Melissa Monti
Biomedical Engineer, PhD student in Biomedical Engineering

Education

Nov 2022 – ongoing	**PhD student in Biomedical, Electrical and System Engineering – curriculum: Biomedical Engineering** *University of Bologna, Italy* Project: Multimodal brain network models for charting the development of brain diseases. Responsibilities: EEG and behavioral tasks programming and data acquisition; preprocessing and processing of non-invasive and invasive electrophysiological data, and MRI data; biophysical neuro-computational modeling, graph theoretical analysis of electrophysiological, EEG and MRI-based data.
2023	**Professional Engineer License**
2022	**Master Degree in Biomedical Engineering for Neuroscience** *University of Bologna, Italy* • Final grade: 110/110 cum Laude • Score weighted average: 30/30 • Master Thesis: Investigating perceptual multisensory impairments in autism through a neural network: a possible neural implementation for the shift from cross-modal competition to facilitation.
Feb 2022 – May 2022	**Research Internship** *University of Bologna, Italy* Project: Neurocomputational modeling of multisensory integration.
2020	**Bachelor Degree in Biomedical Engineering** *University of Bologna, Italy* • Final grade: 110/110 cum Laude • Score weighted average: 29.68/30

Additional courses

12 Jul – 11 Sept 2024	**Advanced machine learning and deep learning techniques for Medicine** *Organizer: University of Bologna* *Cesena, Italy*
12, 13 Jun 2024	**Artificial intelligence for multi-variate brain signals** *Organizer: University of Bologna* *Cesena, Italy*
4, 5 Jun 2024	**Scientific programming in Python: an introduction for bioengineers** *Organizer: University of Bologna* *Cesena, Italy*

7 Mar – 22 Mar 2024	**Special Topics in Applied Neuro-Engineering** *Organizer: University of Bologna* *Cesena, Italy*
11 Jun – 16 Jun 2023	**Summer School on Neurorehabilitation (SNNR) 2023** *Organizer: Shirley Ryan AbilityLab, Imperial College of London, Hospital los Madroños* *Baiona, Spain*
8 Jun – 9 Jun 2023	**Brain Inspired Computing Workshop (BICW)** *Organizer: Università degli studi di Modena e Reggio Emilia* *Modena, Italy*
18 Jan – 24 Feb 2023	**Methods and applications - Introduction to AI for Health and well-being** *Organizer: University of Bologna* *Online*
Oct – Dec 2020	**Behavioural and cognitive neuroscience** *Organizer: IMT School for Advanced Studies Lucca* *Pisa, Italy*

Research Experience

Jan. 2025 – ongoing	**Visiting Professional** *Atrium Health Wake Forest Baptist, Radiology Department, NC, USA* Project: Charting brain tumor network with graph theory to improve prognosis and clinical outcomes. Responsibilities: MRI data processing, DTI tractography, graph theoretical analyses of MRI data from.
Oct. 2023 – ongoing	**Visiting PhD student** *Sapienza University of Rome, Italy* Responsibilities: project management, task programming, EEG data acquisition and processing, brain mapping, ERPs, spectral analysis, brain and inter-brain connectivity, graph theoretical analyses of EEG, stereo-EEG, and MRI data.
Aug 2022 – Sept 2022	**Master Thesis Student** *Albert Einstein College of Medicine, The Cognitive Neurophysiology Laboratory (CNL), New York, USA* Project: Investigating perceptual multisensory impairments in autism through a neural network. Responsibilities: biologically plausible computational modeling.

Participation in research projects

- Investigator for the project "ACT2: Acting together: how motor styles shape action prediction and brain-to-brain connectivity in typical and autistic populations", PRIN 2020, prot. 20207S3NB8, Italian Ministry of University and Research, 2022-2025.

- Investigator for the project "KEATS - Playing in the same Key: Emotions sharing in Autism by mulTi-Subject models", Bando SEED - PNR Università Sapienza, 2021-2024.

- Investigator for the project "VR-BCI4PM: A virtual reality system controlled by a hybrid brain-computer interface to improve powered mobility in individuals with neuromotor disorders", PRIN 2022, Italian Ministry of University and Research.

- Investigator for the project "Visuospatial modulation of bimanual touch perception in real and virtual environments". National Science Foundation (NSF) NSF 2019959.

Collaborations

Sapienza University of Rome
Prof. Laura Astolfi
Country: Italy

Wake Forest University School of Medicine, Comprehensive Cancer Center
Prof. Roy E. Strowd and Prof. Christopher T. Withlow
Country: USA

Albert Einstein College of Medicine
Prof. Sophie Molholm
Country: USA

Wake Forest University
Prof. Barry E. Stein and Prof. Benjamin A. Rowland
Country: USA

Baylor College of Medicine
Prof. Jeffrey M. Yau
Country: USA

UCLA
Prof. Ladan Shams
Country: USA

Publications

Papers in International Journals
- **Monti, M.,** Cuppini, C. The evolution of cross-modal brain organization during development: a neurocomputational-based investigation on typically developing and autistic children. *Submitted*.
- Cuppini, C., Di Rosa, E.F., Astolfi, L., **Monti, M.** Towards a comprehensive framework for the study of multisensory perception: a computational model of audiovisual interactions in space and time. *Submitted*.
- **Monti, M.,** Molholm, S., Foxe, J. J., Cuppini, C**.** Is competition the default configuration of cross-sensory interactions? *Submitted*.
- **Monti, M**., Molholm, S., Cuppini, C. (2023). Atypical development of causal inference in autism inferred through a neurocomputational model. Frontiers in Computational Neuroscience. 17.

- Cuppini, C., Magosso, E., **Monti, M**., Ursino, M., & Yau, J. M. (2022). A neurocomputational analysis of visual bias on bimanual tactile spatial perception during a crossmodal exposure. Frontiers in neural circuits, 16, 933455.

Indexed Long Abstracts in National Conferences
- **Monti, M**., Bisi, M.C., Stagni, R., Cuppini, C. (2023). The neural bases of sensory reweighting for postural control: a neuro-computational model. In Proceedings XXIII Congresso SIAMOC 2023. Page 98. Roma.

- **Monti, M.,** Molholm, S., Cuppini, C. A neural model of sensory interactions in young neurotypical and ASD children. VIII National Congress on Bioengineering 2023, Padua (Italy), 21 Jun - 23 Jun. (Abstract ID: 1643).

Abstract in National and International Conferences
- **Monti, M.** and Cuppini, C. Atypical development of causal inference in autism. FENS Forum 2024, Vienna (Austria), 25 Jun – 29 Jun (Abstract number 2062).
- **Monti, M.,** Bisi, M. C., Stagni, R., Cuppini, C. The neural bases of sensory reweighting for postural control: a neuro-computational model. XXIII Neuroscience 2023, Washington (USA), 11 Nov - 15 Nov (Session PSTR281, Presentation number PSTR281, Abstract Control Number 7166).
- Cuppini, C., **Monti, M.,** Magosso, E., Yau, J. Visual bias on bimanual tactile perception: investigation of the neural mechanisms using neurocomputational modelling. International Multisensory Research Forum 2023, Brussels (Belgium), 27 Jun - 30 Jun (Poster 81).
- **Monti, M.**, Molholm, S., Cuppini, C. A model of the maturation of sensory interactions: from cross-modal competition to facilitation in Autism. 2023 11th International IEEE/EMBS Conference on Neural Engineering, Baltimore (USA), 25 Apr-27 Apr (Abstract 406, Paper ID: 1570881557).
- Stein, B. E., Rowland, B. A., **Monti, M.,** Magosso, E., Cuppini, C. Neural Mechanisms Underlying the Reversal of Hemianopia with Multisensory Training. International Multisensory Research Forum 2022, Ulm (Germany), 3 Jul - 7 Jul (Poster 4:30, Abstract 291).
- Cuppini, C., **Monti, M.,** Ursino, M., Shams, L. A Hebbian model of the lexical-semantic memory helps explain the multisensory benefit in learning name-face association. CNS Annual Meeting 2022, San Francisco (USA), 23 Apr - 26 Apr (Poster Session A, Abstract 53).

Talks

- Invited speech: Charting brain tumor network with graph theory to improve prognosis and clinical outcomes, Brain Tumor Center of Excellence (BTCOE), Atrium Health Wake Forest Baptist, 11 Mar 2025.
- Invited speech: Investigating perceptual multisensory impairments in Autism through a neural network: a possible neural implementation for the shift from cross-modal competition to facilitation, Albert Einstein College of Medicine, 14 Sept 2022.

Academic and didactic experience

- Teaching assistant:

  | *A.A.* | Fundamentals of Biomedical Instrumentation |
  | *2024/2025* | *Bachelor's Degree in Biomedical Engineering, University of Bologna* |

A.A. 2022/2023, 2023/2024	Physiology
	Bachelor's Degree in Biomedical Engineering, University of Bologna

- Co-supervisor to 3 Master Theses in Biomedical Engineering
- Co-supervisor to 7 Bachelor Theses in Biomedical Engineering

Honours and Awards

16 Jan 2025 **Marco Polo mobility grant**
University of Bologna

10 May 2024 **Merit-based scholarship for academic courses A.Y. 2021/2022**
INPS

13 Sept 2023 **Best Master Thesis "Nearlab 2023 - Politecnico di Milano"**
Italian National Group of Bioengineering (GNB)

7 Jun 2020 **Merit-based scholarship for laudable students enrolled in the A.Y. 2019/2020**
University of Bologna

22 May 2020 **Merit-based scholarship for academic courses A.Y. 2017/2018**
INPS

29 Jun 2019 **Merit-based scholarship "Antonio Fiorini" for university students**
Municipality of Molinella

18 Jun 2019 **Merit-based scholarship for laudable students enrolled in the A.Y. 2018/19**
University of Bologna

9 Jan 2019 **Merit-based scholarship for enrollment in courses relating to disciplinary areas of particular national interest**
University of Bologna

Personal skills

Job-related skills:
- Management, planning and setup preparation of experiments involving behavioral and electrophysiological data acquisition;
- Task implementation;
- EEG and EEG-hyperscanning data acquisition;
- Biophysical neurocomputational modelling;
- Invasive and non-invasive EEG pre-processing and analysis;
- EEG brain connectivity and multi-brain connectivity;
- Diffusion MRI data processing;
- DTI tractography;
- Application of graph theory analysis to electrophysiological, EEG, and MRI data.

Technical skills:
- Proficient user of Matlab;
- Confident with Python;

- Advanced user of bash shell scripting;
- Proficient user of Psychtoolbox;
- Proficient user of Brain Products® EEG amplifiers and caps;
- Proficient user of EEGLAB and Brain Vision Analyzer;
- Advanced user of Vicon motion capture system and Vicon Nexus® software;
- Advanced user of MRtrix3 and FSL;
- Confident with Tobii Pro Glasses 3 eye tracking system;
- Confident with inertial sensors.

Languages

Italian: mother tongue

English: advanced user (C1)

Certificates: CAE Cambridge Certificate in Advanced English (June, 2020)

I declare that the information in this Curriculum Vitae is accurate and true. I authorize the processing of my personal data in the cv in accordance with Article 13 of Legislative Decree No. 196 of June 30, 2003 "Code on the Protection of Personal Data" and Article 13 of the GDPR (EU Regulation 2016/679).

Winston-Salem, 24/03/2025
Melissa Monti