Peter Van Katwyk

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Professional Summary

PhD candidate in Scientific Machine Learning at Brown University with 5+ years of experience applying deep learning, uncertainty quantification, and geospatial data analysis to climate and environmental modeling. Proven record of deploying scalable ML systems and emulators for Earth systems across academia, NASA, and industry. Passionate about driving real-world impact in climate tech through data science and AI.

Technical Skills

Programming: Python, Bash, MATLAB, R, Julia, SQL, C++

ML/AI: PyTorch, TensorFlow, Uncertainty Quantification, Spatial/Temporal Modeling, LLMs, interpretability

Data & Tools: AWS (SageMaker, Lambda, API Gateway, DynamoDB, etc.), HPC, Docker, PostgreSQL, Git, Github

Geospatial & Climate: QGIS, ArcGIS, NetCDF, xarray, Dask, ESGF, Zarr, ESMF, CDO

Experience

PhD Researcher, NSF GRFP Fellow, Brown University – Providence, RI — Sep 2021 - Present

- Designed deep learning emulators for Antarctic and Greenland ice sheets, cutting future sea level projection error by over **80%** and reducing inference time by **10x** over widely-used IPCC models
- Created a Python package, **ise**, for end-to-end data processing, modeling, and evaluation of ML emulators
- Developed novel ML-specific uncertainty quantification approach to quantify epistemic vs aleatoric uncertainty
- Published **3 first-author papers (to date)** in JAMES, UAI, and GMD and **coauthored 2 papers** published in Nature and Crysophere, as well as oral and poster presentations at **5 conferences** in the US and Europe

Research Scientist III (Contract), Meta – Remote — Aug 2020 – May 2025

- Built and deployed full-stack AWS infrastructure powering a geospatial ML app for fiber network planning
- Developed and deployed image recognition models and LLM-based GIS plugins for automated soil classification, reporting, and horizontal drill permitting used by over **150** teams at Meta and Vermeer
- Created data visualization tools and ML pipelines that improved subsurface planning workflows; trained engineers at Meta, Vermeer, and Zayo on deployment and modeling best practices

Research Data Scientist Intern, NASA – Mountain View, CA — Summer 2024

- Conceived and independently developed a RL framework, **aiatc**, in PyTorch for AI-based air traffic control, including collision avoidance, dynamic weather rerouting, and sector-aware path planning
- Achieved a **6%** reduction in time-to-destination during weather disruptions and generated valid routing solutions in over **99.7%** of simulated test cases
- Delivered oral presentation at NASA-wide conference and received "Outstanding Intern Presentation" award

Education

Brown University, PhD in Scientific Machine Learning — Sep 2021 – May 2026

- **Advisor**: Karianne Bergen, **Dissertation**: AI for Climate, Bayesian NNs for Projecting Future Sea Level
- National Science Foundation GRFP Fellow

Brigham Young University, BS in Geological Sciences, Minor in Applied Statistics — Sep 2017 – May 2021

Selected Publications

- Van Katwyk & Bergen (2025). HybridFlow: Quantification of Aleatoric and Epistemic Uncertainty with a Single Hybrid Model. *UAI*. (Under Review)
- Van Katwyk et al. (2025). ISEFlow v1.0: A Flow-Based Neural Network Emulator for Improved Sea Level Projections and Uncertainty Quantification. *Geoscientific Model Development*.
- Van Katwyk et al. (2023). A Variational LSTM Emulator of Sea Level Contribution from the Antarctic Ice Sheet. *JAMES*.