

CV of Dott. Mauro Gianni Perrucci

Place of birth: Chieti (CH), Italy

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Current position

Assistant Professor in Physics (ministerial scientific sector, SSD: FIS/07) at University “G. d’Annunzio” of Chieti-Pescara - Department of Neuroscience, Imaging and Clinical Sciences.

Education and academic position

December 2014 - National Scientific Habilitation for Associate Professor in Physics

December 2010 - Assistant Professor in Physics

April 2008 - Ph.D. Degree in functional Neuroimaging

July 2003 - Qualified for engineer profession

December 2002 - Degree in Electronic Engineering (Bioelectronics)

Bibliometric scores

H index: 14; Contemporary H index: 12; Total citations: 1528; Publications: 37

Research activity

Dr. Mauro Gianni Perrucci works at the Institute of Advanced Biomedical Technologies of Chieti-Pescara G. d’Annunzio University since 2004. He is mainly involved in functional magnetic resonance imaging (fMRI) through BOLD technique, studying both the biophysical features of the BOLD signal that its application to several neuroscience experiments. Part of its activity has been dedicated to the integration of fMRI with electroencephalography (EEG). Multimodal integration of these techniques is now the most powerful approach for studying human brain function in a non-invasive manner. In this field he carries out research both methodological and practical with particular reference to the study of the brain networks activation.

From a practical perspective, the difficulty is in the interpretation of the data due to the lack of an accredited model of the relationship between fMRI and EEG signals activations. A detailed and complex model should be based on different neurophysiological mechanisms, some of which are still not well known, to describe the relationship between the electrical activity of neurons, their metabolism and cerebral blood flow changes.

The use of integrated EEG-fMRI technology is of particular interest for the study of brain connectivity. The recent growth of interest of the scientific community towards the brain connectivity is bound to emerge in turn of the concept of functional integration in studies of cognitive neuroscience. Connectivity between specialized brain areas forms the basis of the study of activation networks in brain activity and can be established by means of different types of experimental data. Anatomical connectivity is defined by the existence of anatomical connections between brain areas; functional connectivity is defined exclusively by the functional data when, thanks to the experimental paradigm and activations analysis, these show the information flow from one area to another. Not that this functional connectivity reflects exactly the anatomical connectivity, because the involved circuits can be much more complex. For this reason it is appropriate to introduce the concept of effective connectivity, which is based on patterns of interaction between cortical areas based on knowledge of anatomical connections. It is therefore a neurobiological hypothesis-based connectivity that is compared with experimental functional data. It is clear that the study of functional integration and more broadly distributed networks in the brain activation needs both high spatial resolutions and high temporal resolution. It is necessary on one side a high spatial resolution to identify areas that are activated with precision, and on the other side

a high temporal resolution to analyze the dynamics of activation in addition to connectivity between different areas. The idea behind the application of EEG-fMRI connectivity study is that it can move forward with the integrated use of multimodal neuroimaging techniques. In addition, the study of connectivity will give the most relevant results if conducted in vivo on the human brain, especially in a non-invasive way, because this modality allows to easily find patients and volunteers as well as to perform longitudinal studies (such as plasticity, learning, recovery after stroke etc.)

Within the study of functional networks through EEG-fMRI integrated technology Dr. Perrucci contributed to the publication of several articles in journals with good impact. Also he contributed to the realization of several studies on somatosensory cortex and in several other studies of cognitive neuroscience with fMRI.

Dr. Perrucci has gained experience in the use of programs such as Brain Voyager (fMRI Data Analysis), Brain Analyzer (EEG data analysis), Matlab, SPM5, SPM8, EEGLab, FieldTrip, FSL and other tools as Icasso and GIFTI. In addition, it reached a solid experience in management and administration of computing systems and networking in different environments (Windows XP/7/8, MacOS, Unix, Linux), also performing admin functions and network management of the Institute of Advanced Biomedical Technologies. He also deals with the management and use of a Linux Cluster is provided by the parallel computing package MATLAB Distributed Computing Server (MDCS). Dr. Perrucci took part in the team of the University G. d'Annunzio, who, along with Washington University in St Louis (WashU), University of Minnesota (UMinn), Oxford University, Saint Louis University (SLU) and Ernst Strüngman Institute (ESI), have worked on the HCP project (Human Connectome Project; grant award U01-MH93765).

Training Courses

- July 2010 - International School of Scientific Computation and MATLAB - (ISSCM) University of Palermo, 25-30 July, 2010, Palermo, Italy
- November 2009 - Matlab Programming Course; Introduction to the OpenMP programming on parallels systems with shared memory. Cineca, Via Magnanelli 6/3, Casalecchio sul Reno, Bologna, Italy
- March 2008 - Marie Curie European School in Neuroscience: "Large-Scale Interactions in Brain Networks and their Breakdown in Brain Disease", Santo Stefano di Sessanio, L'Aquila, Italy
- June 2005 - Advanced fMRI course, OHBM, Toronto, Ontario, Canada

Research Awards and Credits

- 2013 – 2015 - Government funding: € 28000
- 2006 - Travel Awards \$750 at 12th Annual Meeting of the Organization for Human Brain Mapping, 11-15 June 2006, Florence, Italy

Talks at international meetings

- June 2006 - "Comparing Generators of Human Brain Alpha and Beta Rhythms: a simultaneous EEG-fMRI study", 12th International Conference of the Organization for Human Brain Mapping, Florence, Italy

National and International meetings

Dott. Perrucci attended the main international and national meetings in the field, with several contributions as oral session, poster presentations or abstract:

- Images of the Mind: New frontiers in brain imaging, Advanced fMRI statistical methods and their applications, University Milano-Bicocca, Italy: 2015

- Annual Meeting of the Organization for Human Brain Mapping: 2016, 2014, 2009, 2008, 2006, 2005
- International Symposium on Noninvasive Functional Source Imaging of the Brain and Heart and the International Conference on Functional Biomedical Imaging, (NFSI & ICFBI), Roma, Italy: 2009, 2007
- International Workshop Perinatal Biomagnetism, Chieti, Italy: 2009
- Meeting ISBET, International Society for Brain Electromagnetic Topography, Chieti, Italy: 2006

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Chieti, July 27, 2016

Signature
