Alessio Basti

Scientific CV (v. 2025-03-13)

PERSONAL DETAILS

Birth	May 14, 1991
Univ. Addr.	Scala Azzurra, Viale Pindaro 42, Pescara (Italy)
Email	`alessio.basti@unich.it`

MAIN RESEARCH AREAS

• Computational Science; Multivariate Analysis; Neuroimaging

PRESENT AND PAST POSITIONS

Assistant Professor of Numerical Analysis Mar 2025 -
Dept. Engineering and Geology, Ud'A
(RTD-A, SSD: MATH-05/A - analisi numerica).

Permanent teacher in Math & Science Sep 2021 - On leave
Istituto Comprensivo Pescara 3
(Docente di ruolo e Collaboratore del Dirigente Scolastico da sett. 2022).

Post-Doctoral Fellow in Applied Physics Nov 2019 - Aug 2021
Dept. Neuroscience, Imaging and Clinical Sciences, Ud'A
(Assegnista di ricerca, SSD: FIS/07 - fisica applicata, SC: 02/D1).

Research Fellow in Applied Physics Nov 2018 - Oct 2019
Dept. Neuroscience, Imaging and Clinical Sciences, Ud'A
(Borsista di studio per attività di ricerca, SSD: FIS/07 - fisica applicata, SC: 02/D1).

EDUCATION

PhD Neuroscience and Imaging Nov 2015 - Mar 2019
University "G. d'Annunzio" Chieti-Pescara (Ud'A)
Additional label of "Doctor Europaeus"; supervisor: Prof. Laura Marzetti; thesis title: "Computational methods for investigating statistical dependencies between multivariate neural signals".

Visiting PhD Student/Scientist May 2018 - Aug 2018
University of Cambridge
Additional position: MCR affiliated member of the Downing College; supervisor: Dr. Olaf Hauk.

MSc. Applied Mathematics Oct 2013 - Oct 2015
Sapienza University of Rome
Summa Cum Laude with completion of the "Excellence Path" (reserved to the 6 most proficient students); thesis supervisor: Prof. Dario Benedetto; thesis title: "Approaches of nonlinear dynamical systems to analyse time series".

BSc. Mathematics Oct 2010 - Oct 2013
Sapienza University of Rome
Thesis supervisor: Prof. Eugenio Montefusco; thesis title: "Existence and blow-up of solutions for some parabolic systems".

AWARDS, ETC

• Winner (#1 ranked candidate in Abruzzo) of the STEM A027 (Math and Physics - High School) public competition (Concorso Ordinario, D.D.G. 252/2022), Aug 2022.
• Winner of the STEM A028 (Math and Science - Middle School) public competition (Concorso Ordinario, art. 59 D.L. 73/2021, D.D. 499/2020), Aug 2021
• First prize winner for the best PhD thesis in the biomedical research given by Abruzzo Foundation for Life Sciences ONLUS, July 2020.
• Scholarship for the "Excellence path", Department of Mathematics "G. Castelnuovo", Sapienza University of Rome, Italy, November 2015 – October 2018.

UNIVERSITY TEACHING ACTIVITIES

• Taught the course "Mathematical Physics" (12 CFU, SSD MAT/07) within the first-level Master's program for teaching in CdC-A028 at UNIDAV, 2023.
• Held the teaching assignment "Mathematical Methods for Neuroimaging: from Linear Algebra to Complex Analysis" (1 CFU: 6 hours for the XXXV cycle; 8 hours for the XXXVI cycle; 8 hours for the XXXVII cycle) for the PhD in Neuroscience and Imaging, UdA, 2019-2022.
• Collaborated in the teaching activities for the course "EEG/MEG Laboratory" (1 CFU course, SSD FIS/07) under the direction of Prof. Filippo Zappasodi within the second-level Master's program "Neuroimaging: from Methods to Applications in Neuroscience" at UdA, 2020-2021.
• Served as Subject Expert in Applied Physics (SSD FIS/07) and as a member of the examination committees for "Physics" and "Physics 2" for the degree program in Biomedical Engineering (L9) and the degree program in Building Engineering (L23) at UdA, 2019-2024.
• Served as Subject Expert in Applied Physics (SSD FIS/07) and as a member of the examination committees for "Medical Physics" for the degree program in Medicine and Surgery at UdA, 2019-2024.

TALKS TO CONFERENCES AND ADVANCED SCHOOLS

• Oral contribution to symposium "Beyond Neural Connectivity: Exploring Higher Order Interactions in the Brain", XXX annual conference of the Italian Association of Psychology, 23 September 2024.
• Oral contribution to symposium "Emerging Methods for Dynamic Multi-dimensional Brain Functional Connectivity Analysis", The annual meeting of the Organization for the Human Brain Mapping (OHBM), 23 june 2022.
• Oral contribution to symposium "Connecting to the networks of the human brain by EEG-guided closed-loop TMS", The 5th Basic and Clinical Multimodal Imaging (BaCI) International (virtual) Conference, 16 October 2021.
• Oral contribution to mini-symposium "New Mathematical Voices for Biomedicine and Neuroscience". XV bi-annual Conference of the Italian Society of Applied and Industrial Mathematics (SIMAI), University of Parma, 31 August 2021.

• Oral contribution to on-line "Istituto nazionale di alta matematica" (INDAM) Workshop "NonInvasive Mathematics". 16 April 2021.

• Oral contribution to special session "Brain connectivity and neuronal system identification: theory and applications to brain state decoding". International conference of the IEEE Systems, Man and Cybernetics Society 2019, Bari, 8 October 2019.

• Oral contribution to mini-symposium "Computational models in neuroscience and medicine". XIV bi-annual Conference of the Italian Society of Applied and Industrial Mathematics, Sapienza University of Rome, 5 July 2018.

• Invited talk to "Imagers Interest Group talks", MRC Cognition and Brain Sciences Unit, University of Cambridge, 4 June 2018.

BIBLIOMETRIC DATA

Num. of peer-reviewed papers indexed in Scopus: 21
H-Index Google Scholar/Scopus: 10/9
Total num. of citations Google Scholar/Scopus: 370/257

SELECTED PEER REVIEWED PUBLICATIONS

• Guidotti R., Basti A., Pieramico G., D'Andrea A., et al. When neurostimulation met control theory (2024). Journal of Neural Engineering.

• Leone F., Caporali A., Pascarella A., Perciballi C., Maddaluno O., Basti A., Belardinelli P., et al. (2024). Investigating the impact of the regularization parameter on EEG resting-state source reconstruction and functional connectivity using real and simulated data. NeuroImage, 303, 120896.

• Basti, A., Nolte, G., Guidotti, R., Ilmoniemi, R. J., Romani, G. L., Pizzella, V., and Marzetti, L. (2024). A bicoherence approach to analyze multi-dimensional cross-frequency coupling in EEG/MEG data. Scientific Reports, 14(1), 8461.

• Guidotti, R., D'Andrea, A., Basti, A., Raffone, A., Pizzella, V., and Marzetti, L. (2023). Long-Term and Meditation-Specific Modulations of Brain Connectivity Revealed Through Multivariate Pattern Analysis. Brain Topography, 36(3), 409-418.

• Pieramico, G., Guidotti, R., Nieminen, A. E., D'Andrea, A., Basti, A., Souza, V. H., ... and Marzetti, L. (2023). TMS-Induced Modulation of EEG Functional Connectivity Is Affected by the E-Field Orientation. Brain Sciences, 13(3), 418.

• D'Andrea, A., Basti, A., Tosoni, A., Guidotti, R., Chella, F., Michelmann, S., Romani, G.L., Pizzella, V., and Marzetti, L. (2022). Magnetoencephalographic spectral fingerprints differentiate evidence accumulation from saccadic motor preparation in perceptual decision-making. iScience, 105246.

• Basti*, A., Chella*, F., Guidotti, R., Ermolova, M., D'Andrea, A., Stenroos, M., Romani, G.L., Pizzella, V., and Marzetti, L. (2022). Looking through the windows: a study about the dependency of phase-coupling estimates on the data length. (*equally contributing authors). Journal of neural engineering, 19.

• Syrjälä, J., Basti, A., Guidotti, G., Marzetti, L., and Pizzella, V. (2021). Decoding working memory task condition using MEG source level long-range phase coupling patterns. Journal of neural engineering, 18, 016027.

• Basti*, A., Nili*, H., Hauk, O., Marzetti, L., and Henson, R.H. (2020). Multi-dimensional connectivity: a conceptual and mathematical review. (*equally contributing authors). NeuroImage, 221, 117179.

• Basti, A., Mur, M., Kriegeskorte, N., Pizzella, V., Marzetti, L., and Hauk, O. (2019). Analysing linear multivariate pattern transformations in neuroimaging data. PloS one, 14(10).

• Ramassone*, A., D'Argenio*, A., Veronese*, A., Basti, A., Soliman, S. H. A., Volinia, S., ... and Visone, R. (2019). Genetic dynamics in untreated CLL patients with either stable or progressive disease: a longitudinal study. (*equally contributing authors) Journal of hematology & oncology, 12(1), 1-5.

• Marzetti, L., Basti, A., Chella, F., D'Andrea, A., Syrjala, J., and Pizzella, V. (2019). Brain functional connectivity through phase coupling of neuronal oscillations: a perspective from magnetoencephalography. Frontiers in neuroscience, 13, 964.

• Basti, A., Chella, F., Snyder, A. Z., Pizzella, V., and Marzetti, L. (2019). Spatiotemporal Structures of Time Lags in the Brain as Revealed by Magnetoencephalography. In 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC) (pp. 2762-2766). IEEE.

• Chella, F., Marzetti, L., Basti, A., Stenroos, M., Parkkonen, L., Ilmoniemi, R. J., and Pizzella, V. (2019). Influence of Co-Registration Errors on the Performance of Anatomical Constraints in MEG Source Connectivity Analysis. In 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC) (pp. 2754-2761). IEEE.

• Basti, A., Pizzella, V., Chella, F., Romani, G. L., Nolte, G., and Marzetti, L. (2018). Disclosing large-scale directed functional connections in MEG with the multivariate phase slope index. NeuroImage, 175, 161-175.

• Chella, F., D'Andrea, A., Basti, A., Pizzella, V., and Marzetti, L. (2017). Non-linear analysis of scalp EEG by using bispectra: the effect of the reference choice. Frontiers in neuroscience, 11, 262.

• Basti, A., Pizzella, V., Nolte, G., Chella, F., and Marzetti, L. (2017). Disclosing brain functional connectivity from electrophysiological signals with phase slope based metrics. Journal of the Serbian Society for Computational Mechanics, 11(2), 50-62.

• Croce, P., Basti, A., Marzetti, L., Zappasodi, F., and Del Gratta, C. (2016). EEG–fMRI Bayesian framework for neural activity estimation: A simulation study. Journal of neural engineering, 13(6), 066017.

OTHER PUBLICATIONS (PREPRINT, PEER REVIEWED OR IN PREPARATION)

• Freddi, R., Cicala, F., Marzetti, L., and Basti, A. (2025). A Mean-Field Approach to Criticality in Spiking Neural Networks for Reservoir Computing. bioRxiv, 2025-02.

• Pedota, M., Cicala, F., and Basti, A. (2024). A Wild Mind with a Disciplined Eye: Unleashing Human-GenAI Creativity Through Simulated Entity Elicitation (No. 3bn95). Center for Open Science.

• Makkynayeri S., Guidotti R., Basti A., et al. Unveiling the relationship between large-scale brain states and corticospinal excitability using Hidden Markov Models. In Preparation.

• Pieramico, G., Makkynayeri, S., Guidotti, R., Basti A., et al. Robustness of Brain State Identification in Synthetic Phase-Coupled Neurodynamics Using Hidden Markov Models. In preparation.

SPARSE INFO AND SKILLS

Languages	Italian (Mother tongue) English (Advanced) Japanese (Elementary)
Software/prog. languages	MATLAB, Python, C++ LaTeX