

# Jeremy Welsh

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Github: [github.com/jeremyiwk](https://github.com/jeremyiwk)

## TECHNICAL SKILLS

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- **Programming Languages:** Python, Fortran, C++, C, R, Julia, Shell scripting (Linux/macOS), Mathematica
- **Frameworks:** NumPy, Pandas, SciPy, Scikit-Learn, TensorFlow, OpenCV, PyMC, MDTraj, Matplotlib, Numba, Flask, ggplot2
- **Software & Tools:** Git, General Particle Tracer (GPT), GROMACS, LAMMPS, PyMol, ImageJ

## WORK EXPERIENCE

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- **Senior Intern - Modeling and Simulation Research Scientist** Jun 2022 – Jun 2023  
Thermo Fisher Scientific Remote
  - ◊ Wrote Python scripts to automate milling, imaging, and data collection procedures on dual-beam FIB-SEM (focused ion beam - scanning electron microscope) systems.
  - ◊ Used Python computer vision libraries such as OpenCV and Skimage for image analysis on FIB-SEM images to measure machining tolerances, optical aberrations, and beam sharpness.
  - ◊ Contributed to a software tool (Python) for performing parallel General Particle Tracer (GPT) simulations Linux HPC environment, and for data preprocessing and analysis.
  - ◊ Developed statistical metrics to characterize performance for novel FIB column designs.
  - ◊ Developed Python code to optimize novel FIB column designs, resulting in up to 350% improvement in FIB performance for some applications.
  - ◊ Used Python libraries such as NumPy, SciPy, Pandas, Matplotlib, and Seaborn for data analysis, visualization, and presentation to a team of scientists in order to inform decisions on technology development.
- **Graduate Research Assistant - Computational Biophysics** Sep 2020 – Jun 2022  
University of Oregon Eugene, OR
  - ◊ Developed and validated coarse-grained models for biological macromolecules using molecular dynamics simulations, Monte-Carlo simulations, and stochastic differential equations.
  - ◊ Performed and analyzed molecular dynamics simulations using GROMACS and LAMMPS software on HPC clusters at San Diego Supercomputer Center.
  - ◊ Characterized performance and the degree of parallelism of molecular dynamics simulations to determine computational resources requirement on 128 Core/node HPC system.
  - ◊ Wrote code in Python and Fortran for statistical analysis of ~10TB of simulation data.
  - ◊ Validated coarse-grained molecular models against predictions of statistical models such as principal component analysis (PCA) and time-lagged independent component analysis (t-ICA).
  - ◊ Mentored undergraduate and graduate research assistants on projects related to molecular coarse-graining schemes and simulation data analysis
- **Graduate Teaching Assistant** Mar 2022 - Jun 2022  
University of Oregon Eugene, OR
  - ◊ Instructed and graded coursework for undergraduate physics courses covering electricity and magnetism, circuitry, and Newtonian mechanics.
- **Library Student Assistant** Sep 2017 - Jun 2022  
University of Oregon Eugene, OR
  - ◊ Provided group tutoring and private tutoring for library patrons in math and science subjects including: elementary algebra, probability, statistics, discrete math, calculus, differential equations, linear algebra, partial differential equations, chemistry, and physics.
  - ◊ Trained library student employees on techniques for tutoring elementary and advanced mathematical topics and concepts.

## EDUCATION

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- **M.S., Physics, GPA: 3.92** Sep 2020 - Jun 2022  
University of Oregon Eugene, OR
- **B.S., Mathematics and Physics, GPA: 3.83** Sep 2016 - June 2020  
University of Oregon Eugene, OR