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# SIMON NARDUZZI in 🔷

# Researcher in Neuromorphic Computing and Edge Al

#### ABOUT ME

4<sup>th</sup> year Ph.D. student from industry, studying the underlying principles of biological neural networks, to create low-power technologies and applications. Curious, persevering and creative, I like to explore new ways of computing by taking inspiration from other fields in science. I am looking for a research position in the field of embedded (edge) and efficient signal processing.

#### SKILLS

- **Deep learning**: Tensorflow, Keras, PyTorch, TFLite, Nengo
- Spiking neural networks: Sinabs, Rockpool, Tonic, Brian2, NEURON
- Hardware: Dynap-CNN, Speck, STM32, Kendryte K210, Coral EdgeTPU
- Programming languages: Python, MicroPython, C, C#, React Native
- Other: Google Cloud Platform, Unity3D

# LANGUAGES

French | Mother tongue Italian | Mother tongue English | Advanced, C1 German | Intermediate, B1

### ACADEMIC SERVICE

Reviewer | 2022 - Today

- IEEE JETCAS, SDS
- Non-IEEE Rivers Publishers

**TPC** | 2023 - Today

 Technical program committee member for the 3<sup>rd</sup> Benchmarking Workshop for Edge AI (Part of HiPEAC 2023)

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#### TinyML Foundation | 2022 - Today

Co-founder and co-organizer of the Swiss branch of the TinyML Foundation.

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- Neuroscience, biology, sustainability, lowpower computing, new computing paradigms
- Electronic music, cooking, hackathons, diving

# **EDUCATION**

# **Ph.D. in Information Technology and Electrical Engineering** Sep 2020 - Sep 2024 ETH Zürich — Zürich, Switzerland

Thesis supervisors: Prof. Shih-Chii Liu, Dr. Andrea Dunbar, Prof. Friedemann Zenke. External thesis at CSEM Neuchâtel.

#### Master of Science in Computer Science

Sep 2016 - Aug 2019

Ecole Polytechnique Fédérale de Lausanne (EPFL) - Lausanne, Switzerland

Minor in Computational Neurosciences, GPA 5.17/6.

# **Bachelor of Science in Computer Science**

2012 - 2016

Ecole Polytechnique Fédérale de Lausanne (EPFL) — Lausanne, Switzerland

#### EXPERIENCE

#### Ph.D. Student

Sep 2020 - Present

#### CSEM - Neuchâtel, Switzerland

As a Ph.D. student in the Edge Al and Vision lab, I receive co-supervision from both Prof. Shih-Chii Liu and Dr. Andrea Dunbar. My research focuses on deep-learning algorithms and spiking neural networks (SNN), with a strong experimental emphasis on deploying these models across various neuromorphic devices and accelerators. In addition, I am currently a visiting student at the Zenke Lab at the FMI in Basel, where I am gaining valuable insights into the latest developments in the field of computational

#### Research Internship

Dec 2019 - May 2020

NECOTIS Lab, University of Sherbrooke - Sherbrooke, Canada

Graduate research on recurrent models (GRU and SNN) to classify EEG data recorded when subjects were listening to audio samples.

#### Deep Learning Intern

Feb 2019 - Oct 2019

CSEM - Neuchâtel, Switzerland

- Master thesis: Efficient deep learning algorithms for face detection on low-power mobile platforms.
- Graduate research on optical neural networks, leading to a CVPR publication.

### **Deep Learning Intern**

Jul 2017 - Feb 2018

Logitech - Lausanne, Switzerland

# RELEVANT PUBLICATIONS

# Efficient neural vision system based on convolutional image acquisition

P. Pad, S. Narduzzi, C. Kundig, E. Turetken, S.A. Bigdeli, L.A. Dunbar – CVPR 2020

# $\label{lem:consumption} \textbf{Optimizing the consumption of spiking neural networks with activity regularization}$

S. Narduzzi, S.A. Bigdeli, S.C. Liu, L.A. Dunbar – ICASSP 2022

#### Benchmarking neuromorphic computing for inference

S. Narduzzi, L.Mateu, P. Jokic, E. Azarkhish, L.A. Dunbar – Rivers Publishers 2022

#### RELEVANT PROJECTS

#### ANDANTE (EU Project) | CSEM - Neuchâtel, Switzerland

2020 - Present

Tools development and use-case implementation of event-based algorithms.

#### TNE Lab | Campus Biotech Geneva - Geneva, Switzerland

2018

Single-compartment model of ultrasound neurostimulation using NEURON.