

# 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 conventional methods struggle to solve.

## EDUCATION

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### University of Amsterdam

Amsterdam

*Degree:* PhD in Machine Learning

August 2019 - September 2023

*Advisor:* prof. Arnold Smeulders

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

*Thesis:* Representation Learning with Structured Invariance

### Skolkovo Institute of Science and Technology

Moscow

*Degree:* MSc in Applied Mathematics

September 2017 - June 2019

*Advisor:* prof. Anh-Huy Phan

*Research:* inverse problems, signal processing, computational imaging

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

## WORK EXPERIENCE

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### Johnson and Johnson

AI/ML for Drug Discovery

*Research Scientist*

April 2024 - Current

*Postdoctoral Researcher*

September 2023 - April 2024

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

### Samsung

AI Algorithms

*Machine Learning Intern*

May 2018 - August 2018

In Samsung I worked on computer vision and image processing. In particular, we tackled image enhancement and restoration with generative models.

### Moscow State University

Neuroscience Department

*External Research Assistant*

February 2016 - March 2017

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

## SELECTED PUBLICATIONS

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- [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\\_-fOwm](https://openreview.net/forum?id=rTpTF_-fOwm).
- [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.

## RELEVANT SKILLS

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### Programming and Computing

- Code: python, bash, R, SQL, C++ (basic)
- Frameworks: pytorch, huggingface, pytorch-geometric, e3nn, JAX, sklearn, cvxpy, amplide
- Scholar: [scholar.google.com/citations?user=mh1CSCEAAAAJ&hl](https://scholar.google.com/citations?user=mh1CSCEAAAAJ&hl)
- GitHub: [github.com/amoskalev](https://github.com/amoskalev)

### Languages

- Fluent in English and Russian

## TEACHING EXPERIENCE

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### 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.

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## INTERN AND STUDENT SUPERVISION

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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

## ADDITIONAL ACHIEVEMENTS

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- 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

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*Available upon request.*