Hang Du

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Hang Du is currently a third year Ph.D. student at the Spiderlab within the ICS department at UC Irvine. He works with Prof. James A. Jones and alumni Doctor Vijay Krishna Palepu from Microsoft. His main research interest is in software testing, program analysis, program instrumentation, mutation analysis, and program comprehension.

EDUCATION

University of California, Irvine 2022 - Now (Expected Graduation Year: 2028)
Ph.D. in Software Engineering
Advisor: James A. Jones

University of California, Irvine 2021 - 2022
Master of Science in Software Engineering
Advisor: James A. Jones
Coursework: Program Analysis, Software Architecture, Software Testing, Information Retrieval

Mcgill University, Montreal, Canada Feb 2020
Machine-learning Certificate Program
Coursework: Computational Applied Statistics, Practical machine learning

Jilin University, China 2017 - 2021
Bachelor of Science in Computer Science and Technology
Bachelor of Finance (minor)

PUBLICATIONS

Monil Narang, **Hang Du**, and James A. Jones. 2025. **What's DAT Smell? Untangling and Weaving the Disjoint Assertion Tangle Test Smell.** In Proceedings of the 40th International Conference on Automated Software Engineering (**ASE 2025)** [Accepted]

Hang Du, Vijay Krishna Palepu, and James A. Jones. 2025. **Leveraging Propagated Infection to Crossfire Mutants.** In Proceedings of the 47th International Conference on Software Engineering (**ICSE 2025)** [PDF]

Hang Du, Vijay Krishna Palepu, and James A. Jones. 2024. **Ripples of Mutation: An Empirical Study of Propagation Effects in Mutation Testing.** In Proceedings of the 46th International Conference on Software Engineering (**ICSE 2024)** [PDF]

Hang Du, Vijay Krishna Palepu, and James A. Jones. 2023. **To Kill a Mutant: An Empirical Study of Mutation Testing Kills.** In Proceedings of the 32nd ACM SIGSOFT International Symposium on Software Testing and Analysis (**ISSTA 2023**) [PDF]

TEACHING & TRAINING

University of California, Irvine - Associate Instructor/Lecturer (Jun. 2023 – Aug. 2023)
Course Lecturer: ICS 45J Programming in Java

Overall Instructor Evaluation **8.08/9.00**, Course Evaluation: **8.12/9.00**
Supervisor: Gopi Meenakshisundaram

University of California, Irvine – Teaching Assistant (Jun. 2022 – Now)
Courses: INF 43 (Introduction to Software Engineering), INF 115 (Software Testing, Analysis, and Quality Assurance), SWE261P (Software Testing and Debugging)
Supervisor: James A. Jones

University of California, Irvine – Graduate Research Mentor (Oct. 2023 – June. 2024)
Mentored an undergraduate **UROP** participant in the development of an honors thesis titled "**Generative AI for Mutation Testing**."
Advised on research topic selection, proposal development for UROP funding, and the creation of a research poster for the 2024 Undergraduate Research Symposium.
Conducted weekly research meetings to provide guidance and feedback.
Supervisor: James A. Jones

University of California, Irvine – Public Speaking Activate to Captivate (Sept. 2023 – Dec. 2023)
Received training on academic public speaking.

University of California, Irvine – Mentoring Excellence Program (Sept. 2025 – Now)
Received training on mentoring academic students

SELECTED PROJECTS

Test Suite Improvement with Assertion Amplification

- Developed a **Java**-based technique using bytecode **instrumentation** and **mutation testing** to enhance software test suites.
- Designed an automated approach to **generate test assertions candidates** in human-written test suite, increasing fault detection capability while reducing human engineering efforts.
- Evaluated the technique on **ten** open-source Java projects, analyzing over **1.2 million** test executions to validate effectiveness.
- Developed a supporting **theoretical model**, detailed in the **publication** (ICSE 2025) and the technique **artifact**.

Empirical Studies on the Runtime Effects of Faults

- Proposed a test-failure taxonomy that **categorizes the bug symptoms** in which test cases can cause mutant kills and real bug detection.
- Proposed a framework that **analyzes the progressive runtime behaviors of faults**.
- Implemented the analysis framework in **Java** and conducted multiple large-scale studies on artificially injected faults and real bugs from Defects4J dataset.
- Gaining insights into faults' runtime behaviors and suggestions on test suite improvements, with publications in venues including **ISSTA 2023**, and **ICSE 2024.**

SERVICE

Junior PC for 23rd International Conference on Mining Software Repositories (MSR 2026)
External Reviewer for IEEE Transactions on Reliability 2024

SKILLS

Java, Python, Mutation Testing, Bytecode Instrumentation, Program Analysis, Machine Learning

CERTIFICATE

Public Speaking Activate to Captivate Certificate Program **University of California, Irvine Winter 2024**
Emotional Intelligence Certificate Program **University of California, Irvine Spring 2024**

AWARDS

Summer Fellowship Award, Department of Informatics, University of California, Irvine [2024]
ICSE Student Mentoring Workshop Award, Funded by NSF [2024]
ACM SIGSOFT CAPS Travel Grant [2023]
Chair's Award from University of California Irvine [2022]
Academic Scholarship from Jilin University, China [2018, 2019, 2020]