Jack Parkinson

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Education

Bachelor of Science – Physics
University of British Columbia 2018 - 2023   Vancouver, CA

Master of Science – Computational Physics
University of Copenhagen 2023 - 2025   Copenhagen, DK

Relevant Courses: *Ocean and Climate Physics, Applied Machine Learning, Applied Statistics (for physicists), Advanced Methods in Applied Statistics, Statistical Inference for Data Science, Scientific Computing, High-Performance Parallel Computing*

Technical Skills

- Python (Pandas, Matplotlib, TF, Pytorch)
- R
- SQL (MySQL, SQL Plus)
- C++
- MATLAB
- HPC (Lustre, Slurm, Linux)

Relevant Projects

Harmonic Tidal Time Series Analysis using Seattle NOAA Station data (Python)
- Used 4 months of **real NOAA water level measurements** (6-minute intervals) from a Seattle station to perform harmonic tidal analysis
- Fit 13 parameters from **6 astronomical constituents** (3 semi-diurnal + 3 diurnal) to tidal data using least squares minimization, **achieving R^2=0.98**
- **Identified systematic residual patterns** indicating missing longer-period constituents, demonstrating model success and limitation with 4-month dataset.

Atlantic Thermohaline Circulation Modeling (Python)
- **Modeled Atlantic THC** using Stommel's two-box framework with realistic physical parameters.
- **Solved Stommel's ODE system computationally**, identifying stable temperature-driven circulation without freshwater forcing, and regime transition with inflow of ~10^7 psu/s freshwater flux.
- **Investigated AMOC stability** through **phase-space T-S analysis**, showing potential circulation collapse under extreme Greenland ice melt scenarios.

Master's Thesis: Neutrino Telescope Monte Carlo Simulation Framework (Python, C++/CUDA)
- Improved a physics Monte Carlo framework by **extending physics models**, **improving core software**, and **running large-scale HPC benchmarks/analysis.**
- Specifically added low-energy event injection, modeled muon light-yield via log-normal fits from GEANT4 simulations, and integrated new optical sensor models into the CUDA-based photon propagator.

ML Computer Vision - 525 Bird Species Image Classification (Pytorch/TF)
- Benchmarked five image classification architectures (**custom CNN, mobileNetV2, ResNet, Vision Transformer** from scratch + pre-trained) on 89,885 images of 525 bird species
- Achieved **>95% test accuracy** on image classification with 2 best models.

Work Experience

Contract Physics/Math AI Trainer - DataAnnotation: August 2025 – Present
- Performed data labeling and quality evaluation for physics/math problems for AI.

Contract Tutor - Varsity Tutors: 2022 – 2023
- Worked as a private math and physics tutor delivering personalized lesson plans to help students understand complex mathematical and physical concepts.