

Jackson Vanover

Researcher focused on maximizing the performance and ensuring the correctness of low-level numerical code in the field of high-performance computing

Education

- Target 2025 **PhD Candidate in Computer Science** at University of California, Davis
2018 to 2020 **MS in Computer Science** at University of California, Davis, GPA: 4.0
2012 to 2016 **BA in Mathematics** at University of California, Santa Cruz, Major GPA: 3.92

Experience

- Jan 2019 to Present **Graduate Researcher** with the UCD-PLSE Research Group, UC Davis
Focus on designing strategies and developing tools for numerical software with an emphasis on the correctness and performance of floating-point computation in high-performance computing applications.
- Summer '21, '22 **Graduate Student Computing Researcher**, Lawrence Livermore National Laboratory
Researching novel techniques for the analysis of numerical software to facilitate the optimization of high-performance computing applications via approximation.

Selected Projects

- March 2024 to Present **Testing Exception-Handling Soundness in Foundational Linear Algebra Libraries**
Collaboration with the Principal Investigators of the LAPACK and BLAS linear algebra libraries. Devising a tool that targets low-level numerical code to ensure that arithmetic failures are reported correctly.
- Feb 2020 to Present **Prose: Optimizing the Performance of Large-Scale Climate Modeling Software**
Collaboration with the Climate & Global Dynamics Laboratory at the National Center for Atmospheric Research to research automated precision tuning optimizations for weather/climate code. Culminated in a first-author publication at the 2024 International Workshop on Software Correctness for HPC Applications.
- Jan 2019 to August 2020 **FPDiff: Automated Differential Testing for Bug-Finding in Numerical Libraries**
Led a team focused on improving the robustness of numerical software that resulted in the FPDiff tool. Culminated in a first-author publication at the 2020 International Symposium on Software Testing and Analysis with an accompanying "Distinguished Artifact" award.

Publications

Vanover, Jackson, Alper Altuntas, and Cindy Rubio-González. "Toward Automated Precision Tuning of Weather and Climate Models: A Case Study." *2024 IEEE/ACM 8th International Workshop on Software Correctness for HPC Applications (Correctness)*. IEEE, 2024.

Vanover, Jackson, Xuan Deng, and Cindy Rubio-González. "Discovering discrepancies in numerical libraries." *Proceedings of the 29th ACM SIGSOFT International Symposium on Software Testing and Analysis*. 2020.

Parasyris, Konstantinos, James Diffenderfer, Harshitha Menon, Ignacio Laguna, **Jackson Vanover**, Ryan Vogt, and Daniel Osei-Kuffuor. "Approximate computing through the lens of uncertainty quantification." In *SC22: International Conference for High Performance Computing, Networking, Storage and Analysis*. 2022.

Menon, Harshitha, James Diffenderfer, Giorgis Georgakoudis, Ignacio Laguna, Michael O. Lam, Daniel Osei-Kuffuor, Konstantinos Parasyris, and **Jackson Vanover**. "Approximate High-Performance Computing: A Fast and Energy-Efficient Computing Paradigm in the Post-Moore Era." *IT Professional* 25, no. 2. (2023)

References

- Dr. Cindy Rubio-González** Advisor at UCD // (530) 752-7069 // crubio@ucdavis.edu
Dr. Harshitha Menon Advisor at LLNL // (650) 741-4260 // harshitha@llnl.gov
Dr. Alper Altuntas Collaborator at NCAR // (919) 649-9980 // altuntas@ucar.edu