Dolores Miao

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Research Interests

Floating-point exception detection, numerical stability and reproducibility, compiler-induced numerical inconsistencies, high-performance computing (HPC), parallel programming, heterogeneous computing, software testing methods, automated input generation, compiler instrumentation and transformation, GPU programming and analysis (AMD/NVIDIA), software engineering for HPC systems, performance tuning and regression analysis.

Education

2020-2026(est.) **Ph.D. in Computer Science**, University of California, Davis, June 2026 (est.)
Advisor: Cindy Rubio-González
Thesis (tentative): Using Program Analysis and Testing to Facilitate Debugging and Optimization of Scientific Applications

2003–2007 **B.Eng. in Communication Science and Engineering**, Fudan University, July 2007
Specialization: Computer networks

Employment

2022, '23, '24 **Computer Science Graduate Intern**, Lawrence Livermore National Laboratory

2023–2025 **Teaching Assistant**, Department of Computer Science, University of California, Davis

2017–2021 **Assistant Technical Director**, Virtuos Games
Led and collaborated with engineering teams and technical directors on project proposals, technical design, feasibility research, and performance engineering; contributed to and reviewed core systems including rendering, shaders, engine architecture, and scheduling.

2011–2016 **Lead Software Engineer (`C++`)**, Virtuos Games

2007–2011 **Software Engineer (`C++`)**, Virtuos Games

2006 **Windows System Administrator Intern**, eBay China

Awards and Honors

National and International

August 2024 **Director's Excellence in Publication Award**, Lawrence Livermore National Laboratory (best student paper)

May 2023 **Hans Mauer Award for Best Research Paper**, ISC High Performance, Hamburg, Germany (1 out of 78 submitted research papers)

Department and University

2005–2006 **Third Prize Scholarship**, School of Information Science and Engineering, Fudan University

— Research —

Publications

Each paper is listed once, even if it has appeared in multiple versions. Unless indicated otherwise, each paper lists authors in contribution-based order.

Conference and Journal Papers

[1] **Dolores Miao**, Ignacio Laguna, Cindy Rubio-González. "FloatGuard: Efficient Whole-Program Detection of Floating-Point Exceptions in AMD GPUs". Proceedings of the ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC'25), July 2025, Notre Dame, IN. Acceptance Rate: 26/138 = 18.8%.

[2] **Dolores Miao**, Ignacio Laguna, Giorgis Georgakoudis, Konstantinos Parasyris, Cindy Rubio-González. "An automated OpenMP mutation testing framework for performance optimization". Journal of Parallel Computing (PARCO'24), August 2024.

[3] **Dolores Miao**, Ignacio Laguna, Cindy Rubio-González. "Input Range Generation for Compiler-Induced Numerical Inconsistencies". Proceedings of the International Conference on Supercomputing (ICS'24), June 2024, Kyoto, Japan. Acceptance Rate: 45/125 = 36%.

[4] **Dolores Miao**, Ignacio Laguna, Giorgis Georgakoudis, Konstantinos Parasyris, Cindy Rubio-González. "MUPPET: Optimizing Performance in OpenMP via Mutation Testing". Proceedings of the 15th International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM'24), co-located with PPoPP'24, March 2024, Edinburgh, United Kingdom.

[5] **Dolores Miao**, Ignacio Laguna, Cindy Rubio-González. "Expression Isolation of Compiler-Induced Inconsistencies in Heterogeneous Code". In Proceedings of ISC High Performance (ISC'23), May 2023, Hamburg, Germany. Acceptance Rate: 21/78 = 26.9%.

Software

2025	FloatGuard: detection of floating-point exceptions in AMD GPUs. `https://github.com/LLNL/FloatGuard`
2024	MUPPET: OpenMP mutation framework for performance optimization. `https://github.com/LLNL/MUPPET`
2024	CIGEN: input range generation for compiler-induced numerical inconsistencies. `https://github.com/LLNL/CIGEN`
2023	Ciel: isolating compiler-induced numerical inconsistencies in heterogeneous programs. `https://github.com/LLNL/Ciel`

Talks

Invited Workshop and Tutorial Talks

2025	Lightning Talk: Using FloatGuard to detect floating point exceptions in AMD GPU programs. At Correctness 2025: 9th International Workshop on Software Correctness for HPC Applications, Co-located with SC 2025.
2025	Tutorial: Tools to Detect and Diagnose Floating-Point Errors in Heterogeneous Computing Hardware and Software, SC 2025.
2024	Tutorial: Tools to Diagnose and Repair Floating-Point Errors in Heterogeneous Computing Hardware and Software, SC 2024.
2023	Workshop: Expression Isolation of Compiler-Induced Numerical Inconsistencies in Heterogeneous Code, FPTalks 2023.

— Education —

Teaching Experience

Teaching assistant at University of California, Davis

Spring 2025	ECS 140A: Programming Languages
Spring 2024	ECS 140A: Programming Languages
Spring 2023	ECS 140A: Programming Languages

— Service —

Professional

Reviewing

- **External co-reviewer** for The 52nd EATCS International Colloquium on Automata, Languages, and Programming (ICALP 2025); The 47th IEEE/ACM International Conference on Software Engineering (ICSE 2025); The 45th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2024); The 46th IEEE/ACM International Conference on Software Engineering (ICSE 2024); The 38th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2023); and The 30th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE 2022)