

CV of Prof. Antonio Ferretti

Personal Information

Date of birth / Place of birth: 1968, January 13 / Lesina (FG), Italy
Gender: male
E-mail: antonio.ferretti@unich.it

Current position

Associate Professor in Applied 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 positions:

April 2017: Abilitazione Scientifica Nazionale approved for Prima Fascia (02/D1, Fisica Applicata).

October 2015: Associate Professor in Applied Physics.

February 2005: Assistant Professor in Applied Physics.

March 1999: PhD in Physics from Bologna University.

July 1993: Italian “Laurea” degree in Physics from Bologna University.

Research activity

Bibliometric scores: H index: 29; Total citations: 2500.

Prof. Antonio Ferretti works at Institute for Advanced Biomedical Technologies (ITAB) of Chieti-Pescara University since 1999. He has been deeply involved in functional magnetic resonance imaging (fMRI) with Blood Oxygen Level Dependent (BOLD) contrast, studying both the biophysical features of the BOLD signal and its application to many experiments in both clinical and basic neuroscience research. Part of his activity has also been initially devoted to the integration of fMRI with magnetoencephalography (MEG) and electroencephalography (EEG).

Prof. Ferretti is also the physicist in charge of the fMRI lab at ITAB, handling the quality assurance procedures and the implementation/optimization of MRI sequences for the 3T Philips Achieva scanner operating in the institute.

His recent interests involve the study of linearity/nonlinearity aspects of the BOLD signal

(e.g. in spin-echo/gradient-echo EPI measurements), the relationship between the BOLD signal and GABA levels and more quantitative fMRI approaches using arterial spin labeling. He is currently working also on functional imaging of brainstem nuclei. Antonio Ferretti is the author of more than 90 publications on peer-reviewed international journals.

More in detail, the main research lines can be summarized as follow:

- Methodological studies on fMRI/structural image acquisition techniques, with particular regard to functional/structural connectivity applications and the BOLD signal, addressing e.g. the reproducibility of connectivity metrics in multicentric longitudinal studies and the microvascular/macrovascular contribution to the fMRI signal nonlinearity.
- Brain activation and connectivity studies on aging populations, patients and pharmacological effects.
- fMRI studies on working memory of somatosensory stimuli and MEG-fMRI studies on the functional organization of the somatosensory cortex in both healthy and pathological subjects.
- fMRI studies on brain correlates of sexual arousal in normal male subjects and patients with psychogenic erectile dysfunction.

Previous National and International Research Projects and Funding

- Local PI (fMRI lab supervisor of the operating unit University of Chieti-Pescara) for the multicentric project “the neurophysiology of sudoku”, (2009-2010) in collaboration with IRCCS Fatebenefratelli of Brescia. Funding assigned to the unit: 12000 Euros.
- Approval of a research project presented for the “Euro-BioImaging Proof-of-Concept Studies” call, of the Euro-Bioimaging consortium (2012). The project, titled “BOLD fMRI connectivity patterns during resting state: spin-echo versus gradient-echo EPI time courses at 7 T”, was hosted at the Sir Peter Mansfield Magnetic Resonance Centre of the Nottingham University (UK).
- Supervisor of the fMRI lab of the operating unit University of Chieti-Pescara of the european multicentric project “PharmaCog”. The project aims at studying brain connectivity in AD and the effects of new pharmacological treatments on cognitive functions using advanced imaging techniques. Funding assigned to the unit: 30000 Euros.
- Scientific supervisor for sequence optimization/development and fMRI/DTI data acquisition and analysis, for the research agreement between “IRCCS Istituto Neurologico Mediterraneo Neuromed” in Pozzilli (IS) and the Department of Neuroscience, Imaging and Clinical Sciences, University of Chieti-Pescara (2013-

2014). Funding assigned to the Department: 60000 Euros.

- Scientific supervisor of the project “Intersubject variability of the endogenous analgesia expressed by conditioned pain modulation and phenotypical characterization of the nociceptive profile in humans. A cortical-brainstem connectivity study”, funded in 2017 with 40000 Euros by an EFIC-GRUNENTHAL GRANT awarded to my postdoc.
- Government funding (italian ex 60%): 70000 Euros (2009-2016).

Coordination activity

Prof. Ferretti has also a significant organizational role for the research activity of the fMRI operating unit, often coordinating the work of people with different background (psychologists, physicists, physicians). Most of the published works have been the argument of PhD theses. Furthermore, he is also involved in clinical application of fMRI, i.e. presurgical mapping and foci localization in epileptic patients using combined BOLD/ASL approaches.

PhD theses

Prof. Ferretti was the supervisor of the following PhD theses:

- 2008: “Motor Imagery and Action Observation to study Mental Representations”, for the PhD named “Neuroimaging Funzionale: dalle cellule ai sistemi”
- 2008: “Valutazione della variazione del segnale emodinamico in risposta ad un compito di riconoscimento tattile di forme geometriche e di memoria di lavoro: uno studio di risonanza magnetica funzionale”, for the PhD named “Neuroimaging Funzionale: dalle cellule ai sistemi”
- 2011: “Temporal and spatial patterns of male sexual inhibition: an fMRI study”, for the PhD named “Neuroimaging Funzionale: dalle cellule ai sistemi”
- 2013: “Sensitivity of BOLD fMRI response to graded visual contrast: a comparison of spin echo and gradient echo EPI acquisition”, for the PhD named “Neuroimaging funzionale: dalla biologia molecolare alle scienze cognitive”.

Stages

- 2004 advanced fMRI course “MGH-NMR / Martinos Center Visiting Fellowship Program in Functional MRI”, tenuto a Boston (USA).
- 2008 advanced pulse programming course for the implementation of new MRI acquisition sequences on Philips scanners, at ETH, Zurich.

Reviewer activity

Prof. Ferretti is reviewer for several neuroimaging and neuroscience journals: NeuroImage; Human Brain Mapping; Psychiatry Research: Neuroimaging; Autonomic Neuroscience: Basic and Clinical; Journal of Neuroscience.

National and International meetings

Prof. Ferretti attended the main international and national meetings in the field, with several contributions as oral or poster presentations:

- “Organization for Human Brain Mapping” international meetings: 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2012, 2014, 2016, with several communications.
- “International Society of Magnetic Resonance in Medicine (ISMRM)” meetings: 2008, 2011.
- “ISMRM Italian Chapter - Risonanza Magnetica in Medicina: dalla ricerca tecnologica avanzata alla pratica clinica”, annual meetings: 2011, 2012, 2013, 2016.
- “BIOMAG” international meetings: 2002, 2004, 2006.
- “Noninvasive Functional Source Imaging (NFSI)” international meetings: 2001, 2003, 2005, 2009.
- “International Society for Brain Electromagnetic Topography (ISBET)” international meetings: 2002, 2006.
- “European Medical and Biological Engineering Conference (EMBEC)” international meetings: 2002.

Invited talks

- 2012: “Basi fisiche della Risonanza Magnetica Funzionale” for the “Scuola AIP in Metodologia delle neuroscienze e imaging”, Chieti (Italy).
- 2013: “Tools for measuring CNS responses: fMRI, DTI, MRS”, for the 3° International Conference of Osteopathic Medicine, "Neurological Aspects of Osteopathic Medicine", Pescara (Italy).
- 2011, 2012, 2013, 2015: “Le tecniche BOLD” for the “Imaging Funzionale In Neuroradiologia” course, Chieti (Italy).
- 2014: “Principi fisici e fisiologici della risonanza magnetica funzionale” for the “Scuola di fisiologia e biofisica della SIF”, Chieti (Italy).
- 2015: “Interpretazione biofisica dei segnali di risonanza magnetica funzionale, vantaggi e limiti”, for the Joint Seminars, IRCCS Fondazione C. Mondino - IRCCS Fondazione S. Maugeri, Pavia (Italy).

Transfer of knowledge/Spin-off

Prof. Ferretti has been involved in the creation of the academic Spin-Off “SerVE” (SERvices Viewing Engineering) S.R.L. The main activity of the company is the R&D of hardware and software systems for the storage, processing, visualization and computer aided diagnosis based on medical imaging data. The company also successfully applied in 2016 to the call Axis I "Investments in Human Capital" Action I.1 "Innovative PhDs with industrial characterization of PON RI 2014-2010 for 2016/2017 Course XXXII”, obtaining the funding for a PhD scholarship.

Teaching activity

Prof. Ferretti has carried out an extensive teaching activity at University of Chieti-Pescara since 2004. He held applied physics, biomechanics and basic computer science courses (including laboratory activities) for students of the biomedical area (Medicine, Nursing, Motor Science), and has been the supervisor of four graduation theses. He also hold fMRI courses for PhD students (PhD title: “Neuroscience and Imaging”).

Furthermore, Prof. Ferretti has been involved as Physics teacher in the following innovative educational projects (E-learning):

- Project “Orientamento Tecnico Scientifico–La scommessa del sapere tecnico scientifico, 2006-2012, Macro-progetto Innovazione, competitività e governance” including a regional project on technical scientific education and the “Progetto IN_CO: azioni integrate per lo sviluppo di “Intermediari della conoscenza tecnologica, organizzativa e gestionale”.
- Project “RES – Rete Europea per l’Educazione Scientifica, LLP-LDV/TOI/2007/IT/372”, funded for the period 2007-2009. The project, developed in collaboration with Universities of Amsterdam and Salonicco, aimed to promote european collaboration among teachers and researchers to improve the educational approach and motivation towards scientific disciplines.

Chieti, 11/07/2017

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