MAKSIM ZHDANOV | Curriculum Vitae

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RESEARCH INTERESTS

- **Geometric Deep Learning**: equivariance, geometric algebra, graph neural networks.

- **Generative Modeling**: geometric latent space models, learning on non-Euclidean domains.

- **AI4Science**: physics simulations, PDE modeling, physics-inspired deep learning.

I also find causality and its intersection with category theory quite interesting.

EDUCATION

TU DRESDEN   10/2019 - 3/2022
M.Sc. in Computer Science, GPA: 1.4.   Dresden, Germany
Thesis: Analyzing Generative Factors of Functional Connectivity with Variational Autoencoders

SAINT PETERSBURG STATE UNIVERSITY   9/2015 - 7/2019
B.Sc. in Physics, GPA: 4.8/5.0, with honours.   Saint Petersburg, Russia
Thesis: Computer Simulations of Model Stratum Corneum Lipid Bilayers

EXPERIENCE

RESEARCH ASSISTANT   04/2022 - ongoing
Helmholtz AI @ Helmholtz-Zentrum Dresden-Rossendorf
- I am working on generative modelling approaches for experimental physics data.
- Developed a normalizing flows-based architecture for likelihood-free inference of scattering data that is orders of magnitudes faster than a baseline.

STUDENT ASSISTANT   09/2020 - 03/2022
Helmholtz AI @ Helmholtz-Zentrum Dresden-Rossendorf
- Created an explainable graph neural network-based framework for automatically diagnosing EEG data.
- Investigated the influence of brain disorders on EEG data with causal representation learning.
- Participated in developing a neural network-based solver for partial differential equations and inverse problems.

STUDENT ASSISTANT   05/2020 - 12/2020
The Institute for Medical Informatics and Biometry
- Performed data analysis and developed statistical models of clinical treatment of leukaemia.

CONFERENCE PROCEEDINGS

- **Zhdanov, M.**, Steinmann, S., & Hoffmann, N. (2022). Investigating Brain Connectivity with Graph Neural Networks and GNNExplainer, ICPR 2022 (Oral).

WORKSHOP CONTRIBUTIONS

- **Zhdanov, M.**, Randolph, L., Kluge, T., Motoaki, N., Gutt, C., Ganeva, M. & Hoffmann, N. (2022). Amortized Bayesian Inference of GISAXS Data with Normalizing Flows, Machine Learning and the Physical Sciences @ NeurIPS 2022.
- **Zhdanov, M.**, Steinmann, S., & Hoffmann, N. (2022). Learning Generative Factors of EEG Data with Variational auto-encoders, Deep Generative Models workshop @ MICCAI 2022 (Oral).

Other publications & preprints

- **Zhdanov, M.**, Hoffmann, N. & Cesa, G. (2022). Implicit Neural Filters for Steerable CNNs (in progress).
- **Zhdanov, M.** (2022). Analyzing Generative Factors of Functional Connectivity with Variational Autoencoders, Master thesis.

Selected projects

- Implicit neural filters for steerable CNNs with application to point cloud data (in progress).
- Simulation-based inference for inverse scattering problems.
- Disentangled representation learning with graph VAEs for neuroimaging problems.
- Learning PDE from thermoimaging data with physics-informed NNs.

Skills

PROGRAMMING LANGUAGE	Python | C++ | R
FRAMEWORKS & TOOLS	Git | GROMACS | AutoDock Vina
LIBRARIES	PyTorch | escnn | PyTorch Geometric | NumPy | Pandas
CONTRIBUTED TO	Neural Solvers
LANGUAGES	**Native:** Russian | **Fluent:** English | **Intermediate:** German

Community service

MACHINE LEARNING AND THE PHYSICAL SCIENCES WORKSHOP @ NEURIPS 2022		09/2022
reviewer		online, USA
SYMMETRY AND GEOMETRY IN NEURAL REPRESENTATIONS WORKSHOP @ NEURIPS 2022		09/2022
reviewer		online, USA
ICPR 2022		05/2022
reviewer		online, Canada

Extracurricular activities

SNI 2022 CONFERENCE	09/2022
poster presentation	Berlin, Germany
LONDON GEOMETRY AND MACHINE LEARNING SUMMER SCHOOL	07/2022
poster presentation + project	online, UK
SWISS EQUIVARIANT WORKSHOP	07/2022
participant	Lausanne, Switzerland
MACHINE LEARNING SUMMER SCHOOL	07/2022
poster presentation	Krakow, Poland
HZDR MACHINE LEARNING JOURNAL CLUB	09/2020 - ongoing
active participant	Dresden, Germany
HELMHOLTZ AI CONFERENCE	06/2022
poster presentation	Dresden, Germany
INTERNATIONAL AI ARCHEOLOGY CHALLENGE	04/2022

3rd place   online, Israel

5. WORKSHOP BIOINFORMATICS MEETS MACHINE LEARNING
12/2021
Talk: "Investigating Brain Connectivity with Graph Neural Networks and GNNExplainer"   online, Germany

MACHINE LEARNING SUMMER SCHOOL
08/2021
participant   online, Taiwan

CASUS WORKSHOP
09/2021
Talk: "Investigating Brain Connectivity with Graph Neural Networks and GNNExplainer"   Gorlitz, Germany

HIDA COVID-DATA CHALLENGE
04/2021
participant   online, Germany