Jeremy Welsh

Computational Scientist

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TECHNICAL SKILLS

- **Programming Languages**: Python, C++, Julia, Fortran, Bash, R, SQL, Mathematica
- **Frameworks**: NumPy, Pandas, SciPy, Scikit-Learn, TensorFlow, OpenCV, OpenMP, MPI, MDTraj, Matplotlib, Numba
- **Software & Tools**: Git, Jira, General Particle Tracer (GPT), GROMACS, LAMMPS, Slurm

WORK EXPERIENCE

Computational Scientist — Feb 2024 – Present
Thermo Fisher Scientific — Remote / Hillsboro, OR

- ◇ Developed scientific software in an Agile environment with a team of scientists and software engineers to model and optimize Focused Ion Beam (FIB) optics and beam interactions with materials.
- ◇ Developed workflows for discretizing FIB column elements for use in boundary element method solvers.
- ◇ Developed algorithms for internal state modeling and adaptive control of FIB systems.
- ◇ Optimized algorithms for computing numerical solutions to Hamilton-Jacobi type equations.
- ◇ Served as system administrator for local high performance computing cluster.

Private Tutor — Aug 2023 – Present
LA Tutors 123 — Remote

- ◇ Provided remote math tutoring for college students in algebra, pre-calculus, and calculus.

Senior Intern — Jun 2022 – Jun 2023
Thermo Fisher Scientific — Remote / Hillsboro, OR

- ◇ Developed Python code to automate machine control for milling and imaging workflows on dual-beam (FIB-SEM) microscope systems.
- ◇ Designed experiments and computer vision image analysis to detect ∼100nm machining tolerances in FIB column.
- ◇ Developed Python code to measure optical aberrations in ion beam using computer vision tools from OpenCV and Skimage.
- ◇ Designed simulation components in C for ion column simulations in the General Particle Tracer software package.
- ◇ Developed scientific software in Python for parallelizing simulations and data analysis in HPC environments.
- ◇ Developed algorithms to optimize ion column designs, resulting in up to 350% improvement in ion beam performance for some applications.
- ◇ Created data visualizations and presentations of algorithm design, experimental design, and results to a team of scientists in order to direct critical decisions about focused ion beam R&D.

Graduate Research Assistant / Graduate Teaching Assistant — Sep 2020 – Jun 2022
University of Oregon — Eugene, OR

- ◇ Developed coarse-grained models of DNA and proteins, and validated models using molecular dynamics simulations (GROMACS and LAMMPS) and Monte Carlo simulations.
- ◇ Wrote scripts in Python and Bash for performing molecular dynamics simulations using GROMACS and LAMMPS molecular dynamics software on HPC clusters at San Diego Supercomputer Center.
- ◇ Characterized performance and degree of parallelism of simulation software to determine computational resource requirement on 128 Core/node HPC system.
- ◇ Developed data analysis tools in Python, Fortran, and C++ for data analysis of ∼10TB of molecular dynamics simulation data.
- ◇ Mentored undergraduate and graduate research assistants on code development, simulation data analysis, and theoretical molecular biophysics.
- ◇ Instructed tutorials and labs in undergraduate physics courses on electricity and magnetism, circuitry, Newtonian mechanics, and computational chemistry.

EDUCATION

M.S., Physics — Sep 2020 - Jun 2022
University of Oregon, GPA: 3.92 — Eugene, OR

B.S., Mathematics and Physics — Sep 2016 - June 2020
University of Oregon, GPA: 3.83 — Eugene, OR