Guillaume Bellec
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born in 1990
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Deep Learning and Computational Neuroscience

Career :

2020 - now	**Postdoc** researcher in the Laboratory of Computational Neuroscience at **EPFL** in Switzerland, with **Wulfram Gerstner** - theory of unsupervised learning in the brain.
2019 - now	Creating and launching **Chord AI**, a mobile application developed with Vivien Seguy another Postdoc level researcher. - deep learning on mobile devices for musical chord recognition (more than 100,000 active users in January 2021)
2015 - 2019	**PhD** in Theoretical Computer Science at **TU Graz** in Austria with **Wolfgang Maass**: - Deep learning with recurrent networks, - models of synaptic plasticity and short-term memory in spiking neural networks and - teaching machine learning and reinforcement learning.
2014	Master thesis in computational neuroscience with **R. Brette** and **P. Yger** at the Vision institute, Paris
2012-2013	One year research internship in sound and music computing with **Anders Friberg** at KTH, Stockholm
2012	Research internship in machine learning with **Tillmann Weyde** at the City University, London

Teaching :

2020 - now	**Supervision** of master and PhD students as part of my postdoc training, at EPFL
2016 - 2019	**Lectures** Introduction to Machine Learning (third year of Bachelor), at TU Graz
2019	**Practical classes** of advanced machine learning (master level) with Thomas Pock at TU Graz
2016	**Practical classes** of reinforcement learning (master level) with Wolfgang Maass at TU Graz

Education :

2013-2014	Master of **Mathematics, Vision and Learning** (MVA) at **ENS Paris-Saclay**, Paris
2010-2014	Master of **Optimization and Operational Research** at **ENSTA ParisTech**, Paris
2012-2013	Erasmus program at **KTH** in audio techonology, Stockholm
2008-2010	Classes préparatoires aux grandes écoles, Paris

Funding received, scientific achievements and skills :

Intel Research Grant received to perform research on neuromorphic hardware and spiking neurons at EPFL (54,500 euros)

Reviewer at NeurIPS (2019 - 2020), ICLR (2020) and ICML (2021)
Reviewer at the IEEE signal processing magazine (2019)
Committee member at the 3rd Human Brain Project student conference on interdisciplinary brain research

Summer school DS3 (data science and machine learning) at **Polytechnique** (2019)
Summer school on Brains, Minds and Machines at the MBL lab in Woods hole, organized by the **MIT**
Summer school at the **Princeton Neuroscience Institute** about Cellular, Comp. and Cogn. Neuroscience

Expert knowledge of **TensorFlow and PyTorch**
Programming of deep and biological neural networks models on **GPU and neuromorphic hardware**
Experience in the analysis of neural data (calcium imaging, electro-physiology)

First author publications :

Nature Communications 2020	*Bellec*, Scherr*, Subramoney, Hajek, Salaj, Legenstein and Maass.* A solution to the learning dilemma for recurrent networks of spiking neurons
NeurIPS 2019 (workshop)	*Bellec*, Scherr*, Hajek, Salaj, Subramoney, Legenstein and Maass.* Eligibility traces provide a data-inspired alternative to backpropagation through time
NeurIPS 2019 (workshop)	*Subramoney*, Bellec*, Scherr*, Hajek, Salaj, Legenstein and Maass.* Slow processes of neurons enable a biologically plausible approximation to policy gradient

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arxiv 2019	*Bellec*, Scherr*, Hajek, Salaj, Legenstein and Maass.* Biologically inspired alternatives to backpropagation through time for learning in recurrent neural nets
NeurIPS 2018	*Bellec*, Salaj*, Subramoney*, Legenstein and Maass.* Long short-term memory and learning-to-learn in networks of spiking neurons
ICLR 2018	*Bellec, Kappel, Maass and Legenstein.* Deep Rewiring: Training very sparse deep networks
Frontiers 2018	*Liu*, Bellec* … Furber, Maass, Legenstein and Mayr.* Memory-Efficient Deep Learning on a SpiNNaker 2 Prototype
JCNS 2016	*Bellec, Galtier, Brette and Yger.* (Journal of Computational Neuroscience) Slow Feature Analysis with spiking neurons and its application to audio stimuli
SMC 2013	*Bellec, Friberg, Elowsson, Wolff, Weyde.* (International Sound & Music Computing Conference) A social network integrated game experiment to relate tapping to speed perception and explore rhythm reproduction

Other selected publications :

IJCNN 2017	*Schmitt, Bellec, … Legenstein, Maass, Mayr, Schueffny, Schemmel, Meier.* (International Joint Conference on Neural Networks) Neuromorphic hardware in the loop: Training a deep spiking network on the brainscales wafer-scale system
ISCAS 2017	*Petrovici, Bellec, … Maass, Schueffny, Mayr, Schemmel, Meier.* (International Symposium on Circuits and Systems) Pattern representation and recognition with accelerated analog neuromorphic systems
AES 2013	*Wolff, Bellec, Friberg, MacFarlane, Weyde.* (International Conference of the Audio Engineering Society) Creating Audio Based Experiments as Social Web Games with the CASimIR Framework

Invited talks :

March 2021	CNRS Thales, virtual seminar
February 2021	MILA in Montreal, virtual seminar (recording at `https://bluejeans.com/playback/s/NKmqqNEpDr23VxhFUs8iKkaghWtrITTs1JVdtrOGedbNhN4U428xbzmWwkmRx8yA`)
January 2020	European Institute for Theoretical Neuroscience in Paris (workshop on synaptic plasticity)
September 2019	Berstein conference in Berlin (workshop entitled Brain against the machine)
September 2019	ENS Paris and INRIA
June 2019	Blue brain project, Geneva
April 2019	Laboratoire des sciences cognitives, Paris
April 2019	Fabebook AI, Paris

Contributed talks :

February 2021	INTEL INRC virtual workshop on Neuromorphic computing
December 2019	NeurIPS conference 2019, Vancouver: workshop on "Future directions at the intersection of neuroscience and AI"
September 2019	Berstein conference in Berlin, conference main track
July 2013	Sound and Music Computing conference in Stockholm