

Rohan Padhye

Research Interests

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

Academic Appointments

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

Education

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

Industry Positions

Summer 2018 **Microsoft Research**, *Research Intern*, Redmond, WA, USA.
Summer 2017 **Samsung Research America**, *Security Engineering Intern*, Mountain View, CA, USA.
2013–2015 **IBM Research India**, *Software Engineer (Research)*, New Delhi, India.

Awards and Achievements

2020 Outstanding Graduate Student Instructor Award, UC Berkeley
2020 C.V. Ramamoorthy Distinguished Research Award, UC Berkeley
2019 ACM SIGOPS—SOSP 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](#)]
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

Teaching

2020–present **Carnegie Mellon University**, *Assistant Professor*.

- *Foundations of Software Engineering* (undergraduate), Fall 2021 (to be co-taught with Michael Hilton)
- *Program Analysis* (undergraduate + graduate), Spring 2021 (co-taught with Jonathan Aldrich)
- *Software Engineering Research* (PhD core course), Fall 2020 (co-taught with ISR faculty)

- 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

- ICSE'21 **Growing a Test Corpus with Bonsai Fuzzing**
 Vasudev Vikram, **Rohan Padhye**, Koushik Sen,
43rd ACM/IEEE International Conference on Software Engineering, ICSE 2021.
 Acceptance Rate: 22.4% (138/615)
- ASE'20 **BigFuzz: Efficient Fuzz Testing for Data Analytics using Framework Abstraction**
 Qian Zhang, Jiyan 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.
 Acceptance Rate: 16.1% (157/977)
- 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). Artifacts 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). Artifacts 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). Artifacts 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)
- ICSE-C'20 **Efficient Fuzz Testing for Apache Spark using Framework Abstraction**
Qian Zhang, Jiyuan Wang, Muhammad Ali Gulzar, **Rohan Padhye**, Miryung Kim,
43rd ACM/IEEE Int'l Conf. on Software Engineering, ICSE 2021, Companion Proceedings.
- 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.

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

- 2021 **Bending Fuzzers to One's Own Will**, *VMWare Research*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *Synopsys*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of Wisconsin–Madison*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of Illinois at Urbana-Champaign*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *Columbia University*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of Massachusetts Amherst*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of Michigan, Ann-Arbor*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *Carnegie Mellon University*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of Washington*, virtual talk.
2020 **Bending Fuzzers to One's Own Will**, *University of British Columbia*, virtual talk.
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.

Student Advising and Mentoring

- 2020–present **Advisor**, *Ph.D. in Software Engineering*, Institute for Software Research, Carnegie Mellon University.
- Ben Gafford (co-advised with Eunsuk Kang)—since Fall 2020
 - Ao Li (co-advised with Vyas Sekar)—since Fall 2020

- 2021 **Advisor**, *Research Experience for Undergraduates in Software Engineering (REUSE)*, Institute for Software Research, Carnegie Mellon University.
 - John Billos (co-advised with Vincent Hellendoorn)—Summer 2021
 - Carolyn Oluwatomi Oluwaseun-Apo (co-advised with Vincent Hellendoorn)—Summer 2021
 - Rafello Sanna—Summer 2021
- 2021 **Advisor**, *Undergraduate Research*, School of Computer Science, Carnegie Mellon University.
 - Isabella Laybourn—Spring 2021
- 2020–21 **Thesis Committee**, *Ph.D. in Software Engineering*, Institute for Software Research, Carnegie Mellon University.
 - Miguel Velez (advised by Christian Kästner)
- 2021 **Mentor**, *ICSE 2021 Speed Networking*.
- 2020 **Panelist**, *JOBS workshop at IEEE MICRO 2020*.
- 2020 **Mentor**, *SPLASH 2020 Programming Languages Mentoring Workshop (PLMW)*.

Service

- 2021–present **Distinguished Reviewer**, *ACM Transactions on Software Engineering and Methodology (TOSEM)*.
- 2019–present **Reviewer**, *IEEE Transactions on Software Engineering (TSE)*.
 - 2021 **Program committee**, *ICSE 2022*.
 - 2021 **Program committee**, *ISSTA 2021*.
 - 2021 **Program committee (Tool demonstrations)**, *ISSTA 2021*.
 - 2020 **Reviewer**, *IEEE Transactions on Dependable and Secure Computing (TDSC)*.
 - 2020 **Invited Reviewer**, *ASPLOS 2021*.
 - 2020 **Invited Reviewer**, *OSDI 2020*.
 - 2020 **External Review Committee**, *SPLASH/OOPSLA 2020*.
- 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*.