

# LUCA HERR-TTI

HERRANZ CELOTTI

## PhD student

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📍 Montreal, Qc

## EXPERIENCE

### PhD student in Machine Learning

#### Multi-sensory Dialogue

📅 April 2016 – expected September 2021    📍 Université de Sherbrooke, Canada

- Supervisor: Jean Rouat
- Subject: incremental and multimodal vocabulary acquisition for a simulated agent dialogue interaction with a human
- Funds from European CHIST-ERA, project **IGLU**
- Courses on "Advanced Signal Processing" and "Reinforcement Learning" taken, and on "Bio-inspired AI" given
- Assistant in the development of a MOOC on spiking networks for the course "GEI792 - bio-inspired AI": pseudo-gradients episode finished and working on a reservoir computing episode
- Talks given in international conferences, papers published, major training events attended
- **Helping Bachelor students** with a target detection network for drones, based on UNet and ResNet for the AUVSI competition in July 2020, tutoring on AI and reviewer for ViGIL NeurIPS Workshop in 2019 and 2021
- 1 learning trading bot and 1 start up cofounded with friends, registered in Quebec
- Written funds application to FRQNT (International internship program)
- Stay in Austria, Graz, at Wolfgang Maass lab to improve the performance of spiking networks and the power efficiency of deep learning
- Lead organizer for the NeurIPS Workshop **DLDE**

### Internship in Computational Neuroscience

#### Uncertainty Propagation in Population Coding

📅 October 2014 – October 2015    📍 Université de Genève, Switzerland

- Supervisor: Alexandre Pouget
- How the probabilistic population coding hypothesis can explain the way the brain deals with uncertainty, by means of Bayesian inference, dynamic programming, drift diffusion models and information theory tools, such as Fisher information and differential correlations
- Lectures taken on "Introduction to cognitive and affective neuroscience" and "Biological modelling of neural networks" with Wulfram Gerstner

### Master in Biophysics

#### Information Transfer between Neurons

📅 October 2012 – October 2013    📍 Universidad Autónoma de Madrid, Spain

- Supervisor: Nestor Parga
- final grade: 2nd best among 14 students, 87,8
- Grant "Ayudas para Inicio de Estudios en Programas de Posgrado de la UAM": the whole Master, a yearlong language course and a monthly wage
- Master Thesis on an Information Theory analysis of neural signals: "Information transfer during a perceptual decision task"

### Erasmus Scholarship

#### Directed Networks for Citation Graphs

📅 October 2011 – October 2012    📍 Imperial College of London, United Kingdom

- Yearlong Project on Graphs: "A dimensional analysis on directed networks for citation graphs"
- Course on "Biophysics of neurons" taken

### Undergraduate in Physics

#### Theoretical Physics

📅 October 2007 – October 2012    📍 Universidad Autónoma de Madrid, Spain

- Final grade: 9th best among 64 students, 81,7%
- Maths (Topology, Differential Geometry, Group Theory, Graphs) and Psychology lectures

## STRENGTHS

Linux  
Latex  
GitHub



Python/Matlab  
Reinforcement Learning  
Deep Learning  
Spiking Networks  
TensorFlow/Pytorch  
EEG/MNE  
programming drones



## LANGUAGES

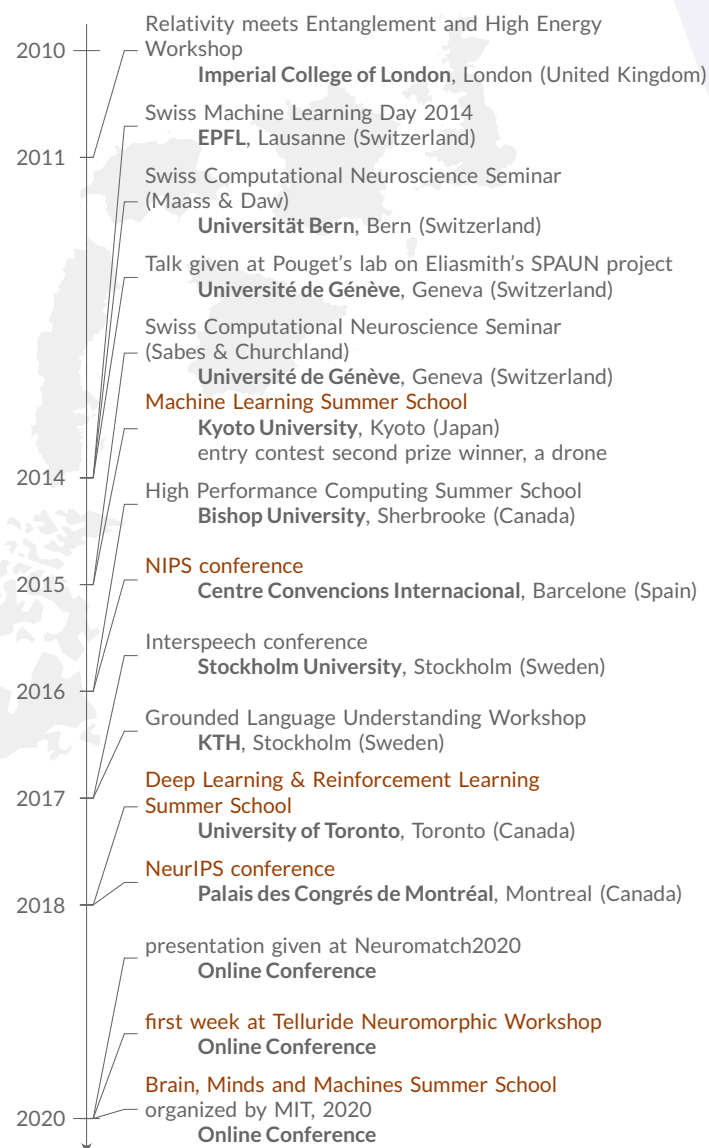
English  
Italian  
Spanish  
French  
German  
Chinese/Arabic/Persian



## PUBLICATIONS

- Hosseini, M., Celotti, L., and Plourde, E. (2021a). "Speaker-independent Brain Enhanced Speech denoising". In: ICASSP.
- – (2021b). "Speaker-Independent Speech Enhancement with Brain Signals". In: submitted to IEEE.
- Brodeur, S., Perez, E., Anand, A., Golemo, F., Celotti, L., Strub, F., Rouat, J., Larochelle, H., and Courville, A. (2018). "HoME: a Household Multimodal Environment". In: ICLR Workshop Paper.
- Celotti, L., Brodeur, S., and Rouat, J. (2018). "Language Coverage and Generalization in RNN-based Continuous Sentence Embeddings for Interacting Agents". In: Visually Grounded Interaction and Language (ViGIL) 2018, NeurIPS Workshop.
- Brodeur, Simon, Celotti, L., and Rouat, Jean (2017). "Proposal of a Generative Model of Event-based Representations for Grounded Language Understanding". In: Proc. GLU 2017 International Workshop on Grounding Language Understanding, pp. 68–72.

## WORKSHOPS & SEMINARS



## SKILLS

- Strong analytical and problem solving skills.
- **Physics background** means ordinary and stochastic differential equations, graphs, probabilities, signal processing, thermodynamics, electronics, general modelling and programming among others.
- **Deep and spiking** neural networks knowledge on subjects such as population coding, nonlinear dynamics and learning algorithms. Practical knowledge on feedforward and recurrent networks, GANs, Transformer based architectures, attractor dynamics, LSNN and techniques such as backpropagation, spike-time-dependent plasticity, holographic reduced representations, and pseudo gradients through non-differentiable layers.
- **Statistics knowledge** on subjects such as parametric and non-parametric Bayesian inference, Markov Decision Processes (MDP), and techniques such as expectation propagation.
- **Machine Learning** knowledge on convex optimization, Deep Neural Networks, Reinforcement Learning and techniques such as Random Forest Classifiers and Gradient Boosting Regressors.
- **Interpersonal skills** in different contexts such as Master students' delegate, team work, engaging people in presentations, interpreting doubts to boost learning as a teacher and moving things forward to make throughout 1 year to make the DLDE NeurIPS workshop happen.

## OTHERS

- Passionate reader.
- Playing football (soccer), even if now I do it seldom, gives me the opportunity to be creative at understanding spaces and actions, peoples' rhythms at moving, their personal understanding of movement, their weaknesses and strengths, while working towards the team's common goals and keeping the team motivated.
- Exploration of different musical instruments like the violin, the guitar, the piano and the drums. I was also a drummer in a Samba band.
- I volunteered two summers with a CSIC researcher in Physics, on "Bohmian Trajectories".
- Hitchhiking 4 000km in a year means holding myself responsible and finding enjoyment in looking for creative solutions.
- Figuration in a Hollywood and in a Bollywood movie :)
- I like to elicit randomness, as a sparkle for creativity, look for the unexpected and learn from it.

## REFEREES

**Prof. Jean Rouat**  
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**Prof. Ugo Bastolla**  
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