DION HÄFNER

PROGRAMMING SCIENTIST | SCIENTIFIC PROGRAMMER

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I am a Physicist specialized on all things scientific computing, with industry experience in data processing and machine learning. My main research interest is "human learning": How can we build machines that teach us something about our physical world?

Recent Work Experience

Apr 2022 – present

Research Engineer @ Pasteur Labs

I build efficient, scalable software for scientific advances in all areas of simulation intelligence (SI). This includes differentiable programming, earth systems simulation, physics-infused machine learning, probabilistic machine learning and computation, simulation based inference, and causal machine learning.

Sep 2017 – Dec 2018

Software development specialist @ DHI GRAS

At DHI GRAS, I built robust data pipelines, powerful statistical tools, 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 primitive equation ocean model capable of accurate, realistic simulations of the global ocean. It 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 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 familiar with modern machine learning workflows and have good knowledge of scikit-learn, Tensorflow / Keras, PyMC, and JAX.

Python

I have both deep and broad experience within the Python ecosystem, especially concerning (but not limited to) data analysis, machine learning, visualization, and scientific computing. I love working with the modern scientific Python stack and am well-versed with NumPy, SciPy, matplotlib, xarray, JAX, Numba, and Pandas.

Education

- **PhD in Physical Oceanography** @ University of Copenhagen (ongoing) — In my project, I use machine learning on large amounts of real-world data to infer by which physical mechanisms extreme ocean waves (rogue waves) are generated.
- **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 big projects on GitHub.
- 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)