Spencer Wallace

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Education

University of Washington — Seattle, Washington
PhD Astronomy — *Oct 2015 – Summer 2023 (Expected, flexible)*

University of Arizona — Tucson, Arizona
BS Computer Science, Astronomy and Physics — *Aug 2009 – May 2014*

Work Experience

Simulating the assembly of terrestrial planets

University of Washington, Astronomy Department — *Jan 2018 – Present*

- Designed, ran and analyzed a suite of N-body simulations that follow the planet formation process from 10^6 asteroid-sized bodies up to full terrestrial worlds (Python, Numpy, Pandas, Git)
- Extended an existing large-scale hydrodynamics code to model collisions between solid bodies (C++, Git)
- Tested, debugged and ran large-scale simulations across multiple compute nodes on a variety of national supercomputers (C++, Git, Bash)
- Created and developed set of analysis tools to track the orbits of particles and follow their collision histories (Python, Numpy, Pandas, Git)
- Led weekly meetings to train and mentor undergraduate researchers to use python data analysis tools, develop modules for our N-body simulation code, and run supercomputer simulations

Detecting stellar flares with the Transiting Exoplanet Survey Satellite

University of Washington, DIRAC Institute — *Jun 2019 – Jun 2020*

- Designed, tested and used an analysis pipeline to construct a catalog of non-periodic flaring events in time series data of brightness for tens of thousands of stars (Python, Numpy, Pandas, Git)
- Used a gaussian process machine learning model to automatically remove periodic signals and quantify the reliability of flare detections

Synthesizing new data from existing simulation results

University of Washington, eScience Institute — *Jan 2023 – Present*

- Designed a pipeline to train a generative adversarial network to produce an infinite supply of qualitatively similar, but numerically distinct simulation results to apply to chaotic systems (Python, PyTorch, Pandas, Numpy, Git)
- Verified the accuracy and robustness of the model through a combination of statistical tests and additional simulations

Exploring parallel algorithms for spatial tree traversal

University of Illinois Urbana-Champaign, Computer Science Department — *Jun 2019 – Apr 2021*

- Participated in a multi-institution interdisciplinary collaboration to develop and test PARATREET, a toolkit for quickly testing and tuning parallel spatial tree traversal algorithms (C++, Python, Bash, Git)
- Worked with a team of computer scientists to apply and test their algorithms on a number of real-world astronomy applications

Verifying the robustness of galaxy simulation codes

University of Washington, Astronomy Department — *Oct 2015 – Dec 2016*

- Ran and analyzed a set of hydrodynamics simulations to assess the scientific validity of the most commonly used galaxy simulation codes (C++, Python, Numpy, Bash, Git)
- Worked with a mult-national team from over thirty institutions to highlight and understand and reconcile differences between state-of-the-art galaxy simulation codes asked to solve an identical problem

Graduate teaching assistant

University of Washington, Astronomy Department — *Oct 2015 – Jun 2020*

- Led weekly discussion sections, graded assignments and occasionally preformed lectures and designed homework exercises for undergraduate students
- Collaborated with a team of other teaching assistants to ensure assignments, quizzes and exams were graded consistently and fairly

Skills

Programming: C++, Python, NumPy, Pandas, PyTorch, scikit-learn, matplotlib, Seaborn, SQL

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

Leadership: Worked on 5 separate science collaboration teams, Mentored and directed research for 6 undergraduate students