Jeremy Welsh-Kavan

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Education

MS Physics // Jun 2022
3.85 GPA
University of Oregon

BS Math & Physics // Jun 2020
3.83 GPA
University of Oregon

Languages, Software, and Technical Proficiencies

Python, Fortran, Bash, R, Arduino, Shell scripting (Unix/Linux/macOS)

NumPy, Matplotlib, Numba, Pandas, SageMath, ggplot2

GROMACS, LAMMPS, Mathematica, RStudio, PyMol, Anaconda, Jupyter

High Performance Computing, Slurm Workload Manager

Monte Carlo simulation, Markov State Modeling

Bayesian Statistical Inference and Optimization

Machine Learning for Regression and Classification, PCA, tICA

Awards & Honors

Departmental Honors in Physics (Undergraduate)

Cum Laude, Latin Honors (Undergraduate)

Phi Beta Kappa Honors Society

Work Experience

Graduate Research Assistant, *University of Oregon, Sep 2020 – Mar 2022*

- Performed and analyzed molecular dynamics simulations using the GROMACS molecular dynamics package on the Comet and Expanse High Performance Computing clusters at San Diego Supercomputer Center.
- Co-developed theoretical models for biological macromolecules at multiple resolutions using a coarse-grained Langevin equation.
- Modified and updated custom Python libraries and Fortran programs to expand functionality and improve legibility for analysis of ~1TB of molecular dynamics simulation data of DNA.
- Developed and implemented Python code for the construction and analysis of a center-of-mass simulation trajectory from atomistic trajectories, leading to improved agreement between predicted and simulated time correlation functions of bond autocorrelation.
- Performed and analyzed simulations of polymer melts using the LAMMPS molecular dynamics software on the Expanse HPC system.
- Developed Fortran code and Unix shell scripts for the analysis of ~10TB of atomistic and coarse-grained LAMMPS simulation data of polymer melts.
- Developed Fortran code to create input data for polymers of arbitrary length for the MCCCS Towhee Monte Carlo molecular simulation software.
- Mentored undergraduate and graduate research assistants on projects related to molecular coarse-graining schemes and simulation data analysis.

Library Student Assistant*, University of Oregon, Sep 2017 – Present*

- Tutored library patrons in elementary algebra, calculus, differential equations, linear algebra, partial differential equations, and physics.
- Trained library student employees on techniques for tutoring elementary and advanced mathematical topics and concepts.
- Trained library student employees on library systems software and the Library of Congress Classification system.
- Assisted library patrons with use of library services and systems.

Volunteer Teaching Assistant, *Eugene Math Circle, Sep 2021 – Present*

- Taught elementary school children problem solving in advanced math and logic.

Selected Coursework

Machine Learning Statistics, Probability & Statistics, Adv. Biostatistics, Computational Chemistry, Experimental Data Analysis Lab, Numerical Analysis, Digital Electronics, Computer Algebra, Partial Differential Equations, Linear Algebra