

# MIROSLAV PURKRABEK

## Computer Vision Researcher & Sports Coach

 MiraPurkrabek.github.io

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 MiraPurkrabek

 Scholar.Google



## SELECTED PUBLICATIONS

For the full list, see my website – [MiraPurkrabek.github.io](https://MiraPurkrabek.github.io)

### Detection, Pose Estimation and Segmentation for Multiple Bodies: Closing the Virtuous Circle

ICCV 2025

Three small specialized models, each conditioned by the others, form a self-improving loop: *BBox-Mask-Pose*. The loop improves consistency of different representations, beats large foundation models and sets a new SOTA on OCHuman.

### ProbPose: A Probabilistic Approach to 2D Human Pose Estimation

CVPR 2025

ProbPose introduces a probabilistic modeling with calibrated probability maps and a presence probability, which handle partially visible individuals better and reduce false positive predictions. Using out-of-image keypoints is necessary for more reliable modeling of the underlying distribution and robust evaluation.

### Improving 2D Human Pose Estimation in Rare Camera Views with Synthetic Data

Face and Gestures 2024

 Best Poster Award

RePoGen, a novel method for the generation of synthetic humans in unusual poses, is not focused on realism but the diversity of generated poses. Training on RePoGen data significantly improves accuracy for rare viewpoints without compromising performance on common views.

## EXPERIENCE

### Researcher

Visual Recognition Group, Czech Technical University in Prague

 February 2019 – Ongoing

 Prague, CZ

- Specialized in analyzing the human body, including Pose Estimation, 3D Shape, and UV Map estimation, along with detection and segmentation
- Co-supervised more junior colleagues in writing their first papers
- Managing the annotation process for our team of annotators
- Supervised by prof. Jiri Matas

### Research Assistant

Visual Cognitive Systems lab, University of Ljubljana

 October 2018 – March 2019

 Ljubljana, SLO

- Initial experience in computer vision research during my Erasmus stay
- Supervised by prof. Matej Kristan

### Head Coach + Assistant Coach

TJ Sokol Kralovske Vinohrady

 August 2017 – Ongoing

 Prague, CZ

- Leading a floorball team to the quarterfinals of the highest Czech league

### Software Developer

Porsche Engineering Services

 March 2020 – July 2022

 Prague, CZ

- We Developed Porsche's (then) most powerful supercharger
- Collaborated in a start-up-like team at CARIAD on out-of-distribution detection for autonomous driving

## IN ONE SENTENCE

*I enjoy connecting basic research with real-world applications.*

## MOST PROUD OF



### Found a way

to combine my two big passions: computer vision and sports



### SKV's Growth

from the second league to the top 8 teams in Czech



### Best Poster Award

for my communication and presentation skills

## RESEARCH FOCUS

Human 2D Pose, 3D Pose and Shape

Human Body

UV Map Estimation

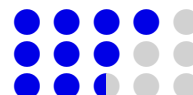
Person Detection and Segmentation

## LANGUAGES

Python

C

C++



## ACTIVITIES

### Invited Talks

CVWWs 24 and 25, SCCH Research Day

### Co-organized and Talked at

Ai4Sports 2024

### Outstanding Reviewer

CVPR 2025

### Summer Schools

ICVSS 2025, V3S 2022

## EDUCATION

### Ph.D. in Computer Science

Computer Vision, AI

Czech Technical University in Prague

 Feb 2023 – Ongoing

### M.S. in Computer Science

AI, Computer Vision, Cyber Security

Czech Technical University in Prague

 Oct 2020 – June 2022

Erasmus – University of Ljubljana, SI

# PROJECTS

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For more details and latest information, see my website – [MiraPurkrabek.github.io](https://MiraPurkrabek.github.io)

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## Set of Forensic Analytical Tools for Image and Video Processing for Criminal Police Service

The project, a collaborative effort with VUT (Brno University of Technology), involves creating a suite of advanced forensic tools for the Czech Republic Police, funded by the Ministry of Interior. These tools focus on the automatic processing of images and videos, specifically using human poses to enhance the efficiency and accuracy of criminal investigations.



## Modeling Infant Sensorimotor Development

The project led by Matej Hoffman focuses on the behavior of infants to gain a deeper understanding of human development. My contribution to this project involves the precise estimation of 2D poses of babies in videos, a crucial aspect that helps in analyzing and interpreting infant movements and interactions. This work is part of a larger effort to model human behavior, particularly in the early stages of life, providing valuable insights for various applications.



## Detection, Identification and Monitoring of Animals by Advanced Computer Vision Methods

The project led by Lukas Picek from University of West Bohemia focuses on the identification of wild animals (especially lynxes) in camera trap images. My contribution to this project involves the estimation of 2D poses of animals, which improves identification accuracy as each animal has a different texture on each side. The project is part of a larger effort to protect the environment using computer vision and AI.



## Advanced Video Analysis for Floorball Player Tracking

This project extends my long-standing interest in sports analysis, a journey that began with my bachelor thesis and evolved through my master's work. The aim is to harness video analysis to gain insight into player movements and team dynamics, enhancing coaching strategies and game understanding.



## PoseAnnotator

A lightweight, local alternative to CVAT and LabelStudio. Originally developed to create the RePoGen dataset, we have since used it for multiple datasets. This easy-to-use Python tool features a simple GUI for annotating 2D human poses in images. Ideal for researchers and developers, PoseAnnotator simplifies the data labeling process for human pose estimation projects. Our research group already used it not only for annotating pose but also for other structured keypoints like facial landmarks.

