Benedetta Mariani

Born: on 21 December 1995 | *Nationality*: Italian

Department of Physics, University of Padua (Via Marzolo 8 Padua), Padova Neuroscience Center (Via Orus 2 Padua)

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personal website: `https://benedetta-mariani.github.io/`

RESEARCH EXPERIENCES

October 2020 - present day

PhD student in Neuroscience

Padova Neuroscience Center
Laboratory of Intedisciplinary Physics, Padova `https://www.liphlab.com/`

- Supervisor: Prof Samir Suweis
- Main research interests: combining the tools of physics of complex systems and data analysis to study collective behavior in Neuroscience and Systems biology (e.g. how information processing in neural systems is enhanced by phase transitions and synchronization phemomena)

December 2019 – September 2020

Ten months scholarship

Laboratory of interdisciplinary Physics, University of Padua

- Project title: "Criticality in rat somatosensory barrel cortex"
- Supervisors: Prof Samir Suweis and Prof. Stefano Vassanelli.

EDUCATION

December 2017 – October 2019

Master degree in Physics of Complex Systems

University of Turin, Italy

- Final grade: 110/110 cum laude
- Final project: "Signatures of criticality in rat brain: beyond avalanches statistics" permormed at Liph Lab (Physics and Astronomy Dept, Padua) and at NeuroChip Lab (Dept. of Biomedical Sciences, Padua).

September 2015 – December 2017

Bachelor degree in Physics

University of Padua, Italy

- Final project: "Phase separation for intrinsically disordered proteins"

October 2014 – September 2015

Student of Biomedical Engineering

Polytechnic University of Milan

PUBLICATIONS

November 2023

Prenatal experience with language shapes the brain

- Science Advances Vol 9, Issue 47
- Benedetta Mariani, Giorgio Nicoletti, Giacomo Barzon, Maria Clemencia Ortiz Barajas, Mohinish Shukla, Ramon Guevara, Samir Simon Suweis, Judit Gervain
- `https://www.science.org/doi/10.1126/sciadv.adj3524`; `https://www.aaas.org/news/babies-brains-are-primed-their-native-language-birth`

July 2022

Criticality and network structure drive emergent oscillations in a stochastic whole-brain model

- Journal of Physics: Complexity, Volume 3, Number 2
- Giacomo Barzon, Giorgio Nicoletti, Benedetta Mariani, Marco Formentin, Samir Suweis
- `https://iopscience.iop.org/article/10.1088/2632-072X/ac7a83/meta`

June 2022 **Disentangling the critical signatures of neural activity**

- Scientific Reports volume 12, Article number: 10770
- Benedetta Mariani, Giorgio Nicoletti, Marta Bisio, Marta Maschietto, Stefano Vassanelli, Samir Suweis
- `https://www.nature.com/articles/s41598-022-13686-0`

August 2021 **Neuronal Avalanches Across the Rat Somatosensory Barrel Cortex and the Effect of Single Whisker Stimulation**

Front. Syst. Neurosci.,vol 15
Benedetta Mariani, Giorgio Nicoletti, Marta Bisio, Marta Maschietto, Roberto Oboe, Alessandro Leparulo, Samir Suweis, Stefano Vassanelli

- `https://www.frontiersin.org/articles/10.3389/fnsys.2021.709677/full`

THESIS CO-SUPERVISION

December 2022 **Co-supervision of a UniPd Physics bachelor degree thesis**

- "Analyses of neural oscillations and synchrony in the brain"

TALKS, PRESENTATIONS AND POSTERS

May 2024 **Invited Talk "Baby Rhythm" ERC closing workshop , *Palazzo Bo, Padova, Italy***

- "Prenatal experience with language shapes the brain"

February 2023 **Talk at Liph Lab Spring Workshop, *Asiago (VI), Italy***

- "Collective oscillations in the rat barrel-thalamus network"

November 2022 **Poster at Brain Criticality Hybrid Meeting November 7-9 2022, *Online***

- "Collective oscillations in the rat barrel-thalamus network"
- `https://braincriticality.org/2022/11/07/poster-20227-benedetta-mariani-collective-oscillations-in-the-rat-barrel-thalamus-network/`

September 2022 **Poster at Bernstein Conference 2022, *Berlin***

- "Collective oscillations in the rat barrel-thalamus network"
- `https://abstracts.g-node.org/conference/BC22/abstracts#/uuid/83d6de84-d449-4f47-ba63-7cd486e93e40`

31st March 2022 **Talk at Liph Lab Spring Workshop, *Asiago (VI), Italy***

- "Modelling oscillations in the rat barrel-thalamus network"

September 2021 **Poster at Bernstein Conference 2021, *online***

- "Disentangling the role of external and intrinsic dynamics on the critical signatures of neural activity"
- `https://abstracts.g-node.org/conference/BC21/abstracts#/uuid/00a75410-d18a-4ba6-a14d-aa682e2c8777`

31st May-12nd June 2021 **Poster at the Beg Rohu Summer School, *St. Pierre Quiberon, France***

- "On the critical signatures of neural activity"

6th October-9th October 2020 **Contributed talk at Brain Criticality Virtual Meeting, *online***

- "Brain criticality beyond resting state neuronal avalanches"
- `https://braincriticality.org/2020/10/11/benedetta-mariani-brain-criticality-beyond-resting-state-neuronal-avalanches-spotlight-talk/`

29th September - 1st October 2020 **Poster at Bernstein Conference 2020, *online***

- "Brain criticality beyond resting state neuronal avalanches"
- `https://abstracts.g-node.org/abstracts/b9ec73de-f9db-4df2-9ab1-c08c2c532e65`

16th - 18th January 2020 **Talk at Liph Lab winter Workshop, *Folgaria (TN)***

- I presented my research outputs.

ATTENDED CONFERENCES AND SCHOOLS

May 2024 ”Baby Rhythm” ERC closing workshop ,*Palazzo Bo, Padova*

November 2022 Brain Criticality Hybrid Meeting November 7-9 2022, *Online*

September 2022 Bernstein Conference 2022, *Berlin*

16th-20th March 2022 Cosyne Tutorial and Cosyne Main meeting, *Lisbon*

15th-24th September 2021 EITN Fall School in Computational Neuroscience, *Paris*

- I took part in the project group ”Mean field and population models” and presented the outputs of our project.
- I attended lectures and tutorials on different models and sofwares to simulate networks of neurons at different levels of complexity (Brian, Nest, Neuron, TVB)

September 2021 Bernstein Conference 2021, *online*

31st May - 12nd June 2021 The Beg Rohu Summer School, *St. Pierre Quiberon, France*

23rd February - 26th February 2021 Computational and Systems Neuroscience (Cosyne) 2021, *online*

14th - 16th December 2020 Brain Hack Padova, *online*

- I led the project group ”Association of Microstructural white matter and personality traits based on Human connectome project dataset”

6th October - 9th October 2020 Brain Criticality Virtual Meeting, *online*

29th September - 1st October 2020 Bernstein Conference 2020, *online*

18th - 23th July 2020 29th Annual Computational Neuroscience Meeting, Organization for Computational Neuroscience, *online*

29th June - 3rd July 2020 Youth in High-dimensions: Machine Learning, High-dimensional Statistics and Inference for the New Generation, *online*

9th - 14th September 2019 Summer School in Computational and Theoretical Models in Neuroscience, European centre for living technology, *Venice*

AWARDS

November 2023 We published “Prenatal experience with language shapes the brain” `https://www.science.org/doi/10.1126/sciadv.adj3524?utm_campaign=SciMag&utm_source=Twitter&utm_medium=ownedSocial`in the high impact journal “Science Advances” `https://www.aaas.org/news/babies-brains-are-primed-their-native-language-birth` and gained visibility (journalists from many countries quoted and interviewed us, including “Le Scienze” journal, “Nature Italy” journal, ”El Paìs, Spain”, ”The Times, UK”, ”Le Figaro, France”, ”The New Scientist, UK”, e.g.: `https://www.lescienze.it/news/2023/11/23/news/linguaggio_mamma_cervello_neonati-14259373/`; `https://www.nature.com/articles/d43978-023-00181-x`; `https://www.nature.com/articles/d43978-023-00181-x`; and we participated to podcasts broadcasting our work, e.g: `https://www.thenakedscientists.com/articles/interviews/babies-learn-language-they-are-even-born`

2022 Our paper “Disentangling the critical signatures of neural activity” `https://www.nature.com/articles/s41598-022-13686-0` has been included in the Top 100 Neuroscience paper of 2022 Scientific Reports Journal.

2021 Winner of SECS (Scholarships for Events on Complex Systems) grant, provided by the Young Researchers of the Complex Systems Society.

2014 Winner of the award for the high school students with the highest final grade and honors, granted by MIUR, the Italian Ministry for Education, University and Research.

COMPUTER SKILLS

Programming Languages

- Python: advanced level
- C++, Mathematica, R: intermediate level
- matlab: basic level

Operating systems

- Windows: advanced level
- Unix: advanced level

PERSONAL SKILLS

Languages known

- Mother tongue: Italian
- English: level B2 (First Certificate of English)
- German: level A2 (certificate from the Goethe Institute of Bremen)