

Silvia F. Storti

Curriculum Vitae

Position Associate Professor
Affiliation Dept. of Engineering for Innovation Medicine (DIMI), University of Verona (Italy)
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Lab Brain Navigation Lab, <https://brainavlab.github.io/>

Brief Bio

Silvia F. Storti is **Associate Professor in Bioengineering** and member of the BraiNavLab at the Dept. of Engineering for Innovation Medicine (DIMI), University of Verona. She received the Master's degree in Electronic Engineering from the University of Padova and the Ph.D. degree in Neuroscience from the University of Verona, Italy. Her academic career began in 2008 at the Dept. of Neurological and Movement Sciences, University of Verona, when she joined the *Clinical Neurophysiology and Functional Neuroimaging Unit*, led by Prof. Paolo Manganotti, as Research Associate first and then as PhD Student in Neuroscience. After completing her PhD degree, she continued working as Post-doctoral Researcher in the same group until 2014. In 2014, she joined the *BraiNavLab*, led by Prof. Gloria Menegaz, at the Dept. of Computer Science, where she continued her research as Post-doctoral Researcher until 2018. In 2018 she became Assistant Professor (tenure-track position, senior researcher RTDb) and later in Nov 2021 achieved a promotion to the position of Associate Professor at the same Department. From March 2023 she moved to the Dept. of Engineering and Innovation Medicine at University of Verona.

Her primary research interests lie in the field of **Neuroengineering**, with a specific focus on brain-computer interfaces (BCI), neurophysiological signal processing, and the integration of *multi-modal functional neuroimaging data*. Her work is based on the analysis of electroencephalography (EEG)/high-density EEG, functional magnetic resonance imaging (fMRI), electromyography (EMG) and inertial measurement unit (IMU) recordings with the aim of inferring *functional brain connectivity* and decoding mechanisms of brain reorganization in response to rehabilitation and adaptive processes. She coordinates research lines on the development of intelligent computational frameworks for the analysis of large-scale dynamic multivariate data, the prediction of brain states, and the modeling of time-variant brain connectivity patterns among brain regions from wearable and non-invasive technologies.

Since November 2018, she has contributed to the development of new research directions within the group, helping to shape and strengthen the group's scientific profile at the University of Verona. Her research vision aims to advance telemedicine and digital health through the integration of wearable technologies and the design and development of next-generation BCI systems with enhanced usability, translational impact and clinical applicability. She supervises PhD students and research fellows, and promotes international research collaborations.

Since 2012, Prof. Storti has also collaborated with the Italian Navy on a long-term research program

exploring alterations in EEG source and connectivity activity during hyperbaric oxygen breathing in professional divers under simulated deep-sea conditions. The collaboration has led to a substantial body of peer-reviewed publications, contributing with new findings of the neurophysiological effects in extreme environments.

She has co-authored **70 publications on International Peer-Reviewed Journals**, covering a wide range of topics in bioengineering and neurophysiology and more than 100 contributions to conferences. Prof. Storti holds prominent editorial roles, including **Associate Editor** for IEEE Journal of Biomedical and Health Informatics (J-BHI), BioMedical Engineering OnLine (Springer Nature), as well as **Editorial Board Member** of Scientific Report (Nature Portfolio). She also held the role of **Lead Guest Editor** of many Special Issues.

She is currently involved in several nationally funded research projects. She is the Task Leader of MNESYS WP4, funded by MIUR - NRRP, for the project "A multiscale integrated approach to the study of the nervous system in health and disease (MNESYS) (DN. 1553 11.10.2022)" supported by #NEXTGENERATIONEU (NGEU) and funded by the Ministry of University and Research (MUR) under the National Recovery and Resilience Plan (NRRP). She is also PI of a PhD grant funded by the National Recovery and Resilience Plan (NRRP) D.M.118 of 02.03.2023, titled "Development of EEG_TMS systems based on brain connectomics for personalized treatment of epilepsy". She is also involved in a research project on wearable EEG and motion-sensor monitoring of brain activity and mental workload during dual-task performance in people with multiple sclerosis, and in a regional project on intelligent technologies for innovative medicine.

She is Vice-President of the ERASMUS+ for Study Commission for the Science and Engineering Area at the University of Veron; she is a member of the Internationalization Commission at the Dept. of Engineering and Innovation Medicine and she is a member of the Council for the PhD in Intelligent Systems Engineering.

Italian National Scientific Qualification

Jul. 2024 She complies with the Italian requirements (**Italian National Scientific Qualification 2023 – Abilitazione Scientifica Nazionale**) for the role of **Full Professor in the Academic Area of Bioengineering** 09/G2 from 08/07/2024 to 08/07/2036.

Bibliometric Parameters

ORCID <http://orcid.org/0000-0002-8605-803X>
Scopus ID 24339432600
Researcher ID K-3142-2016
H-index 25 - Scopus
Citations 1736 - Scopus

Scientific Production Summary

- 70 Journal papers on international peer-reviewed journals
- 2 Editorials
- 25 Short-papers (proceedings) on international conferences

- 4 Short-papers (proceedings) on national conferences
- 82 International and national conference abstracts
- 1 National book chapter

Education

- Jan. 2009– **Ph.D. Degree in Neuroscience** (*University of Verona, Italy*)
- Dec. 2011 Graduate School of Sciences Engineering Medicine, PhD degree in Neuroscience (XXIV cycle).
Dissertation: "Multimodal imaging approach for quantitative assessment of epilepsy".
Supervisor: Prof. Paolo Manganotti, Reviewer: Prof. Michel M. Christoph (University of Genève) - *Note*: winner of PhD fellowship.
- Nov. 2007 **Master Degree in Electronic Engineering - curriculum Biomedical Engineering** (*University of Padova, Italy*)
Thesis: "Metodi e modelli per la generazione di mappe di attivazione fMRI"
Supervisor: Prof. Gianna M. Toffolo.

Current Academic Position

- 2021–present **Associate Professor** (*University of Verona, Italy*)
Dept. of Engineering for Innovation Medicine (Mar 2023 - present), University of Verona, S.S.D. ING-INF/06.
Dept. of Computer Science (Nov 2021 - Feb 2023), University of Verona, S.S.D. ING-INF/06.

Previous Academic Positions

- Nov. 2018– **Assistant Professor (RTDb)** (*University of Verona, Italy*)
Oct. 2021 Dept. of Computer Science, University of Verona, S.S.D. ING-INF/06
- Oct. 2017– **Post-Doctoral Research Fellow** (*University of Verona, Italy*)
Oct. 2018 Research activity on "Brain microstructural modeling for improved TMS anchoring".
Supervisor: Prof. Gloria Menegaz, Dept. of Computer Science, University of Verona, S.S.D. INF01, Project "BrAnch" - Joint Projects 2015.
- Oct. 2016– **Post-Doctoral Research Fellow** (*University of Verona, Italy*)
Sep. 2017 Research activity on "Study, implementation and validation of interfaces for robotic systems". Supervisor: Prof. Gloria Menegaz, Dept. of Computer Science, University of Verona, S.S.D. INF01, FSE 2014-2020.
- Apr. 2014– **Post-Doctoral Research Fellow - Two years** (*University of Verona, Italy*)

- Sep. 2016 Research activity on "Assessment of functional connectivity in motor tasks and investigation of its relation with DTI-derived structural pathways". Supervisor: Prof. Gloria Menegaz, Dept. of Computer Science, University of Verona, S.S.D. INF01.
- Jan. 2012– **Post-Doctoral Research Fellow - Two years** (*University of Verona, Italy*)
- Dec. 2013 Research activity on "Multimodal approach to the study of dementia and mild cognitive impairment". Supervisor: Prof. Paolo Manganotti; Dept. of Neurological and Movement Sciences, University of Verona. Two-year scholarship funded by the Cariverona Foundation (Fondazione Cassa di Risparmio di Verona Vicenza Belluno e Ancona), S.S.D. MED26.
- Mar. 2008– **Research Fellow** (*University di Verona, Italy*)
- Dec. 2008 Research activity on "Vascular changes and neuroinflammation in the experimental and human epilepsy: identification of new drug targets. EEG-fMRI coregistrations". Supervisor: Prof. Paolo Manganotti; Dept. of Neurological and Vision Sciences, University of Verona. Research fellowship funded by the Cariverona Foundation (Fondazione Cassa di Risparmio di Verona Vicenza Belluno e Ancona), S.S.D. MED26.

Institutional Duties

Ongoing

- Jul 2024 - *Member of Department Board (Giunta)* - Dept. of Engineering for Innovation
ongoing Medicine, UniVR.
- Apr 2024 - *Member of Council of the PhD in Intelligent Systems Engineering* (Collegio Docenti
ongoing del Dottorato in Ingegneria dei Sistemi Intelligenti) - Doctoral School on Natural
and Engineering Sciences, UniVR.
- Apr 2024 - *Quality Assurance Board of PhD in Intelligent Systems Engineering, UniVR*
ongoing
- Jun 2023 - *Internationalization Commission Member* (Referente per l'internazionalizzazione) -
ongoing Dept. of Engineering for Innovation Medicine, UniVR.
- Mar 2024 - *Vice-President of the ERASMUS+ for Study Commission of the Science and Engi-
ongoing neering Area, UniVR*
- Mar 2024 - *Member of the Student Services Commission* - Dept. of Engineering for Innovation
ongoing Medicine, UniVR.
- AY2020-21 - *Professor Tutor, Bachelor's course in Computer Science, University of Verona (Italy)*
ongoing

Past

- Jul 2020 - *Teaching Staff-Student Joint Committee* (Membro della Commissione Paritetica
Dec 2023 Docenti-Studenti Scienze-Ingegneria CPDS) - Dept. of Computer Science, UniVR.
- Apr 2019 - *Member of Council of the PhD School in Computer Science* (Collegio Docenti del
Apr 2024 Dottorato in Informatica) - Doctoral School on Natural and Engineering Sciences.

Research Projects

Principal Investigator (PI) of Research Projects

2023-26 PhD grant funded by NRRP D.M.118

Development of EEG-TMS systems based on brain connectomics for personalized treatment of epilepsy funded by National Recovery and Resilience Plan (NRRP) D.M.118 of 02.03.2023, Role: PI of the Project and supervisor of the PhD student (cycle XXXIX), duration: 3 years (Oct. 2023-Sep. 2026).

2023-24 Brain-RESTORE funded by Ricerca di Base, UniVR

Brain-connectivity based computer interfaces: An enhanced technology for restoring motor function in stroke survivors. This research was supported by the funding initiative of the University of Verona, Ricerca di Base 2022, for projects positively evaluated in the Prin call but not funded: Prin2022 - score 94/100, Project code: 2022K4EJRM. Role: PI of the project, duration: 1 year (Nov.2023-Nov.2024), €38.9K.

2020 Post-doc grant funded by the Dept. of Computer Science, UniVR

BCIConnect: EEG-based connectivity for BCI in robotic device control. Role: PI of the project, duration: 12 months, €23.8K, [AdR3554/20].

2019 Post-doc grant funded by the Dept. of Computer Science, UniVR

Modeling of brain microstructure informed-connectomics for improved transcranial magnetic stimulation anchoring. Role: PI of the project, duration: 12 months, €23.8K, co-funded, [AdR3309/19].

Task Leader of Research Projects

2022-26 MNESYS funded by MIUR - NRRP

A multiscale integrated approach to the study of the nervous system in health and disease (MNESYS) (DN. 1553 11.10.2022) supported by #NEXTGENERATIONEU (NGEU) and funded by the Ministry of University and Research (MUR), National Recovery and Resilience Plan (NRRP). Duration: 36 months (Nov 2022-Oct 2025, extended to Feb 2026).

Participation to Spoke 2, Task leader for UniVR in Work Package 4 - T4.5. Neural dynamics and plasticity. Addressing neuronal dynamics and neuronal plasticity with neurostimulation and fast imaging technologies. Objectives: integrate multi-modal imaging technologies for brain connectomics into medically interpretable AI models and develop connectivity-based machine learning algorithms to address neuronal plasticity in health and disease for the design of personalized treatments. The WP foresees an advance from TRL1 (begin) to TRL3 (end).

Responsible for Deliverable - D4.1. Framework for multi-layer connectome analysis and automated extraction of neuronal connectivity features.

Funding of €24K received and allocated for the acquisition of equipment, as well as funding for AdR initiatives, over which I have been and continue to be the supervisor [AdR4227/23 and AdR4492/23].

link: MNESYS Team

link: MNESYS – Neural dynamics and plasticity in neurorehabilitation

link: MNESYS – Interpretable brain connectivity models for personalized medicine

Proposer of Research Projects

2022-24 **AI4Health funded by MIUR D.M. 737/2021**

AI4Health: empowering neurosciences with eXplainable AI methods. Storti S.F. is one of the proposers of the project, duration: 36 months. Budget received for one RTDa position (ING-INF/06) and two 1-year AdR fellowships (ING/INF05 e INF01). PI: Prof. G. Menegaz. Role: proposer and supervisor of one AdR "AI4Health: integration of neuroimaging and neurophysiology data through eXplainable AI for pre-surgical planning and prediction of surgical outcome" [AdR3850/21].

Scientific Participation in Research Projects funded by Public Organizations

2024-27 **INTELLI-MI funded by Regione Veneto - PR Veneto FESR 2021-2027**

Tecnologie Intelligenti per la Medicina di Innovazione. Funding of research and development projects carried out by Regional Innovative Networks and Industrial Districts RIR – FESR2021-2027 (DGR n. 729 del 26 giugno 2024). PI: Prof. G. Menegaz, duration: Oct 2024-Apr 2027 (31 months), €project value: 2,557€K; financed: 378€K.

2016-17 **BrAnch funded by University Joint Project 2015**

Brain microstructural modeling for improved TMS anchoring. PI: Prof. G. Menegaz, partner: EB Neuro Spa (Firenze, Italy), duration: 24 months, €27.3K.

2015-16 **BRAINCO funded by University Joint Project 2014**

Investigation of structural and functional brain connectivity from multimodal data. PI: Prof. G. Menegaz, partner: EB Neuro Spa (Firenze, Italy), duration: 24 months, €31.86K.

2013-14 **AHeAD funded by University Joint Project 2012**

Automatic Human behavior Analysis in neurological Diseases: the case of epilepsy. PI: Prof. G. Menegaz, partner: EB Neuro Spa (Firenze, Italy), duration: 24 months, €20K.

2012-13 **Image-Guided Neuronavigation System funded by University Joint Project 2011**

Highly reliable image-guided multimodal neuronavigation for motor cortex stimulation. PI: Prof. P. Manganotti, partner: ATES MEDICA Device s.r.l. (Verona, Italy), duration: 24 months, €30.45K.

2009-10 **Project funded by Ricerca Sanitaria Finalizzata – Regione Veneto (VE, VR, TV, VI).**

Studio sull'uso della Stimolazione Magnetica Transcranica e della Stimolazione Elettrica Diretta Continua Transcranica, per migliorare la diagnosi e la prognosi e per proporre un approccio terapeutico innovativo nei pazienti in stato vegetativo (PI: Dr. S. Casson), duration: 24 months, €170K.

Scientific Participation in Research Projects funded by Private Organizations

2024-27 **Research Project funded by Fondazione Italiana Sclerosi Multipla**

The effectiveness of combining a home-based Digital motor Telerehabilitation program with conventional therapy in Progressive Multiple Sclerosis: a multicentre, randomized controlled trial, PI: Prof. M. Gandolfi. Department of Neurosciences, Biomedicine and Movement Sciences (University of Verona), duration: 24 months (extended for one year), €240.6K. Role: participant responsible of wearable EEG and IMU-Based assessment of Mental Workload During Dual-Task Performance (iTUG) in pwMS at Units 1 and 2. FISM: 2023/R-Multi/010, trial registration: NCT06485115, CE Protocol: 232CET

2021-22 **OPERA funded by Fondazione Cariverona**

Osservazione dei processi lavorativi, con garanzie oggettive di tutela della Privacy, per la prevenzione di Errori e situazioni di Rischio in maniera Automatica ai tempi di Industria 4.0 (OPERA 4.0). PI: Prof. D. Quaglia. Department of Computer Science (University of Verona), duration: 24 months, €100K. Role: participant - Work Package: MA2 Intelligent systems.

2020-22 **EDIPO funded by Fondazione Cariverona**

A computational solution for bringing neuroimaging genetic into translational research (EDIPO), PI: Prof. G. Menegaz. Department of Computer Science (University of Verona), duration: 36 months, €180K. Other organizations involved: Imaging Genetics Center (IGC) of the University of Southern California (USC), French National Institute of Research in Informatics and Automation (INRIA).

2017 **Research Project funded by Verona Brain Research Foundation**

"Brain connectivity underlying physiological and pathological patterns in action tremor", PIs: Prof. G. Menegaz - Dr. F.B. Pizzini. University Hospital Verona and Department of Computer Science (University of Verona), duration: 12 months, €23.7K.

2016 **Research Project funded by Verona Brain Research Foundation**

"Mapping functional connectivity patterns in neurological and neurosurgical diseases with Arterial Spin Labeling and Blood Oxygenation Level Dependent MRI", PIs: Prof. G. Menegaz - Dr. F.B. Pizzini, University Hospital Verona and Dept. of Computer Science (University of Verona), duration: 12 months, €16K.

2011-13 **Research Project funded by Fondazione Cariverona**

"Disabilità cognitiva e comportamentale nelle demenze e nelle psicosi", PI: Prof. N. Rizzuto. Dept. of Neurological and Movement Sciences (University of Verona), duration: 36 months, €73.63K for the unit.

2007-08 **Research Project funded by Fondazione Cariverona**

"Vascular changes and neuroinflammation in experimental and human epilepsy: identification of new drug targets", PI: Dr. B. Dalla Bernardina, Dept. of Neurological and Vision Sciences (University of Verona), duration: 24 months, €449.66K.

Research and consulting assignments

Jul. 2014– **Research contract** (*EB Neuro Spa, Florence, Italy*)

Aug. 2014 Description: quantitative analysis of electroencephalographic data of students (not experienced divers) acquired during the breathing of air and oxygen at normobaric pressure; breathing air at 0 msw, oxygen at 18 msw and breathing air at 0 msw after the decompression phase in a hyperbaric chamber (Italian Navy divers, Italian Navy Medical Service CONSUBIN Varignano, Le Grazie, La Spezia).

Nov. 2012– **Research contract** (*EB Neuro Spa, Florence, Italy*)

Jun. 2013 Description: quantitative analysis of electroencephalographic data of healthy and oxygen-sensitive subjects acquired during the breathing of air at 0 msw, oxygen at 18 msw and air after the decompression phase at 0 msw in a hyperbaric chamber (Italian Navy divers, Italian Navy Medical Service CONSUBIN Varignano, Le Grazie, La Spezia).

Jan. 2008 **Research contract** (*University of Padova, Italy*)

Description: statistical analysis of biomedical signals. Supervisor: Prof. Gianna M. Toffolo, Dept. of Information Engineering, University of Padova.

Chair/Moderator Activity for, Organizer of International Events

Chair Activity

May 2021 **Chair of the session entitled: Podium Session 1: Brain-Computer/Machine Interface**, May 4, 2021, at *International IEEE EMBC Conference on Neural Engineering*, Virtual Conference.

Organization of International Conferences/Workshops

Sep 2019 **"2019 Winter School on Brain Connectomics - 3rd Edition"**, sponsored by PhD School in Natural Sciences and Engineering and Dept. of Computer Science University of Verona, MICCAI, Brain Research Foundation. Sep 23-27, 2019, Dept. of Computer Science, University of Verona, Italy. Co-president of the Scientific and Organizing Committee. <http://brainconnectomics.org>

- Oct 2017 **"2017 IEEE SPS Winter School on Brain Connectomics - 2nd Edition"**, sponsored by PhD School in Natural Sciences and Engineering and Dept. of Computer Science University of Verona, IEEE Signal Processing Society, MICCAI, Brain Research Foundation. Oct 09-13, 2017, Dept. of Computer Science, University of Verona, Italy. Co-president of the Scientific and Organizing Committee. <http://brainconnectomics.org/archive/2017/index.html>
- Sep 2016 **"2016 Summer School on Brain Connectomics - 1st Edition"**. Sponsored by PhD School in Natural Sciences and Engineering and Dept. of Computer Science University of Verona, Fondazione Bruno Kessler, MICCAI, ISMRM Italian Chapter, AINR, University of Trieste. Sep 19-22, 2016, Dept. of Computer Science, University of Verona, Italy. Member of the Organizing Committee and Tutor for the lab session on Functional Imaging. <http://brainconnectomics.org/archive/2016/index.html>
- Mar 2012 **International Workshop on: "Multimodal Brain Imaging in Epilepsy"**, Mar 23, 2012, Dept. Neurosciences, Biomedicine and Movement Sciences, University of Verona, Italy. Member of the Local Organizing Committee.
- May 2008 **International Workshop on: "Coregistration EEG-fMRI and epilepsy"**, May 30, 2008, Policlinico Universitario G.B.Rossi, Verona, Italy. Member of the Local Organizing Committee.
- Jan 2008 **International Workshop on: "Dense Array EEG and Epilepsy"**, Jan 26, 2008, Policlinico Universitario G.B.Rossi, Verona, Italy. Member of the Local Organizing Committee.

Editorial Responsibilities

- 2017-ongoing **Associate Editor** for *BioMedical Engineering OnLine* (Springer Nature)
IF2022: 3.8
<https://biomedical-engineering-online.biomedcentral.com/about/editorial-board>
- 2022-ongoing **Associate Editor** for *IEEE Journal of Biomedical and Health Informatics J-BHI - (IEEE)*, IF2022: 7.7
<https://www.embs.org/jbhi/associate-editors/>
- 2023-ongoing **Editorial Board Member** for *Scientific Report* (Springer Nature), IF2022: 4.9
https://www.nature.com/srep/about/editors#engineering_section
- 2012-13 **Guest Editor** for *Frontiers in Neurology - Epilepsy*
Co-editor of the Research Topic "The role of neuroimaging in the pre-surgical evaluation of the epileptic patient".
<https://www.frontiersin.org/research-topics/1300/the-role-of-neuroimaging-in-the-pre-surgical-evaluation-of-the-epileptic-patient>
- 2020-21 **Lead Guest Editor** for *Electronics* (MDPI)
Co-editor of the Special Issue "Machine Learning applied to Medical Image Analysis".
https://www.mdpi.com/journal/electronics/special_issues/Medical_Image
- 2022-23 **Guest Editor** for *Frontiers in Neuroscience-Brain Imaging Methods*

Co-editor of the Research Topic "Chasing Brain Dynamics at Their Speed: What Can Time-Varying Functional Connectivity Tell Us About Brain Function?". The following Editorial has been written to accompany the research topic: [IE1-2023].

<https://www.frontiersin.org/research-topics/34359/chasing-brain-dynamics-at-their-speed-what-can-time-varying-functional-connectivity-tell-us-about-brain-function>

2022-23 **Lead Guest Editor** for *Frontiers in Human Neuroscience*

Co-editor of the Research Topic "Brain-Connectivity - Based Computer Interfaces". The following Editorial has been written to accompany the research topic: [IE2-2023].

<https://www.frontiersin.org/research-topics/32047/brain-connectivity-based-computer-interfaces>

2023-25 **Lead Guest Editor** for *Sensors (MDPI)*

Co-editor of the Special Issue "Brain Computer Interface for Biomedical Applications".

https://www.mdpi.com/journal/sensors/special_issues/1P9YC6R70K

2017 **Editorial Board Member** for *BioMedical Engineering OnLine (Springer Nature)*

<https://link.springer.com/journal/10548/editors>

2017-ongoing **Review Board Member** for *Brain Topography (Springer Nature)*, IF2022: 3.4

<https://link.springer.com/journal/10548/editors>

2021 **Conference Program Committee** "International Conference on Image Processing and Vision Engineering" - IMPROVE 2021

<https://improve.scitevents.org/ProgramCommittee.aspx?y=2021>

2023 **Member of Scientific Committee** "VII National Congress of Bioengineering" - Padova, June 21-23 2023.

<http://gnb2023.it/scientific.html>

Accademic Services

Reviewer for international grants

2018 Swiss National Science Foundation (SNF).

Reviewer for Doctoral Theses

2021, 2026 External reviewer for two Ph.D. theses, University of Trieste (Industrial and Information Engineering).

Referee activity

- Since 2010 Referee for several international peer-reviewed journals, including Journal of Neuroscience Methods, Journal of Neuroengineering and Rehabilitation, Experimental Brain Research, IEEE Transactions on Biomedical Engineering, PloS One, Brain Topography, Biomedical Signal Processing and Control, EURASIP Journal on Image and Video Processing, IEEE Journal of Biomedical and Health Informatics, BioMedical Engineering OnLine.
- Since 2014 Referee for several international and national conferences, including Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC; International Workshop on Pattern Recognition in Neuroimaging, PRNI; International Conference on Biological Information and Biomedical Engineering, BIBE; International Symposium on Biomedical Imaging, ISBI, Gruppo Nazionale Bioingegneria (GNB).

Awards

- 2025 Awarded at the National Congress of the Italian Association of Physiotherapy (AIFI), Milan, Nov 28-29, 2025 for best presentation in the "Digital Technologies" category with the contribution "Motor-Cognitive Interaction in Multiple Sclerosis: AI-driven Integration of EEG and Motor Assessment in a Dual-Task Paradigm." *N. Valè, I. Siviero, M. Crestani, A. Baroni, A. Pasini, A. Ramos-Murguialday, S. Straudi, A. Gajofatto, M. Gandolfi and S.F. Storti.*
- 2019 Best Paper Award: "EEG-Based Workload Index as a Taxonomic Tool to Evaluate the Similarity of Different Robot-Assisted Surgery Systems" at the 3rd International Symposium on Human Mental Workload: Models and Applications, H-WORKLOAD 2019, Nov 14-15, Rome, Italy. <http://hworkload.org/2019/awards/>
- 2018 Best Poster Award "Vector graphs could reveal functional polymorphism of brain regions" at the 2nd International Workshop on Connectomics in NeuroImaging (CNI) held in conjunction with MICCAI 2018, September 20th, 2018, Granada, Spain.
- 2012 Paul Durst Prize awarded by the National Group of Bioengineering for the best Italian Ph.D. Thesis in Bioengineering.
- 2008 Oral Presentation Award "Continuous EEG-fMRI study in patients with partial epilepsy and focal interictal slow-rate discharges on EEG", at the 13th European Congress of Clinical Neurophysiology, May 9, 2008, Istanbul, Turkey.

Visiting and Mobility Programs

Supervisor for Erasmus+ Mobility (Traineeship and Study)

- 2024 Outgoing mobility: supervisor of Matteo Sartor (BSc student) visiting BrainCapture APS, Denmark (Erasmus+ Traineeship).

- 2025 Outgoing mobility: supervisor of Sogand Ghasemi (MSc student) visiting the Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany (Erasmus+ Traineeship).
- 2024 Incoming mobility: supervisor of Bruna Ferreira (MSc student), University of Porto, Portugal (Erasmus+ Study).

Visiting Researcher Programs

- 2024 Winner of the Visiting Call for Applications, Internationalization Program – Category B (2023 edition). Grant awarded to host Prof. Sergey Plis (Georgia State University, USA) as visiting researcher at the Department of Engineering for Innovation Medicine. Stipend: €1.7K.
- Oct–Dec 2023 Winner of the Visiting Call for Applications, Internationalization Program – Category B (2022 edition). Grant awarded to host Dr. Marco Pizzolato (Technical University of Denmark, Denmark) as visiting researcher at the Department of Engineering for Innovation Medicine. Stipend: €1.5K.

Erasmus+ Mobility Inter-institutional Agreements

- 2025–ongoing Coordinator for Erasmus+ Study agreement with Universidade Católica Portuguesa – Porto (P LISBOA01), field 0710 – Bioengineering. Mobility for undergraduate and postgraduate students and teaching staff.

Teaching

Ongoing

- AY2025-26 **Teacher** for the *Master's Degree in in Computer Engineering for Intelligent Systems, Advanced methods for biomedical signal processing* (University of Verona, Italy), 6 CFU: 30h theory; 12h lab, SSD IBIO-01/A.
- AY2023-24–
today **Teacher** for the *Bachelor's course in Human Centered Medical System Engineering, Modeling and analysis of biological systems* (University of Verona, Italy), 3 CFU: 16h theory; 12h lab, SSD IBIO-01/A.
- AY2025-26 **Teacher** for the *Bachelor's degree in Computer Engineering for Robotic and Intelligent Systems* and *Bachelor's course in Bioinformatics, Statistical Methods for Engineering* (University of Verona, Italy), 6 CFU: 32h theory; 24h lab, SSD IINF-05/A.

Past

- AY2020-21-
AY2024-25 **Teacher** for the *Doctoral School on Natural and Engineering Sciences*, "**Brain Computer Interfaces**" (University of Verona, Italy).
PhD in Computer Science: 2 CFU: 8h, AY2020-21, AY2022-23; 3 CFU: 12h, AY2021-22.
PhD in Intelligent Systems: 3 CFU: 12h, AY2024-25.
This course aims to provide an introduction to the fundamentals of Brain Computer Interfaces (BCI) with a focus on the analysis of oscillatory EEG activity from a signal processing perspective. The objective is to understand how brain activity can be processed and translated in a control signals for real-time BCI systems. The course is divided into two parts. The first part covers topics including the BCI model, different types of BCI systems and their associated signal processing techniques, performance evaluation of these systems, limitations of current BCI paradigms, and a wide range of BCI applications. The second part focuses on practical work with hands-on BCI design and implementation, as well as an introduction to real-time EEG signal processing.
- AY2019-20
AY2024-25 **Teacher** for the *Bachelor's course in Computer Science*, **Biomedical Data and Signal Processing** (University of Verona, Italy) (6 CFU: 32h theory; 29h lab - AY2019-20; 32h theory; 24h lab - AY2020-21; AY2021-22; AY2022-23; AY2023-24; AY2024-25), SSD ING-INF/06. Mutual course with "Modeling and analysis of biological systems" for the *Bachelor's course in Human Centered Medical System Engineering* in AY2023-24, AY2024-25 for 3 CFU: 16h theory; 12h lab
- AY2018-19-
AY2024-25 **Teacher** for the *Bachelor's course in Computer Science* and *Bachelor's course in Bioinformatics*, **Probability and Statistics** (University of Verona, Italy) (8 CFU: 32h theory; 48h lab, AY2018-19; 6 CFU: 33h theory; 26h lab, AY2019-20; 6 CFU: 32h theory and 24h lab, AY2020-21, AY2021-22). Teacher for the Bachelor's course in Bioinformatics, 6 CFU: 32h theory; 24h lab, SSD MED-06, AY2022-23, AY2023-24, and AY2024-25.
- From
AY2008-09 to
AY2017-18 **Teaching Assistant** for Master's course in Bioengineering (University of Padova, Italy), Master's course in Bioinformatics and Medical Biotechnology, Master's course in Computer Science and Engineering, and Bachelor's course in Bioinformatics (University of Verona, Italy), Master's course in Mathematics (University of Trento, Italy), Post-Degree Graduate Course, 1st level, in Information Elaboration of Biomedical data and Telecontrol in medicine (University of Verona, Italy).

Advising

Ongoing - PhD Students

- Oct 2023 - **Supervisor of a PhD Student** (Edoardo Paolini - XXXIX cycle - PhD in Computer Science - University of Verona) with a research project on "Development of EEG-TMS systems based on connectomics for personalized treatment of epilepsy" - DM118-PNNR. Winner of two scholarships for a period of 6 months abroad (Harvard Medical School - USA): Blanceflor and mobility grants UniVR reserved to PhD students: non-EU destinations.
- Oct 2022 - **Supervisor of a PhD Student** (Ettore Cinquetti - XXXVIII cycle - PhD in Computer Science - University of Verona) with a research project on "Enhanced safety in Industry 5.0: Development of passive BCI with deep learning architectures for vigilance prediction". Winner of a scholarships for a period of 6 months abroad (INRIA Center at the University of Bordeaux - France): Erasmus+ Student Mobility for Traineeships.

Ongoing - Postdoc Researchers

- Feb 2023 - **Supervisor of a Post-doc Scholar - AdR4492/23** (Nicola Valè - Dept. of Engineering for Innovation Medicine - University of Verona) with a research project on "Modeling brain dynamics, connectivity, and plasticity with eXplainable AI", SSD ING-INF/06 (funded by #NextGenerationEU - MNESYS Project, Spoke2) Feb 2023-Jan 2026. From Jan 2026- Jan 2027 co-funded by FISM.

Past - Postdocs and PhD Students

- Jan 2022 - **Co-supervisor of a PhD Student** (Ilaria Siviero - XXXVII cycle - PhD in Computer Science - University of Verona) with a research project on "AI4Health: empowering Telemedicine through explainable AI methods for personalized diagnosis, monitoring and treatment" (PON Ricerca e Innovazione).
- Ago 2023 - **Supervisor of a Post-doc Scholar - AdR4227/23** (Ilaria Boscolo Galazzo - Dept. of Computer Science - University of Verona) with a research project on "eXplainable AI-based integration and modeling of multimodal data and brain connectomics for precision medicine", SSD ING-INF/06 (funded by #NextGenerationEU - MNESYS Project, Spoke2).
- Jan 2023 - **Supervisor of a Post-doc Scholar - AdR3850/21** (Federica Cruciani - Dept. of Computer Science - University of Verona) with a research project on "AI4Health: integrazione e modellazione di dati di neuroimaging multimodali mediante eXplainable AI in ambito clinico", SSD ING-INF/05 (funded by MIUR D.M. 737/2021, University of Verona).
- Sep 2020 - **Supervisor of a Post-doc Scholar - AdR3554/20** (Francesca Stival - Dept. of Computer Science - University of Verona) with a research project on "BCIConnect: EEG-based connectivity for BCI in robotic device control", SSD ING-INF/06 (funded by Dept. of Computer Science, University of Verona).

Ago 2019 - **Supervisor of a Post-doc Scholar - AdR3309/19** (Lorenza Brusini - Dept. of
 Jul 2020 Computer Science - University of Verona) with a research project on "Modeling
 of brain microstructure informed-connectomics for improved transcranial magnetic
 stimulation anchoring", SSD ING-INF/06 and INF01 (funded by Dept. of Computer
 Science, University of Verona).

Past - Research Fellows

Apr 2023 - **Supervisor of a Graduate Student - BO07/23** (Edoardo Paolini - Dept. of
 Sep 2023 Computer Science - University of Verona) with a research project on "Sviluppo di
 algoritmi di apprendimento automatico per il monitoraggio e la predizione di dati
 biomedici per la sicurezza sul lavoro nell'industria 4.0" (funded by OPERA 4.0,
 University of Verona).

Apr 2022 - **Supervisor of a Graduate Student - AdR3916/22** (Ettore Cinquetti - Dept. of
 Sep 2022 Computer Science - University of Verona) with a research project on "Passive BCI
 for the user mental workload assessment during work processes in Industry 4.0", SSD
 ING-INF/06 (funded by OPERA 4.0, University of Verona).

Supervision of Bachelor/Master Students

Summary	Undergraduate	Master
Thesis Advisor	41	6
Company Stage Advisor	53	8
Academic Stage Advisor	9	7
Thesis Co-Advisor	4	9
Stage Co-Advisor	5	13

Membership of Scientific Societies

Ongoing

2019-ongoing National Group of Bioengineering (Gruppo Nazionale di Bioingegneria, GNB)
 2019-ongoing IEEE and IEEE Signal Processing Society
 2024-ongoing IEEE Engineering in Medicine and Biology Society (EMBS)

Past

2009,10,13,16 Organization for Human Brain Mapping (OHBM)
 2014 International Society for Magnetic Resonance in Medicine (ISMRM)
 2016 Italian Society of Clinical Neurophysiology (SINC)

Main Research Activity

Dynamics and Brain Connectivity

The main research activity consists in the development of new approaches for modeling the brain functional connectivity in the healthy and pathological brain. The brain is a complex system in which neurons or brain regions organize themselves into different dynamic connectivity patterns based on functional needs. The main purpose is to demonstrate the existence of an integrated functional activity of different brain areas and determine when the connections between the areas (and, therefore, the network) show altered functional patterns. To support this, the graph theory, applied to non-invasive brain data such as electroencephalogram (EEG) / high-density EEG, functional magnetic resonance imaging (fMRI), and arterial spin labeling (ASL), allows characterizing temporal dynamics and decoding the functional connectivity patterns of the brain. The goal is to extract the most significant characteristics of the network organization under normal conditions, mainly related to real motor functions or imagined and in neurological diseases, integrating the information deriving from multiple neuroimaging modalities such as EEG, EEG-TMS, fMRI, ASL, and diffusion MRI.

■ [brAIIn] Models of brain dynamics, connectivity, and plasticity based on AI

2019-ongoing *(Main collaborations related to MNESYS e DM737: Perception and Awareness (PandA) Lab, UniVR - Prof.ssa Silvia Savazzi, Dott.ssa Chiara Mazzi; Fondazione Don Carlo Gnocchi Milano - Dott.ssa Francesca Baglio, Dott.ssa Valeria Blasi e Università degli Studi della Campania Luigi Vanvitelli - Prof. Fabrizio Esposito, coordinator of WP4-MNESYS; Prof. Marialuisa Gandolfi, Cognitive Rehabilitation Research Center, UniVR.)*

The research focuses on improving our understanding of the brain using AI methods. We explore how the brain works in both healthy and diseased states, with particular emphasis placed on understanding neural dynamics and plasticity. In addition, we combine neuroimaging and physiological data to better plan surgeries and predict their outcomes. Key focus areas include the development of frameworks for multi-layer connectome analysis and automated extraction of neuronal connectivity features using AI methods. By doing this, a deeper comprehension of brain function and pathology is pursued, with the goal of advancing medical interventions and treatment strategies.

■ [Multi4Epilepsy] Multimodality, Connectomics, and Functional Dynamics in Epilepsy

2008-ongoing A major problem in pre-surgical patient selection is the correct identification of the epileptogenic zone, especially in patients with negative MRI. Standard pre-surgical workup includes long-term EEG recording, video-EEG, MRI, and neuropsychological evaluation. When localization of the epileptic focus is uncertain, further techniques may include positron emission tomography (PET), ictal and interictal single-photon emission computed tomography (SPECT), EEG-functional MRI (fMRI), high-density EEG, and invasive EEG recording. EEG-fMRI can provide information on the hemodynamic changes as a consequence of the abnormal neural activity generating IEDs. Differently, the source analysis estimates the current density of the source that generates a measured electric potential, and it yields a plausible dipole localization of irritative regions. Source analysis involves numerous scalp electrodes, high-density EEG, and realistic head models derived from structural MRI. EEG-fMRI coregistration and high-density EEG can be combined to map noninvasively abnormal brain activation elicited by epileptic processes. The aim is to identify by means of multimodal, noninvasive assessment the epileptogenic zone to be resected. Advanced methods for modeling ictal and interictal activity combine and integrate high-density EEG, EEG-fMRI, and other imaging data as arterial spin labeling (ASL), and PET data. The second aim is to validate the aforementioned multimodal investigation approach with the stereo-EEG results in each patient, given that stereo-EEG remains the only reliable method to define the epileptogenic zone (the gold standard). The use of noninvasive methods to identify the epileptic zone could reduce the need for more expensive stereo-EEG investigations while providing a better diagnostic definition of patients with complex epilepsy. The main national and international collaborations (*Prof. P. Manganotti, University of Trieste; Dr. R. Mai, Ospedale Cà Granda Niguarda, Milan; Prof. M.C. Michel, Functional Brain Mapping Laboratory, University of Geneva*) have led to numerous scientific publications on the topic, 2008-2014. The recent collaboration with *Harvard Medical School (Prof. Eleonora Tamilia and Prof. Alexander Rotenberg)* promises to further consolidate the research developed over the years and to extend it to the pediatric context as well, 2023-ongoing.

■ [DeepBrain] Study of brain activity for the prevention of oxygen toxicity during immersion.

2012-ongoing (*in collaboration with the Italian Navy, COMSUBIN, Le Grazie, La Spezia, Italy; University La Sapienza - Prof. L. Pastena; Dept. of Neuroscience, Section of Rehabilitation - University of Padova - Dr. E. Formaggio*)

Oxygen toxicity is a problem in diving, with potentially fatal consequences for the diver in the water. When divers use a closed-circuit oxygen rebreathing apparatus, they are breathing O_2 100% and are exposed to hyperoxide conditions. In this scenario, the body could be affected differently depending on the exposure type. The electrical activity of the brain is sensitive to its oxygen supply. In this project, we study the source and functional connectivity through brain sources to evaluate the physiological effects of oxygen breathing and to delineate different diving profiles, providing indications on the potential risk of a dive. The project targets the acquisition and processing of signals from distributed wearable body sensors in extreme conditions, that is during under-water training and operation of divers of the ComSubIn. Even though this could be considered a niche project, it would provide the unique opportunity to investigate the modulation of the physiological and neurophysiological activity in such critical scenarios unveiling mechanisms that could not be observed in normal laboratory conditions and opening new perspectives in neural modulation. This is not only unique but also poses an outside-the-norm technical challenge.

Brain Computer Interfaces

This project intends to fill the gap between the human brain and external devices in the framework of motor-imagery (MI)-based brain computer interfaces (BCIs) technologies. The BCI is a system able to read voluntary changes in brain activity and then translate neural signals into a message or a computational command in real-time. Among the various types of systems, a non-invasive BCI based on EEG and MI transforms neuroelectric signals derived from motor regions into command outputs for external effectors. The success of translating the signal in messages depends on several methodological contributing factors, i.e., decoding algorithms, calibrated on the motor regions using a suitable representation of the data that simplifies the classification or detection of specific brain patterns. The state-of-the-art devices provide good performance albeit limited, particularly when few EEG electrodes are used, calling for novel approaches. In answer to this call, we propose new methods for extracting discriminative features to distinguish different mental movements within a multivariate and deep learning framework. The system is trained to decode the brain activity during MI tasks using the coupling information or causal influence between signals.

■ [Brain-RESTORE] Development of Brain Computer Interfaces for Rehabilitative Purposes.

2020-ongoing *(in collaboration with University of Tübingen, RamosLab, Prof. Ander Ramos Murguialday; Prof. Marialuisa Gandolfi, Neuromotor and Cognitive Rehabilitation Research Center (CRRNC), UniVR)*

The recent collaboration with Prof. Ramos and his team provides us with the opportunity to address challenges in motor rehabilitation, especially in uncontrolled settings, such as at home. In these real-world scenarios, signals like EMG, EEG from portable devices and inertial measurement unit (IMU) data are important for decoding continuous human actions and deciphering the related neural activity. Classical modeling methods, such as linear, adaptive, or static filters, lack the capacity to capture complex relationships between surface EMG and kinematics, as well as generalizability across subjects. We propose deep learning models for the continuous decoding of hand motion. Our approaches enhance wrist kinematics decoding providing a generalized model based on data captured with wearable devices. The findings hold potential for innovative home-based telemedicine solutions in motor rehabilitation.

■ [PassiveBCI] Development of passive BCIs through AI architectures for mental state prediction in Industry 5.0

2016-ongoing *(in collaboration with BrainSigns, spin-off of the University Sapienza, Rome - Prof. F. Babiloni)*

Passive BCI allows the monitoring of a subject's mental state, without the need of any active input. It has applications in fields where operator mistakes may cause severe accidents, such as air traffic control, plant surveillance, or driving. The first studies conducted between 2016 and 2019 in collaboration with Prof. Babiloni and his team aimed to assess the level of brain engagement during tasks assigned to surgical apprentices at UniVR, using both the "Da Vinci" system and the Actaeon simulator (BBZ s.r.l., UniVR). This approach allowed us to measure the cognitive reserve. Subsequently, starting from 2022, we explored the possibility of using passive BCI also in an industrial context, specifically by monitoring an operator's level of vigilance, which can be defined as the capacity to sustain one's attention during the realization of a task, and their mental workload, that is the effort furnished to respond to the task's demands. Both vigilance and mental workload fluctuations can be observed over time by analyzing the EEG, since they are associated with specific behaviors. The goal of the project is to create a deep learning pipeline for monitoring an operator's mental state in real-time, during the execution of prolonged activities and for predicting vigilance degradation during repetitive tasks. The model needs to alert operators by audio or video cues, should they become too tired to work without endangering themselves or the assembly procedure.

Scientific Production

Papers on International Peer-Reviewed Journals

- [IJ1-2008] Avesani M., Formaggio E., **Storti S.**, Alessandrini F., Bongiovanni L.G., Cordioli C., Beltramello A., Fiaschi A., and Manganotti P. f-MRI in epilepsy with spike and wave activity evoked by eye closure: different BOLD activation in a patient with idiopathic partial epilepsy with occipital spikes and a control group. *Neuroradiology Journal*, 21(2):159–165, 2008. ISSN: 1971-4009, doi: 10.1177/197140090802100201.

- [IJ2-2008] Formaggio E., Avesani M., **Storti S.F.**, Milanese F., Gasparini A., Acler M., Cerini R., Pozzi Mucelli R., Fiaschi A., and Manganotti P. Effect of a static magnetic field (1.5T) on brain oscillatory activities in resting state condition. *Neuroradiology Journal*, 21(5):629–635, 2008. ISSN: 1971-4009, doi: 10.1177/197140090802100504.
- [IJ3-2008] Manganotti P., Formaggio E., Gasparini A., Cerini R., Bongiovanni L.G., **Storti S.F.**, Pozzi Mucelli R., Fiaschi A., and Avesani M. Continuous EEG-fMRI in patients with partial epilepsy and focal interictal slow-wave discharges on EEG. *Magnetic Resonance Imaging*, 26(8):1089–1100, 2008. ISSN: 0730-725X, doi: 10.1016/j.mri.2008.02.023.
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- [IJ7-2010] **Storti S.F.**, Formaggio E., Beltramello A., Fiaschi A., and Manganotti P. Wavelet analysis as a tool for investigating movement-related cortical oscillations in EEG-fMRI coregistration. *Brain Topography*, 23(1):46–57, 2010. ISSN: 0896-0267, doi: 10.1007/s10548-009-0117-2.
- [IJ8-2010] Manganotti P., Acler M., Formaggio E., Avesani M., Milanese F., Baraldo A., **Storti S.F.**, Gasparini A., Cerini R., Mucelli R.P., and Fiaschi A. Changes in cerebral activity after decreased upper-limb hypertonus: An EMG-fMRI study. *Magnetic Resonance Imaging*, 28(5):646–652, 2010. ISSN: 0730-725X, doi: 10.1016/j.mri.2009.12.023.
- [IJ9-2010] Borelli P., Avesani M., Formaggio E., **Storti S.F.**, Zanoni T., Moretto G., Fiaschi A., Cerini R., and Manganotti P. EEG-fMRI as an useful tool to detect epileptic foci associated with secondary bilateral synchrony. *Seizure*, 19(9):605–608, 2010. ISSN: 1059-1311, doi: 10.1016/j.seizure.2010.09.001.
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- [IJ11-2011] Piccione F., Cavinato M., Manganotti P., Formaggio E., **Storti S.F.**, Battistin L., Cagnin A., Tonin P., and Dam M. Behavioral and neurophysiological effects of repetitive transcranial magnetic stimulation on the minimally conscious state: A case study. *Neurorehabilitation and Neural Repair*, 25(1):98–102, 2011. ISSN: 1545-9683, doi: 10.1177/1545968310369802.

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- [IJ13-2011] Manganotti P., Brigo F., Zoccatelli G., Alessandrini F., Pizzini F.B., Beltramello A., **Storti S.F.**, Formaggio E., Fiaschi A., and Bongiovanni L.G. Highly focal BOLD activation on functional MRI in a patient with progressive myoclonic epilepsy and diffuse giant somatosensory evoked potentials. *Epilepsy and Behavior*, 20(3):579–582, 2011. ISSN: 1525-5050, doi: 10.1016/j.yebeh.2011.01.011.
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Verona, Mar 13th, 2026

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