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moarbugs
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Rohan Padhye

Research Interests

Areas Software Engineering, Programming Languages, Systems, Security
Topics Dynamic Program Analysis, Automatic Test Generation, Fuzz Testing

Appointments

2020–present **Carnegie Mellon University**, *Assistant Professor*, Pittsburgh, PA, USA.
Institute of Software Research (ISR)
School of Computer Science (SCS)

Education

2015–2020 **Ph.D**, *Computer Science*, University of California, Berkeley.
2011–2013 **M.Tech**, *Computer Science & Engineering*, Indian Institute of Technology (IIT) Bombay.
2007–2011 **B.E**, *Computer Engineering*, University of Mumbai—Thadomal Shahani Engineering College (TSEC).

Awards and Achievements

2020 Outstanding Graduate Student Instructor Award, UC Berkeley
2020 C.V. Ramamoorthy Distinguished Research Award, UC Berkeley EECS Department
2019 **Best Paper Award** [SOSP'19]
2019 **ACM SIGSOFT Tool Demonstration Award** [ISSTA'19b]
2019 **ACM SIGSOFT Distinguished Artifact Award** [ISSTA'19a]
2018 **ACM SIGSOFT Distinguished Paper Award** [ISSTA'18]
2018 Amazon AWS Cloud Credits for Research Award ($10,000)
2015 Mining Software Repositories Hall of Fame (Honorable Mention) [MSR'14]
2014 ICSE-NIER Award for Innovation and Potential Impact [ICSE-C'14]
2013 Institute Silver Medal, IIT Bombay
2013 Shri K.M. Doshi Charitable Trust Prize, IIT Bombay
2011 TSEC Ambassador, Thadomal Shahani Engineering College, Mumbai
2011 TSEC Leader, Thadomal Shahani Engineering College, Mumbai

Industrial Positions

May–Aug. 2018 **Microsoft Research**, *Research Intern*, Redmond, WA, USA.
Dynamic analysis of asynchronous C# programs

May–Aug. 2017 **Samsung Research America**, *Security Engineering Intern*, Mountain View, CA, USA.
Fuzz testing of Trusted Execution Environments (TEE)

2013–2015 **IBM Research India**, *Blue Scholar*, New Delhi, India.
Mining software repositories

Teaching

2018–2019 **University of California, Berkeley**, *Graduate Student Instructor*.
Designed the **ChocoPy** programming language [SPLASH-E'19]
`https://chocopy.org`
- *Programming Languages and Compilers* (undergraduate), Fall 2019
- *Programming Languages and Compilers* (undergraduate), Fall 2018

2012–2013 **IIT Bombay**, *Teaching Assistant*.
- *Abstractions and Paradigms of Programming* (undergraduate), Spring 2012
- *Software Lab* (graduate), Fall 2012
- *Essential Abstractions in GCC* (graduate + industry), Summer 2012
- *Implementation of Programming Languages* (undergraduate), Spring 2013

Publications

Peer-Reviewed **Research** Papers

ASE'20 **BigFuzz: Efficient Fuzz Testing for Data Analytics using Framework Abstraction**
Qian Zhang, Jiyuan Wang, Muhammad Ali Gulzar, **Rohan Padhye**, Miryung Kim,
35th ACM/IEEE International Conference on Automated Software Engineering, ASE 2020.
Acceptance Rate: 22.5% (93/414)

ICSE'20 **Quickly Generating Diverse Valid Test Inputs with Reinforcement Learning**
Sameer Reddy, Caroline Lemieux, **Rohan Padhye**, Koushik Sen,
42nd ACM/IEEE International Conference on Software Engineering, ICSE 2020.
Acceptance Rate: 20.9% (129/617)

USENIX Sec'20 **PARTEMU: Enabling Dynamic Analysis of Real-World TrustZone Software Using Emulation**
Lee Harrison, Hayawardh Vijayakumar, **Rohan Padhye**, Koushik Sen, Michael Grace,
29th USENIX Security Symposium, USENIX Security'20 (to appear).

SOSP'19 **Efficient and Scalable Thread-Safety-Violation Detection**
Best Paper Guangpu Li, Shan Lu, Suman Nath, Madan Musuvathi, **Rohan Padhye**,
27th ACM Symposium on Operating Systems Principles, SOSP 2019.
Acceptance Rate: 13.77% (38/276). Aritifacts Evaluated: *Functional* + *Available*.

OOPSLA'19 **FuzzFactory: Domain-Specific Fuzzing with Waypoints**
Rohan Padhye, Caroline Lemieux, Koushik Sen, Laurent Simon, Hayawardh Vijayakumar,
Proceedings of the ACM on Programming Languages, Volume 3 Issue OOPSLA.
Acceptance Rate: 35.8% (72/201). Aritifacts Evaluated: *Functional* + *Available*.

ISSTA'19a **Semantic Fuzzing with Zest**
Distinguished Artifact **Rohan Padhye**, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon,
28th ACM SIGSOFT International Symposium on Software Testing and Analysis, ISSTA 2019.
Acceptance Rate: 23.8% (32/134). Aritifacts Evaluated: *Functional* + *Reusable* + *Available*.

ISSTA'18 **PerfFuzz: Automatically Generating Pathological Inputs**
Distinguished Paper Caroline Lemieux, **Rohan Padhye**, Koushik Sen, Dawn Song,
27th ACM SIGSOFT International Symposium on Software Testing and Analysis, ISSTA 2018.
Acceptance Rate: 27.6% (31/112)

ICSE'17 **Travioli: A Dynamic Analysis for Detecting Data-Structure Traversals**
Rohan Padhye, Koushik Sen,
39th ACM/IEEE International Conference on Software Engineering, ICSE 2017.
Acceptance Rate: 16.4% (68/415)

ISEC'16 **Mining API Expertise Profiles using Partial Program Analysis**
Senthil Mani, **Rohan Padhye**, Vibha Singhal Sinha,
9th ACM ISOFT India Software Engineering Conference, ISEC 2016.
Acceptance Rate: 15.7% (16/102)

ASE'14 **NeedFeed: Taming Change Notifications by Modeling Code Relevance**
Rohan Padhye, Senthil Mani, Vibha Singhal Sinha,
29th ACM/IEEE International Conference on Automated Software Engineering, ASE 2014.
Acceptance Rate: 19.9% (55/276)

Peer-Reviewed **Education** Papers

SPLASH-E'19 **ChocoPy: A Programming Language for Compilers Courses**
Rohan Padhye, Koushik Sen, Paul N. Hilfinger,
2019 ACM SIGPLAN SPLASH-E Symposium.

Other Peer-Reviewed Publications (Workshops and Short Papers)

VMIL'19 **Efficient Fail-Fast Dynamic Subtype Checking**
Rohan Padhye, Koushik Sen,
11th ACM SIGPLAN Workshop on Virtual Machines and Managed Runtimes, VMIL 2019.

JPF'19 **SAFFRON: Adaptive Grammar-based Fuzzing for Worst-Case Analysis**
Xuan Bach D. Le, Corina Pasareanu, **Rohan Padhye**, David Lo, Willem Visser, Koushik Sen,
Java Path Finder Workshop 2019.

ISSTA'19b **JQF: Coverage-Guided Property-Based Testing in Java**
Best Tool Demo **Rohan Padhye**, Caroline Lemieux, Koushik Sen,
28th International Symposium on Software Testing and Analysis, ISSTA 2019, Tool Demo.

ICSE-C'19 **Validity Fuzzing and Parametric Generators for Effective Random Testing**
Rohan Padhye, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon,
41st ACM/IEEE Int'l Conf. on Software Engineering, ICSE 2019, Companion Proceedings.

ICSE-C'15 **Smart Programming Playgrounds**
Rohan Padhye, Pankaj Dhoolia, Senthil Mani, Vibha Singhal Sinha,
37th ACM/IEEE Int'l Conf. on Software Engineering, ICSE 2015, Companion Proceedings.

MSR'15a **Detecting and Mitigating Secret-Key Leaks in Source Code Repositories**
Vibha Singhal Sinha, Diptikalyan Saha, Pankaj Dhoolia, **Rohan Padhye**, Senthil Mani,
12th Working Conference on Mining Software Repositories, MSR 2015.

MSR'15b **The Synergy Between Voting and Acceptance of Answers on StackOverflow, or the Lack Thereof**
Neelamadhav Gantayat, Pankaj Dhoolia, **Rohan Padhye**, Senthil Mani, Vibha Singhal Sinha,
12th Working Conference on Mining Software Repositories, MSR 2015.

ICSE-C'14 **API as a Social Glue**
NIER Innovation Award **Rohan Padhye**, Debdoot Mukherjee, Vibha Singhal Sinha,
36th ACM/IEEE Int'l Conf. on Software Engineering, ICSE 2014, Companion Proceedings.

MSR'14 **A Study of External Community Contribution to Open-source Projects on GitHub**
Hall of Fame **Rohan Padhye**, Senthil Mani, Vibha Singhal Sinha,
11th Working Conference on Mining Software Repositories, MSR 2014.

SOAP'13 **Interprocedural Data Flow Analysis in Soot using Value Contexts**
Rohan Padhye, Uday P. Khedker,
2nd ACM SIGPLAN Int'l Workshop on State-Of-the-Art in Java Program Analysis, SOAP 2013.

Dissertations

PhD **Abstractions and Algorithms for Specializing Dynamic Program Analysis and Random Fuzzing**
Rohan Padhye (advisor: Prof. Koushik Sen),
Ph.D. Dissertation, University of California, Berkeley.

MTP **Interprocedural Heap Analysis Using Access Graphs and Value Contexts**
Rohan Padhye (advisor: Prof. Uday Khedker),
Master's Thesis Project, IIT Bombay.

Media and Adoption

2019 TechRepublic article on *How ChocoPy uses Python and RISC-V to teach compiler creation*.
`https://www.techrepublic.com/article/how-chocopy-uses-python-and-risc-v-to-teach-compiler-creation`

2019 JQF+Zest is provided as a service by *FuzzIt*, a continuous fuzzing startup.
`https://fuzzit.dev`

2019 Multiple talks by Pentagrid IT Security on *Fuzzing Java with the Help of JQF*.
`https://www.pentagrid.ch/en/blog/fuzzing_java_with_jqf/`

Conference Talks

13 talks across 7 venues

2019 OOPSLA'19, VMIL'19, SPLASH-E'19 at Athens, Greece
2019 ISSTA'19a, ISSTA'19b at Beijing, China
2017 ICSE'17 at Buenos Aires, Argentina
2015 ICSE-C'15 (New Ideas Track), MSR'15a, MSR'15b at Florence, Italy
2014 ASE'14 at Västerås, Sweden
2014 ICSE-C'14 (New Ideas Track), MSR'14 at Hyderabad, India
2013 SOAP'13 at Seattle, WA, USA

Invited / Other Talks

2020 **Bending Fuzzers to One's Own Will**, *University of Wisconsin–Madison*, Madison, WI, USA.
2020 **Bending Fuzzers to One's Own Will**, *University of Illinois at Urbana-Champaign*, IL, USA.
2020 **Bending Fuzzers to One's Own Will**, *Columbia University*, New York, NY, USA.
2020 **Bending Fuzzers to One's Own Will**, *University of Massachesuetts Amherst*, Amherst, MA, USA.
2020 **Bending Fuzzers to One's Own Will**, *University of Michigan*, Ann-Arbor, MI, USA.
2020 **Bending Fuzzers to One's Own Will**, *Carnegie Mellon University*, Pittsburgh, PA, USA.
2020 **Bending Fuzzers to One's Own Will**, *University of Washington*, Seattle, WA, USA.
2020 **Bending Fuzzers to One's Own Will**, *University of British Columbia*, Vancouver, BC, Canada.
2020 **Bending Fuzzers to One's Own Will**, *UC San Diego*, San Diego, CA, USA.
2020 **Bending Fuzzers to One's Own Will**, *Cornell University*, Ithaca, NY, USA.
2020 **Bending Fuzzers to One's Own Will**, *Georgia Tech*, Atlanta, GA, USA.
2019 **Bending Fuzzers to One's Own Will**, *University of Chicago*, Chicago, IL, USA.
2019 **Bending Fuzzers to One's Own Will**, *Apple*, Cupertino, CA, USA.
2019 **Bending Fuzzers to One's Own Will**, *CISPA*, Saarland, Germany.
2019 **Fuzzing for Performance Bottlenecks and Semantic Bugs**, *University of Toronto*, Canada.
2018 **Lightweight Happens-Before Analysis**, *Microsoft Research*, Redmond, WA, USA.
2018 **Dynamic Analysis of Data-Structure Traversals**, *IIT Bombay*, Mumbai, India.
2017 **Optimistic Fuzz Testing**, *Samsung Research America*, Mountain View, CA, USA.

Service

2021 **Program committee**, *ISSTA 2021*.
2020 **Board of Distinguished Reviewers**, *ACM Transactions on Software Engineering & Methodology (TOSEM))*.
2020 **External Review Committee**, *SPLASH/OOPSLA 2020*.
2020 **Reviewer**, *IEEE Transactions on Dependable and Secure Computing (TDSC)*.

2019–2020 **Reviewer**, *IEEE Transactions on Software Engineering (TSE)*.

2019–2020 **Reviewer**, *Journal of Information and Software Technology (IST)*.

2018–2019 **Artifact evaluation committee**, *PLDI 2018, PLDI 2019*.

2015–2020 **Subreviewer**, *ASPLOS'16, ISSTA'16, PLDI'17, ASPLOS'18, PLDI'18, CAV'18, ICST'20, ISSTA'20*.

2016–2018 **Program committee**, ISEC'16, ISEC'17, ISEC'18.