DANIEL HOLMBERG

3166 Harold Frank Hall, UC Santa Barbara, CA 93106

dholmberg@ucsb.edu | https://danielholmberg.fi

EXPERIENCE

University of California, Santa Barbara　　Aug 2025 – Present
Visiting Researcher　　*Santa Barbara, USA*

· Fulbright Finland Scholar at Jeong Lab and Geometric Intelligence Lab during the 25–26 acadmeic year.

University of Helsinki　　Aug 2022 – Present
PhD Candidate　　*Helsinki, Finland*

· Part of the Complex Systems Computation group led by Prof. Teemu Roos, where I research structured deep learning.
· Currently creating an uncertainty aware neural emulator for ion-kinetic space weather simulations.

Euro-Mediterranean Center on Climate Change　　Oct 2024 – Apr 2025
Visiting Researcher　　*Bologna, Italy*

· Built a machine learning based alternative to the operational numerical Mediterranean forecasting system.

South African Radio Astronomy Observatory　　Jan 2024 – Apr 2024
Visiting Researcher　　*Cape Town, South Africa*

· Developed computer vision techniques to deconvolve radio interferometric images from the MeerKAT telescope.

European Organization for Nuclear Research　　Jul 2021 – Jun 2022
Technical Student　　*Geneva, Switzerland*

· Interned in the IT cloud infrastructure team under CNCF Research User Group lead Ricardo Rocha.
· Gained expertise on the Kubeflow cloud platform able to facilitate the complete machine learning lifecycle.
· Implemented an end-to-end pipeline to run a novel machine learning based calibration technique for particle jets.

Helsinki Institute of Physics　　Nov 2020 – May 2021
Research Assistant　　*Helsinki, Finland*

· Began my research on calibrating particle jets represented as point clouds arising in highly energetic collisions at the Large Hadron Collider under guidance by Dr. Henning Kirschenmann and Prof. Mikko Voutilainen.

Fjuul Vision　　Mar 2020 – Mar 2021
Software Engineer　　*Helsinki, Finland*

· Contributed to the development and maintenance of the company's health tracking mobile application.
· Successfully integrated Withings tracker functionality, covering both backend and frontend.

EDUCATION

University of Helsinki　　*May 2022*
M.Sc. in Data Science

Thesis: *Jet Energy Corrections with Graph Neural Network Regression*
Grade: 5/5

University of Helsinki　　*Dec 2019*
B.Sc. in Physics

Thesis: *Interatomic Potentials for Simulating Fe–Cr*
Grade: 4/5

PUBLICATIONS

D. Holmberg, I. Zaitsev, M. Alho, I. Bouri, F. Franssila, H. Jeong, M. Palmroth, T. Roos. *Graph-based Neural Space Weather Foreasting*. In NeurIPS 2025 Workshop on Machine Learning and the Physical Sciences (2025).

A. Ovaska, E. Rauth, D. Holmberg, et al. *Global fields of daily accumulation-mode particle number concentrations using in situ observations, reanalysis data and machine learning*. Aerosol Research (2025).

D. Holmberg, M. Airaksinen, V. Marchi, A. Guzzetta, A. Kivi, L. Haataja, S. Vanhatalo, T. Roos. *Learning Developmental Age from 3D Infant Kinetics Using Adaptive Graph Neural Networks*. IEEE Transactions on Neural Systems and Rehabilitation Engineering (2025).

D. Holmberg, E. Clementi and T. Roos. *Regional Ocean Forecasting with Hierarchical Graph Neural Networks*. In NeurIPS 2024 Workshop on Tackling Climate Change with Machine Learning (2024).

D. Holmberg, D. Golubovic and H. Kirschenmann. *Jet Energy Calibration with Deep Learning as a Kubeflow Pipeline*. Computing and Software for Big Science (2023).

P. Kuopanportti, M. Ropo, D. Holmberg, H. Levämäki, K. Kokko, S. Granroth and A. Kuronen. *Interatomic Fe–Cr potential for modeling kinetics on Fe surfaces*, Computational Materials Science (2022).

PRESENTATIONS

D. Holmberg. *Regional Ocean Forecasting with Hierarchical Graph Neural Networks*. CMCC (2024). Bologna, Italy.

D. Holmberg and D. Golubovic. *Jet Energy Corrections with GNN Regression using Kubeflow at CERN*. Kubecon + CloudNativeCon Europe (2022). Valencia, Spain.

D. Holmberg. *Jet Energy Corrections with GNN Regression*. Learning to Discover at Institut Pascal (2022). Paris, France.

OUTREACH

CMS ML Hackathon
Instructor

Nov 2021
Geneva, Switzerland

· Showcased usage of cloud platforms for machine learning to attending physicists.

CodeRefinery
Instructor

May 2020 – Jun 2020
Helsinki, Finland

· Helped people taking part in coding workshops with new concepts such as version control or modularity.

GRANTS & AWARDS

Fulbright-KAUTE Foundation Award
Research Visit, UC Santa Barbara

May 2025

Helsinki Institute of Information Technology
Travel Grant, Nordic Probabilistic AI School in Trondheim

June 2023

Nylands Nation
Research Grant

Mar 2023