

Iaro Melekhov

Skills computer vision: image-based localization, 3D scene understanding, SfM, SLAM, 3D Gaussian Splatting, point cloud semantic segmentation, diffusion models; **tools**: Python, PyTorch/TensorFlow, C++, OpenCV, Docker, AWS; **machine learning**: design, optimization, and implementation of neural networks for vision and point cloud data; **leadership**: guided junior scientists and supported tech development

Employment History

- 06/23 – present **Postdoctoral Researcher (part-time)**, *Aalto University, Finland*,
Prof. Dr. Juho Kannala. Assisted in organizing and facilitating a successful computer vision course for 200 students; served as the course TA, actively engaging in the assessment process. In parallel, I took the lead on a research project focused on stable diffusion for image descriptor matching
- 06/22 – present **Senior Research Engineer**, *Sharper Shape, Finland*,
Led efforts in point cloud semantic segmentation, implementing a voxel-based approach that substantially improved target segmentation metrics by 30%; Developed an active learning algorithm tailored for point clouds, resulting in a significant 45% reduction in annotation costs.
- 01/20 – 06/22 **Postdoctoral Researcher**, *Aalto University, Finland*,
Prof. Dr. Jaakko Lehtinen. Prepared and submitted a manuscript on camera relocalization to the IJCV journal (accepted in 2023).
- 07/19 – 11/19 **Research Engineering intern**, *Niantic Labs, UK*,
Propose and implement a CNN-based feature detector and descriptor that is robust to different weather/illumination conditions and large viewpoint changes. The project led to a top computer vision conference (ECCV) publication.
- 10/18 – 04/19 **Research Engineering intern**, *Wayve, UK*,
Propose and implement a self-supervised approach for video-scene understanding (depth, optical flow, and ego-motion estimation). The project led to an ICML publication.
- 01/15 – 01/16 **Researcher**, *University of Oulu, CMV group, Finland*,
Implementing an algorithm for patch matching problem; Conducting research related to image retrieval
- 09/09 – 12/14 **Software Developer**, *Soft-Alliance, Russia*,
Implemented an aircraft trajectory prediction module based on dynamic characteristics of the aircraft and environment conditions

Academic History

- 2016 – 2020 **Ph.D. in Computer Science**, *Aalto University, Finland*,
Supervisors: Dr. Juho Kannala, Dr. Esa Rahtu,
Thesis: Deep Learning Methods for Image Matching and Camera Relocalization
Date of defense: 21st February 2020, **degree awarded**: 12th March 2020
- Spring 2018 **Visiting Ph.D. student**, *ETH Zürich, Switzerland*,
Hosted by Dr. Marc Pollefeys and Dr. Torsten Sattler
- 2010 – 2014 **Doctor of Philosophy in science**, *ETU LETI, Russia*,
Supervisor: Dr. Vladimir Orlov,
Thesis: Analysis and development of algorithms of joint information processing in relative navigation
Date of defense: 9th April 2014, **degree awarded**: 10th May 2014
- 2008 – 2010 **M.Sc in Radio Engineering**, *ETU LETI, Russia*, GPA 3.96/4.0
- 2004 – 2008 **B.Sc in Radio Engineering**, *ETU LETI, Russia*, GPA 3.91/4.0

Selected Publications

Differentiable Product Quantization for Memory Efficient Camera Relocalization, *ECCV 2024*, Z. Laskar*, [I. Melekhov](#)*, A. Benbihi, S. Wang, J. Kannala; *equal contribution

HSCNet++: Hierarchical Scene Coordinate Classification and Regression for Visual Localization with Transformer, *IJCV 2024*

S. Wang*, Z. Laskar*, [I. Melekhov](#), X. Li, Y. Zhao, G. Tolas, J. Kannala; *equal contribution

Digging Into Self-Supervised Learning of Feature Descriptors, *3DV 2021*

[I. Melekhov](#), Z. Laskar, X. Li, S. Wang, J. Kannala

DGC-Net: Dense Geometric Correspondence Network, *WACV 2019*, **Best paper award**

[I. Melekhov](#), T. Sattler, A. Tiulpin, M. Pollefeys, E. Rahtu, J. Kannala

Awards and Scholarships

- 2020 Our approach secured 2nd place in two ECCV 2020 competitions on image-based localization **1** and **2**
- 2018 Google Landmark Recognition Challenge (Kaggle) - Top 9% (out of 477 teams)
- 2017 TensorFlow Speech Recognition Challenge (Kaggle) - Top 9% (out of 1315 teams)
- 2018 Nokia Foundation scholarship