Rohan Padhye

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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, 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.
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). 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 **Rohan Padhye**, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon,
Artifact *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 Caroline Lemieux, **Rohan Padhye**, Koushik Sen, Dawn Song,
Paper *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
Best Tool Demo   **JQF: Coverage-Guided Property-Based Testing in Java**
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
NIER
Innovation Award   **API as a Social Glue**
Rohan Padhye, Debdoot Mukherjee, Vibha Singhal Sinha,
36th ACM/IEEE Int'l Conf. on Software Engineering, ICSE 2014, Companion Proceedings.

MSR'14
Hall of Fame   **A Study of External Community Contribution to Open-source Projects on GitHub**
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 Massachesuetts 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

2021   **Mentor**, *ICSE 2021 Speed Networking*.

2020   **Panelist**, *JOBS workshop at IEEE MICRO 2020*.

2020   **Mentor**, *SPLASH 2020 Programming Languages Mentoring Workshop (PLMW)*.

2020   **Mentor**, *SPLASH 2020 Programming Languages Mentoring Workshop (PLMW)*.

Service

2021   **Program committee**, *ICSE 2022*.

2021   **Program committee**, *ISSTA 2021*.

2021   **Program committee (Tool demonstrations)**, *ISSTA 2021*.

2019–2021   **Reviewer**, *IEEE Transactions on Software Engineering (TSE)*.

2020   **Invited Reviewer**, *ASPLOS 2021*.

2020   **Invited Reviewer**, *OSDI 2020*.

2020   **External Review Committee**, *SPLASH/OOPSLA 2020*.

2020   **Reviewer**, *IEEE Transactions on Dependable and Secure Computing (TDSC)*.

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*.