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 Génève, 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 Processing
- Programming Drones
- Flask/Docker/Kubernetes

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

2010
Relativity meets Entanglement and High Energy Workshop
Imperial College of London, London (United Kingdom)

2011
Swiss Machine Learning Day 2014
EPFL, Lausanne (Switzerland)

Swiss Computational Neuroscience Seminar (Maass & Daw)
Universität Bern, Bern (Switzerland)

Talk given at Pouget's lab on Eliasmith's SPAUN project
Université de Génève, Geneva (Switzerland)

Swiss Computational Neuroscience Seminar (Sabes & Churchland)
Université de Génève, Geneva (Switzerland)

2014
Machine Learning Summer School
Kyoto University, Kyoto (Japan)
entry contest second prize winner, a drone

High Performance Computing Summer School
Bishop University, Sherbrooke (Canada)

2015
NIPS conference
Centre Convencions Internacional, Barcelone (Spain)

2016
Interspeech conference
Stockholm University, Stockholm (Sweden)

Grounded Language Understanding Workshop
KTH, Stockholm (Sweden)

2017
Deep Learning & Reinforcement Learning Summer School
University of Toronto, Toronto (Canada)

2018
NeurIPS conference
Palais des Congrés de Montréal, Montreal (Canada)

presentation given at Neuromatch2020
Online Conference

first week at Telluride Neuromorphic Workshop
Online Conference

2020
Brain, Minds and Machines Summer School
organized by MIT, 2020
Online Conference

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
@ jean.rouat@usherbrooke.ca

Prof. Ugo Bastolla
@ ubastolla@cbm.uam.es