Etienne Mueller

(address hidden in web version)

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PROFESSIONAL EXPERIENCE

Postdoctoral Researcher AI & Computational Neuroscience — since 2023
University of Melbourne, Australia

– 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 — 2022 − 2023
Flowers Software GmbH

– 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

Technical Advisor — 2021 − 2022
Technical University of Munich

– Led the technical coordination of a pilot case for an EU-funded (Horizon 2020) project (SHOP4CF)
– Creation of modular tools for autonomous factories for Industry 4.0

AI Researcher — 2018 − 2022
Infineon Technologies AG

– 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

Formula Student Member @ e-gnition Hamburg e.V. — 2012 − 2017
Developer Driverless Actuator Technology (2016 − 2017)

– 1st Place Formula Student Driverless: Autonomous Design
– 3rd Place Formula Student Driverless: Overall

Division Manager Business Plan (2014 − 2016)

– Special Award for educational video "How to Business Plan" at Formula Student Hungary

President & Team Captain (2013 − 2014)

– Special Award for Ecological Design by Magna Steyr

Division Manager Aerodynamics (2012 − 2013)

Co-founder & CEO — 2015 − 2016
Slive

– 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 — 2023
Technical University of Munich, Germany

M.Sc. in Product Development and Production — 2017
Technical University of Hamburg, Germany

Semester Abroad — 2016
Institut Catholique d'Arts et Métiers Nantes, France

B.Sc. in Mechanical Engineering — 2014
Technical University of Hamburg, Germany

Skills

Programming	Python, TensorFlow, JAX, MATLAB, Bash, Java, C++, SQL
Languages	German (native), French (native), English (fluent), Spanish (basic), Chinese (basic)
Interests	Music (Piano, Ukulele), Fitness, Health

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

Razer Blade for Data Science ⌂

– Collection of instructions, settings, and bash scripts for setting up Nvidia-based gaming notebooks to work with Linux and CUDA

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.

E. Mueller, J. Hansjakob, D. Auge, A. Knoll, "Minimizing Inference Time: Optimization Methods for Converted Deep Spiking Neural Networks," in *International Joint Conference on Neural Networks (IJCNN),* Online (Shenzen, China), 2021, pp. 1-8.

D. Auge, J. Hille, **E. Mueller**, A. Knoll, "A Survey of Encoding Techniques for Signal Processing in Spiking Neural Networks," *Neural Processing Letters,* vol. 53, issue 6, pp. 4693-4710, Dec 2021.

See Google Scholar profile for a full list.