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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.
Software and Societal Systems Department (S3D), School of Computer Science (SCS); also affiliated with the CyLab Security and Privacy Institute

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

2022–2023 **Amazon Web Services**, *Visiting Academic*, Remote.

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

2023 ACM SIGSOFT Distinguished Paper Award [ISSTA'23]

2022 Amazon Research Award

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

Carnegie Mellon University, *Instructor of Record.*

Fall 2024	*17-313: Foundations of Software Engineering* (co-taught with Michael Hilton)
Fall 2023	*17-313: Foundations of Software Engineering* (co-taught with Andrew Begel)
Spring 2023	*17-712: Fantastic Bugs and How to Find Them*
Fall 2022	*17-313: Foundations of Software Engineering* (co-taught with Michael Hilton)
Spring 2022	*17-355/17-665/17-819: Program Analysis*
Fall 2021	*17-313: Foundations of Software Engineering* (co-taught with Michael Hilton)
Spring 2021	*17-355/17-665/17-819: Program Analysis* (co-taught with Jonathan Aldrich)
Fall 2020–2023	*17-808: Software Engineering Research* (co-taught with S3D faculty)

Carnegie Mellon University, *Guest Lecturer.*

Fall 2020–2024	*14-735: Secure Coding* (instructor of record: Hanan Hibshi)

University of California, Berkeley, *Graduate Student Instructor.*

Fall 2019	*CS164: Programming Languages and Compilers* (instructor of record: Koushik Sen)
Fall 2018	*CS164: Programming Languages and Compilers* (instructor of record: Koushik Sen)

IIT Bombay, *Teaching Assistant.*

Spring 2012	*CS152: Abstractions and Paradigms of Programming* (instructor of record: Amitabha Sanyal)
Fall 2012	*CS699: Software Lab* (instructor of record: Supratim Biswas)
Summer 2012	*Workshop: Essential Abstractions in GCC* (instructor of record: Uday Khedker)
Spring 2013	*CS316: Implementation of Programming Languages* (instructor of record: Uday Khedker)

Publications

Peer-Reviewed **Research** Papers

NSDI'24 **ExChain: Exception Dependency Analysis for Root Cause Diagnosis**
Ao Li, Shan Lu, Suman Nath, **Rohan Padhye**, Vyas Sekar,
21st USENIX Symposium on Networked Systems Design and Implementation, NSDI 2024.

ISSTA'23
Distinguished Paper
Guiding Greybox Fuzzing with Mutation Testing
Vasudev Vikram, Isabella Laybourn, Ao Li, Nicole Nair, Kelton OBrien, Rafaello Sanna, **Rohan Padhye**,
32nd ACM SIGSOFT International Symposium on Software Testing and Analysis, ISSTA 2023.

IEEE'23 **Fuzzing, Symbolic Execution, and Expert Guidance for Better Testing**
Ismet Burak Kadron, Yannic Noller, **Rohan Padhye**, Tevfik Bultan, Corina Păsăreanu, Koushik Sen,
IEEE Software, Volume 41, Issue 1, pp. 98–104.

MSR'22 **On the Naturalness of Fuzzer-Generated Code**
Rajeswari Hita Kambhamettu, John Billos, Tomi Oluwaseun-Apo, Benjamin Gafford, **Rohan Padhye**, Vincent J Hellendoorn,
19th International Conference on Mining Software Repositories, MSR 2022.

SoCC'21 **Service-Level Fault Injection Testing**
Christopher S. Meiklejohn, Andrea Estrada, Yiwen Song, Heather Miller, **Rohan Padhye**,
12th ACM Symposium on Cloud Computing, SoCC 2021.

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.

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.
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.
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.
SOSP'19 Best Paper	**Efficient and Scalable Thread-Safety-Violation Detection** Guangpu Li, Shan Lu, Suman Nath, Madan Musuvathi, **Rohan Padhye**, *27th ACM Symposium on Operating Systems Principles*, SOSP 2019. 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. Aritifacts Evaluated: *Functional + Available*.
ISSTA'19a Distinguished Artifact	**Semantic Fuzzing with Zest** **Rohan Padhye**, Caroline Lemieux, Koushik Sen, Mike Papadakis, Yves Le Traon, *28th ACM SIGSOFT International Symposium on Software Testing and Analysis*, ISSTA 2019. Aritifacts Evaluated: *Functional + Reusable + Available*.
ISSTA'18 Distinguished Paper	**PerfFuzz: Automatically Generating Pathological Inputs** Caroline Lemieux, **Rohan Padhye**, Koushik Sen, Dawn Song, *27th ACM SIGSOFT International Symposium on Software Testing and Analysis*, ISSTA 2018.
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.
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.
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.
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.
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.

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, Tool Demos, New Ideas)

FUZZING'24   **The Havoc Paradox in Generator-Based Fuzzing (Registered Report)**
Ao Li, Madonna Huang, Caroline Lemieux, **Rohan Padhye**,
3rd ACM International Fuzzing Workshop, FUZZING 2024.

Onward'24   **Software Engineering Methods For AI-Driven Deductive Legal Reasoning**
Rohan Padhye,
2024 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software, Onward! at SPLASH 2024.

ICSE-C'21   **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.

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.

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.

Preprints

arxiv'23   **Can Large Language Models Write Good Property-Based Tests?**
Vasudev Vikram, Caroline Lemieux, **Rohan Padhye**,
Preprint, `https://arxiv.org/abs/2307.04346`.

arxiv'22a   **SPIDER: A Practical Fuzzing Framework to Uncover Stateful Performance Issues in SDN Controllers**
Ao Li, **Rohan Padhye**, Vyas Sekar,
Preprint, `https://arxiv.org/abs/2209.04026`.

arxiv'22b   **Distributed Execution Indexing**
Christopher S. Meiklejohn, **Rohan Padhye**, Heather Miller,
Preprint, `https://arxiv.org/abs/2209.08740`.

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.

Professional Service

2025	**Program committee**, *PLDI 2025*.
2024	**Program committee**, *FUZZING Workshop 2024*.
2024	**Co-chair for Tool Demonstrations**, *ECOOP/ISSTA 2024*.
2024	**Program committee**, *ISSTA 2024*.
2023	**Program committee**, *FUZZING Workshop 2023*.
2023	**Co-organizer**, *Dagstuhl Seminar on "Software Bug Detection: Challenges and Synergies"*.
2021–present	**Distinguished Reviewer**, *ACM Transactions on Software Engineering and Methodology (TOSEM)*.
2019–present	**Reviewer**, *IEEE Transactions on Software Engineering (TSE)*.
2022	**Program committee**, *ICST 2023*.
2022	**Program committee**, *ESEC/FSE 2022*.
2022	**Program committee**, *ISSTA 2022*.
2021	**Program committee**, *ICSE 2022*.
2021	**Program committee**, *ISSTA 2021*.
2021	**Program committee**, *ISSTA 2021*, Tool demonstrations.
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.

Student Advising and Mentoring

2020–present **Advisor**, *Ph.D. in Software Engineering*, Software and Societal Systems Department (S3D), Carnegie Mellon University.
- Shrey Tiwari—since Fall 2023
- Vasudev Vikram—since Fall 2021
- Ao Li (co-advised with Vyas Sekar)—since Fall 2020

2022–2023 **Advisor**, *M.S. in Information Technology-Information Security*, Information Networking Institute (INI), Carnegie Mellon University.
- Palash Oswal–graduated Spring 2023.

2021–2022 **Advisor**, *Research Experience for Undergraduates in Software Engineering (REUSE)*, Software and Societal Systems Department (S3D), Carnegie Mellon University.
- Alexander Joukov, Stony Brook University—Summer 2024
- Serena Chen, UC San Diego—Summer 2024
- Peter Vandervelde, UC Santa Barbara—Summer 2024
- Nicole Nair, Swarthmore College—Summer 2022
- Kelton OBrien, University of Minnesota—Summer 2022
- John Billos, Wake Forest University (co-advised with Vincent Hellendoorn)—Summer 2021
- Carolyn Oluwatomi Oluwaseun-Apo, Penn State (co-advised with Vincent Hellendoorn)—Summer 2021
- Hita Kambhamettu, CMU (co-advised with Vincent Hellendoorn)—Summer 2021; now PhD student at University of Pennsylvania.
- Rafello Sanna, University of Rochester—Summer 2021; now PhD student at Harvard University.

2021–2023	**Advisor**, *Undergraduate Research*, School of Computer Science, Carnegie Mellon University.
	○ Isabella Laybourn—five semesters from Spring 2021 to Spring 2023; now at Apple.
2024	**Thesis Committee**, *Ph.D. in Computer Science*, Khoury College of Computer Sciences, Northeastern University.
	○ Katharine Hough (advised by Jonathan Bell)
2020–24	**Thesis Committee**, *Ph.D. in Software Engineering*, Software and Societal Systems Department, Carnegie Mellon University.
	○ Miguel Velez (advised by Christian Kästner)—graduated Fall 2021
	○ Christopher Meiklejohn (advised by Heather Miller)—graduated Spring 2024
2021–22	**Reader**, *M.S. in Information Security*, Information Networking Institute (INI), Carnegie Mellon University.
	○ Sears Schulz (advised by Maverick Woo)—graduated Spring 2022
2022	**Mentor**, *ICSE 2022 Student Mentoring Workshop*.
2021	**Mentor**, *ICSE 2021 Speed Networking*.
2020	**Panelist**, *JOBS workshop at IEEE MICRO 2020*.
2020	**Mentor**, *SPLASH 2020 Programming Languages Mentoring Workshop (PLMW)*.

Patents

2015	**Smart Programming Playgrounds**. *Inventors*: Pankaj Dhoolia, **Rohan Padhye**, Senthil Mani and Vibha Singhal Sinha. *US Patent Number*: 9710361. *Assigned to*: IBM Corporation.
2014	**Preventing Sharing of Sensitive Information Through Code Repositories**. *Inventors*: Vibha Singhal Sinha, **Rohan Padhye**, Senthil Mani and Pankaj Dhoolia. *US Patent Number*: 9910837. *Assigned to*: IBM Corporation.
2014	**Controlling Generation of Change Notifications in a Collaborative Authoring Environment**. *Inventors*: **Rohan Padhye**, Senthil Mani and Vibha Singhal Sinha. *US Patent Number*: 9910837. *Assigned to*: IBM Corporation.