Ulysse Rançon, PhD student

Academic Research CV

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Scholar: profile
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"All models are wrong, some are useful."
George Box (1976)

Keywords

Computational neuroscience, neuromorphic computing, AI, spiking neural networks, computer audition, computer vision, electrophysiology

Experience

Research:

`2022–now` **PhD in NeuroAI**, *CERCO - CNRS UMR 5549*, France.
Modeling of single-unit activity in sensory cortex with deep learning models.
Supervisors: Dr. Benoit Cottereau (DR CNRS) & Dr. Timothée Masquelier (DR CNRS)

`2021–2022` **PhD in Electronics**, *IMS - CNRS UMR 5218*, France. (Quit)
FPGA implementation of spiking neural networks for real-time spike sorting of micro-electrode array data
Supervisor: Pr. Timothée Lévi

`2021` **Academic Research Intern**, *CERCO CNRS UMR 5549*, Toulouse, France.
Binocular depth regression from event cameras and spiking neural networks.

`2020` **R&D Intern**, *Atos - Bull*, Grenoble, France.
Visual object detection and re-identification from surveillance cameras and deep learning.

`2019–2020` **Academic Research Student**, *Kohno Lab*, Institute of Industrial Studies (IIS), University of Tokyo, Japan.
Basic computational neuroscience and in-depth discovery of academic research.

Teaching:

`2024` **Introduction to Spiking Neural Networks**, *Univ. Paul Sabatier, Toulouse 3*, France.
Introductory course on low-level modeling of the brain with SNNs. Level: M2

`2021` **Managing an Arduino Project**, *IUT GEII, Univ. Bordeaux*, France. Teaching 1st year students programming in Arduino, and guiding them on a personal hands-on project of their choice. Level: L1

Education

`2022–now` **PhD in NeuroAI**, *Univ. Paul Sabatier, Toulouse 3*, France.

`2021–2022` **PhD in Electronics**, *Univ. Bordeaux*, France. (Quit)

`2016–2021` **French Engineering Degree in Electrical Engineering**, *INSA Lyon*, France.

`2015–2016` **French Baccalaureate**, *Lycée St Genès Bordeaux*, France. Advanced mathematics, highest honors.

Miscellaneous

Languages:

- French (Native)
- English (Professional)
- German, Spanish, Japanese (Conversational)

Referee for:

- Nature Communications
- Neurocomputing
- IEEE Trans. on Neur. Net. and Learning Sys.

Open Research and Educational Resources

2024 **deepSTRF** | urancon/deepSTRF
A Pytorch library for fitting deep neural network models of single and multi-unit sensory neuron recordings with preprocessed datasets and model zoo
Role: Main developer

Conference Talks

2024 **A SNN with plastic delays could provide a mechanistic understanding of V1 responses to dynamic stimuli**. Queant, A; Goodman, D; Rançon, U; Masquelier, T; Cottereau, BR. Spiking Neural networks as Universal Function Approximators (SNUFA 2024). Online.

Recurrent neural networks outperform canonical computational models at fitting auditory brain responses. Rançon, U; Masquelier, T; Cottereau, BR. 33rd Annual Computational Neuroscience Meeting (CNS 2024). Natal, Brazil.

2021 **StereoSpike: Depth Learning with a Spiking Neural Network**.
Rançon, U; Cottereau, BR; Masquelier, T. Spiking Neural networks as Universal Function Approximators (SNUFA 2021). Online.

Publications

2025 **Dreaming up scale invariance via inverse renormalization group**.
Rançon, A; Rançon, U; Ivek, T; Balog, I. *arXiv preprint*. doi:10.48550/arXiv.2506.04016
Open science: adam-rancon/upscaling_Ising

Temporal recurrence as a general mechanism to explain neural responses in the auditory system.
Rançon, U; Masquelier, T; Cottereau, BR. *bioRxiv preprint*. doi:10.1101/2025.01.08.631909
Open science: urancon/deepSTRF

2024 **A general model unifying the adaptive, transient and sustained properties of ON and OFF auditory neural responses**.
Rançon, U; Masquelier, T; Cottereau, BR. *PLoS Computational Biology*. doi:10.1371/journal.pcbi.1012288
Open science: urancon/deepSTRF

2023 **FPGA implementation of a Spiking Neural Network for Real-Time Action Potential and Burst Detection**.
Cheslet, J; Beaubois, R; Rançon, U; Bailly, L; Bernert, M; Kohno, K; Yvert, B; Lévi, T. IEEE Biomedical Circuits and Systems Conference (BioCAS). doi:10.1109/BioCAS58349.2023.10388622

Optical flow estimation from event-based cameras and spiking neural networks.
Cuadrado-Anibarro, J; Rançon, U; Barranco, F; Cottereau, BR; Masquelier, T. Frontiers in Neuroscience. doi:10.3389/fnins.2023.1160034
Open science: J-Cuadrado/OF_EV_SNN

2022 **StereoSpike: Depth Learning With a Spiking Neural Network**.
Rançon, U; Cottereau, BR; Masquelier, T. *IEEE Access*. doi:10.1109/ACCESS.2022.3226484
Open science: urancon/StereoSpike