

## Research Interests

Computer Vision, Machine Learning, Invariance and Equivariance in Neural Networks, Representation Learning, Structured Neural Networks

## Education

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|----------------|---|
| 2017 – Present | <b>PhD, Computer Vision</b> ,<br>University of Amsterdam, Amsterdam, The Netherlands<br><i>“Learning Symmetries in Computer Vision”</i>   |
| 2015 – 2017    | <b>MSc with Honors, Applied Mathematics and Physics</b> ,<br>Moscow Institute of Physics and Technology, Moscow, Russia<br>Skolkovo Institute of Science and Technology, Moscow, Russia<br><i>“Neural Networks for Topology Optimization”</i> |
| 2011 – 2015    | <b>BSc with Honors, Applied Mathematics and Physics</b> ,<br>Moscow Institute of Physics and Technology, Moscow, Russia<br><i>“Two-dimensional system for the prior positioning of the STM”</i>   |

## Highlights

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|--------------|---|
| Scholarships | <i>“Foundation for the Development of Innovation Education”</i> (2012 – 2014)   |
| Awards       | BMVC 2021 Best Paper Award <a href="#">[link]</a> <a href="#">[interview]</a><br>Kaggle <i>“Leaf Classification”</i> competition <a href="#">[interview]</a><br>National Physics Olympiad for Students 2013<br>Moscow Physics Olympiad 2011<br>Phystech Mathematical Olympiad 2011<br>Phystech Physics Olympiad 2011<br>Moscow Mathematical Olympiad 2010<br>Moscow Physics Olympiad 2010 |

## Academic Experience

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|-----------|---|
| Teaching  | MSc course <b>Applied Machine Learning</b> ,<br>University of Amsterdam, 2017 – 2020<br><br>MSc, PhD course <b>iOS Game Development</b> ,<br>Skolkovo Institute of Science and Technology, 2016                                   |
| Reviewing | ICLR 2023, TPAMI 2022, ICML INNF+ 2021, ICCV 2021, ICLR 2021, WACV 2021, CVPR 2018, Computer Vision and Image Understanding, Engineering Optimization, Computer Methods in Applied Mechanics and Engineering, The Visual Computer |

## Academic Experience

Supervision                      Cees Kaandorp, Lucas Meijer, Dario E. Shehni Abbaszadeh, Dave Meijdam, Jonne Goedhart, Daan Ferdinandusse, Gongze Cao, Michał Szmaja, Jan Jetze Beitler

## Work Experience

03.2022 – Present              **Amazon ML**SL, Applied Scientist

06.2021 – 10.2021            **Amazon ML**SL, Applied Scientist Intern  
Worked on representation learning for 3D garment reconstruction.

08.2016 – 09.2016            **SAP Labs**, Intern  
Developed prototypes for a smart fleet management system. Designed software and hardware solutions for tracking the engine's and the vehicle's parameters.

02.2016 – 08.2016            **Teachbase**, iOS Developer  
Developed a client-server iOS application for watching educational courses. [\[link\]](#)

09.2014 – 06.2015            **P.L. Kapitza Institute for Physical Problems**, Laboratory Assistant  
Studied nano-structured materials. Designed a system for the prior positioning of the needle of the scanning tunneling microscope.

## Skills

Coding                          Python, Objective-C, Swift, C

Technical                      Cryogenics, Vacuum Equipment, Scanning Tunneling Microscopy

## Publications

2023              I. Sosnovik, A. Moskalev, C. Kaandorp, A. Smeulders, “*Learning to Summarize Videos by Contrasting Clips*”, Preprint, 2023 [\[pdf\]](#)

2022              A. Moskalev, A. Sepiarskaia, I. Sosnovik, A. Smeulders, “*LieGG: Studying Learned Lie Group Generators*”, NeurIPS, 2022 [\[pdf\]](#)[\[video\]](#)

                    A. Moskalev, I. Sosnovik, V. Fischer, A. Smeulders, “*Contrasting Quadratic Assignments for Set-based Representation Learning*”, ECCV, 2022 [\[pdf\]](#)[\[code\]](#)[\[poster\]](#)

2021              S. Gulshad\*, I. Sosnovik\*, A. Smeulders, “*Wiggling Weights to Improve the Robustness of Classifiers*”, Preprint, 2021 [\[pdf\]](#)

                    I. Sosnovik, A. Moskalev, A. Smeulders, “*DISCO: accurate Discrete Scale Convolutions*”, BMVC (**Oral**), 2021, **Best Paper Award** [\[pdf\]](#)[\[code\]](#)

## Publications

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- A. Moskalev, I. Sosnovik, A. Smeulders, “*Two is a Crowd: Tracking Relations in Videos*”, Preprint, 2021 [\[pdf\]](#)
- I. Sosnovik, A. Moskalev, A. Smeulders, “*How to Transform Kernels for Scale-Convolutions*”, ICCV VIPriors Workshop, 2021 [\[pdf\]](#)[\[code\]](#)
- A. Moskalev, I. Sosnovik, A. Smeulders, “*Relational Prior for Multi-Object Tracking*”, ICCV VIPriors Workshop (**Oral**), 2021 [\[link\]](#)
- S. Gulshad\*, I. Sosnovik\*, A. Smeulders, “*Built-in Elastic Transformations for Improved Robustness*”, Preprint, 2021 [\[pdf\]](#)
- 2020 I. Sosnovik\*, A. Moskalev\*, A. Smeulders, “*Scale Equivariance Improves Siamese Tracking*”, WACV, 2021 [\[pdf\]](#)[\[code\]](#)
- 2019 I. Sosnovik, M. Szmaja, A. Smeulders, “*Scale-Equivariant Steerable Networks*”, ICLR, 2020 [\[pdf\]](#)[\[code\]](#)
- A. Atanov, A. Volokhova, A. Ashukha, I. Sosnovik, D. Vetrov, “*Semi-Conditional Normalizing Flows for Semi-Supervised Learning*”, ICML INNF, 2019 [\[pdf\]](#)[\[code\]](#)
- I. Sosnovik, I. Oseledets, “*Neural Networks for Topology Optimization*”, Russian Journal of Numerical Analysis and Mathematical Modelling, 34(4) [\[pdf\]](#)[\[code\]](#)
- 2018 J.J. Beitler, I. Sosnovik, A. Smeulders, “*PIE: Pseudo-Invertible Encoder*” [\[pdf\]](#)

## Patents

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- 2020 I. Sosnovik, A. Smeulders, K. Groh “*Device and Method for Training a Scale-Equivariant Convolutional Neural Network*”, 2020 EP, 2021 US CN [\[link\]](#)
- A. Moskalev, I. Sosnovik, A. Smeulders, K. Groh “*Recognition of Objects in Images with Equivariance or Invariance in Relation to the Object Size*”, 2020 DE 2021 US CN [\[link\]](#)
- 2019 I. Sosnovik, A. Smeulders, K. Groh, M. Szmaja “*Method and Apparatus for Processing Sensor Data Using a Convolutional Neural Network*”, 2019 DE, 2020 US CN [\[link\]](#)