

MARCO DE NEGRI

22-05-2003, Zürich, Switzerland.

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PROJECTS & EXPERIENCES

Learning & Adaptive Systems Group (Prof. Andreas Krause, Scott Sussex) **Zürich, Switzerland**
Generative Antibody Design with Protein Language Models Spring 2026 – present

- Turning ESM2, a masked protein language model, into a generative model for antibody design, fine-tuning on yeast-display binding data via Direct Preference Optimization (DPO) to generate higher-affinity CDR-H3 variants of the C05 broadly neutralizing anti-flu antibody.
- Showed that evotuning (unsupervised fine-tuning on antibody sequence databases) gives a better starting point for DPO than the vanilla model, especially in the low-data regime, reaching a Spearman correlation of 0.65 between model scores and experimental binding on held-out test sets.
- Generated novel antibody variants via both Gibbs sampling and beam search decoding; all training and inference run on the ETH Euler HPC cluster.

ETH AI Center (Apertus group) **Zürich, Switzerland**
Training and Visualising Degeneration Apertus Probes Spring 2026 – present

- Built a token-level degeneration probe on LoRA-adapted Apertus-8B-Instruct hidden states, trained on 83K labelled completions via a sliding-window repetition score, reaching 0.92 F1 (99.9% recall) at flagging degenerating tokens before generation visibly collapses; project carried out in collaboration with Anna Hedström, Valentina Pyatkin, and Eduard Durech (ETH AI Center / IVIA Lab).
- Found via PCA that LoRA adaptation makes degenerate and healthy tokens more linearly separable, and used the probe to steer generations toward safe regions and trigger early stopping during training, cutting wasted RL/SFT compute; built an interactive dashboard for diagnostics, with training and inference run on the Alps supercomputer (CSCS).

Computer Vision and Geometry Lab, ETH Zürich (Daniel Barath) **Zürich, Switzerland**
Goal-driven 3D Map Generation with Reinforcement Learning Spring 2026

- Trained an RL agent using PPO to dynamically allocate resolution in a 3D map, learning to keep high detail in regions relevant to the task at hand while compressing the rest, under a tight memory budget.
- Built a Python library for 3D maps with online adaptive resolution (incremental delta-buffer updates, raycasting-based false-obstacle pruning) and integrated it with the PEANUT navigation agent in the AI Habitat simulator, cutting memory usage by 88.6% in test episodes while maintaining task success.

EDUCATION

ETH Zürich **Zürich, Switzerland**
Master of Science in Computer Science September 2025 - present
Major in Machine Intelligence **GPA: 5.63/6.0**

Politecnico di Milano **Milan, Italy**
Bachelor's in Engineering of Computer Systems September 2022 - July 2025
Final Grade: 110/110 with honors

- **Honors:** “Best Freshmen Youth Fund” issued by Politecnico di Milano.
- Tuition tax exemption for 2 years (merit-based).

Universidad de Málaga **Malaga, Spain**
Erasmus+ September 2024 - February 2025

University of California, Santa Barbara (UCSB) **Santa Barbara, California**
Summer Session in Communication August 2023

SKILLS

- **Programming Languages:** Python, Java, C/C++, JavaScript/TypeScript, SQL, LaTeX
- **ML & Data:** PyTorch, HuggingFace Transformers, NumPy, pandas, scikit-learn, Matplotlib, W&B
- **Tools & Infrastructure:** Git, Linux, SLURM (Euler HPC), Docker, React, Next.js

LANGUAGES

- Italian - Native
- English - C1 (IELTS, Band 7 - July 2024)