

Hang Du

Ph.D. candidate

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Hang Du is currently a fourth year Ph.D. Candidate at the [Spiderlab](#) 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. Beyond research, Hang is deeply passionate about software engineering education, with a strong commitment to improving how testing and code quality are taught and practiced among students and future developers.

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)

PEER REVIEWED 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]

Acceptance Rate: 20.6%

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](#)]

Oral presentation in Ottawa, Canada (presented by **Hang Du**). Acceptance Rate: 21.4%

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](#)]

Oral presentation in Lisbon, Portugal (presented by **Hang Du**). Acceptance Rate: 21.2%

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](#)]

Oral presentation in Seattle, USA (presented by **Hang Du**). Acceptance Rate: 25.9%

TEACHING & MENTORING

University of California, Irvine - *Associate Instructor/Lecturer* (Jun. 2023 – Aug. 2023)

- *ICS 45J: Programming in Java*
- Served as the sole course instructor, responsible for designing the syllabus, assignments, exams, and grading rubrics for an undergraduate course on object-oriented programming in Java.
- Delivered all lectures and lab sessions, providing instruction on core programming concepts, data structures, and software design principles.
- Supervised and coordinated with Teaching Assistants to manage grading, lab support, and student feedback.
- Achieved strong teaching evaluations (Instructor: 8.08/9.00, Course: 8.12/9.00) reflecting effective instruction and student engagement.

University of California, Irvine – *Guest Lecturer* (Apr. 2025)

- Guest lecturer for graduate course *INF 215: Dynamic Analysis, Testing, and Debugging*.
- Delivered a special lecture on mutation testing and its applications in assessing test adequacy, revealing fault propagation, and guiding test improvement.

University of California, Irvine – *Teaching Assistant* (Jun. 2022 – Now)

- *INF 43: Introduction to Software Engineering* — Fall 2022, Fall 2023, Fall 2025
- *INF 115: Software Testing, Analysis, and Quality Assurance* — Spring 2023, Spring 2024, Fall 2024, Spring 2025
- *SWE 261P: Software Testing and Debugging* — Winter 2023, Winter 2024, Winter 2025
- Assisted instruction across software engineering and testing courses, including grading, assignment design, and student support through office hours and discussions.

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.

University of California, Irvine – *Graduate Research Mentor* (Sept. 2023 – June 2025)

- Mentored a master student with the thesis titled "Automated Detection and Refactoring of Disjoint-Assertion Tangle: A Novel Test Smell".
- Guided the student through experimental design, implementation, paper writing, and thesis development, resulting in a co-authored paper accepted at **ASE 2025**.

SERVICE

Program Committee Member, 23rd International Conference on Mining Software Repositories (MSR 2026)

- Reviewed and evaluated research papers submitted to 23rd International Conference on Mining Software Repositories (Research/Technical Track)
- Provided constructive feedback to authors and participated in the peer-review and discussion process.

External Reviewer, IEEE Transactions on Reliability (Journal), 2024

- Reviewed and provided detailed feedback on submitted manuscripts in software reliability and testing.

University of California, Irvine – Graduate Research Mentor (Oct. 2023 – June. 2024)

- Mentored an undergraduate UROP (Undergraduate Research Opportunities Program) 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.

SELECTED PROJECTS

Test Suite Refactoring and Test Code Quality Education (Disjoint Assertion Tangle Smell)

- Advanced the understanding of **how students and developers write and maintain software test code**, identifying the Disjoint Assertion Tangle (DAT) smell — a common pattern where a single test mixes multiple unrelated behaviors, which is prevalent in 8.6% of tests across 49 open-source projects, as well as in student submissions.
- Developed an automated refactoring tool that reorganizes tangled tests into focused and parameterized unit tests, **reducing code duplication by 36%**.
- Conducted **developer and student studies** showing over 80% preference for the refactored tests due to improved readability and maintainability.
- Findings and tool are shared openly to support teaching and research on test code quality, with results published in top software engineering venues ([ASE 2025](#)).

Test Suite Improvement with Assertion Amplification

- Designed an automated approach to **generate test assertions candidates** in human-written test suite, increasing fault detection capability while reducing human engineering efforts.
- Developed a technique that optimizes these assertions to uncover multiple hidden faults simultaneously, detecting all detectable faults with only **1.1%** of candidates and boosting fault detection by **6×** on average.
- 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](#).

CERTIFICATES & TRAINING

Mentoring Excellence Program	University of California, Irvine Fall 2025 (on going)
Public Speaking Activate to Captivate Certificate Program	University of California, Irvine Winter 2024
Emotional Intelligence Certificate Program	University of California, Irvine Spring 2024

PROFESSIONAL AFFILIATIONS

Member of the IEEE.

Member of the Association for Computing Machinery (ACM).

Member of the ACM Special Interest Group on Software Engineering (ACM SIGSOFT).

AWARDS & FUNDING

Undergraduate Research Experience Fellowship (mentor), University of California, Irvine [2024]

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]