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.

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, $7.5M, 2022-27.
- 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.
- Descartes – Intelligent Modeling for Decision making in Critical Urban Systems, Co-director, NRF CREATE with CNRS France, $25M, 2021-26.

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.
    - Award given since 1989, first time a paper outside N America/Europe awarded.
- IEEE TCSE New Directions Award 2022 (awarded jointly with Cristian Cadar).
    - For contributions to symbolic execution for software testing and repair.
- Several awards for distinguished / best papers, most recently from ASE22, AsiaCCS21.

Significant Professional Service

- Steering Committee Chair, ACM SIGSOFT Foundations of Software Engineering (FSE).
- Program Co-chair, International Conference on Software Engineering (ICSE) 2024.

- Member of SE3 Committee coordinating the three major Software Engineering international 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 ACM Transactions on Software Engineering and Methodology (2019-24), IEEE Transactions on Dependable and Secure Computing (2019 – 2023).
  - Editor-in-Chief, TOSEM Special Section, Security and Software Engineering.
- Lead of Foundational Research Capability Task force to study capabilities in Security and Data Privacy for Singapore (appointed by National Research Foundation), 2021–22.

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 and ran Singapore Cybersecurity Consortium in 2016-22, 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, collaboration with IIT Kanpur, Monash Malaysia.

Recent Student Placement

- Xiang Gao, PhD NUS $\rightarrow$ Beihang University, China as Associate Professor.
- Sergey Mechtaev, PhD NUS $\rightarrow$ University College London, UK as Lecturer.
  - Winner of ACM SIGSOFT Outstanding Dissertation Award.
- Shin Hwei Tan, PhD NUS $\rightarrow$ Concordia Univ, Chaired Associate Professor.
- Van Thuan Pham, PhD NUS $\rightarrow$ University of Melbourne, Senior Lecturer.
- Marcel Böhme, PhD NUS $\rightarrow$ Max-Planck Institute (MPI), Germany, faculty member.
- Sudipta Chattopadhyay, PhD NUS $\rightarrow$ SUTD Singapore, Assistant Professor

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 Lectures at Max Planck Institute of Software Systems, KAIST Korea.

Teaching   Introduced *Software Testing (undergrad), Software Security (undergrad)* at NUS. 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*

Other Information Singapore Citizen, Married, One son.