EMILIA SZYMAŃSKA

Computer Vision Research Engineer

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ABOUT ME

Robotics engineer by education, currently working in AI & computer vision research. I'm passionate about innovation and applied machine learning, with a particular focus on real-world computer vision systems, while staying open to new challenges across different fields and technologies.

EDUCATION

ETH Zurich

Master in Robotics, Systems & Control

📅 09.2022 - 10.2024

- **Victory at Datathon 2023** in **Amazon Web Services Challenge**, organized by ETHZ Analytics Club
- Receiver of **Excellence Scholarship and Opportunity Program** 2022 - fully funded studies at ETHZ

Focus: computer vision, mixed reality, autonomous systems, robotics

Wroclaw University of Science and Technology

Bachelor in Robotics & Control Engineering

📅 10.2018 - 02.2022

- Faculty's **best Bachelor graduate** in 2021/2022 academic year
- Dean's Award for the **best BSc thesis** at the faculty in 2021/22
- Three-time **Dean's Award winner** in 2019/20, 2020/21 and 2021/22 years
- Three-time **Rector's scholarship** receiver in years 2019/20, 2020/21 and 2021/22
- **Santander Universidades Award** 2021 edition

Focus: embedded programming, control, robotics, artificial intelligence, algorithms

University of Zagreb

Exchange semester in Robotics

📅 10.2020 - 02.2021

Focus: control, neural networks

Languages: **Polish** (native), **English** (C2), **Spanish** (B1), **German** (B1), **French** (A1)

EXPERIENCE

Hilti AG

Computer Vision Research Engineer

📅 11.2024 - present

📍 Schaan, LI

- Successfully completed a **Python**-based project focused on IR and RGB **object detection** and **segmentation**, covering stakeholder management, implementation, data collection and partner collaboration
- Coordinating a cross-company R&D project on **object segmentation** and **tracking**, supervising a Master thesis student
- Co-organising the **Hilti x Trimble SLAM Challenge 2026**, a cross-company initiative in collaboration with the University of Oxford, delivering an academic competition for SLAM algorithm development and evaluation (live in February at hilti-trimble-challenge.com)

Microsoft MR & AI Lab

Master Thesis Student

📅 03.2024 - 09.2024

📍 Zurich, CH

- Created a benchmark for spatial Q&A systems evaluation composed of 1'000 questions and answers, proposed an **LLM**-based RAG solution for 3D reasoning
- Before the thesis, collaborated on a project with **Hololens 2** and **Spot** robot

Rheinmetall Air Defence

R&D Software Engineer Intern

📅 10.2023 - 02.2024

📍 Zurich, CH

- Developed a **Python** pipeline that performed multi-stage calibration of the mount system with the cameras
- Optimized the tests to shorten their execution from 2 hours to 15 minutes

Tethys Robotics

Semester Project Student

📅 03.2023 - 07.2023

📍 Zurich, CH

- Developed a **ROS**-based **C++** algorithm that performed the post-processing smoothing on underwater robot's coverage path
- Reduced the trajectory tracking cumulative error by 35%

Clone Inc.

Junior Robotics Researcher

📅 01.2022 - 06.2022

📍 Wroclaw, PL

- Designed and implemented the base of the hydraulic-muscles-operated robotic hand simulation in **MuJoCo** along with a **Python** API
- Managed the creation of a custom OS for the vision unit, implemented a **visual estimation** of human hand poses with RGBD camera with a visualization

EPFL CREATE Lab

Research Intern

📅 06.2021 - 09.2021

📍 Lausanne, CH

- Developed a robotic system carrying out food experiments autonomously - created a **ROS2**-based system with a **Python computer vision** pipeline, 3D designed hardware components, used **embedded C** to operate the AVR units
- Carried out experiments to compare different **optimization** methods finding the input parameters resulting in the optimal food properties

PUBLICATIONS

- **Robotic Optimization of Powdered Beverages Leveraging Computer Vision and Bayesian Optimization**, Frontiers in Robotics and Artificial Intelligence 2025
- **Space3D-Bench: Spatial 3D Question Answering Benchmark**, ECCV 2024 Workshop
- **Simulation Environment for Underwater Vehicles Testing and Training in Unity3D**, IAS17 inproceedings
- **From ROVs to AUVs - Optimization and Analysis of Underwater Vehicles Design**, MIPRO 2022 inproceedings
- **Optimized Laser Triangulator for Underwater Robot Vision**, MIPRO 2022 inproceedings
- **Mobile Robot Teleoperation via Android Mobile Device with UDP Communication**, MIPRO 2021 inproceedings