

## PROFILE

MSc student working on self-supervised learning and neural decoding, with a strong interest in applying deep learning to understand brain signals. Multilingual (German, Spanish, English) from growing up in Latin America. Outside research I play tennis, spend time outdoors, and build practical, well-designed software.

## Education

### ETH Zurich

*PhD Student, D-ITET*

*2026 – present*

Zurich, Switzerland

### ETH Zurich & UZH

*MSc. Neural Systems and Computation*

— *Thesis: Scaling Self-Supervised Learning for Clinical EEG*

*2024 – 2026*

Zurich, Switzerland

### Osnabrück University

*BSc. Cognitive Science*

— *Thesis: Compressing EEG Data with Neural Networks*

*2019 – 2023*

Osnabrück, Germany

## Experience

### EPFL — Prof. Courtine Lab (.NeuroRestore / ONWARD)

*Research Intern*

*Jun 2023 – Oct 2023*

Lausanne, Switzerland

Worked on using self-supervised learning with Electrocorticography (ECoG) data from brain implants to improve neural decoding and walking in patients with spinal cord injury.

### Charité Berlin — Computational Neurology

*Research Intern*

*Nov 2023 – Jan 2024*

Berlin, Germany

Worked on using self-supervised learning for patient monitoring, optimizing representations for clinical triage and seizure-pattern detection.

## Publications & Preprints

**M. Kalcher**, T. Dubcek. *A Scaling Law for Bandwidth Under Quantization*. arXiv:2602.23252, 2026. [paper]

**M. Kalcher**. *Frequency-Ordered Tokenization for Better Text Compression*. arXiv:2602.22958, 2026. [paper]

## Interests

- Neurotechnology and neurorehabilitation
- Clinical neuroscience and discovery
- Self-supervised / representation learning
- Compression

## Service & Awards

Compute Grant recipient from the *Swiss National Supercomputing Centre (CSCS)*, 2026.

Reviewer for *Biomedical Signal Processing and Control* (Elsevier), 2024.

Google (Keras) Community Prize Winner, December 2022.