DION HÄFNER

PHD | PROGRAMMING SCIENTIST | SCIENTIFIC PROGRAMMER

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I am a physical scientist and research engineer specialized on all things scientific computing, with industry experience in scientific machine learning / AI, data engineering, and engineering leadership in a research setting.

Recent Work Experience

Apr 2022 – present

Staff Research Engineer — R&D lead @ Pasteur Labs

My team and I build efficient, scalable software for scientific advances at the interface between physical simulators and modern machine learning. As R&D lead, I guide the team in technical decision making, execution, and research-to-product transitions.

Sep 2017 – Dec 2018

Software development specialist @ DHI GRAS

At DHI GRAS, I built robust data pipelines at the Terabyte scale, powerful statistical / data science applications, and optimized remote sensing workflows.

Major Software Projects

Veros — A high-performance ocean model in pure Python

I am the main developer and maintainer of Veros, a full-fledged ocean model capable of accurate, realistic simulations of the global ocean. Veros leverages the JAX library for state-of-the-art performance on CPU and GPU clusters. See on GitHub

Terracotta — A light-weight geospatial raster tile server

Terracotta is a minimal, east-to-use, cloud-ready raster tile server, leveraging the cloud-optimized GeoTiff format and a modern geospatial Python stack. See on GitHub

Programming Skills

ML frameworks

I am intimately familiar with modern machine learning and data workflows, and are a power user of the JAX library ecosystem. Also scikit-learn, Tensorflow / Keras, and PyMC3.

Python

I have both deep and broad experience with the modern Python stack, especially concerning data analysis, machine learning, visualization, and scientific computing, but also general SWE and application development. Be it NumPy, JAX, Numba, Cython, pydantic, streamlit, xarray, pandas, flask, FastAPI, flake8, ruff, uv, matplotlib, pyvista — I have used Python in all its facets.

Education

- **PhD in Physical Oceanography** @ University of Copenhagen (2022) — In my project, I used machine learning on large amounts of real-world data to infer the physical mechanisms behind extreme ocean waves (rogue waves).
- **BSc and MSc in Physics** @ Heidelberg University (2016) — GPA of 1.3 and 1.2, respectively ("very good"). Exchange year at KTH Stockholm in 2014. Specialization on computational physics.

Other Skills & Interests

- Strong mathematical and analytical skills, and an affection for data.
- Good theoretical foundation of applied mathematics and scientific computing (including ODE / PDE solvers, numerical optimization, signal processing, and automatic differentiation).
- A knack for probabilistic reasoning and Bayesian data analysis. I like to make my assumptions and uncertainties explicit.
- I am passionate about open-source software development, and have contributed code to several large projects on GitHub (and started my own).
- A special interest in effective communication through writing, oral presentations, and data visualization. I take the quality of my publications seriously, and love to present my work.
- Languages: German (native), English (fully proficient), Swedish (proficient), Danish (elementary)