italy
Intern
February 2016–June 2016
Research Unit in Embedded Systems
- **Lanit-Tercom, Inc** Saint-Petersburg, Russia
Software Developer
May 2010–July 2012
HaScOL hardware-description language
- **OOO Dvin** Saint-Petersburg, Russia
Software Developer
June 2009–April 2010
Video surveillance software startup

PUBLICATIONS

Google Scholar: <https://scholar.google.com.sg/citations?user=XTFR93cAAAAJ&hl=en>

DBLP: <https://dblp.uni-trier.de/pers/hd/m/Mechtaev:Sergey>

- **Crash-Avoiding Program Repair** ISSTA'19
Xiang Gao, Sergey Mechtaev, Abhik Roychoudhury
International Symposium on Software Testing and Analysis 2019
- **Symbolic Execution with Existential Second-Order Constraints** FSE'18
Sergey Mechtaev, Alberto Griggio, Alessandro Cimatti, Abhik Roychoudhury
Symposium on the Foundations of Software Engineering 2018

- **Test-equivalence Analysis for Automatic Patch Generation** TOSEM'18
Sergey Mechtaev, Xiang Gao, Shin Hwei Tan, Abhik Roychoudhury
Transactions on Software Engineering and Methodology 2018
- **Semantic Program Repair Using a Reference Implementation** ICSE'18
Sergey Mechtaev, Manh-Dung Nguyen, Yannic Noller, Lars Grunske, Abhik Roychoudhury
International Conference on Software Engineering 2018, Acceptance: 105/502 = 21%
- **A Correlation Study Between Automated Program Repair and Test-suite Metrics** EMSE'17
Jooyong Yi, Shin Hwei Tan, Sergey Mechtaev, Marcel Boehme, Abhik Roychoudhury
Empirical Software Engineering Journal 2017
- **Codeflaws: A Programming Competition Benchmark for Evaluating Automated Program Repair Tools** ICSE'17-Poster
Shin Hwei Tan, Jooyong Yi, Yulis, Sergey Mechtaev, Abhik Roychoudhury
International Conference on Software Engineering, Poster track 2017
- **Angelix: Scalable Multiline Program Patch Synthesis via Symbolic Analysis** ICSE'16
Sergey Mechtaev, Jooyong Yi, Abhik Roychoudhury
International Conference on Software Engineering 2016, Acceptance: 101/530 = 19%
- **DirectFix: Looking for Simple Program Repairs** ICSE'15
Sergey Mechtaev, Jooyong Yi, Abhik Roychoudhury
International Conference on Software Engineering 2015, Acceptance: 84/452 = 18%
- **Eliminating Boilerplate Code in Objective Caml Programs** SysProg'11
Sergey Mechtaev
System Programming 2011
- **Efficiently Scrapping Boilerplate Code in OCaml** ML'11
Dmitri Boulytchev, Sergey Mechtaev
Workshop on ML 2011

PROJECTS

GitHub: <https://github.com/mechtaev>

- **Angelix:** the first constraint-based program repair system that scales to large real-world programs. Angelix generated a patch for the well-known Heartbleed vulnerability; it has been downloaded by researchers from over 60 institutions, and has been used in several projects including an intelligent tutoring system at IIT Kanpur. <http://angelix.io>
- **program-repair.org:** a community-driven website on program repair that was initiated and designed by me. Since its release, researchers from 7 institutions have contributed to this website; it has 200-300 unique visitors per month. <http://program-repair.org>
- **ocaml-syb:** an adaptation of Scrap Your Boilerplate approach for OCaml. This library has been used in the compiler of HaSCoL hardware-description language. The prototype is available here: <http://oops.math.spbu.ru/syb-ocaml/>

SUPERVISION

- **Edwin Lesmana Tjong** National University of Singapore
MSc co-advisor 2017–2018
Thesis: Use of Repairs Tool to Fix Security Vulnerabilities

TEACHING

- **CS4218 Software Testing and Debugging** National University of Singapore
Teaching Assistant January 2015–May 2015

TALKS

- **Semantic Program Repair**
Imperial College London London, United Kingdom
May 2019
- **First-Order and Second-Order Symbolic Execution**
JetBrains Research Saint-Petersburg, Russia
April 2019
- **Semantic Program Repair**
University College London London, United Kingdom
July 2018
- **Semantic Program Repair Using a Reference Implementation**
International Conference on Software Engineering 2018 Gothenburg, Sweden
May 2018
- **Semantic Program Repair Using a Reference Implementation**
Dagstuhl Seminar 18151 on Program Equivalence Schloss Dagstuhl, Germany
April 2018
- **Semantics-based Program Repair**
School of Computing, National University of Singapore Singapore
April 2017
- **Efficient Exploration of Patch Spaces for Automated Program Repair**
JetBrains Research Saint-Petersburg, Russia
March 2017
- **Towards a Synergy of Syntax-based and Semantics-based Program Repair**
Dagstuhl Seminar 17022 on Automated Program Repair Schloss Dagstuhl, Germany
January 2017
- **Angelix: Scalable Multiline Program Patch Synthesis via Symbolic Analysis**
International Conference on Software Engineering 2016 Austin, USA
May 2016
- **Constraint-based Automated Program Repair**
Fondazione Bruno Kessler Trento, Italy
May 2016
- **DirectFix: Looking for Simple Program Repairs**
International Conference on Software Engineering 2015 Florence, Italy
May 2015

SERVICE

- **Program committee:**
 - International Conference on Automated Software Engineering (ASE) 2019
- **Reviewer:**
 - Transactions on Software Engineering (TSE) 2017, 2018, 2019
 - Empirical Software Engineering (EMSE) 2017, 2018, 2019×2
 - Transactions on Software Engineering and Methodology (TOSEM) 2018, 2019
- **Subreviewer:**
 - International Conference on Automated Software Engineering (ASE) 2013
 - International Symposium on Software Testing and Analysis (ISSTA) 2015
 - International Conference on Software Testing, Verification, and Validation (ICST) 2017
 - Symposium on the Foundations of Software Engineering (FSE) 2017
 - International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2019

AWARDS

- **IMDA Excellence Prize 2019**
National University of Singapore Singapore
2019
- **Outstanding Doctoral Dissertation Award**
ACM SIGSOFT Montreal, Canada
2019
- **Research Achievement Award**
National University of Singapore Singapore
2016
- **NEERC Northern Subregional Programming Contest Honorable Mention**
ACM ICPC Saint Petersburg, Russia
2007