Simone Poetto

Ph.D. candidate in Computational Neuroscience

Education

Dec 2021–present **Ph.D. Candidate**, *Nicolaus Copernicus University in Torun*, Torun, Poland, Ph.D. in Computational Neuroscience
PhD advisors: Karolina Finc, Giovanni Petri

Jun 2021 **Master in Physics of Complex Systems**, *University of Turin*, Turin, Italy
Grade: *110 cum laude / 110*

2016 **Bachelor in Physics**, *University of Turin*, Turin, Italy
Title of bachelor thesis: *Neural fields*

Master thesis

title **Topological data analysis of grid-like units in recurrent neural networks trained to path integrate**

supervisors Giovanni Petri, Piero Fariselli

description I have trained different types of recurrent neural networks in the task of path integration. After the training I have studied the spatial patterns of activation of the hidden units, which reproduce the pattern of activation of grid cells in the mammalian brain. I used topological data analysis to classify the different kinds of pattern that emerge.

Experience

Internships

Dec 2022 - March 2023 **Intern at CENTAI Institute**, *Turin, Italy*, During this period I worked on analysis of neuroimaging data with techniques from networks and topology

Jan 2022 - April 2022 **Intern at ISI Foundation**, *Turin, Italy*, During this period I worked on computational model of brain vision as part of my PhD

July 2021 **Summer Intern**, *Toruń Summer Students Program*, Toruń, Poland
Summer research project on natural language processing and analysis of brain data.

Schools

March 2023 **Interdisciplinary College**, *Möhnesee-Günne, Germany*, One week Spring School, 2023 edition: Dynamics of Experience – Minds, Bodies, and Things

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June 2022 **Complex Systems Summer School**, *Santa Fe, New Mexico*, Four-week Summer School on complex behavior in mathematical, physical, living, and social systems.

May 2022 **Mathematics of large networks**, *Erdős Center, Budapest, Hungary*, One week school on networks dynamics, geometry and higher order structures

April 2021 **BCI & neurotechnology spring school 2021** , *g.tec neurotechnology GmbH*, Online 10 days Spring School on brain computer interfaces and analysis of brain's recordings

Vocational

2018–present **Co-Founder**, *MLJC machine learning journal club*
MLJC (`https://www.mljc.it`) is a non-profit student organization which aims to explore and spread knowledge in the field of machine learning. Our activities range from teaching the basics of python to undergraduate students, participating in hackatons and online competitions, developing original research projects.

Miscellaneous

2016–present **Private teacher**
Private teacher for high school students

2018–2020 **Teacher of informatics**, *Merende Digitali*, Turin
Designing and teaching courses of informatics, coding and robotics for middle and high school students

Awards

March 2022 **3rd place**, *Brain-Score Competition 2022*, Brain-Score Workshop at Cosyne
Use of gated recurrent neural network to emulate the ventral visual stream

April 2021 **1th place winner**, *BR41N.IO virtual brain hackaton*, g.tec medical engineering
Improve classification of EEG signals using topological data analysis.

Languages

Italian Mother tongue

English Advanced

Computer skills

Python Advanced, *Numpy, Scipy, Pandas, Matplotlib, Scikit-Learn, Tensorflow, PyTorch GiottoTDA*

C++, Matlab, GAML, Mathematica, SQL Beginner, *Used for some curricula projects*

LaTeX Intermediate

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Git Intermediate
Linux OS Intermediate
bash Beginner

Presentations

March 2022 **Improving Neural Predictivity in the Visual Cortex with Gated Recurrent Connections**, *Cosyne Conference 2022*, Brain-Score Workshop

Publications

[1] Simone Azeglio, Arianna Di Bernardo, Gabriele Penna, Fabrizio Pittatore, Simone Poetto, Johannes Gruenwald, Christoph Kapeller, Kyousuke Kamada, and Christoph Guger. Topological data analysis (tda) techniques enhance hand pose classification from ecog neural recordings. *arXiv preprint arXiv:2110.04653*, 2021.

[2] Simone Azeglio, Simone Poetto, Marco Nurisso, and Luca Savant Aira. Improving neural predictivity in the visual cortex with gated recurrent connections. In *Brain-Score Workshop*, 2022.

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