

EMILIA SZYMAŃSKA

Master of Science in Robotics, Systems and Control

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Skills: Python, C++, C, Git, Bash, SQL, Java (Android), HTML, CSS, LLM RAG (Llama Index, semantic kernel)

EDUCATION

ETH Zurich

Master in Robotics, Systems & Control

📅 09.2022 - 10.2024

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

Wroclaw University of Science and Technology

Bachelor in Robotics & Control Engineering

📅 10.2018 - 02.2022

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

University of Zagreb

Exchange semester in Robotics

📅 10.2020 - 02.2021

Focus: control, neural networks

ACHIEVEMENTS

- ✦ **Victory at Datathon 2023** in **Amazon Web Services Challenge**, organized by ETHZ Analytics Club
- ✦ **2nd best BSc thesis** at TRUMPF Huettinger national competition in Poland
- ✦ Receiver of **Excellence Scholarship and Opportunity Program 2022** - fully funded studies at ETHZ
- ✦ 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
- ✦ **2nd place** at the **national EBEC** engineering hackathon in Poland
- ✦ **Santander Universidades Award** 2021 edition

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

EXPERIENCE

Hilti AG

📅 11.2024 - present

Computer Vision Research Engineer

📍 Schaan, LI

- Investigating the improvements on Hilti's construction solutions with respect to computer vision and artificial intelligence

Microsoft MR & AI Lab

📅 03.2024 - 09.2024

Master Thesis Student

📍 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

📅 10.2023 - 02.2024

R&D Software Engineer Intern

📍 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

📅 03.2023 - 07.2023

Semester Project Student

📍 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.

📅 01.2022 - 06.2022

Junior Robotics Researcher

📍 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

📅 06.2021 - 09.2021

Research Intern

📍 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

- Szymańska, Hughes, **Robotic Optimization of Powdered Beverages Leveraging Computer Vision and Bayesian Optimization**, arXiv 2025
- Szymańska, Dusmanu, Buurlage, Rad, Pollefeys, **Space3D-Bench: Spatial 3D Question Answering Benchmark**, ECCV 2024 Workshop
- Szłęg, Barczyk, Maruszczak, Zieliński, Szymańska, **Simulation Environment for Underwater Vehicles Testing and Training in Unity3D**, IAS17 inproceedings
- Purzycki, Ilnicka, Komorowska, Papież, Szymańska, **From ROVs to AUVs - Optimization and Analysis of Underwater Vehicles Design**, MIPRO 2022 inproceedings
- Kacperowski, Szymańska, Purzycki, Skrok, Pietrzak, **Optimized Laser Triangulator for Underwater Robot Vision**, MIPRO 2022 inproceedings
- Szymańska, Petrović, Marković, Petrović, **Mobile Robot Teleoperation via Android Mobile Device with UDP Communication**, MIPRO 2021 inproceedings