Abhik   ROYCHOUDHURY

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Provost's Chair Professor
National University of Singapore (NUS)

https://abhikrc.com

Research Interests

- Program Analysis, Software Testing, Software Security, Trustworthy Systems.

Education Ph.D. in Computer Science, State University of New York at Stony Brook, 2000.

- PhD Thesis: Program Transformations for Verifying Parameterized Systems.

Employment National University of Singapore, School of Computing, since 2001.

- Professor, Computer Science Department (2014 - now).
    - Provost's Chair Professor (2020 – now).
- Associate Professor, Computer Science Department (2007-2014).
- Assistant Professor, Computer Science Department (2001-2007).

Recent Projects and Initiatives

- Fuzz Testing, NRF National Cybersecurity R&D program, Lead PI, $6.7M, 2023-27.
- Automated Program Repair, Ministry of Education Tier 3, Lead PI, $7.1M, 2022-27.
- Descartes – Intelligent Modeling for Decision making in Critical Urban Systems, Co-director, NRF CREATE with CNRS France, $25M, 2021-26.
- Software Recovery using Semantic Program Repair, DSO, Sole PI, $1.8M, 2020-23.
- National Satellite of Excellence in Trustworthy Software Systems, Director, $12M, 19-23.

Selected Publications

- SemFix: Program Repair via Semantic Analysis, ICSE 2013.
- Coverage-based Greybox Fuzzing as Markov Chain, CCS 2016.
- Directed Greybox Fuzzing, CCS 2017.
- Angelix: Scalable Multi-line Program Patch Synthesis via Symbolic Analysis, ICSE 2016.
- Automated Program Repair, Communications of the ACM Dec 2019.

Recent Awards

- ICSE23 Most Influential Paper Award for ICSE 2013 paper SemFix: Program Repair via Semantic Analysis.
    - Given to only one paper published 10 years ago.
- IEEE TCSE New Directions Award 2022 (awarded jointly with Cristian Cadar).
- Several awards for distinguished / best papers, most recently from ASE22, AsiaCCS21.

Recent Professional Service

- Program Co-chair, International Conference on Software Engineering (ICSE) 2024.

- General Chair, ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2022.
- Member of SE3 Committee coordinating the major Software Engineering conferences ICSE, FSE and ASE.
- Program Chair, Intl. Symposium on Software Testing and Analysis (ISSTA) 2016.
- Associate Editor, Communications of the ACM, from 2023.
- Associate Editor of IEEE Transactions on Software Engineering, 2014-18, ACM Transactions on Software Engineering and Methodology (2019-now), IEEE Transactions on Dependable and Secure Computing (2019 – now), Guest Editor-in-Chief ACM TOSEM Continuous Special Section on Security and SE.
- Lead of Foundational Research Capability Task force to study capabilities in Security and Data Privacy for Singapore (appointed by National Research Foundation), 2021–22.

Recent Student Placement

- Xiang Gao, PhD NUS → Beihang University, China as Associate Professor.
- Sergey Mechtaev, PhD NUS → University College London, UK as Lecturer.
- Shin Hwei Tan, PhD NUS → SUSTech, China, as Assistant Professor.
- Van Thuan Pham, PhD NUS → University of Melbourne, Australia, Lecturer.
- Marcel Böhme, PhD NUS → Max-Planck Institute (MPI), Germany, faculty member.
- Sudipta Chattopadhyay, PhD NUS → Assistant Professor at SUTD Singapore.

Recent Invited Talks and Keynotes

- Invited Award Talk, International Conference on Software Engineering (ICSE), May 23.
- Invited Tutorial, Embedded Systems Week, October 2022.
- Keynote at 27th Asia-Pacific Software Engineering Conference (APSEC) 2020, 4th IEEE/ACM Intl. Conference on Mobile Software Engineering and Systems (MobileSoft) 2017, 21st Intl. Symposium on Real-time Computing (ISORC) 2018.
- Distinguished Lecture at University of Luxembourg, Peking University, Max Planck Institute of Software Systems, KAIST Korea.

Translational Impact

- AFLFast and AFLGo as extended grey-box fuzzing tools, for detecting program vulnerabilities. AFLFast has been integrated to the regular AFL distribution.
- Set up Singapore Cybersecurity Consortium in 2016, involving 25 companies, the first industry consortium in Computer Science in Singapore.
- Angelix and related tools for program repair, used for intelligent tutoring to teach programming to students in India, collaboration with IIT Kanpur (Amey Karkare).

Teaching   Introduced *Software Testing (undergrad)*, *Software Security (undergrad),* authored a textbook "*Embedded Systems and Software Validation*" under Elsevier in 2009.

- Introduced a course Foundations of SE, building an intelligent tutoring system for programming – linking Software Engineering teaching and programming teaching.

Citations
https://scholar.google.com.sg/citations?user=UxFWSJIAAAAJ&hl=en