Shrey Tiwari

+1 (724) 350 1897 | shreytiwari.com | shrey@cmu.edu | github.com/shreytiwari | @shrey_twr | shrey

My research focuses on developing practical tools to ensure the reliability of industry-scale software by enhancing static and dynamic analyses for bug detection. I am particularly interested in leveraging artificial intelligence to innovate and improve methodologies in software engineering.

Education

Carnegie Mellon University - School of Computer Science — *Aug 2023 - Jul 2028 (expected)*

Doctor of Philosophy, Advisor: Prof. Rohan Padhye — *CGPA: **4.0/4.0***

PES University — *Aug 2016 - Jul 2020*

B.Tech (honors) in Computer Science & Engineering (Systems & Core Computing), **Gold Medalist** — *CGPA: **9.93/10.0***

Research

It's About Time: An Empirical Study of Date and Time Bugs in Open-Source Python Software — ***MSR 2025***

Shrey Tiwari, Alexander Joukov, Peter Vandervelde, Serena Chen, Ao Li, Rohan Padhye

ACM SIGSOFT Distinguished Paper Award

Fray: An Efficient General-Purpose Concurrency Testing Platform for the JVM — ***OOPSLA 2025***

Ao Li, Byeongjee Kang, Vasudev Vikram, Isabella Laybourn, Samvid Dharanikota, **Shrey Tiwari**, Rohan Padhye — *Under Review*

Lightweight and Modular Resource Leak Checking (Extended Version) — ***SOAP 2024***

Pritam Gharat, Narges Shadab, **Shrey Tiwari**, Michael D. Ernst,... Shuvendu Lahiri, Akash Lal, Manu Sridharan

Inference of Resource Management Specifications — ***OOPSLA 2023***

Pritam Gharat, Narges Shadab, **Shrey Tiwari**, Michael D. Ernst,... Shuvendu Lahiri, Akash Lal, Manu Sridharan

Resource Leak Checker (RLC#) for C# code using CodeQL — ***Preprint 2023***

Narges Shadab, Pritam Gharat, **Shrey Tiwari**, Shuvendu Lahiri, Akash Lal

Work Experience

Microsoft Research — *Jun 2021 - Jul 2023*

Research Fellow | Advisors: Dr. Akash Lal & Dr. Suman Nath — *Bangalore, India*

- At Microsoft Research India's Cloud Reliability team, I developed tools to "shift left" Azure reliability and prevent production bugs. My research focused on developing static and dynamic resource leak detection tools for the Microsoft Azure cloud.
- I was also exposed to multiple nascent projects utilizing LLMs to reason about code semantics, including bug detection in Python, fixing compilation errors in Rust, and inferring program specifications for static analysis in C# .

Citrix Systems — *Jul 2020 - Jun 2021*

Software Engineer | Supervisor: Mukul Agarwal — *Bangalore, India*

- I was the core developer for the Citrix Cloud Connector , a critical component of the cloud VPN gateway service, handling over 3 million weekly VPN tunnels.
- I was responsible for feature development, bug fixes, production monitoring, and on-call support. I contributed to increasing the test coverage to >90%, resulting in the Cloud Connector becoming the most reliable component of the cloud VPN solution.

Citrix Systems — *Jan 2020 - Jun 2020*

Software Development Intern | Supervisor: Mukul Agarwal — *Bangalore, India*

- I developed a test automation platform for the Citrix VPN Gateway client, reducing testing time from 2 days to 5 hours and eliminating manual testing efforts. I also resolved customer issues and bugs, gaining extensive experience in Windows debugging, including dump analysis and performance monitoring.

Morgan Stanley — *May 2019 - Jul 2019*

Technology Analyst Intern | Supervisor: Vignesh Natarajan — *Bangalore, India*

- I containerized the "Data Influx Adapter", a key component of the tax lot processing pipeline, using Docker. Testing on a 6-million tax lot dataset demonstrated significant cost savings while maintaining performance. I successfully deployed the containerized solution to production, improving code portability and developer productivity.

Indian Institute of Science *May 2018 - Aug 2018*

Research Intern | Advisor: Prof. Arkaprava Basu *Bangalore, India*

- I was selected as one of 19 students (from 2500+ applicants) for the Narendra Summer Internship at IISc's Computer Systems Lab, researching dynamic detection of heterogeneous data races in CUDA-based GPGPU programs.

Selected Projects

AI-Assisted Differential Fuzz Testing of Date and Time Libraries *Nov 2024 - Present*

Carnegie Mellon University

- Developing a differential fuzz testing framework that utilizes LLMs to synthesize and translate date/time computations across libraries, aimed at detecting edge-case bugs and ensuring the correctness of Python date/time libraries.

LLMs for Code Generation in No-Resource Languages *Jan 2024 - May 2024*

Carnegie Mellon University

- Investigated the application of state-of-the-art LLMs for code generation in "no-resource" programming languages, implementing prompting techniques that increased compile@10 performance to 50% for languages like Onyx and Catala with GPT-4 Turbo.
- Proposed a new programming language design, Dagger, optimized for neural code generation, to address the limitations observed in the Catala language for context-limited code generation tasks.

`FixIt`: A Precise and Scalable Dynamic Resource-Leak Detection Tool *Aug 2021 - Jul 2022*

Microsoft Research

- Developed a novel and scalable lightweight instrumentation-based tool for detecting resource leaks in managed programming languages like C# and Java, achieving approximately 79% accuracy by leveraging unit test suites.

Futuristic Homes: A Practical Take on Secure, Economical and Voice-enabled Smart Home Automation Systems *Aug 2019 - Jun 2020*

Center for Information Security, Forensics and Cyber Resilience (ISFCR), PES University

- Developed a secure, scalable, and platform-agnostic smart home automation solution. Integrated various technologies to create an elegant, robust system for automating and controlling IoT networks in homes and offices.

Mentoring

Research Study	Mentoring an undergraduate student on her final year research project at the PASTA Lab, where she collaborates with me on my ongoing research.	*Dec 2024 - Apr 2025*
REUSE Program	Mentored three outstanding undergraduate students during the summer, contributing to CMU's recognition as having the best REU mentors in the United States.	*Jun 2024 - Aug 2024*

Service

Reviewer	Programming Language Design and Implementation conference (PLDI 2025)	*Dec 2024*
Student Volunteer	International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH 2024)	*Oct 2024*
Reviewer	International Symposium on Software Testing and Analysis (ISSTA 2024)	*May 2024*

Presentations

Microsoft Research	Gave a talk about my research at the Cloud Reliability Workshop	*Feb 2022*
Morgan Stanley	Presented my work and analysis results to the entire India team (end of internship expo)	*Jul 2019*
IISc Bangalore	Presented a poster on my research work at the end of internship exhibit	*Jul 2018*

Awards & Scholarships

Distinguished Paper Award	Awarded the ACM SIGSOFT Distinguished Paper Award at MSR 2025 in Ottawa
SIGPLAN Travel Support	Granted travel support to attend SPLASH 2024 in Pasadena
Gold Medalist	Awarded a gold medal for ranking second in the entire batch of 500+ CSE students, PES University
CNR Rao Scholarship	Six-time recipient of the CNR Rao Merit Scholarship (every applicable semester)
MHRD Scholarship	Six-time recipient of the MHRD Merit Scholarship (every applicable semester)

Achievements

MSR Jigsaw Hackathon	Winner of the Microsoft Research hackathon held for all the research fellows and interns, 2021
Epsilon CTF Competition	Winner of the capture the flag competition held as part of the college technical fest, 2018