MAKSIM ZHDANOV

email · website · github · google scholar · twitter

research: hierarchical models, sub-quadratic architectures, weather modelling

EDUCATION

PhD in Machine Learning   2023 — 2027
University of Amsterdam, AMLab

· Advisors: Max Welling & Jan-Willem van de Meent

MSc in Computer Science   2019 — 2022
TU Dresden

· GPA: 1.4 (excellent)
· Thesis: analyzing brain connectivity with generative modelling

BSc in Physics   2015 — 2019
Saint Petersburg State University

· GPA: 4.8/5.0 (with honours)
· Thesis: simulating skin with molecular dynamics

WORK EXPERIENCE

Research Assistant   Apr 2022 — Apr 2023
Helmholtz AI, Dresden

Research Student   Sep 2020 — Apr 2022
Helmholtz AI, Dresden

Research Student   May 2020 — Dec 2020
TU Dresden

TEACHING

Machine Learning I   Sep 2023 — Dec 2023
University of Amstedam, with Erik Bekkers

Deep Learning II   Feb 2024 — May 2024
University of Amstedam, with Erik Bekkers and Stratis Gavves

Deep Learning II   Feb 2025 — May 2025
University of Amstedam, with Erik Bekkers and Stratis Gavves

TECHNICAL SKILLS

Code: Python, C++, MATLAB   **ML:** JAX, PyTorch, Triton, HPC

PUBLICATIONS

Erwin: A Tree-based Hierarchical Transformer for Large-scale Physical Systems
Maksim Zhdanov, Max Welling, Jan-Willem van de Meent
ICML 2025   arxiv   code   blog

Adaptive Mesh-Quantization for Neural PDE Solvers
Winfried van den Dool*, Maksim Zhdanov*, Yuki Asano, Max Welling
TMLR   arxiv   code

Clifford Steerable Convolutional Neural Networks
Maksim Zhdanov, David Ruhe, Maurice Weiler, Ana Lucic, Johannes Brandstetter, Patrick Forré
ICML 2024   arxiv   code   blog

Implicit Convolutional Kernels for Steerable CNNs
Maksim Zhdanov, Nico Hoffmann, Gabriele Cesa
NeurIPS 2023   arxiv   code   blog

Investigating Brain Connectivity with Graph Neural Networks and GNNExplainer
Maksim Zhdanov, Saskia Steinmann, Nico Hoffmann
ICPR 2022 (Oral)   arxiv   code

WORKSHOP SUBMISSIONS

Conditional Clifford-Steerable CNNs with Complete Kernel Basis for PDE Modeling
Bálint Szarvas and Maksim Zhdanov
AI4Science @ NeurIPS 2025   arxiv   code

BSA: Ball Sparse Attention for Large-scale Geometries
Catalin E. Brita, Hieu Nguyen, Lohithsai Yadala Chanchu, Domonkos Nagy, Maksim Zhdanov
LCFM @ ICML 2025   arxiv   code

AdS-GNN - a Conformally Equivariant Graph Neural Network
Maksim Zhdanov, Nabil Iqbal, Erik Bekkers, Patrick Forré
MLMP @ ICLR 2025   arxiv   code

Amortized Bayesian Inference of GISAXS Data with Normalizing Flows
Maksim Zhdanov, Lisa Randolph, Thomas Kluge, Motoaki Nakatsutsumi, Christian Gutt,
Marina Ganeva, Nico Hoffmann
ML4PS @ NeurIPS 2022

Learning Generative Factors of EEG Data with Variational Auto-Encoders
Maksim Zhdanov, Saskia Steinmann, Nico Hoffmann
DGM @ MICCAI 2022

PREPRINTS

(Sparse) Attention to the Details: Preserving Spectral Fidelity in ML-based Weather Forecasting Models
Maksim Zhdanov, Ana Lucic, Max Welling, Jan-Willem van de Meent

MSPT: Efficient Large-Scale Physical Modeling via Parallelized Multi-Scale Attention
Pedro Curvo, Jan-Willem van de Meent, Maksim Zhdanov

INVITED TALKS

AI4Science Reading Group   Aug 2025
Mila, Quebec
Triton & Flash Attention Workshop   Dec 2025
ELLIS' Deep Thinking Hour