

# NICOLAI HERMANN

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## EXPERIENCE

### The Perception, Display, and Fabrication Group, IDSIA USI-SUPSI

Sep. 2024 – Present

Research Assistant

Lugano, Switzerland

- Working with Prof. Piotr Didyk and Jorge Condor on 3D Gaussian Splatting. Our recent work is currently under review for ICCV, but a preprint is available [here](#).

### Neural Wave – AI Hackathon

Dez. 2023 – Okt. 2024

Lead Co-Organizer

Lugano, Switzerland

- Co-organized the first USI AI-focused hackathon with projects proposed by the companies. Official website: [here](#).
- The hackathon received 132 applications for participation of which 71 were selected, competing for a prize pool of 10'000 CHF that we raised through our sponsors.
- I technically advised a total of five company project proposals from Swisscom, Bosch, Duferco, PastaHR and Ai4Privacy.

### Aility GmbH

Jan. 2024 – May 2024

AI and Systems Engineer

Lugano, Switzerland

- Developed a scalable solution to deploy object-tracking models on custom hardware that was successfully integrated into a test facility.

### Queen's University

Jul. 2022 – Sep. 2022

Deep Learning Research Assistant

Kingston, Canada

- Applied deep learning methods to predict tick-borne pathogens for in situ detection achieving a Cohens Kappa of 0.91, and classifying phenological stages of herbarium records through transfer learning computer vision techniques due to sparse data availability.

### Social Brain in Action Lab, Macquarie University

Oct. 2021 – Dec. 2021

Remote Unity Developer

Sydney, Australia

- Developed a VR study paradigm with the robot Pepper in Unity. Further, I redesigned the code architecture to refactor the legacy codebase, separating intertwined experiments and enabling seamless expansion for new studies.

→ For a complete list of my experiences please refer to my [LinkedIn](#) profile.

## EDUCATION

### Università della Svizzera italiana (USI)

Sep. 2022 – Sep. 2024

Master of Science in Artificial Intelligence (ETCS: 125, CGPA: 9.66/10 - Honors: summa cum laude)

Lugano, Switzerland

- My master's thesis was on "Perceptually-Driven Neural Inpainting for Seamless 3D Reconstructions", where I worked on 3D Gaussian Splatting (3DGS), supervised by Prof. Piotr Didyk and Jorge Condor. (Grade 10/10).

### Eidgenössische Technische Hochschule (ETH)

Sep. 2023 – Feb. 2024

Exchange semester during my second year of my master's.

Zürich, Switzerland

- Focused on Computer Vision and Probabilistic AI, covering state-of-the-art deep learning architectures from the fields of semantic/instance/panoptic segmentation, depth estimation, 2D & 3D object detection and tracking, 3D reconstruction and localization, and got to implement a selection of them in two bigger projects finishing as the second best group with a grade of (5.84/6).

### University of Osnabrück (UOS)

Sep. 2019 – Aug. 2022

Bachelor of Science in Cognitive Science (ETCS: 217/180, 1.5 (German Grading System) - Honors: excellent (highest))

Osnabrück, Germany

- Recipient of two scholarships from the prestigious Deutscher Akademischer Austauschdienst (DAAD).
- Winner of the AI for Climate Change Hackathon at PIK FutureLabs: We trained a model to forecast forest fires around the globe.

## RELEVANT COURSEWORK

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|---|---|------------------------------------|
| • CV & AI for Autonomous Cars (ETH)     | • Probabilistic AI (ETH)                | • [Bio]Neuroinformatics (USI, UOS) |
| • Deep Learning Lab (USI, UOS)          | • Deep Reinforcement Learning (UOS)     | • Machine Learning (USI, UOS)      |
| • Adv. Experiment Design in Unity (UOS) | • CV and Pattern Recognition (ETH, USI) | • Applied Neuroscience (UOS)       |

## TECHNICAL SKILLS

**Programming Languages:** Python, C, C++, C#, Java, R, Matlab, Prolog.

**Web:** HTML, CSS, JavaScript, TypeScript.

**Frameworks/Others:** PyTorch, TensorFlow, SLURM, Weights and Biases, Pandas, OpenCV, NumPy, Sci-kit learn, Unity, Git, GitHub.

## PUBLICATIONS & PROJECTS

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### **Puzzle Similarity: A Perceptually-guided No-Reference Metric for Artifact Detection in 3D Scene Reconstructions**

Nov. 2024

- *Authors: Nicolai Hermann, Jorge Condor, Piotr Didyk*

### **Robotics: Markov and Monte Carlo Localization**

May 2023 – Jul. 2023

- Implementation of Markov and Monte Carlo Localization enabling a robot to localize itself in an known environment.
- The framework can deal with uncertainties in the movement model and noise in sensor readings. We further implemented Mote Carlo Localization for more complex environments where discrete state spaces are insufficient.

### **Score Scan OCR**

Dez. 2022 – Present

- Implementation of an OCR application to automatically parse relevant metadata from semi-structured, scanned music scores.
- This application is used by the state orchestra of Badenwürttemberg (Germany) to accelerate the digitalization of musical score archives.

### **Bioinformatics Project | BLAST, NCBI, UniProt, PDB, ExPASy**

Dec. 2022 – Jan. 2023

- Gained hands-on experience with key concepts in bioinformatics, where the task was to find a receptor given a gene sequence containing more proteins from the laboratory.
- Created the model of a specific receptor (MAS1, proto-oncogene mas). Started with a template search using the PSI-BLAST algorithm and then created the model.
- Performed an extensive prior validation comparison has been made with **PSIPRED 4.0**, **DISOPRED3**, **MEMSAT-SVM**, **MEMPACK** and Ramachandran plots. Performed a QMEAN analysis with SWISS-MODEL.

### **Pokégans: The next Pokémon generation by GenAI**

Mar. 2021 – Apr. 2021

- Scraped the web for Pokémon images to gather a dataset to train various Generative Adversarial Networks (GAN).
- Implementation of various GenAI algorithms like DCGAN, Wasserstein GAN–GP, and Autoencoder GAN to generate a variety of new Pokémon including an evolution animation by interpolating the latent spaces of two Pokémon.

## EXTRACURRICULAR / OTHER

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**Languages:** English (Professional), German (Native), Italian (Beginner).

**Hobbies:** I have been playing drums and percussion since I was 5 years old, currently playing in the Landesblasorchester Baden-Württemberg who was recently Europe's ambassador at the WASBE conference in South Korea. Furthermore, I like to hike in the mountains.