

**Research Fellowship Grant (type B) at the Department of Biomedical, Dental Sciences, and Morphological and Functional Imaging, at the University of Messina, Italy**

**Project: Probing the interindividual synchronization during cooperative motor tasks at  
the brain, spinal, and muscular levels**

**ERC panel: LS5\_16, Systems and computational neuroscience**

The position is linked to the PRIN 2022 project “Probing the interindividual synchronization during cooperative motor tasks at the brain, spinal, and muscular levels”, Project Number PRIN\_2022TSYBJH, CUP J53D23011070001, funded by the Italian Ministry for University and Research, and directed by Prof. Alberto Cacciola at the University of Messina. The proposed research is aimed at better understanding how the activity of the human brain modifies the neuromuscular system to achieve effective interpersonal synchronization. We will first study how cortically originated brain controls drive a motor action during isometric force generation tasks, by analyzing the common oscillations between EEG and EMG signals, both at the muscular and single motor unit levels. Then, two collaborative protocols will probe how participants’ brain activity changes during motor interaction and whether human-human interaction induces participants’ brain activity and motor neuron firings synchronization.

We are seeking someone to participate in these PRIN-funded investigations who is familiar with computational neuroscience, neuroimaging methodology including EEG and/or EMG, and data analysis, and is interested in developing research questions and optimizing analysis streams tailored to the study aims and populations. The successful candidate will also work in close collaboration with the Research Units of Polytechnic University of Turin and Humanitas University of Milan, led respectively by Prof. Alberto Botter and Prof. Francesco Bolzoni. The discoveries in this field are expected to increase knowledge regarding the neuromuscular system. Furthermore, the results may lead to the design of novel biologically inspired control algorithms for human-robot or robot-robot interaction.

**Requirements:** MD, MSc, PhD in computational neuroscience, biomedical engineering, physics or a related discipline and a strong research background are required. The ideal candidate will have a background in EEG and/or EMG methodology; research experience in brain connectivity, muscle synergies, and cortico-muscular coherence; experience in task design and analysis for kinematic experiments; and fluency with statistical analysis packages. A background in computational neuroscience and/or signal processing (e.g., in Matlab or Python) is beneficial. Good knowledge of the English language (written and oral), as well as skills for teamwork in a multidisciplinary research group, are required.

The position will be available from January 2024 and shall last for approximately 12 months. The gross salary per annum for the grant holder will be defined in accordance with the current Regulations Governing Research Grant Awards pursuant to Art. 22 of Law no. 240/2010. The research grant will be conducted at the Department of Biomedical, Dental Sciences, and Morphological and Functional Imaging, at the University of Messina, Italy.

Interested candidates should email their CV, including a brief description of their past and current research interests and a list of the published articles and degrees, as a single PDF to: [alberto.cacciola@unime.it](mailto:alberto.cacciola@unime.it)