Elias Nyholm

PhD Student
Mathematics of Geometric Deep Learning

Department of Mathematical Sciences, Chalmers University of Technology & University of Gothenburg
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Education

PhD Mathematics — *Gothenburg, Sweden*
Chalmers University of Technology & University of Gothenburg — *Oct. 2023 - Current*

MSc Physics — *Zürich, Switzerland*
ETH Zürich — *Sept. 2020 - Sept. 2022*

BSc Theoretical Physics — *Lund, Sweden*
Lund University — *Sept. 2017 - Jun. 2020*

Professional Experience

Research Assistant, Computational Physics Group of Prof. Marina Marinkovic — *Zürich, Switzerland*
Institute for Theoretical Physics, ETH Zürich — *Jan. - Jun., 2023*

Research Assistant, Mesoscopic Physics Group of Prof. Peter Samuelsson — *Lund, Sweden*
Division of Mathematical Physics, Lund University — *Jun. - Aug., 2020*

Data Science Intern, Research and Development Group — *Lund, Sweden*
Apptus Technologies — *Jun. 2020 - Dec. 2021*

Research Interests

- **Geometric and Topological structures in Geometric Deep Learning**
- **Applications of Geometric Deep Learning, particularly in Mathematics and Physics**
- **The effect of Symmetries in Machine Learning, Physics and Mathematics**
- **Neural Scaling laws**

Publications and preprints

Equivariant non-linear maps for neural networks on homogeneous spaces, **E. Nyholm**, O. Carlsson, M. Weiler, D. Persson, arxiv:2504.20974 (2025)

Entanglement and thermokinetic uncertainty relations in coherent mesoscopic transport, K. Prech, P. Johansson, **E. Nyholm**, G. T. Landi, C. Verdozzi, P. Samuelsson, and P. P. Potts, Phys. Rev. Res. 5, 023155 (2023)

Conferences and Workshops

LOGML Summer School [§]
Imperial College London, London, UK — *July 7-11, 2025*

Young Topologists Meeting
KTH Royal Institute of Technology and Stockholm University, Stockholm, Sweden — *June 23-27, 2025*

Summer School on Invariant Theory
Lie-Størmer Center, Tromsø, Norway — *May 26-30, 2025*

Learning on Graphs and Geometry Workshop [* †]
Uppsala University, Uppsala, Sweden — *February 11-12, 2025*

WASP Winter Conference [†‡]
University of Linköping, Norrköping, Sweden — *January 15-16, 2025*

CHAIR Structured Learning Workshop [‡]
Chalmers University of Technology, Gothenburg, Sweden — *October 28-31, 2024*

CaLISTA Workshop on Geometric Deep Learning [‡]
Ecole de Mines, Paris, France — *September 2-5, 2024*

WASP Community Building Summer School [†]
Linköping University, Norrköping, Sweden — *August 26-30, 2024*

LOGML Summer School [§]
Imperial College London, London, UK — *July 8-12, 2024*

GeUmetric Deep Learning Workshop [†]
Umeå University, Umeå, Sweden — *June 11-13, 2024*

WASP Winter Conference
University of Linköping, Norrköping, Sweden — *January 9-11, 2024*

Workshop on Geometry and Machine Learning
Max-Planck Institute for Mathematics in the Sciences, Leipzig, Germany — *November 13-15, 2023*

Machine Learning for Lattice Field Theory and Beyond
ECT*, Trento, Italy — *June 26-30, 2023*

IAIFI PhD Summer School and Workshop
Institute for AI & Fundamental Interactions IAIFI, Boston, MA, USA — *August 1-9, 2022*

EuroHack22: GPU Programming Hackathon [§]
Swiss National Supercomputing Centre CSCS, Lugano, Switzerland — *September 19-29, 2022*

[*] (Co-)organised, [†] Gave presentation, [‡] Presented poster, [§] Included project work