

Curriculum Vitae - Sara Spadone

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Academic History

- April 24, 2012 - **Ph.D. Degree** in “Functional Neuroimaging: from cells to systems” at the “G. d’Annunzio” University of Chieti, Italy. Thesis title: “*Development of methods for characterizing brain activity and connectivity*” (Scientific Sector PHYS-06/A ex FIS/07).
- July 22, 2008 - **Master’s Degree in Biomedical Engineering** at the Polytechnic University of Milan, Italy, with final mark 110/110 cum laude. Title of the thesis: “*Classification of independent components for the analysis of magnetoencephalographic signals*”.

Current Position

- From November 2025, **Tenure-Track Researcher (RTT)** in Physics for Life Sciences, the Environment and Cultural Heritage (PHYS-06/A) at the Departmental Faculty of Medicine, Saint Camillus International University of Health Sciences (UniCamillus)

Previous Positions

- July 2023 – October 2025, **collaborator** at the “*Innovative Instrumentation Laboratory: methods and applications*” of the Department of Neuroscience, Imaging and Clinical Sciences, “G. D’Annunzio” University of Chieti-Pescara, Italy and Tenured Physics **Teacher** at the “E. Alessandrini” Upper Secondary School, Montesilvano, Italy.
- July 2020 – June 2023, **Researcher RTD-A** at the Department of Neuroscience, Imaging and Clinical Sciences of the “G. d’Annunzio” University of Chieti-Pescara, Italy – project *OxiNEMS* (Grant: Horizon 2020 - OXiNEMS) Scientific Sector PHYS-06/A ex FIS/07.
- December 2016 – June 2020, **Postdoctoral Research Fellow** at the Department of Neuroscience, Imaging and Clinical Sciences of the “G. d’Annunzio” University of Chieti, Italy. Scientific Sector PHYS-06/A ex FIS/07.
- April 2015 – November 2016, **Postdoctoral Research Fellow** at the Department of Physiology and Pharmacology "Vittorio Erspamer", Sapienza University of Rome, Italy. (S.S.D. BIO/09).
- May 2012 – March 2015, **Postdoctoral Research Fellow** at the Department of Neuroscience, Imaging and Clinical Sciences, “G. D’Annunzio” University of Chieti-Pescara, Italy. Scientific Sector PHYS-06/A ex FIS/07
- 2009 – 2011, **Ph.D. Student** at the Department of Neuroscience and Imaging of “G. D’Annunzio” University of Chieti-Pescara. Scientific Sector PHYS-06/A ex FIS/07.

Visiting Researcher

- January – April 2020, **Visiting Researcher** at the Department of Psychophysiology, Jagiellonian University, Krakow, Poland, as part of the university's international mobility programs. Conducted research in Prof. Wyczęsany’s laboratory on the project “*Study of MEG Source-Space Directional Connectivity through Directed Transfer Function*”

Teaching Activity

Teaching Activities in Bachelor's Degree Programs

- 2025/26, Professor of *Applied Physics*, Unicamillus University of Rome.
- 2025/26, Tutor for the filter semester of the Veterinary Medicine degree program, University of Teramo (30 hours of Physics teaching)
- 2020/21 – 2022/23, Professor of *Applied Physics* and *Informatics* for Bachelor's Degrees courses in the Healthcare Professions, "G. d'Annunzio" University of Chieti-Pescara. 2 ects for 2020/21, 8 ects for 2021/22, 12 ects for 2022/23.
- August – September 2018, 2019, 2020, Lecturer for the *Physics Preparation Course* for admission tests to Medicine and Surgery and Healthcare Professions degree programs, "G. d'Annunzio" University of Chieti-Pescara, Italy. 20 hours in 2020 and 12 hours in 2018 and 2019.
- 2012/13 – 2019/20, Teaching Assistant "*Expert in the field*" in Applied Physics (FIS/07), "G. d'Annunzio" University of Chieti-Pescara, Italy.
- 2009/10 – 2019/20, Tutor for the *Applied Physics Laboratory*, School of Medicine, "G. d'Annunzio" University of Chieti-Pescara, Italy.

Teaching Activities in Master's Degree Programs

- 2020/21 – 2022/23, Professor of the "*MEG/EEG Graph Theory analysis laboratory*" in the Second-Level Master's Program "Neuroimaging: from Methods to Applications in Neuroscience", "G. d'Annunzio" University of Chieti-Pescara, Italy (2 ects, 8 hours).

Teaching Activities in Ph.D. Programs

- 2021/22 – 2022/23, Professor of "*Spectral Analysis in EEG and MEG*" (1 ects) for Ph.D. Courses "Neuroscience and Imaging", "G. d'Annunzio" University of Chieti-Pescara and "Theoretical and Applied Neuroscience", University of Camerino, Italy. Scientific Sector PHYS-06/A ex FIS/07.
- 2020/21, Professor of "Topological analysis of functional connectivity" (1 ects) for the Ph.D. Course "Neuroscience and Imaging", "G. d'Annunzio" University of Chieti-Pescara. Scientific Sector PHYS-06/A ex FIS/07.

Invited Teaching Activities

- June 2017, Tutor for *Magnetoencephalography* at the *AIP School in Neuroscience Methodology and Imaging*.

Grants

Role: PI

- 2014 – 2015, project title: "*Methods to study dynamic reorganization of brain connectivity networks during a task*" (Al.FO Project within the P.O.F.S.E. Abruzzo 2007-2013 to fund a one-year research fellowship at the University of Chieti-Pescara).
- 2010, project title "*Multivariate classification of independent components for the analysis of the intra- and inter-subject consistency of the spatio-temporal dynamics of electroencephalographic brain activations*" (RECOTESSC Project within the P.O.F.S.E. Abruzzo 2007-2013 to fund a three months research period at national non-regional research facilities).

- 2008, project title: “*Multivariate classification of independent components obtained from ICA decomposition for the analysis of magnetoencephalographic signals*” (IN_CO Project within the POR Abruzzo Objective 3 2000-2006 to fund a three month Research Fellowship at the University of Chieti-Pescara.

Role: participant

- 2020 – 2023, *Oxide Nanoelectromechanical Systems for Ultrasensitive and Robust Sensing of Biomagnetic Fields – OxiNEMS* (H2020-FETOPEN-2018-2019-2020-01) N. 828784 01/05/2019. Participant of UdA unit as a Researcher RTD-A.
- 2017 – 2018, Project Title: “*Unraveling the neural mechanisms of human memory decisions with magnetoencephalography*”. Research bursary-BIAL Foundation Grant n°: 159-2016. Participant of UdA unit as a Postdoctoral Research Fellow.
- 2015 – 2016, *TENECO - Tele-Neurosurgery Support System*. Funded by a regional grant (Lazio region). Participant as a Postdoctoral Research Fellow.
- 2010 – 2012, MRI Instrumentation for combined MEG-MRI. Funded by the PRIN Program (Projects of Relevant National Interest Research) (PRIN 2008KXYSP9_002). Participant as a Ph.D. student.

Coordination of national and international research groups, or participation in them

Coordination of research groups

- 2022, Co-tutor of a Ph.D. student in “*Theoretical and Applied Neuroscience*”, University of Camerino, in collaboration with “G. d’Annunzio” University of Chieti-Pescara (XXXVIII cycle), with a project entitled “*Methods to Study the Mechanisms for Large-Scale Functional Connectomics*”

Participation to research groups

- From 2020, participation in the research activities of the UdA unit within the OxiNEMS project (H2020-FETOPEN-2018-2019-2020-01, No. 828784), featuring international collaborations and coordinated by the CNR unit in Genoa. Participating institutions: “G. d’Annunzio University, Chalmers University of Technology (Sweden), University of Hamburg (Germany), Quantified Air BV (Netherlands), META group (Italy).
- From 2018, participation in the research activities of Dr. Baldassarre and Dr. Pavone’s group (IRCCS NEUROMED, Pozzilli). Within this collaboration, I was responsible for designing and applying methods to study the association between the degree of spatial neglect and both static and dynamic brain connectivity in patients with right-hemisphere stroke, using functional magnetic resonance imaging, as part of the project “*Understanding Neural Mechanisms of Spatial Neglect by Linking Anatomical Damage to Resting-State Functional Connectivity*” funded by the Italian Ministry of Health (Code: GR-2013 02358806).
- From 2018, participation in the research activities of the group involving Prof. Mirosław Wyczesany (Jagiellonian University, Krakow) and Prof. Capotosto (University of Chieti-Pescara). Within this collaboration, I focused on optimizing the Directed Transfer Function (DTF) for the dynamic analysis of frequency-band-specific directional connectivity at the level of magnetoencephalography (MEG) brain sources.
- From 2011, participation in the research activities of the group involving Prof. Maurizio Corbetta (University of Padua and Washington University in St. Louis), Prof. Stefania Della Penna (University of Chieti-Pescara), Prof. Paolo Capotosto, and Prof. Carlo Sestieri (University of Chieti-Pescara). Within this collaboration, I was responsible for designing and applying methods to study time–frequency brain activity and dynamic connectivity using

electroencephalography (EEG), magnetoencephalography (MEG), and functional magnetic resonance imaging (fMRI), as part of the EU FP7 Grant 200728 (*BrainSynch*).

Talks at national and international conferences

Invited talks

- “*Multimodal imaging of brain activity and connectivity reorganization following different attention operations*”, International Workshop “*Integration of NMR and MRI with other techniques in Brain Imaging*”, supported by Italian Group for Discussion on Magnetic Resonance (GIDRM), held at ITAB, University G. D’Annunzio of Chieti-Pescara, May 30-31, 2019.
- “*Beta band communication flow within DAN controls attentional processes*” within the symposium “*Modulation of emotional responses*”, NEURONUS 2020 IBRO Neuroscience Forum, Krakow, Poland, December 9-11, 2020.
- “*The beta band as the spectral signature of control signals in the DAN during attentional reorienting*” within the symposium “*Frequency band specific markers of cognitive and sensorimotor processes*”, XXIX Meeting of the Italian Psychophysiology and Cognitive Neuroscience Society (SIPF), Palermo, Italy, September 30-October 2, 2021.
- “*Impact of pick-up loop design on analysis of on-scalp MEG data*” within the symposium “*Trends on on-scalp magnetoencephalography*”, EMBC 2022, Glasgow, UK, July 11-15, 2022.
- “*Analysis of dynamic properties of brain activity and connectivity*”, internal seminars of the Department of Neuroscience, Imaging and Clinical Sciences, University G. D’Annunzio of Chieti-Pescara, November 24, 2022.

Talks

- “*Different rhythm modulations serve different mechanisms during reorienting of visuospatial attention*”, XXVI Meeting of the Italian Psychophysiology and Cognitive Neuroscience Society (SIPF), Torino, Italy, November 15-17, 2018.

Third Mission Activities

Contribution to the development of the open-source **ATLANTIS PROCESSING TOOLBOX** (<https://atlantis.psychologia.uj.edu.pl/>). The tool is used to study spectral directional dynamic connectivity through the Directed Transfer Function for MEG and EEG data.

Awards

Degree Awarded by the DSU of the Polytechnic University of Milan, A.A. 2007/2008, July 2008 session.

Others Titles

Qualifications

- May 2023 – National Scientific Qualification for the position of Associate Professor of Applied Physics (Academic Recruitment Field 02/D - Applied Physics, Physics Teaching and History of Physics). Qualification valid from 23/05/2023 to 23/05/2035.
- 2021 – Qualification for teaching class A020 - Physics in upper secondary schools, Ordinary STEM competition, art. 59 of D.L. 73/2021.

- 2009 – qualification to practice as an Engineer, registered with the Order of Engineers of the Province of Pescara, registration number 2132.

Referee's Activity:

Peer-reviewed journals:

- From 2017, Reviewer for NeuroImage, Elsevier ed., Nature Scientific Reports, Human Brain Mapping, Frontiers in Human Neuroscience, Brain Sciences, IEEE Transactions on Cognitive and Developmental Systems, Entropy.
- From 2022, Review Editor for Frontiers in Human Neuroscience, Brain Imagin and Stimulation section (ISSN 1662-5161).

International grants:

- From 2017, Reviewer of four project proposals for the Poland National Science Centre (Narodowe Centrum Nauki - NCN; <http://www.ncn.gov.pl>), a government agency responsible for public funding of scientific research in Poland.

General scientific interest

My research activity has primarily focused on the design, development, and application of advanced methodologies for extracting information in the time and frequency domains from functional neuroimaging data, with a specific interest in magnetoencephalography (MEG), functional magnetic resonance imaging (fMRI), and electroencephalography (EEG), as well as their multimodal integration. I gained extensive experience in the analysis and classification of signal power modulations and interactions between brain regions, both at the sensor and source levels. In particular, my research activity aims to design methodologies to characterize brain dynamics in healthy subjects and patients during cognitive tasks, in the absence of stimuli, or during transitions from rest to task, and to predict behavioral responses from neural data.

Scientific Publications:

Co-author of 27 peer-reviewed publications in international journals (10 as first author and 12 without the Ph.D. Supervisor. Bibliometric indices according to Scopus: 600 total citations and H-index=13.

Papers in peer-reviewed journals

- [1] **Spadone S.**, de Pasquale F., Mantini D., Della Penna S. (2012), A K-means multivariate approach for clustering independent components from magnetoencephalographic data, *NeuroImage* 62 (3), 1912-1923.
- [2] Capotosto P., Tosoni A., **Spadone S.**, Sestieri C., Perrucci M.G., Romani G.L., Della Penna S., Corbetta M. (2013), Anatomical segregation of visual selection mechanisms in human parietal cortex, *Journal of Neuroscience* 33 (14), 6225-6229.
- [3] Sestieri C., Corbetta M., **Spadone S.**, Romani G.L., Shulman G.L. (2014), Domain-general signals in the cingulo-opercular network for visuospatial attention and episodic memory, *Journal of Cognitive Neuroscience* 26 (3), 551-568.
- [4] Calluso C., Tosoni A., Pezzullo G., **Spadone S.**, Committeri G. (2015), Interindividual variability in functional connectivity as long-term correlate of temporal discounting, *PLoS ONE* 10(3), e0119710.
- [5] Capotosto P., **Spadone S.**, Tosoni A., Sestieri C., Romani G.L., Della Penna S., Corbetta M. (2015), Dynamics of EEG rhythms support distinct visual selection mechanisms in parietal cortex: a simultaneous TMS-EEG study, *Journal of Neuroscience* 35 (2), 721-730.

- [6] **Spadone S.**, Della Penna S., Sestieri C., Betti V., Tosoni A., Perrucci M.G., Romani G.L., Corbetta M. (2015), Dynamic reorganization of human resting-state networks during visuospatial attention, *PNAS* 112 (26),8112-8117.
- [7] Capotosto P., Baldassarre A., Sestieri C., **Spadone S.**, Romani G.L., Corbetta M. (2017), Task and Regions Specific Top-Down Modulation of Alpha Rhythms in Parietal Cortex, *Cerebral Cortex*, 27 (10), 4815-4822.
- [8] **Spadone S.**, Sestieri C., Baldassarre A., Capotosto P. (2017), Temporal dynamics of TMS interference over preparatory alpha activity during semantic decisions, *Scientific Reports* 7(1), 2372.
- [9] Croce P., Zappasodi F., **Spadone S.**, Capotosto P. (2018), Magnetic stimulation selectively affects pre-stimulus EEG microstates, *Neuroimage* 176: 239-245.
- [10] Sinibaldi R., Conti A., Sinjari B., **Spadone S.**, Pecci R., Palombo M., Komlev V.S., Ortore M.G., Tromba G., Capuani S., Guidotti R., De Luca F., Caputi S., Traini T., Della Penna S. (2018), Multimodal-3D imaging based on μ MRI and μ CT techniques bridges the gap with histology in visualization of the bone regeneration processes, *Journal of Tissue Engineering and Regenerative Medicine* 12(3): 750-761.
- [11] **Spadone S.**, Croce P., Zappasodi F., Capotosto P. (2020), Pre-stimulus EEG microstates correlate with anticipatory alpha Desynchronization, *Frontiers Human Neuroscience* 14: 182.
- [12] Baldassarre A., Filardi M.S., **Spadone S.**, Della Penna S., Committeri G., (2021) Distinct connectivity profiles predict different in-time processes of motor skill learning. *Neuroimage* 238:118239.
- [13] Croce P., **Spadone S.**, Zappasodi F., Baldassarre A., Capotosto P., (2021) rTMS affect EEG microstates dynamic during evoked activity. *Cortex* 138:302-310.
- [14] de Pasquale F., **Spadone S.**, Betti V., Corbetta M.*, Della Penna S.*, (2021), Temporal modes of hub synchronization at rest. *Neuroimage* 235:118005.
- [15] Di Cosmo G., Costantini M., **Spadone S.**, Pizzella V., Della Penna S., Marzetti L., Ferri F., (2021) Phase-coupling of neural oscillations contributes to Individual Differences in Peripersonal Space. *Neuropsychologia* 156:107823.
- [16] Favaretto C., **Spadone S.**, Sestieri C., Betti V., Cenedese A., Della Penna S.*, Corbetta M.*, (2021) Multi-band MEG signatures of BOLD connectivity reorganization during visuospatial attention, *Neuroimage* 230:117781.
- [17] Sebastiani V., Chiacchiaretta P., Pavone L., Sparano A., Grillea G., **Spadone S.**, Capotosto P., Committeri G., Baldassarre A., (2021) Cortical Hyper-Connectivity in a Stroke Patient with Rotated Drawing, *Case Reports in Neurology* 13: 677-686.
- [18] **Spadone S.**, Betti V., Sestieri C., Pizzella V., Corbetta M.*, Della Penna S.*, (2021) Spectral signature of attentional reorienting in the human brain, *Neuroimage* 244:118616.
- [19] **Spadone S.**, Perrucci M.G., Di Cosmo G., Costantini M., Della Penna S.*, Ferri F.*, (2021), Frontal and parietal background connectivity and their dynamic changes account for individual differences in the multisensory representation of peripersonal space, *Scientific Reports* 11: 20533.
- [20] **Spadone S.**, Wyczesany M., Della Penna S., Corbetta M., Capotosto P., (2021) Directed flow of beta band communication during reorienting of attention within the Dorsal Attention Network. *Brain Connectivity* 11:717-724.
- [21] Venskus A., Ferri F., Migliorati D., **Spadone S.**, Costantini M.*, Hughes G.*, (2021) Temporal binding window and sense of agency are related processes modifiable via occipital tACS, *PloS one* 16:e0256987.
- [22] **Spadone S.**, Tosoni A., Della Penna S.*, Sestieri C.*, (2022) Alpha rhythm modulations in the intraparietal sulcus reflect decision signals during item recognition. *Neuroimage* 258: 119345.
- [23] **Spadone S.**, de Pasquale F., Chiacchiaretta P., Pavone L., Capotosto P., Delli Pizzi S., Digiovanni A., Sensi S.L., Committeri G., Baldassarre A., (2023) Reduced segregation of brain networks in spatial neglect after stroke. *Brain Connectivity*, 13(8): 464–472.

- [24] **Spadone S.**, de Pasquale F., Digiovanni A., Grande E., Pavone L., Sensi S.L., Committeri G., Baldassarre A., (2023) Dynamic brain states in spatial neglect after stroke, *Frontiers in systems neuroscience* 17:1163147.
- [25] De Iure D., Conti A., Galante A., **Spadone S.**, Hilschenz I., Caulo M., Sensi S., Del Gratta S., Della Penna S., (2023) Analyzing the sensitivity of quantitative 3D MRI of longitudinal relaxation at very low field in Gd-doped phantoms. *Plos One* 18:e0285391.
- [26] Tosoni A., Capotosto P., Baldassarre A., **Spadone S.**, Sestieri C., (2023) Neuroimaging evidence supporting a dual-network architecture for the control of visuospatial attention in the human brain: a mini review, *Frontiers in Human Neuroscience* 2023, 17: 1250096
- [27] Pellegrino L., Manca N., Plaza A., Cicchetto L., Marrè D., Maspero F., Cuccurullo S., Bertacco R., Wahlberg E., Kalaboukhov A., Lombardi F., Hanke T., Mungpara D., Schwarz A., Hilschenz I., Ragucci E., **Spadone S.**, Venstra, W. Della Penna S. (2023) A Hybrid Superconductor/Nanomechanical Magnetic Field Detector for Biomagnetism., (2023) *IEEE Nanotechnology Materials and Devices Conference, NMDC 2023*, 2023, pp. 770–771
- [28] **Spadone S.**, Sestieri C., Capotosto P., Baldassarre A., Sensi S., Della Penna S., Increasing the sensitivity in the analysis of individual ERD/ERS dynamics through noise-corrected feature extraction (under review)
- [29] Ferrazza M., Gosti G., Milanetti E., **Spadone S.**, Ruocco G., Della Penna S., The Recurrent Hopfield Mass Model: Scalability and Optimization (under review)
- [30] Onofrij V., Franciotti R., Mitterova K., Brabenec L., Gajdos M., Moravkova I., Ferretti A., **Spadone S.**, Padulo C., Baldassarre A., Sensi S.L., Rektorova I., MCI-LB brain networks reorganization in relation to specific cognitive domains deficits. *Scientific Reports* (under review)

Digital Skills

Matlab / C++ / MySQL / Microsoft Office

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Sara Spadone