Etienne Mueller

(address hidden in web version)
etiennemueller.com | contact@etiennemueller.com | github.com/EtienneMueller | (hidden)

Professional Experience

Postdoctoral Researcher (*University of Melbourne, Australia*) **2023 – present**
- Developing a neural network growth algorithm to create biologically-inspired memory cells for more efficient recurrent neural networks, using ML for simulations of brain imaging data across different developmental stages using JAX
- Running deep convolutional neural networks on a Slurm-based HPCwith up to 4xH100 GPUs per node for automated segmentation of synchrotron brain imaging data, reducing the need for manual annotation by a factor of 10

AI Engineer (*Flowers Software, Germany*) **2022 – 2023**
- Established the AI research department at a seed-financed startup, deploying deep learning infrastructure from scratch
- Developed a TensorFlow-based information extraction workflow on AWS to identify recurring positions on invoices that complies with EU data privacy law, saving the company over €5,000/month by eliminating third-party API costs

AI Researcher (*Infineon Technologies, Germany*) **2018 – 202**
- Research in neuromorphic computing and spiking neural networks, leading to 11 first- and second-author publications
- Developed a TensorFlow-based toolbox for converting conventional to spiking neural networks, which was subsequently used in a research project to reduce the simulation time of hardware components in neuromorphic systems by half

Co-founder & CEO (*Slive, Germany*) **2015 – 2016**
- Developed smart wearable devices and location-based algorithms for hands-free data use in industrial environment
- Secured the Nissen Foundation Start-Up Grant (€3,000) to support early-stage product development and business growth

Education

Ph.D. in Computer Science (*Technical University of Munich, Germany*) **2023**
M.Sc. in Product Development (*Technical University of Hamburg, Germany*) **2017**
Semester Abroad (*Institut Catholique d'Arts et Métiers Nantes, France*) **2016**
B.Sc. in Mechanical Engineering (*Technical University of Hamburg, Germany*) **2014**

Skills

Programming Python, TensorFlow, JAX, MATLAB, Bash, Java, C++, SQL
Languages German (native), French (native), English (fluent), Spanish (basic), Chinese (basic)

Open Source Projects

High-Performance Zebrafish (HPZ)
- A Python and bash toolkit designed to automate recurring brain imaging data tasks on a Slurm-based HPC setup
- End-to-end pipeline that consolidates multiple manual steps for loading, preprocessing, and detecting neurons and spikes in microscopy data into a single automated process, reducing manual intervention and error by a factor of five
- Automated setup for new users to easily work with zebrafish brain imaging data, improving onboarding efficiency

Convert2SNN
- A TensorFlow-based library that converts conventionally trained neural networks with continuous activation functions to spiking neural networks, with minimal to no performance loss, to estimate energy consumption in neuromorphic systems
- Supports key spike encoding techniques, including rate, population, and temporal coding, with the ability to estimate spike counts for efficiency evaluation, reducing the need for extensive hardware simulations during development

Selected Publications

E. Mueller, W. Qin, "Reverse Engineering Neural Connectivity: Mapping Neural Activity Data to Artificial Neural Networks for Synaptic Strength Analysis," in *8th International Conference on Information Technology (InCIT),* Chonburi, Thailand and Kanazawa, Japan, 2024, (accepted).

E. Mueller, S. Klimaschka, D. Auge, A. Knoll, "Neural Oscillations for Energy-Efficient Hardware Implementation of Sparsely Activated Deep Spiking Neural Networks," in *Association for the Advancement of Artificial Intelligence (AAAI) Practical DL,* Online (Vancouver, Canada), 2022, pp. 1-7.

E. Mueller, V. Studenyak, D. Auge, A. Knoll, "Spiking Transformer Networks: A Rate Coded Approach for Processing Sequential Data," in *7th Int. Conference on Systems and Informatics (ICSAI),* Online (Jiaxing, China), 2021, pp. 1-5.

See Google Scholar profile for a full list.