

ARTEM MOSKALEV

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My research focuses on geometric deep learning and language models, with a keen interest in developing geometry-aware methods that efficiently learn from unlabeled data. I am driven by the challenge of scaling AI to tackle complex scientific problems that traditional methods struggle to solve. Outside of work, I enjoy playing chess and paddle boarding.

EDUCATION

University of Amsterdam, Delta Lab

Amsterdam

PhD in Machine Learning

August 2019 - August 2023

Advisor: prof. Arnold Smeulders

Research agenda: geometric deep learning, self-supervised learning, inductive biases

Thesis: Representation Learning with Structured Invariance

Skolkovo Institute of Science and Technology

Moscow

MSc in Applied Mathematics

September 2017 - June 2019

Advisor: prof. Anh-Huy Phan

Research agenda: inverse problems, signal processing, computational imaging

Thesis: Trainable regularization for Wiener filter deconvolution (top 3%)

WORK EXPERIENCE

Johnson and Johnson Innovative Medicine

AI/ML Group

Research Scientist

April 2024 - Current

Postdoctoral Researcher

September 2023 - April 2024

In JJIM, I work on combining geometric deep learning and large language models for molecular representation learning.

Samsung RnD Institute

AI Algorithms Lab

Machine Learning Intern

May 2018 - August 2018

The main direction of my work in Samsung included computer vision and image processing. In particular, we tackled image enhancement and restoration with generative models.

Moscow State University of Medicine

Neuroscience Department

External Research Assistant

February 2016 - March 2017

My work as a research assistant involved mathematical modeling and embedded software engineering. We used mathematical models to describe the behavior of the neurons under the mechanical influence.

SELECTED PUBLICATIONS

- [1] Artem Moskalev et al. “SE(3)-Hyena Operator for Scalable Equivariant Learning”. In: *ICML workshop on Geometry-grounded Representation Learning and Generative Modeling (ICML-GRaM)*. 2024.

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- [2] Artem Moskalev et al. “On genuine invariance learning without weight-tying”. In: *ICML workshop on Topology, Algebra, and Geometry in Machine Learning (ICML TAG-ML)*. 2023.
- [3] Artem Moskalev et al. “Contrasting quadratic assignments for set-based representation learning”. In: *European Conference on Computer Vision (ECCV)*. 2022.
- [4] Artem Moskalev et al. “LieGG: Studying Learned Lie Group Generators”. In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2022.
- [5] Artem Moskalev, Ivan Sosnovik, and Arnold W.M. Smeulders. “Relational Prior for Multi-Object Tracking (**Oral**)”. In: *2nd Visual Inductive Priors for Data-Efficient Deep Learning Workshop*. 2021. URL: <https://openreview.net/forum?id=1MznMuu8mg4>.
- [6] Ivan Sosnovik, Artem Moskalev, and Arnold Smeulders. “DISCO: accurate Discrete Scale Convolutions (**Best Paper Award**)”. In: *British Machine Vision Conference (BMVC)*. 2021.
- [7] Ivan Sosnovik, Artem Moskalev, and Arnold W.M. Smeulders. “How to Transform Kernels for Scale-Convolutions”. In: *2nd Visual Inductive Priors for Data-Efficient Deep Learning Workshop*. 2021. URL: https://openreview.net/forum?id=rTpTF_-f0wm.
- [8] Ivan Sosnovik*, Artem Moskalev*, and Arnold W.M. Smeulders. “Scale Equivariance Improves Siamese Tracking”. In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. 2021.

STUDENT AND INTERN SUPERVISION

Junjie Xu: Explicit and implicit geometry learning for large-molecule property prediction
Mehdi Yazdani-Jahromi: Transformer prior for pretraining state-space models
Evgenia Ilia: Efficient self-supervised learning for real-world tabular data
Harm Manders: Dense contrastive learning for microscopy cell segmentation
Lotte Bottema: Deep sequence modeling for trajectory forecasting
Nadia Isiboukaren: Space-Time-Slot correspondence for video object segmentation
Jorrit Ypenga: Domain-regularization for siamese object tracking

TEACHING EXPERIENCE

Statistics, Simulation and Optimization
Teaching Assistant, 6EC

University of Amsterdam
2019 - 2022

Introduction to Image Processing
Lecturer

Skolkovo Institute of Science and Technology
February 2019 - March 2019

A mini-course for graduate students to introduce the basics of digital image processing.

RELEVANT SKILLS

Programming and Computing

- Code:

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- python, bash, R, SQL, C++ (basic)
- Frameworks:
 - pytorch, huggingface, JAX, sklearn, cvxpy, amplide
- Scholar: scholar.google.com/citations?user=mh1CSCEAAAAJ&hl
- GitHub: github.com/amoskalev

Languages

- Fluent in English and Russian

ADDITIONAL ACHIEVEMENTS

- Best paper award BMVC 2021 (one best paper for the whole conference)
- Reviewer at NeurIPS, ICML, ECCV/ICCV, Computer Vision and Image Understanding Journal
- Skoltech graduate merit scholarship

REFERENCES

Available upon request.