# Iaro Melekhov

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## Skills

computer vision — image-based localization, 3D reconstruction, pointcloud classification, NeRFs, scene understanding, Structure-from-Motion, SLAM

## Employment History

06/23 – present **Postdoctoral Researcher (part-time)**, *Aalto University, Finland*,
Advised by Dr. Juho Kannala. Stable diffusion for 3D reconstruction and camera relocalization; scene understanding using 3D Gaussian Splatting; image retrieval (re-ranking).

06/22 – present **Senior Research Engineer**, *Sharper Shape, Finland*,
Pointcloud classification, active learning for pointclouds, memory efficient techniques for processing large pointclouds.

01/20 – 06/22 **Postdoctoral Researcher**, *Aalto University, Finland*,
Advised by Dr. Jaakko Lehtinen. Solving the image matching problem based on the dense correspondences between views.

07/19 – 11/19 **Research Engineering intern**, *Niantic Labs, UK*,
Propose and implement a CNN-based feature detector and descriptor which is robust to different weather/illumination conditions and large view-point angles.

10/18 – 04/19 **Research Engineering intern**, *Wayve, UK*,
Propose and implement a self-supervised approach for video-scene understanding with the focus on autonomous vehicles.

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

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

**HSCNet++: Hierarchical Scene Coordinate Classification and Regression for Visual Localization with Transformer**, *IJCV 2023*.
S. Wang*, Z. Laskar*, I. Melekhov, X. Li, Y. Zhao, G. Tolias, J. Kannala; *equal contribution

**Digging Into Self-Supervised Learning of Feature Descriptors**, *3DV 2021*.
I. Melekhov, Z. Laskar, X. Li, S. Wang, J. Kannala

**Continual Learning for Image-Based Camera Localization**, *ICCV 2021*.
S. Wang, Z. Laskar, I. Melekhov, X. Li, 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

**TC-Net: Self-Supervised Monocular Video Scene Understanding Using Temporally Consistent Geometric Prior**, *ICMLW 2019*.
I. Melekhov, E. Rahtu, J. Kannala, A. Kendall

## 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