Spencer Wallace

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Education

University of Washington — Seattle, Washington
PhD Astrophysics — *August 2023*

University of Arizona — Tucson, Arizona
BS Computer Science, Astronomy and Physics — *May 2014*

Experience

Postdoctoral Researcher

University of Washington, Astronomy Department (Remote) — *September 2023 – Present*

- Led the deployment of the tree-based N-body code ChaNGa on the new Grace Hopper CPU-GPU nodes at the Texas Advanced Computing Center
- Performed memory and performance profiling, along with debugging of ChaNGa on the new hardware using a suite of C++ and CUDA-based tools
- Collaborated with a wide range of specialists facing similar algorithm challenges to improve the performance of our code, including computer scientists, physicists and molecular biologists

Research Assistant

University of Washington, Astronomy Department — *October 2019 – August 2023*

- Designed, proposed and executed a $450,000 National Science Foundation-funded research project to simulate the formation of Earth-like planets using a high-performance computing cluster, which resulted in three first-author publications
- Implemented a tree-based collision detection module in the N-body code ChaNGa to track the growth of solid bodies, allowing me to run the first-ever simulation of planet formation using realistic-sized objects
- Built a pipeline to artificially generate simulation results using a score-based diffusion model, saving over 900,000 CPU hours of computation
- Trained and mentored 5 undergraduate students while they ran and analyzed simulations on a local HPC cluster
- Produced a coauthored IEEE publication while helping to develop paratreet, a toolkit for quickly testing and tuning parallel tree traversal algorithms

Teaching Assistant

University of Washington, Astronomy Department — *October 2015 – September 2019*

- Led weekly discussion sections, graded exams, and occasionally designed homework assignments and performed guest lectures for undergraduate astronomy classes, some of which involved teaching basic data analysis and numerical modeling skills using Python and Excel
- Collaborated with a team of other teaching assistants to ensure exams and assignments were graded consistently and fairly

Software Consultant

LSST Corporation — *June 2011 – August 2014*

- Designed and implemented a series of widgets for the web-based astronomical data visualization tool ASCOT
- Built a fully customizable, persistent dashboard interface, along with a front-facing webpage and documentation for the project

Skills

Programming Languages: C++, Python, Bash, JavaScript

Tools and Environments: Git, CUDA, NumPy, pandas, PyTorch, SLURM, matplotlib, seaborn, node.js

Communication: 3 first-authored publications, 2 co-authored publications, 7 conference talks, 3 conference posters, 20 pop-sci articles published through astrobites