CURRICULUM

VITAE ET STUDIORUM

of

SILVIA COMANI

MAY 2022

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PLEASE NOTE: Parts of some sub-sections of section 4. “SCIENTIFIC RESEARCH” are highlighted in light orange because they are referred to in some sub-sections of section 5. “INTERNATIONALIZATION”.

1. Current position, Personal information and Education

Current position, official address, phone and fax numbers:

Full Professor of Applied Physics, University "G. d'Annunzio", Chieti – Italy (http://www.unich.it)

Scientific Consultant for Translational and Technological Innovation in Neuroscience at the private hospital "Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy (http://www.villaserena.it/)

Scientific Consultant for Biosignal Processing at the Institut für Biomedizinische Technik und Informatik of the Technischen Universität Ilmenau (Ilmenau) – Germany (https://www.tu-ilmenau.de/bmti/)

Member of the Scientific Committee of the "Fondazione Villaserena per la Ricerca", Città S. Angelo (PE) – Italy

Delegate for student guidance, School of Human Movement Sciences, Chieti University - Italy.

Expert Reviewer of research projects (PRIN and FIR) for the Italian Ministry of Research.

Expert Reviewer for the Novo Nordisk Foundation (NNF), Denmark

Affiliated, Department of Neuroscience, Imaging and Clinical Sciences,
Affiliated, BIND – Behavioral Imaging and Neural Dynamics Center
University "G. d'Annunzio" of Chieti-Pescara
Via dei Vestini 33
66100 CHIETI
ITALY
Phone: +39-0871-3556901/02
Fax: +39-0871-3556930
e-mail: comani@unich.it

Date and place of birth: 1st June 1956, Parma, Italy

Nationality: ITALIAN

Education: Ph.D. in Physics, 1985, Catholic University of Louvain-la-Neuve (Belgium) with the thesis "Analysis of the Historical Series of Temperature and Precipitation at Bologna (1716-1774)" (Original in English) on the spatio-temporal analysis of climatic data at Bologna (Italy) in the context of the Italian and European climate in the XVIII century.
Italian Degree of Doctor in Physics, 1979, University of Bologna (Italy) with the thesis "Problema dell'inizio di una glaciazione" on the physical problems related to the inception of glaciations.

***Languages*:** fluent written and spoken English and French

Scientific metrics as of 31/03/2022 on Scopus**:**

Number of indexed scientific publications: 94

Number of citations: 1854

h-index: 24

2. Career/Employment

1 Sept 2020 – present: **Full Professor of Applied Physics** (School of Medicine and Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara - Italy)

11 Sept 2019 **National Scientific Habilitation for the position of Full Professor,** Subject Area 02/D1 - FISICA APPLICATA, DIDATTICA E STORIA DELLA FISICA, Subject sector FIS/07 - FISICA APPLICATA (A BENI CULTURALI, AMBIENTALI, BIOLOGIA E MEDICINA) (5 out of 5 members of the evaluation committee favorable).

Feb 2019 - present: **Scientific Consultant for Biosignal Processing** at the Institut für Biomedizinische Technik und Informatik of the Technischen Universität Ilmenau (Ilmenau) – Germany

Nov 2018 - present: **Member of the Scientific Committee** of the "Fondazione Villaserena per la Ricerca", Città S. Angelo (PE) – Italy

April 2017 **Marie Curie fellowship** at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani was Coordinator.

April 2015 **Marie Curie fellowship** at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani was Coordinator.

18 Dec 2014 **National Scientific Habilitation for the position of Full Professor,** Subject Area 02/D1 - FISICA APPLICATA, DIDATTICA E STORIA DELLA FISICA, Subject sector FIS/07 - FISICA APPLICATA (A BENI CULTURALI, AMBIENTALI, BIOLOGIA E MEDICINA) (5 out of 5 members of the evaluation committee favorable).

16 July 2011 **Selected candidate** (one of the six selected candidates out of the about 20 applicants) **for the position of Full Professor in Computational Neurosciences and Head of the Biomagnetic Center**, Department of Neurology at the University Hospital, Jena (Germany)

07 Jan 2011 **Offered an appointment as Associate Professor at the School of Biological and Health Systems Engineering (SBHSE) of the Ira A. Fulton Schools of Engineering, Arizona State University (USA) at the yearly salary of 110.000,00 USD** with a start-up support for research activities consisting in: 4 months of summer salary during the first 2 years of employment, support for 2 Ph.D. candidate graduate research associates for the first 2 years, 235.000,00 USD for laboratory equipment and supplies and 10.000,00 USD for travel funding for the first year of appointment, lab space of about 1500 as ft with offices.

2008 – present **Scientific Consultant for Translational and Technological Innovation in Neuroscience** at the private hospital "Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy

Apr 2007 – Nov 2021 **Director, BIND** – Behavioral Imaging and Neural Dynamics Center (University "G. d'Annunzio" of Chieti-Pescara – Italy)

1 Nov 2005 – 31 August 2020: **Associate Professor of Applied Physics** (School of Medicine and Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara - Italy)

1 March 2000 – 31 Oct 2005: **Research Professor of Applied Physics** (School of Medicine, University "G. d'Annunzio" of Chieti-Pescara - Italy)

1995 – 2009 **Head of the Laboratory of Magnetocardiography** at the Institute of Advanced Biomedical Technologies (ITAB) - University "G. d'Annunzio" of Chieti-Pescara - Italy

1994 – 2009 **affiliated to the Institute of Advanced Biomedical Technologies (ITAB)** - University "G. d'Annunzio" of Chieti-Pescara - Italy

1 Sept. 1988 – 28 Feb 2000: **Research Assistant** (School of Medicine, University "G. d'Annunzio" of Chieti-Pescara - Italy)

1986 – 1987 **System Engineer and Seller Engineer for universities at IBM Italy SpA** (Rome, Italy)

1982 – 1985 **Ph.D. fellow in Physics**, Catholic University of Louvain-la-Neuve (Belgium)

1980 – 1986 **Fixed-term research contracts** with the "Institute for the Study of the Physical and Chemical phenomena at the high and low Atmosphere" of the **Italian National Research Council**, with the Bologna University and the Region Emilia Romagna (Italy)

3. MANAGEMENT AND INSTITUTIONAL ACTIVITY

2015 - present	**Delegate of the Human Movement Science Bachelor programme for student guidance** at the University "G. d'Annunzio" of Chieti-Pescara**.**
2014 - 2016	**Erasmus Delegate for the Bachelor Course in Human Movement Sciences**, University "G. d'Annunzio" of Chieti-Pescara – Italy
2013 - 2016	**Member of the Curriculum Committee** of the Bachelor Course in Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara – Italy
2005 - 2006	Representative for the Faculty of Human Movement Sciences at the **University Committee for Linguistic Studies**, University "G. d'Annunzio" of Chieti-Pescara – Italy
2003 - 2007	Representative of the Faculty of Human Movement Sciences at the **University Committee for E-learning**, University "G. d'Annunzio" of Chieti-Pescara - Italy
2002 - 2005	Member of the **Committee for student Curricula** at the Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara - Italy
2002 - 2005	Member of the **Committee for Information, Communication and Technology (ICT)** at the Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara - Italy
2001	Member of the **Supervisory Committee** for the studies on Human Movement Sciences at the School of Medicine, University "G. d'Annunzio" of Chieti-Pescara - Italy

4. SCIENTIFIC RESEARCH

4.1 Main fields and current research interests

During her scientific career, Silvia Comani has been working in applied physics, with focus on the **development of novel linear and non-linear analytical methods for the analysis of diverse types of signals.**

During her PhD training and shortly afterwards, Silvia Comani analysed meteorological proxy data.

Since 1988, when she was recruited at the University "G. d'Annunzio" of Chieti-Pescara, Silvia Comani has focused on the **development and application of novel analytical methods for the pre-processing and analysis of biomedical signals** – from gastrointestinal and cardiac signals (adult and fetal signals) to **neural signals.**

Since 2007 Silvia Comani has focused on the acquisition and analysis of neural signals related to human movement execution, control and learning in adults and infant populations, especially during the ecological performance of individual and dyadic motor tasks.

The biomedical data analysed by Silvia Comani were acquired in **various human populations** – adults, infants, children, athletes, neurological patients – using a variety of **non-invasive imaging techniques** including **biomagnetic techniques** - such as adult and fetal magnetocardiography (MCG and fMCG), and adult and infant magnetoencephalography (MEG and babySQUID), **fMRI** and **electroencephalography** (EEG).

During the last fourteen years, Silvia Comani has focused on four main research lines:

1. the **development of a novel dry electrode EEG system** suitable for the non-invasive, fast and reliable functional monitoring of the human brain in adult clinical and non-clinical populations (see the European ANDREA project) and, more recently, in infant populations (see the European INFANS project);
2. the **design and implementation of novel methods for the automatic detection and removal of artefacts affecting EEG recordings** in adult populations and, more recently, in infant populations (see the European ANDREA and INFANS projects);
3. the **design and implementation of analytical methods to quantify the neural correlates and functional connectivity associated with motor performance** in individual athletes, and **with interpersonal coordination** during the performance of collaborative (and competitive) motor tasks (dyadic *hyperbrain* studies);
4. the **development and application of novel multimodal and ecological experimental protocols for human movement neuroscience and social neuroscience.** These protocols permit to study patients' neuro-motor rehabilitation, athletes' performance and team motor coordination in an **ecological setting with a multimodal approach** that integrates multiple levels of investigation: neural (by EEG monitoring), myoelectric (by electromyographic monitoring with EMG), kinematic (by motion monitoring through Haptic Devices or Motion Capture systems), environmental manipulation (through Virtual Reality) and psychological (by the test evaluation of psychological states).

Given the multidisciplinary nature of her research, **Silvia Comani has developed good skills in collaborative work with researchers from different specialty areas and with different scientific background**, such as mathematics, engineering, computer science, biology, cardiology, neurology, psychology, psychiatry and kinesiology.

Main fields of research

- **Biomedical signal processing:**
    a. Application of Blind Source Separation (BSS) methods - such as Independent Component Analysis (ICA) – and data mining techniques – such as Support Vector Machines (SVM) – to the processing of biomedical signals;
    b. Development of novel methods for the detection and rejection of physiological and non- physiological artifacts from EEG recordings;
    c. Application of the tools provided by linear and nonlinear analytical methods (such as functional connectivity, Graph Theory, Microstate analysis and Network Physiology) for the evaluation of the neural activity, dynamics and development of the brain in adults and infants.
- **Neuroimaging techniques:**
    a. Development of novel EEG technologies (dry electrodes), and their application to clinical and non-clinical experimental settings, in adult and infant populations.
- **Applied physics:**
    a. Multimodal approaches combining bioelectric and biomagnetic methods with psycho-physiological and kinematic monitoring tools for basic and clinical studies in cognitive neuroscience, behavioral neuroscience, neuro-motor rehabilitation;
    b. Use of bioelectric and biomagnetic methods and tools for basic and clinical studies in adult and infants.

Current research interests

- ***Hyperbrain* studies for the characterization of the inter-personal functional connectivity during social interactions**, particularly during collaborative and competitive motor tasks;
- **Development of automatic methods for the detection and rejection of artifacts affecting EEG recordings** in various experimental conditions - especially during the performance of motor tasks and during neonatal monitoring;
- **Functional imaging** of the neural basis of motor performance;
- **Development of linear and nonlinear methods for the quantification and characterization of functional and effective connectivity** in stroke survivors undergoing neuro-motor rehabilitation and in the developing human brain (neonates and infants);

4.2 Detailed description of the research activity

During the very first years of her scientific career and during her PhD, Silvia Comani has worked in the field of **Historical Climatology**, with main focus on the reconstruction and analysis of climatic data recorded during the XVIII century in Florence, Bologna and Padua. The climatic information was retrieved from codes written in Latin. Temporal series of temperature and pressure required the conversion to modern units of measurement through the reconstruction of ancient thermometric and pressure scales, and other meteorological data was retrieved from phenomenological data (such as crop production), which is, in general, qualitative information that needs to be coded and quantified in order to be analysed with mathematical methods.

In **1987** Silvia Comani started to work in the **analysis of biomedical data**, when she collaborated with the Institute of Normal Human Anatomy (Bologna University, Italy) to analyse data on *Natural Killer cells* (NK) obtained with *scattering* methods to estimate the cyto-toxic activity of single cells.

In 1988, Silvia Comani started to work at the **clinical application of Biomagnetism,** and actively contributed to the following studies, working at the design of the experimental setup, and performing Biomagnetic data acquisition and analysis:

1) **Normative study for the evaluation of the risk for sudden cardiac death due to arrhythmia**; biomagnetic maps of the cardiac activity were analyzed and the results were compared with data obtained with routine electrocardiogram (ECG).
2) **Comparative study of risk factors between non clinical and clinical populations with myocardial dysfunctions**; this study was performed on patients affected by repolarization dysfunction of the left ventricle and by cardiac hypertrophy.
3) **Dynamic magnetocardiography in athlete populations**; this study aimed at identifying cardiac dysfunction under stress in athletes through the detection of morphology modifications on the magnetocardiogram (MCG). The stress test during biomagnetic acquisitions was performed using an apparatus built with the purpose of avoiding any interference with the magnetic measurements. Its setup allowed the athlete to reach high levels of stress during MCG acquisitions.
4) **Assessment of the segmented gastro-intestinal transit times**; this study aimed at assessing a non-invasive method to determine the segmented gastro-intestinal transit times in patients at radiological risk, such as children and pregnant women. New magnetic markers were built and used for this study. Magnetic field maps were compared with aligned MRI structural images to determine the positions of the markers inside the bowel and the associated segmented gastro-intestinal transit times.
5) **Assessment of the spontaneous gastric activity**; this study aimed at validating a non-invasive biomagnetic method for the assessment of gastric activity with respect to invasive traditional clinical methods, such as electrical, manometric and endoscopic techniques. Rare myoelectric activity, such as the Migrating Motor Complexes, was identified. Biomagnetic data were analysed using a statistical approach and neural networks.
6) **Haematic flux modelling by means of a paramagnetic marker**; this study aimed at

assessing blood flow velocity by means of a paramagnetic tracer. This method showed to be particularly effective for the online non-invasive monitoring of blood flow in the venous system.

In the same period, Silvia Comani participated in other studies related to the biomagnetic measurement of **human tissue susceptibility** and of the **evoked cortical activity**, with the identification of its main components and corresponding neuronal groups.

From 1994 until 2004, Silvia Comani was **principal investigator** of the following studies:

1) **Assessment of magnetocardiographic parameters for the early diagnosis of cardiac hypertrophy**. Biomagnetic map analysis and cardiological parameters were combined to differentiate between patients affected by left ventricle hypertrophy secondary to hypertension and non-clinical subjects.
2) **Biomagnetic study of patients affected by left ventricle re-modelling secondary to hypertension**. This clinical population is at major risk for developing left ventricle hypertrophy, and the diagnostic power of some magnetocardiographic parameters, derived by the conjoint analysis of biomagnetic maps and early–stage morphological modifications, was verified vs. non-significant variations of electrocardiographic and echocardiographic indexes.
3) **Development of methods for the localization of sources of myocardial activity signals**. This study was performed in conjunction with the study listed at point 2, and aimed at assessing a method for the detection of the source of myocardial activity throughout the cardiac cycle. Models for the human thorax and heart, and for the signal source were developed, and the localization technique was assessed vs. anatomical localization of the cardiac structures as visualized by means of MRI monitoring.

In 2000, Silvia Comani started to work in **Fetal Magnetocardiography (fMCG)**. The clinical usefulness of fMCG mainly depends on the availability of good methods to separate the fetal cardiac signal from the mixed signals recorded with a multi-channel MCG system. **Silvia Comani was the first to apply Independent Component Analysis (ICA) to the processing of fMCG data for the reconstruction of noise-free fetal cardiac signals from fMCG recordings acquired also at very early gestation**.

The fMCG data used were acquired with the MCG system installed in Chieti (ATB Argos 200, 55-channel system), but also with other systems available at other **centers of Biomagnetism in Europe and in the USA**, with which she established scientific collaborations.

Within this area of research, Silvia Comani was the **principal investigator** of the following studies:

1) **Development of methods to separate the fetal cardiac signal from MCG data recorded with different multi-channel systems in shielded and unshielded environment** (55–channel and 36-channel biomagnetic systems, Chieti and Rome - Italy). **Independent Component Analysis (ICA)** was applied to fMCG data for the first time to obtain fetal cardiac signals with clear morphology and correct timing also during early gestation. ICA performances were compared with those of other methods and generally outperformed them

not only in the analysis of data recorded in a magnetically shielded room, but mainly in the analysis of data recorded in an unshielded environment.

2) **Separation of fetal cardiac signals from twin pregnancy MCG data** (55–channel system, Chieti - Italy). The usefulness of ICA to separate reliable fetal cardiac signal was tested in twin pregnancy. ICA was successful for fMCG data recorded during the third trimester of gestation, and the localization of signal sources was consistent with simultaneous echocardiographic information.
3) **Normative study to determine reference fetal cardiac time intervals** (55–channel system, Chieti - Italy). This longitudinal study aimed at calculating reference fetal cardiac time intervals on a beat-to-beat basis using reliable and good quality fetal cardiac signals separated with ICA. The outcome of the study was compared with reference values obtained on averaged fetal heartbeats, as usually done with other systems to improve the signal-to-noise ratio of the fetal cardiac signals.
4) **Development of an automatic system for the calculation of fetal cardiac time intervals from fMCG** (55 –channel system, Chieti - Italy). This system was developed to speed up the process of calculating the fetal cardiac time intervals on a beat-to-beat basis, which may be a long-lasting procedure if performed manually. This automatic system was based on the automatic determination of the onset and endpoints of the cardiac waves (P, QRS, T).
5) **Characterization of fetal arrhythmias from fetal magnetocardiograms** (55–channel system, Chieti - Italy). Methods to analyzed the fetal magnetocardiograms in the time and frequency domains were developed.
6) **Reconstruction of magnetic maps from ICA separated fetal magnetocardiograms** (55–channel system, Chieti – Italy). The application of ICA to separate the fetal signals has the limit of providing only one trace out of multiple recordings. A method to interpolate and re-project the separated fetal signal onto the sensor plane was developed to allow for magnetic maps reconstruction and analysis.
7) **Filtering methods for fetal cardiac signal enhancement** (55–channel system, Chieti – Italy). Different band-pass filters and smoothing algorithms were compared in order to assess the best pre-processing setup for fetal magnetocardiograms.
8) **Development of a SW platform for fMCG data handling and analysis**. In the perspective of bringing fMCG in the clinical practice, a SW platform was developed to allow operators not skilled in fMCG data analysis to process fMCG data recorded with different multi-channel systems having different number of sensors and different technical features.

In 2005, the article **"Time course reconstruction of fetal cardiac signals from fMCG: independent component analysis versus adaptive maternal beat subtraction**", published by Silvia Comani et al. in *Physiological Measurement* (2004), 25(5):1305-1321, **was nominated by the Publishing team of *Physiological Measurement* for inclusion in the Highlights 2004**. The same article **was among the top 30 most highly downloaded articles in the journal during 2005**. To put this into context, across all IOP journals 3% of articles were accessed over 500 times in 2005.

Since 2006 Silvia Comani has established several **international scientific collaborations** in the

field of **fetal magnetocardiographic (fMCG) signal processing**, as listed below:

1) **Department of Medical Physics, Wisconsin University at Madison, Wisconsin – USA** (***Prof. Ronald T. Wakai***) and **Wisconsin Children's Hospital, Fox Valley – USA** (***Prof. Janette Strasburger***), for the application of different ICA algorithms to separate fetal cardiac signals in multiple pregnancy fMCG data recorded in Chieti (Italy) and Madison (USA). Moreover, different techniques to separate the fetal cardiac signals were compared.
2) **Laboratory of Computational Neuro-engineering**, Dept. of Radiology, **California State University at San Francisco**, California – USA (***Dr. Kenneth E. Hild II and Prof. Srikantan S. Nagarajan***), to quantify the performances of different ICA algorithms for the extraction of the fetal signal from fetal magnetocardiograms.
3) **Fetal Magnetoencephalography Laboratory, University of Arkansas** in Little Rock – USA (***Dr. Hubert Preissl e Dr. Hari Eswaran***) to compare the performance of ICA with that of Project Operator (PO). FMCG data recorded with two different systems (ATB Argos 200, Chieti - Italy, and SARA system, Little Rock, Arkansas - USA) were used for this study.
4) **Department of Physics, Facultade de Filosofia, Ciências e Letras de Riberão Preto, Universidade de São Paulo – Brazil** (***Prof. Oswaldo Baffa, Prof. Draulio de Araujo, Prof. Eder Rezende Moraes, Prof. Luiz Otavio Murta***) for the following studies:
    a) the identification of linear and nonlinear parameters suitable to characterize the fetal cardiac function and fetal states;
    b) the development of a new segmented ICA algorithm for the separation of higher SNR fetal cardiac signals from fetal magnetocardiograms affected by non-stationarity;
    c) the development of a new SW platform for the analysis of fMCG data that includes linear and nonlinear processing tools.
5) **Department of Biomagnetism, Faculty of Medicine, University of Witten Herdecke, Bochum** – Germany (***Prof. Peter van Leeuwen***), to compare the performance of ICA, that is based on the spatial distribution of the fetal magnetocardiograms, with the performance of the template matching technique (TMT), which is based on the temporal analysis of fMCG data. FMCG data recorded with two different systems (ATB Argos 200, Chieti - Italy, and 4D Neuroimaging Magnes 1330C, Bochum - Germany) were used for this study.

In the same period, Silvia Comani also collaborated with Prof. Francesco Di Salle (Department of Neurological Sciences, University Federico II, Naples – Italy) on the **application of ICA to the processing of adult fMRI data**, and with Prof. Allan Kardec Barros (**PIB-Laboratory for Biological Information Processing, Federal Univ. Maranhão, São Luís** – Brazil) for the application of ICA to the processing of adult ECG data and its compression for telemedicine purposes.

On April 13, 2007, **Silvia Comani and some colleagues** from the Faculty of Human Movement Science (University "G. d'Annunzio", Chieti – Italy) **founded the inter-Faculty research center BIND – Behavioral Imaging and Neural Dynamics Center**, (http://www.bindcenter.it). Since

then and until November 2021, **Silvia Comani has been the Director of the BIND Center**, presently affiliated to the Department of Medicine and Aging Sciences of the University "G. d'Annunzio of Chieti-Pescara, Italy. As Director of the BIND Center, **Silvia Comani established several scientific collaborations with Italian and foreign research centers**, and **within the framework of international research projects funded by the Italian Ministry for University and Research (MIUR) and the European Commission (EC).**

Since 2007, Silvia Comani focused on the **interdisciplinary and multimodal study** (detection and analysis) **of the neural correlates and functional connectivity associated with specific movements in humans – such as individual single limb movements or inter-limb coordination, and inter-personal coordination.** fMRI, MEG and EEG systems were / are used in conjunction with EMG monitoring, new systems for movement guidance (Haptic Devices) and monitoring (Motion Capture systems), environment manipulation (Virtual Reality) and new psycho-physiological approaches. **Methods for the automatic detection and removal of physiological artefacts affecting EEG recordings,** and for the **assessment of functional and effective connectivity in the human brain** were implemented and applied to study the **developing brain** (typically developing infants and children), to assess the **neural correlates of motor performance** in individual athletes and during **the performance of dyadic motor tasks (*hyperbrain* studies)**, as well as in patients affected by neurological diseases and stroke survivors for **neuro-motor rehabilitation** purposes.

The list of the main research projects from 2007 until present is given below:

1) **Development of a non-magnetic equipment for the high spatio-temporal resolution monitoring of finger kinematics in bimanual coordination tasks**. We developed and validated a new equipment for the acquisition of kinematic information on finger movements during functional brain monitoring performed with fMRI, MEG or EEG.

2) **Neural correlates of different bimanual coordination patterns in tasks that imply spontaneous or intentional switching.** These studies were performed using the equipment mentioned at point 1. The study on the neural correlates of intentional switching during bimanual coordination was performed in collaboration with the **Center for Complex Systems and Brain Sciences, Florida Atlantic University - Boca Raton (FL - USA)** (***Prof. JAS Kelso*****),** where 3T fMRI data were collected together with kinematic data, and replicated in collaboration with the **Human Cognition and Neural Dynamics Laboratory, Western Washington University - Bellingham (Washington – USA)** (***Prof. KJ Jantzen***), where HR-EEG data were collected together with kinematic data.

3) **Longitudinal study of the functional response (Mu-rhythm) to prehension in children from 1-month-old to 6-years-old**. This study was performed in collaboration with the **Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, Health Sciences Center, University of New Mexico, Albuquerque – USA** (***Prof. Yoshio Okada e Dr. Julia Stevens***), where the functional data were acquired with the paediatric MEG system available there (Baby-SQUID). The psycho-motor development in infants was also evaluated with dedicated tests.

4) **Bio-psycho-social states in elite shooters**. The purpose of this study was to combine psychological (emotion, bodily states), physiological (EEG, EOG, HR, GSR, RF) and neural (EEG) data, and to correlate them with the performance of elite shooters. This study was performed in collaboration with the **Federazione Italiana Pentathlon Moderno - Italy** (FIPM), the **Unione Italiana Tiro a Segno - Italy** (UITS), the **NeuroLab, Institute of Sport Sciences (CONI)**, the **Department of Human Physiology and Pharmacology, University "La Sapienza", Rome - Italy** (***Prof. Fabrizio Eusebi***) and the **Department of Biomedical Sciences, University of Foggia - Italy** (***Prof. Claudio Babiloni***).

5) **Perspective taking in schizophrenic patients and non clinical subjects with a high degree of schizotypy in self-rotation tasks using a Virtual Reality (VR) environment**. The purpose of this study was to: i) use VR environments to explore the deficit in allocentric simulation shown by schizophrenic patients and in subjects with a high degree of schizotypy, and ii) evaluate, by means of HR-EEG, the cortical activity related to egocentric and allocentric space representations in those two populations. The identification of altered perspective taking patterns and of their neural correlates, together with an evaluation of the effectiveness of a VR environment, might help defining new meta-cognitive interventions in schizophrenic patients. This study was performed in collaboration with the private hospital "**Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy** (***Dr. Biancamaria Guarnieri***), where schizophrenic patients and non clinical subjects with a high degree of shizotypy were enrolled and treated.

6) **Use of Virtual Reality and Haptic Device for the neuro-motor rehabilitation of ischemic stroke patients**. The purpose of this study was to evaluate the effectiveness of a haptic device working in combination with VR environments for the neuro-motor rehabilitation of upper limbs in stroke survivors (both acute and chronic patients). The recovery of motor and neural functions and brain functional plasticity was monitored with dedicated tests and HR-EEG. This study was performed in collaboration with the private hospital **"Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy** (***Prof. Sandro Sorbi, Dr. Biancamaria Guarnieri***), where stroke survivors were enrolled and treated, and with the technical assistance of Prof. Antonio Frisoli from the **PERCRO Lab, Scuola Superiore Sant'Anna, University of Pisa – Italy**.

7) **Development of an automatic system for the categorization of patients affected by Coronary Artery Disease (CAD)**. This system is based on the nonlinear information contained in the MCG traces recorded in patients affected by *angina pectoris* but not necessarily showing a manifest narrowing of the coronary arteries. The aim of this study was to support an early diagnosis of Coronary Artery Disease (CAD), and was performed in collaboration with the **Institute of Biomedical Engineering and Informatics at the Technical University Ilmenau, Germany** (***Prof. Jens Haueisen***) and with the **Department of Biomagnetism, Faculty of Medicine, University of Witten Herdecke, Bochum – Germany** (***Prof. Peter van Leeuwen***), where the MCG patient data were collected.

8) **Quantification of electrophysiological markers of early human brain development**. This study was performed on a population of infants (2-12 months) and children (2-5 years) by means of time-frequency analysis and non linear methods to identify the features of

functional connectivity patterns over the range of frequencies typical of μ rhythm in the study populations. Indices derived by Graph Theory were calculated and evaluated as indicators of the developmental brain stage.

9) **Detection of differences in the default mode network (DMN) in neurological patients** (patients affected by Alzheimer Disease (AD), patients affected by Dementia with Lewy Bodies (DLB) and characterized by fluctuating cognition). This study was performed in collaboration with the **Aging Research Centre of the "G. d'Annunzio" University Foundation of the University of Chieti** (***Prof. Marco Onofrj***), and aimed at using Granger causality analysis to identify differences in the effective connectivity of the resting state network of these patients as compared to non clinical subjects.

10) **ERD/ERS patterns of shooting performance within the multi-action plan model**. This study, performed at the **BIND Center (UdA)**, aimed at testing the cortical patterns correlated to the performance categories conceptualized within the multi-action plan (MAP) model, which reflects the notion that different psychophysiological states underlie distinct performance-related experiences, in a population of professional shooters.

11) **ERD/ERS patterns in endurance cycling within the multi-action plan model**. The purpose of this study, performed within the **BIND Center (UdA)** and similar to that listed at point 10, was to test the ERD/ERS patterns associated with the performance categories conceptualized within the multi-action plan (MAP) model in a population of cyclists.

12) **Quantification of functional and effective connectivity during endurance training in cyclists**. This study aimed at testing the efficacy of different attention-based strategies derived from the MAP model to improve performance in endurance activity, and to verify whether specific cortical functional networks, and effective connectivity patterns, are associated with the different types of performance foreseen in the MAP model. This study was performed **in collaboration with the Engineering Department of Roma3 University in Rome** (Italy) (***Prof. Silvia Conforto***) and aimed at using coherence analysis and Graph Theory metrics to quantify brain functional connectivity and efficiency during task performance in different experimental conditions.

13) **Quantification of the muscular fatigue by means of a bi-dimensional EMG parameter**. The aim of this study was to introduce a new parameter for fatigue investigations, which relies on a bidimensional analysis of sEMG signals in temporal and spectral domains. The new parameter, the Fatigue Vector, is defined in a space domain whose coordinates are the amplitude and the mean spectral frequency of the sEMG signal. This study is performed **in collaboration with the Engineering Department of Roma3 University in Rome** (Italy) (***Prof. Silvia Conforto***).

14) **Determination of a neural minimum input model to reconstruct the electrical cortical activity**. In the present study we determined whether the amount of information derived from a standard 19 channel EEG recording can be obtained using a smaller number of electrodes, in particular with a set of only 8 channels. This study was performed **in collaboration with the Engineering Department of Roma3 University in Rome** (Italy) (***Prof. Silvia Conforto***).

15) **A novel social neuroscience approach to identify neuropsychophysiological markers of team mental models**. In this study we introduced the Juggling Paradigm, a novel research paradigm that uses cooperative juggling as a platform to capture peripheral and central neuro-psycho-physiological markers underlying the notion of team mental models (TMM). This study was performed **in collaboration with the Social Interaction and Performance Science Laboratory (SINAPSE), School of Psychology, University of Central Lancashire, Preston (United Kingdom**) (***Dr. Edson Filho***).

16) **Hyperbrain connectivity during cooperative motor tasks**. In this study we detected the functional connections active during cooperative motor tasks in juggling dyads within the theoretical framework of Team Mental Models and using Graph Theory concepts to characterize functional connectivity maps at the *hyperbrain* level. Also this study was performed **in collaboration with the Social Interaction and Performance Science Laboratory (SINAPSE), School of Psychology, University of Central Lancashire, Preston (United Kingdom**) (***Dr. Edson Filho***).

17) **Functional topological organization in infants and children during a prehension task**. The functional topological and efficiency organization in infants and children during a prehension task and its evolution with age was assessed using Synchronization Likelihood measure and Graph Theory metrics. Data were acquired using the pediatric MEG system available at the **Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, Health Sciences Center, University of New Mexico, Albuquerque – USA**.

18) **Development of a novel type of gel for wet electrodes**. **In collaboration with the partners of the European ANDREA Project**, of which Prof. Silvia Comani was Primary Coordinator, a novel alginate-based hydrogel was developed as an alternative to the traditional EEG electrolytic gels. This study was performed **in collaboration with the Mechanical Engineering Research Center, Universidade do Porto, Portugal (*Prof. Carlos Fonseca*) and the Institute of Biomedical Engineering and Informatics at the University of Ilmenau, Germany (*Prof. Jens Haueisen and Dr. Patrique Fiedler*).**

19) **Development of an automatic method for the classification of physiological artifacts affecting EEG recordings (the Fingerprint Method)**. This study was performed **within the framework of the European ANDREA Project,** particularly **in collaboration with *Prof. Jens Haueisen and Dr. Patrique Fiedler*** from the **Institute of Biomedical Engineering and Informatics at the University of Ilmenau (Germany)**. We implemented the Fingerprint Method, a method for the detection and rejection of 4 major artifacts affecting EEG recordings: eyeblinks, eye movements, myogenic artifacts and cardiac interference. The method consists of the Support Vector Machine (SVM) classification of EEG independent components (ICs) based on the value of their fingerprints (including original features in space, time, frequency and statistical fields) and was validated in EEG datasets containing cued artifacts.

20) **Development of an Optimized Fingerprint Method for the classification of physiological artifacts affecting EEG recordings during sports science applications**. This study was performed **within the framework of the European ANDREA Project,** particularly **in collaboration with *Prof. Jens Haueisen and Dr. Patrique Fiedler*** from the

Institute of Biomedical Engineering and Informatics at the University of Ilmenau (Germany). We improved the Fingerprint Method for the detection and rejection of eyeblinks, eye movements and myogenic artifacts in EEG datasets recorded during an endurance cycling task. The most effective subset of features was identified for each artifact. The method was validated in real experimental EEG datasets.

21) **Development of a method for the Automatic Removal of Cardiac Interference (ARCI) affecting EEG recordings**. **Within the framework of the European ANDREA Project**, we developed an automatic method for classifying and removing both electrical cardiac and cardiovascular artifacts without the use of additional ECG recordings. Our method employs independent component analysis (ICA) to isolate data independent components (ICs) and identifies the artifactual ICs by evaluating specific IC features in the time and frequency domains.

22) **Hyperscanning of Interactive Juggling: Expertise Influence on Source Level Functional Connectivity**. In this study we employed a dyadic juggling paradigm and electroencephalography (EEG) hyperscanning to evaluate functional connectivity between EEG sources within and between jugglers' brains during individual and interactive juggling. We applied graph theoretical measures to identify significant differences in functional connectivity between the individual and interactive juggling conditions. Connectivity was measured in multiple juggler pairs with various skill levels where dyads were either skill-level matched or skill-level unmatched. This study was performed **in collaboration with the Social Interaction and Performance Science Laboratory (SINAPSE), School of Psychology, University of Central Lancashire, Preston (United Kingdom**) (***Dr. Edson Filho***).

23) **Dry EEG in Sports Sciences: A Fast and Reliable Tool to Assess Individual Alpha Peak Frequency Changes Induced by Physical Effort**. This study was performed **in collaboration with *Prof. Jens Haueisen and Dr. Patrique Fiedler*** from the **Institute of Biomedical Engineering and Informatics at the University of Ilmenau (Germany).** We performed a counterbalanced repeated measure endurance cycling study to objectively validate the performance and applicability of a novel commercially available 64-channel dry electrode cap for sport science. We compared the performance of the 64-channel dry electrode cap with a commercial gel-based cap system in terms of usability metrics, reliability, and signal characteristics. We further validated the performance of the dry EEG cap during a realistic sport science investigation, verifying the hypothesis of a systematic, reproducible shift of the individual alpha peak frequency (iAPF) induced by physical effort.

24) **Validation of the Fingerprint Method and the ARCI approach to remove physiological interference in EEG recordings by using microstate analysis.** This study was performed to verify that the recently introduced optimized fingerprint method and automatic removal of cardiac interference (ARCI) approach not only remove physiological artifacts from EEG recordings but also preserve global brain dynamics, as assessed with a new approach based on microstate analysis.

25) **Characterization of the Functional Dynamics in the Neonatal Brain during Active and Quiet Sleep Stages by means of Microstate Analysis.** In this study, performed within the

framework of the EU INFANS Project **in collaboration with *Prof. Sampsa Vanhatalo* (University of Helsinki, Finland)**, we modeled the ongoing neonatal EEG into sequences of a limited number of microstates and investigated whether the extracted microstate features are altered in active (AS) and quiet sleep (QS) states and depend on the EEG frequency band. The analysis of microstate syntax demonstrated that the microstate sequences characterizing AS and QS had specific non-casual structures that differed in the two sleep stages.

26) **Automatic selection and deletion of artefactual segments in neonatal EEG.** In this study, performed within the framework of the EU INFANS Project **in collaboration with *Prof.s Maarten De Vos and Sabine Van Huffel* (University of Leuven, Belgium)**, we implemented a method for the automatic detection and deletion of segments of the neonatal EEG showing two types of most common artefacts, like flat line (i.e., episodes in which EEG fails) and large amplitude activity (e.g., movement artefact). The method to detect flat line activity is based on calculation of the second order difference. In the method to detect large amplitude activity, the maximal absolute amplitude (MAA), the maximal absolute first order difference (MAFOD) and the ratio between the frequency content above 50 Hz and the frequency content across all frequencies (RFC) are calculated for non-overlapping 5 second windows of the neonatal EEG. Results showed that the percentages of deleted EEG segments ranged from 1.73% to 90.58% and from 8.36% to 61.97% for neonatal EEG datasets recorded with different systems and caps with a different number of electrodes.

27) **Microstate Alterations Associated with Seizure Events in Full-term Neonates**. In this study, performed within the framework of the EU INFANS Project, we are assessing the EEG dynamics during seizure and non-seizure segments through microstate analysis, aiming at demonstrating that microstate analysis can provide a tool for seizure classification.

28) **A Hidden Markov Modal for the classification of Active Sleep and Quite Sleep stages in Full-term Neonates.** In this study, performed within the framework of the EU INFANS Project **in collaboration with *Prof. Sampsa Vanhatalo* (University of Helsinki, Finland)**, we are developing a Hidden Markov Model to analyze EEG recordings in term neonates for the automatic classification of Active Sleep and Quite Sleep segments.

29) **A Microstate analysis approach for the assessment of neural development in pre-term infants.** In this study, performed within the framework of the EU INFANS Project **in collaboration with *Prof.s Maarten De Vos and Sabine Van Huffel* (University of Leuven, Belgium)**, we apply microstate analysis to EEG recordings in pre-term neonates for the detection of early signs of neural development.

30) **Development of a convolutional neural network (CNN) approach for the automatic classification of sleep stages in neonates.** In this study, performed within the framework of the EU INFANS Project **in collaboration with *Prof.s Maarten De Vos and Sabine Van Huffel* (University of Leuven, Belgium)**, we apply a convolutional neural network (CNN) approach to EEG recordings in neonates hospitalized in the neonatal intensive care unit (NICU) for the automatic classification of sleep stages.

31) **Development of a new type of nanostructured titanium-based thin film for dry electrode coating.** This study was performed **in collaboration with *Prof. Filipe Vaz* (Universidade do Minho, Braga, Portugal) and *Prof. Patrique Fiedler* (Technische Universität Ilmenau, Germany)**. We developed a new type of nanostructured titanium-based thin film is proposed, revealing improved biopotential sensing performance and overcoming several of the limitations of conventional gel-based electrodes such as reusability, durability, biocompatibility, and comfort.

32) **Multimodal recording of kinematic and neuro-physiological correlates of joint action in cooperation and competition.** This study is performed within the framework of the EU EMBRACE Project. We will develop a new study protocol suitable to simultaneous monitor the kinematic and neuro-physiological signals from a dyad of volunteers while they perform a table tennis task alternatively in cooperative and competitive modality at different levels of task difficulty. We will then simultaneously acquire kinematic, EEG, EMG, heart rate and respiration signals from the volunteers, which will be analyzed to detect the functional connectivity networks at the individual and dyadic (hyperbrain) level using various approaches; Graph Theory measures will be used to typify the functional networks in terms of topological properties and integration/segregation balance, and the use of indices of neural synchrony will permit to identifying the leader and the follower within each dyad. Microstate analysis will be performed at the individual and dyadic level to better characterize hyperbrain dynamics. Information extracted from the EEG will then be merged with information extracted from the EMG, heart rate and respiration signals to apply a Network Physiology approach for the extraction of information from all systems involved in the dyadic joint action to build a functional connectivity network at systems level. A new method to remove movement artefacts from all signals will be also developed.

33) **Development of new methods for the detection and removal of movement-related artefacts from EEG recorded during full body movements.** This study, performed within the framework of the EU EMBRACE Project and **in collaboration with *Prof. Patrique Fiedler* (Technische Universität Ilmenau, Germany)** aims at developing a method dedicated to the identification and subsequent removal of artefacts affecting EEG signals recorded in adults during the performance of a motor task that involves the total body. Specific features of stereotyped movements are being identified for the development of an automatic artefact removal method dedicated to movement artefacts.

34) **Identification of the neural correlates of the development of gaze following abilities in infants of less than 1 year of age**. In this study we characterized the development of the gaze following ability, a component of Joint Attention, in infants at 9 months of age by means of the ERD/ERS analysis of EEG signals. We used for the first time a live gaze shift paradigm, and found a confirmation that infants develop this ability before 1 year of age, by quantifying neural activation patterns in the theta and alpha bands.

4.3 Scientific collaborations

During her scientific career and within the framework of her research projects, Silvia Comani has established **several national and international scientific collaborations**, as per the list below.

2020 – present	Universidad Complutense de Madrid, Madrid, Spain (Prof. Fernando Maestù, Dr. Lucìa Vaquero)
2020 – present	BRAINVESTIGATIONS SL, Las Rozas de Madrid, Spain (Dr. Daniel Morera, Dr. Tania Ortuño)
2020 – present	BTS S.p.A., Garbagnate Milanese, Italy (Dr. Bruno Ros)
2019 – present	Faculty of Engineering, Division ESAT-STADIUS, Katholieke Universiteit Leuven, Belgium (Prof. Sabine van Huffel, Prof. Maarten De Vos)
2019 – present	Faculty of Medicine, Institute of Clinical Medicine, University of Helsinki, Finland (Prof. Sampsa Vanhatalo)
2019 – present	Wilhelmina Children's Hospital, University Medical Center Utrecht, Netherlands (Dr. Jeroen Dudink)
2015 – present	School of Psychology, University of Central Lancashire, Preston, UK (Prof. Edson Filho)
2014 – present	Centro de Física das Universidades do Minho e Porto, Universidade do Minho, Braga, Portugal (Prof. Filipe Vaz)
2014 – 2020	Mechanical Engineering Research Center, Universidade do Porto, Porto, Portugal (Prof. Carlos Fonseca)
2011 – present	ANT-Neuro, Enschede, Netherlands (Dr. Frank Zanow, PhD, CEO)
2011 – present	eemagine Medical Imaging Solutions GmbH, Berlin, Germany (Dr. Ralf Hauffe, PhD, CEO)
2011 – present	Dept. of Applied Electronics, Faculty of Engineering, University Roma3, Roma, Italy (Prof. Silvia Conforto)
2009 – present	Institute of Biomedical Engineering and Informatics at the Technical University Ilmenau, Germany (Prof. Jens Haueisen, biomedical engineer)
2008 – present	private hospital "Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy (Prof. Sandro Sorbi, neurologist, Prof. Alessandro Rossi, psychiatrist, Dr. Biancamaria Guarnieri, neurologist)
2007 – 2020	PERCRO Lab, Scuola Superiore Sant'Anna, University of Pisa – Italy (Prof. Massimo Bergamasco, engineer, and Dott. Antonio Frisoli, engineer)
2007 – 2009	Department of Physics, University of Parma – Italy (Dr. Maria Teresa Di Bari, physicist)
2007 – 2012	Department of Biomedical Sciences, Foggia University – Italy (Prof. Claudio Babiloni, physiologist)
2007 – 2010	Human Cognition and Neural Dynamics Laboratory, Western Washington University - Bellingham (Washington – USA) (Prof. KJ Jantzen, psychologist)

2007 – 2008	Department of Human Physiology and Pharmacology, University “La Sapienza”, Rome - Italy (Prof. Fabrizio Eusebi, sport physician and physiologist)
2006 – 2007	MEG-Center, University of Tübingen - Germany (Dr. Hubert Preissl, physicist)
2006 – 2011	Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, Health Sciences Center, University of New Mexico, Albuquerque – USA (Prof. Yoshio Okada, neuroscientist, and Dr. Julia Stevens, physicist)
2006 – 2013	Department of Biomagnetism, Faculty of Medicine, University of Witten Herdecke, Bochum – Germany (Prof. Peter van Leeuwen, mathematician and electro-physiologist)
2006 – 2015	Department of Medical Physics, Wisconsin University at Madison, Wisconsin – USA (Prof. Ronald T. Wakai, physicist)
2006 – 2015	Wisconsin Children’s Hospital, Fox Valley – USA (Prof. Janette Strasburger, pediatric cardiologist)
2006 – 2015	Department of Physics, Facultade de Filosofia, Ciências e Letras de Riberão Preto, Universidade de São Paulo – Brazil (Prof. Oswaldo Baffa, physicist, Prof. Draulio de Araujo, physicist, Prof. Eder Rezende Moraes, physicist, Prof. Luiz Otavio Murta, physicist)
2006 – 2010	Center for Complex Systems and Brain Sciences, Florida Atlantic University - Boca Raton (FL - USA) (Prof. JAS Kelso, neuroscientist)
2006 – 2010	PIB-Laboratory for Biological Information Processing, Federal Univ. Maranhão, São Luís – Brazil (Prof. Allan Kardec Barros, electronic engineer)
2006 – 2007	Fetal Magnetoencephalography Laboratory, University of Arkansas in Little Rock – USA (Dr. Hubert Preissl, physicist, and Dr. Hari Eswaran, physicist)
2006 – 2007	Laboratory of Computational Neuro-engineering, Dept. of Radiology, California State University at San Francisco, California – USA (Prof. Srikantan S. Nagarajan, engineer, and Dr. Kenneth E. Hild II, engineer)
2004 – 2006	Department of Neurological Sciences, University Federico II, Naples – Italy (Prof. Francesco Di Salle, neuro-radiologist)
2000 – 2004	Dept. of Electronics, Artificial Intelligence and Telecommunication, Polytechnical Marche University, Ancona (Italy) (Prof. Giovanni Cancellieri, electronic engineer)
1994 – 2005	Biomagnetism Center, Catholic University of the Sacred Heart, Rome (Italy) (Prof. Riccardo Fenici, electro-physiologist)
1994 – 1996	Zentralinstitut für Biomedizinische Technik, Ulm Universität, Ulm (Germany) (Dr. Sergio Nicola Erné, physicist)
1990 – 1993	Pediatric Clinic, Freie Universität, Berlin (Germany) (Prof. Konrad Brockmeier, pediatric cardiologist)
1990 – 1993	Physikalisch-Technische Bundesanstalt, Berlin (Germany) (Dr. Sergio Nicola Erné, physicist)

4.4 Research projects funded by National and International Institutions

1 Feb 2021 – 31 Oct 2025 **European Project EMBRACE** (Grant Agreement N. 101007521) *"tEchnology for Multimodal inter-BRain dynAmiCs invEstigation"* – Call identifier **H2020-MSCA-RISE-2020**
CORDIS webpage: https://cordis.europa.eu/project/id/101007521

The project network includes academic and industrial partners, with 6 beneficiaries from Italy, Germany, and Spain. Technical university partners include: University "G. d'Annunzio" of Chieti-Pescara (Italy) – Coordinator; Technical University of Ilmenau (Germany); Universidad Complutese de Madrid (Spain). Industrial partners include: eemagine Medical Imaging Solutions GmbH, Berlin (Germany); BTS S.p.A., Milano (Italy); BraInvestigations, S.L. (Spain).

The purpose of the EMBRACE project is to develop: **1)** a new mobile and wireless dry electrode EEG system suitable for monitoring brain activity during full body movements; **2)** novel bodynetwork sensors and a multimodal alignment system for simultaneously recording neural, physiological and kinematic signals from two interacting subjects; **3)** novel analytical solutions for motion artefact removal and multi-level analysis of multimodal data; **4)** a new research dyadic paradigm to exploit the technological advances.

Silvia Comani is the Primary Coordinator of the EMBRACE project, responsible for coordinating the scientific and administrative aspects of the project at the University "G. d'Annunzio" of Chieti-Pescara (Italy) and among all partners. The project will be implemented in close collaboration with the project partners through intensive international and intersectoral staff exchange (secondments). The BIND-UdA unit (f which Silvia Comani is the scientist is charge) will be in charge of: **(1)** defining a new study paradigm for the multimodal study of cooperative and competitive dyadic interactions; **(2)** collecting multimodal data; **(3)** developing new analytical solutions to remove noise and motion-related artefacts and for the cognitive-behavioral-social analysis of the multimodal dyadic data.

Total Project Funds: € 818.800,00

Funds to BIND-UdA partner: € 193.200,00

2019-2022 **European Project INFANS** (Grant Agreement N. 813483) *"INtegrating Functional Assessment measures for Neonatal Safeguard"* – Call identifier **H2020-MSCA-ITN-2018** – WEBSITE: http://www.infansproject.eu/.

The project network includes academic, industrial and clinical partners, with 8 beneficiaries and 2 associated partners from Germany, Italy, Belgium, Finland, Iceland, the Netherlands. Technical university partners include: Technical University of Ilmenau (Germany) - Coordinator, University "G. d'Annunzio" of Chieti-Pescara (Italy), Catholic University of Leuven (Belgium). Medical university partners include: University of Helsinki (Finland), University Medical

Center of Utrecht (Netherlands). Industrial partners include: eemagine Medical Imaging Solutions GmbH, Berlin (Germany), Artinis Medical Systems B.V., Elst (Netherlands), Kvikna ehf, Reykjavik (Iceland).

The purpose of the INFANS project is to develop a novel dry electrode/optode solution for EEG, NIRS and simultaneous EEG-NIRS monitoring for neonatal functional brain monitoring, to develop novel analytical methods for the pre-processing, analysis and classification of EEG and NIRS features, and to assess and optimize the performance of the novel EEG-NIRS prototype and analytical tools in real clinical settings.

Silvia Comani is the Local Coordinator of partner BIND-UdA (Università "G. d'Annunzio", Chieti - Italy). Silvia Comani is responsible for coordinating the scientific and administrative aspects of the project at the University "G. d'Annunzio" of Chieti-Pescara (Italy). Three PhD students have been recruited, and, under the supervision of Silvia Comani, they will develop EEG denoising methods based on BSS approaches to remove artefacts affecting neonatal EEG recordings, and to develop analytical methods for evaluating the functional connectivity and efficiency of the developing neonatal brain.

Total Project Funds: € 3.950.394,84

Funds to BIND-UdA partner: € 784.499,04

2014-2017 **European Project ANDREA** (Grant Agreement N. 610950) *"Active Nanocoated DRy-electrode for Eeg Applications"* – Call identifier **FP7-PEOPLE-2013-IAPP**. WEBSITE: https://www.andreaproject.eu/

The project network included academic, industrial and clinical partners from Italy, Germany, and Portugal. In particular: 3 Universities (Università "G. d'Annunzio", Chieti – Italy, Coordinator; University of Ilmenau, Germany; University of Porto, Portugal), 2 companies (Casa di Cura Privata Villa Serena, Città S.Angelo - Italy, eemagine Medical Imaging Solutions GmbH, Berlin - Germany), of which one is a private hospital (Casa di Cura Privata Villa Serena).

The purpose of the ANDREA project was to develop a novel dry electrode EEG system with adjustable cap network provided with an automated sensor positioning mechanism, active preamplification and a SW toolbox for physiological artefact removal. The novel technologies address the requirements of high signal quality and reliability, mobility, high patient/subject comfort and long-term use, and were validated in clinical and non clinical populations to produce a prototype optimized for broad EEG employment.

Silvia Comani has been the Primary Coordinator of the ANDREA Project. Silvia Comani was responsible for coordinating the administrative aspects of the project, and for supervising the scientific activities at the University "G. d'Annunzio" of Chieti-Pescara (Italy). One post-doc researcher was recruited to work under the supervision of Silvia Comani to develop an EEG denoising method based on BSS approaches for the removal of artefacts affecting adult EEG recordings, to test it in EEG recordings acquired in athletes and neurological

patients, and to integrate it into a SW toolbox for EEG signal pre-processing.

Total Project Funds: € 1.595.310,46

Funds to BIND-UdA partner: € 467.188,64

2009-present Research funds by the private hospital "Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy.
Funding: € 97.000,00

2006-2009 **INTERLINK Project n.II04CD8G5A "New methods to reconstruct and analyze the fetal cardiac signals recorded by magnetocardiography"** funded by the Italian Ministry for University and Research (MIUR).

The purpose of this project was to develop and implement analytical methods and instrumentation to promote the use of fetal magnetocardiography for diagnostic purposes.

Silvia Comani was the Primary Coordinator of the INTERLINK Project n.II04CD8G5A. The project network included 3 academic partners: the Università "G. d'Annunzio", Chieti (Italy), the University of San Paolo (Brazil) and the University of Wisconsin at Madison (USA).

Funding: € 242.000,00

2002-2004 **Silvia Comani was the local responsible for the section Magnetocardiography,** within the framework of the European project "Functional Imaging of the Human Body (FIHBO)" – **Marie Curie Training Site – FP5** – EU Funds

2001 - 2003 **Silvia Comani participated** in the research project **PRIN 2001** "MAGNETOCARDIOGRAFIA: STUDIO DI PAZIENTI CON CARDIOPATIA ISCHEMICA, ARITMIE CARDIACHE ED IPERTROFIA VENTRICOLARE SINISTRA. MAGNETOCARDIOGRAFIA FETALE." Protocollo 2001064829_003; Period: 12-12-2001 - 11-12-2003; Scientific Coordinator: Prof. Riccardo Fenici (Università Cattolica del Sacro Cuore - Roma); Local Scientific Coordinator: Prof. Silvano Di Luzio (UdA).

2001-present Research funds provided by the University "G. d'Annunzio" of Chieti-Pescara on the basis of the personal scientific production.
Funding: about € 120.000,00

1990 **Silvia Comani participated** in the European project **Biotrast COMET II**, and in the European project **COMAC Biomagnetism Initiative.**

1989 **Silvia Comani participated** in the project "Superconductive and Cryogenic Technologies" funded by the Italian National Research Council

4.5 Direction and coordination of research centres and groups

From 2006 until present, Silvia Comani has coordinated and supervised international research groups within the framework of the **international research projects** that were assigned based on competitive calls implementing a peer-review selection process:

- **2006-2009: INTERLINK Project** n.II04CD8G5A "New methods to reconstruct and analyze the fetal cardiac signals recorded by magnetocardiography", with partners from Brasil and the USA;
- **2014-2017: European Project ANDREA** (Grant Agreement N. 610950 - "Active Nanocoated DRy-electrode for Eeg Applications" – Call identifier FP7-PEOPLE-2013-IAPP - https://www.andreaproject.eu/), with partners from Italy, Germany and Portugal;
- **2019-2022: European Project INFANS** (Grant Agreement N. 813483 - "INtegrating Functional Assessment measures for Neonatal Safeguard" – Call identifier H2020-MSCA-ITN-2018 - http://www.infansproject.eu/), with partners from Germany, Belgium, Finland, Iceland, the Netherlands;
- **2021-2025: European Project EMBRACE** (Grant Agreement N. 101007521 - "t**E**chnology for **M**ultimodal inter-**BR**ain dyn**A**mi**C**s inv**E**stigation" – Call identifier H2020-MSCA-RISE-2020), with partners from Italy, Germany and Spain.

These research collaborations have led to the publication of several **scientific articles in peer-reviewed international journals**.

From April 2007 until November 2021, Silvia Comani has been the Director of the inter-Faculty research center BIND – Behavioral Imaging and Neural Dynamics Center (http://www.bindcenter.it). The BIND Center was founded on 13 April 2007 and is presently affiliated to the Department of Medicine and Aging Sciences, University "G. d'Annunzio of Chieti-Pescara, Italy. The BIND Center gathers researchers with diverse expertise, spanning from applied physics, biomedical engineering, to motor behavior, sport psychology, neuropsychology and cognitive neuroscience. The BIND Center is committed to enhance the understanding of the processes and mechanisms that underlie the development, maintenance and improvement of human motor behavior and performance. This commitment is achieved through original research that combines the Sciences and the Humanities perspectives. Questions regarding perception, cognition and action, and how brain and behavior interact and develop from the prenatal to the elderly ages are addressed with a multimodal and multidisciplinary approach to uncover how neural dynamics sustain motor behavior and how behavior can modulate the activity of large-scale brain networks.

Silvia Comani has guided the researchers of the BIND Center to start several scientific projects in collaboration with Italian and foreign research centers, as assessed by the publication of peer-reviewed articles. Those projects used different functional imaging techniques (MCG, MEG, fMRI and EEG), newly developed scientific instrumentation and analytical methods (such as the dry electrode EEG system and the software tools developed within the European ANDREA Project to study the neural correlates and functional connectivity related to: 1) the interpersonal motor coordination in adults (Hyperbrain studies), 2) prehension in infants (Mu-rhythm), 3) good performance in elite athletes, 4) neurocognitive representation of space and

action (with the aid of Virtual Reality environments), 5) neural function plasticity in neuro-motor rehabilitation (with the aid of a haptic device working in a Virtual Reality environment). The outcome of these research lines has been the publication of **multiple scientific articles in peer-reviewed international scientific journals**.

From 1995 to 2009, **Silvia Comani was the responsible of the Laboratory of Magnetocardiography (MCG) at the Institute of Advanced Biomedical Technologies of the University "G. d'Annunzio of Chieti-Pescara, Italy**. During those years, she has established numerous national and international scientific collaborations with researchers from Europe, USA and Brazil. These collaborations focused on the clinical and experimental use of adult and fetal Magnetocardiography (MCG) and on the development of innovative analytical methods to extract useful information from adult and fetal MCG. These collaborations led to several **scientific publications in peer-reviewed international journals**, which had an important impact in the scientific community.

4.6 Scientific organizational activity

30 August 2017	**Co-organizer** of the Final Workshop of the EU Project ANDREA as a satellite event of the BaCI Conference 2017, Bern, Switzerland.
25 June 2016	**Organizer** of the Fifth Training School of the EU Project ANDREA as a satellite event of the OHBM Conference 2016, Geneva, Switzerland.
20 Jan 2016	**Organizer** of the Fourth Training School of the EU Project ANDREA, within the framework of the international ANT Neuromeeting 2016 conference, Beaune, France.
Jan 2015	**Co-organizer** of the Second Training School of the EU Project ANDREA, within the framework of the international ANT Neuromeeting 2015 conference, Beaune, France.
Sept 2014	**Co-organizer and invited speaker** at the First Training School of the EU Project ANDREA, eemagine Medical Imaging Solutions GmbH, Berlin, Germany. Lecture on "Grant writing".
Nov 2010	**Co-organizer and invited speaker** at the second International Workshop "Fetal Magnetocardiography", MEG-Center, University of Tubingen (Germany) 22-23 Nov 2010 with the talk “fMCG signal processing with Independent Componenet Analysis”
Oct 2010	**member of the Scientific Committee** at the XVIII National Congress of the Italian Association of Sport Psychology, University of Chieti (Italy) 16-17 Oct 2010
April 2009	**Organizer** and **General Chair** of the first International Workshop “Perinatal Biomagnetism 2009: how can it help sick fetus/infant?”, Chieti - Italy (http://pb2009.udanet.it). Purpose of the workshop was to provide obstetricians, perinatologists, pediatricians, pediatric neurologists and pediatric cardiologists, who might be interested in new technologies in translational Perinatal Medicine, with an updated overview of the state-of-the-art in the application of Magnetocardiography (MCG) and Magnetoencephalography (MEG) in the specific field of fetal and neonatal medicine. Particular emphasis was devoted to compare the prospective suitability of MCG and MEG in Perinatal Medicine with that of techniques routinely used in the clinical setting, such as ultrasound or ECG/EEG.
August 2008	**Organizer, chair-person** and **speaker**, workshop “Recent advances in fetal Magnetocardiography”, organized within the 16th International Conference on Biomagnetism (Biomag 2008), Ryoton (Sapporo - Japan)
Sept 2006	**Member of the Scientific Committee**, 17th International Meeting of the International Society for Brain Electromagnetic Topography (**ISBET 2006**) – Chieti (Italy)
2005 - 2007	**Responsible for funding**, **European Task Force for the clinical application of Magnetocardiography**

Sept 2003 **Member of the Scientific Committee**, 4th International Symposium on Noninvasive Functional Source Imaging within the human brain and heart" (**NFSI2003**), Chieti - Italy

4.7 Invited speaker and lecturer

September 2021	**lecturer:** 2nd International INFANS Summer School "Advanced Functional Diagnostics in Neonatology", 6-10 September 2021, online. Lecture: "Physiological artefact removal from EEG using data driven methods"
August 2020	**lecturer:** International Summer School in Biomedical Engineering "Non-invasive dynamic brain imaging in infants, children and adults", 5-11 August 2020, Erfurt, Germany. Lecture: "Artefact Removal in electrophysiological signal processing"
July 2018	**lecturer:** International Summer School on Technologies and Signal Processing in Perinatal Medicine, 2-6 July 2018, Pula, Sardinia, Italy. Lecture: "Fetal Magnetocardiography"
June 2018	**lecturer:** World Congress on Medical Physics and Biomedical Engineering - IUPESM 2018, 3-8 June 2018, Prague, Czech Republic. Special Session on "Recent advances in EEG signal processing". Lecture: "An automatic ICA-based fingerprint method for rejecting physiological artefacts in EEG recordings: validation in cued and sports science EEG data"
Sept 2015	**lecturer:** International Summer School on Human-Machine Interaction, 14-18 Sept 2015, Monopoli, Puglia, Italy. Lecture: "Monitoring Neuro-motor Recovery from Stroke with High-resolution EEG, Robotics and Virtual Reality"
August 2015	**lecturer:** 7th International Summer School in Biomedical Engineering "New Instrumentation for brain measurements and stimulation" 17th - 29th August 2015, Lutherstadt Wittenberg, Germany. Lectures: "Artifact detection and rejection for dry electrode signals" and "How to manage instrumentation development projects?".
Sept 2014	**lecturer**: eemagine Medical Imaging Solutions GmbH, Berlin, Germany. Lecture on "Grant writing".
August 2013	**invited speaker**: University of São Paulo at Ribeirão Preto, Brazil, 12-16 August 2013, with the talk "A passive robotic device, virtual reality environments and high-resolution EEG for the neuro-motor rehabilitation of post-stroke patients"
August 2012	**invited speaker** at the 18th International Conference on Biomagnetism, Symposium on "Novel Developments in Magnetocardiography" with the talk "Automatic classification of Coronary Artery Disease patients based on MCG signal entropy", Paris (France).
June 2012	**invited speaker**: Centre for Sport Studies, Faculty of Social Sciences – University of Kent (United Kingdom), with the talk "Effective brain connectivity: quantification methods and sample applications"
June 2011	**invited speaker** at the 2nd International Workshop "Perinatal Biomagnetism 2011: how can it help the sick fetus/infant?", 3-4 June, Jena (Germany) with the talk "Signal analysis in fetal magnetocardiography"

Nov 2010	**invited speaker**: First International Workshop "Fetal Magnetocardiography", MEG-Center, University of Tuebingen (Germany), with the talk " Fetal cardiac signal extraction with ICA"
Sept 2010	**invited speaker**: School of Biological Health System Engineering – Arizona State University (Arizona – USA), with the talk "Biomedical signals: acquisition and analysis"
March 2010	**invited speaker** at the 17th International Conference on Biomagnetism, Symposium on "Biomagnetism in fetal and reproductive medicine: Applications and Modelling" with the talk "Fetal magnetocardiographic data processing", Dubrovnik (Croatia).
Dec 2009	**invited speaker**: Department of Physics and Mathematics – FFLCRP, San Paolo University, Riberao Preto (San Paulo – Brazil), with the talk "Biomagnetism: functioning principles, systems and analysis methods in fetal and neonatal studies"
April 2008	**invited speaker**: VenLab, Brown University, Providence (RI – USA), with the talk "Research lines at BIND Center: overview and prospective ideas"
Sept. 2007	**invited speaker** at the BMT 2007 - Annual Meeting of the German Society for Biomedical Engineering, Aachen (Germany), with the talk "Effectiveness of ICA processing for feature extraction in magnetocardiographic signals"
August 2006	**invited speaker** at the 15th International Conference on Biomagnetism, Symposium on Fetal Magnetocardiography, Vancouver (Canada), with the talk "Comparison of the performances of various Independent Component Analysis algorithms for fetal signal reconstruction from real FMCG datasets"
June 2006	**invited speaker** at the 11th National Congress of Medical Physics of Brazil, Riberao Preto (San Paulo – Brazil), with the talk "Fetal magnetocardiography"
April 2006	**invited speaker**: Department of Kinesiology, San Francisco State University (SFSU), San Francisco (USA), with the talk "Measurement of finger dynamics in bimanual coordination experiments"
April 2006	**invited speaker**: Department of Medical Physics, Wisconsin University at Madison (Wisconsin – USA) with the talk "ICA and its application to the processing of fMCG data"
April 2006	**invited speaker**: Department of Radiology California University at San Francisco (UCSF), Center for Medical Sciences (California – USA) with the talk "Extraction of fetal cardiac signals from fMCG by means of ICA"
April 2006	**invited speaker**: Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, Health Sciences Center, New Mexico University, Albuquerque (New Mexico – USA) with the talk "Analysis of fMCG data: problems and solutions"
October 2002	**invited speaker**: Centro interuniversitario di ricerca in Bioingegneria e Scienze Motorie, University of Brescia, Trento e Verona, Rovereto (Italy) with the talk "The role of fMRI in motor learning"

March 1987	**invited speaker**: Max Planck Institut für Meteorologie, University of Hamburg (Germany), with the talk “Earliest instrumental data for Italian stations”
February 1987	**invited speaker**: Climatic Research Unit, East Anglia University, Norwich (UK), with the talk “Earliest instrumental data for Italian stations”

4.8 National and International Conferences and Schools

Feb. 2022	The 13th International Newborn Brain Conference – Online event – Feb-10-12, 2022. **Posters: (1) "**Functional Connectivity Alternations before and during Neonatal Seizure" Mohammad Khazaei, Khadijeh Raeisi, Pierpaolo Croce, Gabriella Tamburro, Filippo Zappasodi and Silvia Comani; **(2) "**Fully automated quiet sleep quantification in preterm infants" Laura Smets, Silvia Comani, Maarten De Vos, Anneleen Dereymaeker; **(3) "**Assessing maturational effects on brain dynamics in preterm neonates using microstate analysis" Tim Hermans, Mohammad Khazaei, Khadijeh Raeisi Nafchi, Pierpaolo Croce, Gabriella Tamburro, Maarten De Vos, Filippo Zappasodi and Silvia Comani**.**
Sept. 2021	**Lecturer** at the 2nd International INFANS Summer School "Advanced Functional Diagnostics in Neonatology", 6-10 September 2021, online.
June 2021	OHBM 2021 Annual Meeting (Virtual), 21-25 June 2021. **Posters: (1)** "Automatic selection and deletion of artefactual segments in neonatal EEG", authors: Laura Smets, Gabriella Tamburro, Katrien Jansen, Anneleen Dereymaeker, Gunnar Naulaers, Maarten De Vos and Silvia Comani; **(2)** "EEG Microstates Distinguish Active and Quiet Sleep During Neonatal Period", authors: Khadijeh Raeisi, Mohammad Khazaei, Pierpaolo Croce, Gabriella Tamburro[1] Silvia Comani and Filippo Zappasodi; **(3)** "Microstate Alterations Associated with Seizure Events in Full-term Neonates", authors: Mohammad Khazaei, Khadijeh Raeisi, Pierpaolo Croce, Gabriella Tamburro, Filippo Zappasodi and Silvia Comani.
17 March 2021	**Attendant** at the ANT Neuro webinar "Using brain technologies in practice in sports setting", speaker Prof. Maurizio Bertollo
24 February 2021	**Attendant** at the ANT Neuro webinar "HD-EEG with dry electrodes", speaker Prof. Jens Haueisen
August 2020	**speaker** at the 1st Summer School within INFANS project: 05.-11. August 2020, 9th International Summer School in Biomedical Engineering (2020) "Non-invasive dynamic brain imaging in infants, children, and adults", Erfurt, Germany, with the lecture "Artefact removal in electrophysiological signal processing".
January 2020	**speaker** at the 29th Burgundy Neuromeeting, 15-18 January 2020, Beaune, France - INFANS Workshop. Talk on "EEG artefact removal with fingerprinting".
June 2018	OHBM 2018 Annual Meeting, 17-21 June 2018, Singapore. Poster: "The Fingerprint Method for the automatic detection and removal of EEG artifacts", authors: Stone D., Tamburro G., Fiedler P., Haueisen J., Comani S.
August 2017	**speaker** at the Final Workshop of the EU Project ANDREA, a satellite event of the BaCI Conference 2017, 30 August 2017, Bern, Switzerland. Talk on "The fingerprint method to reject artifacts from EEG signals".

February 2017	**speaker** at the BIOSTEC 2017 - Tenth International Joint Conference on Biomedical Engineering Systems and Technologies, 21-23 February 2017, Porto, Portugal. Talk on "Active Nanocoated DRy-Electrode for EEG Applications".
June 2016	**speaker** at the Fifth Training School of the EU Project ANDREA as a satellite event of the OHBM Conference 2016, Geneva, Switzerland. Talk on "The Fingerprint method to reject artifacts from EEG signals".
Jan 2016	**speaker** at the 25th Burgundy Neuromeeting, 20-23 January 2016 in Beaune in France. Talk on "A new method for artifact detection and correction from EEG signals".
Sept 2015	**speaker** at the BACI - International Conference on Basic and Clinical Multimodal Imaging, 1-5 Sept 2015, Utrecht, The Netherlands. Talk on "Hyperbrain connectivity features of cooperative dyadic juggling"
August 2015	37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Milan, Italy, 25-29 August 2015, with the paper "Assessing Neuro-motor Recovery in a Stroke Survivor with High-resolution EEG, Robotics and Virtual Reality" (authors: Silvia Comani, Lorenzo Schinaia, Gabriella Tamburro, Lucia Velluto, Sandro Sorbi, Silvia Conforto, Biancamaria Guarnieri).
July 2015	14th European Congress of Sport Psychology, Bern, Switzerland, 14-19 July 2015, with the paper "Shared coordination in dyadic juggling: Perceptual-cognitive and physiological synchronization". (authors: E Filho, D Pierini, S Comani, C Robazza, G Tenenbaum, M Bertollo).
April 2015	50th Anniversary of the International Society of Sport Psychology, Rome, Italy, 19-20 April 2015, with the paper " Neuro-technology in sport, exercise and performance psychology ". (authors: M Bertollo, S Comani, L Bortoli, S di Fronso, B Van de Laar, E Filho, C Robazza).
March 2015	18th Annual Meeting of the Biofeedback Federation of Europe, Rome, Italy, 24-28 March 2015, with the paper "Is Athlete brain efficient or proficient? Cortical patterns of athletic performance within the multi-action plan model". (authors: M Bertollo, S di Fronso, E Filho, L Bortoli, C Robazza, S Comani).
January 2015	**speaker** at the 24th ANT Burgundy Neuromeeting, Beaune, Bourgogne, France, 21-24 January 2015, with the talks "Changes of functional organization in the developing sensorimotor cortex".
January 2014	**speaker** at the 23rd ANT Burgundy Neuromeeting, Beaune, France, 29 January - 1 February 2014, with the talks "Cortical efficiency and attentional focus in endurance cycling" and "Interactive brains in juggling dyads: a hyperbrain case study".
Sept 2013	**presenter** at the XIII Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2013, Sevilla (Spain), 25-28 September 2013, with the posters “Attentional Focus and Functional Connectivity in Cycling: An EEG Case Study” and "ERD/ERS Patterns of Shooting Performance within the Multi-Action Plan Model".

January 2013	**speaker** at the 22nd ANT Burgundy Neuromeeting, Beaune, France, 23-26 January 2013, with the talk "Combining a passive robotic device, virtual reality and high-resolution EEG for post-stroke neuro-motor rehabilitation".
January 2012	**speaker** at the 21st ANT Burgundy Neuromeeting, Beaune, France, 25-28 January 2012 with the talks "Electrophysiological markers of early human brain development: dependence of mu-rhythm desynchronization on age" and "Virtual reality and perspective taking in adults with schizophrenia".
Nov 2010	Autumn School "Analyse the Brain", MEG-Center, University of Tubingen (Germany) 24-25 Nov 2010
Nov 2010	MEG Conference "Lifelong Imaging", MEG-Center, University of Tubingen (Germany) 25-27 Nov 2010
October 2010	**member of the Scientific Committee** of the 18th National Congress of the Italian Association of Sport Psychology "Psicologia dello sport e dell'esercizio tra prestazione e benessere", Chieti (Italy)
Sept 2009	Autumn School "Wiring the Brain: Anatomical and Functional Connectivity", Tubingen (Germany)
Sept 2009	11th International Congress on Medical Physics and Biomedical Engineering, Munich (Germany)
Apr.-May 2008	NCM 2008, 18th Annual Meeting of Neural Control of Movement, Naples (Florida – USA)
April 2008	ESGCO 2008 - 5th International Conference on the European Study Group on Cardiovascular Oscillations, Parma (Italy)
June 2007	HBM 2007 - 13th Annual Meeting of the Organization for Human Brain Mapping, Chicago (Illinois – USA)
February 2007	International Conference CD2007, Coordination: Neural, Behavioral and Social Dynamics, Boca Raton (Florida – USA)
Sept. 2006	17th International Meeting of the International Society for Brain Electromagnetic Topography ISBET – Chieti (Italy)
Nov. 2005	**speaker** at the 3rd European Medical & Biological Engineering Conference EMBEC'05 and at the European Conference on Biomedical Engineering IFMBE, Prague (Czech Republic)
August 2004	**speaker** at the 14th International Conference on Biomagnetism, Boston (USA)
Sept. 2003	**speaker** at the 4th International Symposium on Noninvasive Functional Source Imaging within the human brain and heart (NFSI2003), a Chieti (Italy)
May 2003	**speaker** at the 1st Meeting of Complex Systems and Sports (COM&COM) a Barcelona (Spain)
March 2003	**speaker** at the 2nd European *Congress of Radiology* (ECR 2003), Vienna (Austria)
Dec. 2002	**speaker** at the 2nd European Medical & Biological Engineering Conference EMBEC'02, Vienna (Austria)
August 2002	13th International Conference on Biomagnetism, Jena, Germany

May 2002	**speaker** at the 40th National Congress of the Italian Society of Medical Radiology, Rimini (Italy)
April 2002	**speaker** at the National Congress MIUR/CNR-ENEA "Predizione dell'impatto ambientale dei sistemi elettromagnetici e valutazione dell'esposizione umana", Rome (Italy)
Nov. 2001	**speaker** at the National Congress of Kinesiology "Le Scienze Motorie nella Società Complessa", Marostica (Vicenza - Italy)
Sept. 2001	3rd International Symposium on Noninvasive Functional Source Imaging within the Human heart and brain (NFSI 2001), Innsbruck (Austria)
Dec. 1998	15th National Congress of the Italian Association of Neuroradiology, Florence (Italy)
August 1993	9th International Conference on Biomagnetism, Vienna, Austria
August 1991	8th International Conference on Biomagnetism, Muenster, Germany
June 1991	International Workshop COMAC-BME "Biomagnetic investigations of nervous system", Porto Carras, Halkidiki (Greece)
July 1991	World Congress on Medical Physics and Biomedical Engineering, Kyoto (Japan)
June 1991	International Workshop COMAC-BME "Biomagnetic investigations of nervous system", Porto Carras, Halkidiki (Greece)
Dec. 1990	International Workshop COMAC-BIOMAGNETISM "Non Pharmacological treatment of cardiac arrhythmias: present and future", Centro Congressi Catholic University, Rome (Italy)
July 1989	International Conference on "Topographic EEG Analysis on Brain Mapping", Saint Vincent, Aosta (Italy)
August 1989	7th International Conference on Biomagnetism, New York City, D.C., U.S.A.
July 1984	Annual Meeting of the European Geophysical Society, Catholic University of Louvain-la-Neuve (Belgium)
October 1983	Third International School of Climatology "Climatological aspects of desertification: facts, theories and methods", Scientific Center "Ettore Majorana" (Erice, Sicilia - Italy)
Sept. 1983	Second International Meeting of Statistical Climatology (Lisboa - Portugal)
July 1982	Second International School of Climatology "Climate and Energy: Carbon dioxide", Scientific Center "Ettore Majorana" (Erice, Sicilia - Italy)
March 1980	First International School of Climatology "Climatic variations and variability: facts and theories", Scientific Center "Ettore Majorana" (Erice, Sicilia - Italy)

4.9 Visiting scientist

April 2017	**Marie Curie Fellowship** for one month at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani is Coordinator.
February 2017	two days at the Mechanical Engineering Research Center of the Universidade do Porto (Portugal) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani is Coordinator.
April 2015	**Marie Curie Fellowship** for one month at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani is Coordinator.
April 2015	three days at the Institute of Biomedical Engineering and Informatics of the Technical University of Ilmenau (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani is Coordinator.
Sept 2014	two days at eemagine Medical Imaging Solutions GmbH, Berlin (Germany)
June 2012	one week at the Centre for Sports Studies, University of Kent at Medway (United Kingdom)
Sept 2010	two days at the Tristan Technologies, San Diego (California – USA)
Sept 2010	three days at the School of Biological Health System Engineering – Arizona State University (Arizona – USA)
March 2009	one week at the Department of Medical Physics, Wisconsin University at Madison (Wisconsin – USA)
Nov 2009	one week at the Department of Physics and Mathematics – FFLCRP, San Paolo University, Riberao Preto (San Paulo – Brazil)
October 2009	one week at the Department of Medical Physics, Wisconsin University at Madison (Wisconsin – USA)
April 2008	two weeks at the Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, MIND Institute, University of New Mexico, Albuquerque (New Mexico – USA)
April 2008	one week at the VenLab, Brown University, Providence (RI – USA)
July 2007	two weeks at the Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, MIND Institute, University of New Mexico, Albuquerque (New Mexico – USA)
June 2007	one week at the Department of Medical Physics, Wisconsin University at Madison (Wisconsin – USA)
May 2007	two weeks at the Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, MIND Institute, University of New Mexico, Albuquerque (New Mexico – USA)

Nov 2006	two week at the Center for Complex Systems and Brain Sciences, Florida Atlantic University - Boca Raton (Florida – USA)
May 2006	one week at the Infant Studies Laboratory, Psychology Department, Berkley University, San Francisco (California - USA)
April 2006	one week at the Department of Medical Physics, Wisconsin University at Madison (Wisconsin – USA)
April 2006	one week at the Center for Complex Systems and Brain Sciences, Florida Atlantic University - Boca Raton (Florida – USA)
Apr-July 1994	four months at the Zentralinstitut für Biomedizinische Technik (ZBMT), University of Ulm (Germany)
January 1994	one month at the Zentralinstitut für Biomedizinische Technik (ZBMT), University of Ulm (Germany)
March 1990	one month at the Physikalisch-Technische Bundesanstalt Institut (PTB), Berlin (Germany)

4.10 Reviewing activity

Silvia Comani is expert reviewer for the following scientific journals:

1. **Acta Paediatrica** (Wiley) since June 2016
2. **Annals of Biomedical Engineering** (Springer) since July 2010
3. **Autonomic Neuroscience: Basic and Clinical** (Elsevier) since November 2012
4. **BioMedical Engineering Online** (BioMed Central) since July 2009
5. **Biomedical signal processing and control** (Elsevier) since March 2013
6. **Biomedizinische Technik** (Walter de Gruyter) since May 2008
7. **Computers in Biology and Medicine** (Elsevier) since July 2007
8. **Computers Methods and Programs in Biomedicine** (Elsevier) since March 2011
9. **Developmental Science** (Wiley) since July 2012
10. **Early Human Development** (Elsevier) since May 2006
11. **Frontiers in Human Neuroscience** (Frontiers Publ.) since October 2013
12. **IEEE Trans. on Instrumentation & Measurement** (IEEE Publ.) since March 2007
13. **IEEE Transactions on Biomedical Engineering** (IEEE Publ.) since April 2006
14. **IEEE Transactions on Neural Systems & Rehabilitation Engineering** (IEEE Publ.) since August 2014
15. **Journal of Medical Systems** (Springer) since August 2007
16. **Journal of Neural Engineering** (Institute of Physics Publ.) since March 2017
17. **Journal of Neurophysiology** (Institute of Physics Publ.) since September 2010
18. **Journal of Neuroscience Methods** ((Elsevier) since February 2016
19. **Journal of Obstetrics and Gynaecology Research** (Blackwell) since December 2007
20. **Journal of Perinatal Medicine** (De Gruyter Publ.) since June 2011
21. **Medical & Biological Engineering & Computing** (Springer) since March 2005
22. **Medical Engineering and Physics** (Elsevier) since May 2011
23. **Neuroimage** (Elsevier) since May 2009
24. **Neuroscience Letters** (Elsevier) since February 2016
25. **Pediatric Research** (Lippincott Williams and Wilkins) since November 2005
26. **PeerJ** (PeerJ, Inc) since September 2014
27. **Physics in Medicine and Biology** (Institute of Physics Publ.) since January 2005
28. **Physica Scripta** (Institute of Physics Publ.) since May 2004
29. **Physiological Measurement** (Institute of Physics Publ.) since November 2004
30. **PLOS ONE** (PLOS Publications) since May 2013
31. **SLAS Technology** since March 2018

32. **Superconductor Science and Technology** (Institute of Physics Publ.) since November 2005
33. **Engineering Science and Technology: an International Journal** (Elsevier) since March 2015

Silvia Comani is expert reviewer for the following institutions:

1. **Italian Ministry of University and Research** (MIUR - research projects PRIN and FIR);
2. **Novo Nordisk Foundation** (NNF), Denmark.

4.11 Editorial Activity and Scientific Societies

Silvia Comani is **member of the Editorial Board** of the following scientific journals:

1. **Frontiers in Network Physiology**, section **Information Theory** as Review Editor (https://www.frontiersin.org/journals/network-physiology/sections/information-theory) since January 2022
2. **Frontiers in Neuroscience**, section **Brain Imaging Methods** (https://www.frontiersin.org/journals/all/sections/brain-imaging-methods) since May 2020
3. **PeerJ** (PeerJ, Inc) since September 2014 (https://peerj.com/SComani/)
4. **The Open Biomedical Engineering Journal** (Bentham Science Publishers) since March 2007 (https://benthamopen.com/TOBEJ/editorial-board/)
5. **Recent Patents on Engineering** (Bentham Science Publishers) since July 2006 (http://www.recentpatentsonengineering.com/author/editorial-board-members.php)

Silvia Comani is **Guest Associate Editor** of the following scientific journals:

2020-present: Sensors (MDPI - Multidisciplinary Digital Publishing Institute) for the Special Issue on "*EEG Sensors for Biomedical Applications*" (https://www.mdpi.com/journal/sensors/special_issues/EEGSBA)**. Guest Associate Editors:** Filippo Zappasodi, Silvia Comani and Patrique Fiedler

2018-2021: Frontiers in Neuroscience - **Section: Brain Imaging Methods** (Frontiers, www.frontiersin.org) for the Research Topic " *Dry electroencephalography for brain monitoring in sports and movement science*" (https://www.frontiersin.org/research-topics/7847/dry-electroencephalography-for-brain-monitoring-in-sports-and-movement-science)**. Guest Associate Editors:** Silvia Comani, Jens Haueisen and Maurizio Bertollo.

2014-2015: Frontiers in Human Neuroscience (Frontiers, www.frontiersin.org) for the Research Topic "*Bridging the gap before and after birth: methods and technologies to explore the functional neural development in humans*" (https://www.frontiersin.org/research-topics/2612/bridging-the-gap-before-and-after-birth-methods-and-technologies-to-explore-the-functional-neural-de)**. Guest Associate Editors:** Marika Berchicci and Silvia Comani. Frontiers E-Book published in Lausanne: Frontiers Media SA. ISSN 1664-8714; ISBN 978-2-88919-687-6. **DOI**: 10.3389/978-2-88919-687-6

Silvia Comani is **member of the ISBET** - The International Society for Brain Electromagenetic Topography (http://www.isbet.info/) since September 2015.

4.12 Scientific consulting activity

Presently, Silvia Comani has the following scientific consulting activity:

1. **Scientific Consultant for Translational and Technological Innovation in Neuroscience** at the private hospital "Casa di Cura Villa Serena", Città S. Angelo (PE) – Italy (http://www.villaserena.it/)
2. **Scientific Consultant for Biosignal Processing** at the Institut für Biomedizinische Technik und Informatik of the **Technischen Universität Ilmenau (Ilmenau) – Germany** (https://www.tu-ilmenau.de/bmti/)
3. **Member of the Scientific Committee of the "Fondazione Villaserena per la Ricerca",** Città S. Angelo (PE) – Italy

5. INTERNATIONALIZATION

5.1 Career/Employment

Silvia Comani pursued the following international achievements during her scientific career:

Feb 2019 - present: **Scientific Consultant for Biosignal Processing** at the Institut für Biomedizinische Technik und Informatik of the Technischen Universität Ilmenau (Ilmenau) – Germany (https://www.tu-ilmenau.de/bmti/)

2018 **Expert Reviewer** for the Novo Nordisk Foundation (NNF), Denmark.

April 2017 **Marie Curie fellowship** at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani was Coordinator.

April 2015 **Marie Curie fellowship** at eemagine Medical Imaging Solutions GmbH, Berlin (Germany) for research purposes and Transfer of Knowledge activities within the EU project ANDREA of which Silvia Comani was Coordinator.

5.2 International research activity and collaborations

During the years spent in Belgium (Catholic University of Louvain-la-Neuve) for obtaining the **PhD in Physics**, **Silvia Comani became acquainted with the international dimension of research**.

The first international scientific collaboration of Silvia Comani started in 1990, when she worked with **Prof. Konrad Brockmeier**, pediatric cardiologist from the Pediatric Clinic, Freie Universität, Berlin (Germany) on the **application of magnetocardiography in athletes to identify cardiac dysfunction under stress during exercise testing**.

Since 2006 Silvia Comani has established several **international scientific collaborations** in the field of **fetal magnetocardiographic (fMCG) signal processing**, as listed below:

6) **Department of Medical Physics, Wisconsin University at Madison, Wisconsin – USA** (***Prof. Ronald T. Wakai***) and **Wisconsin Children's Hospital, Fox Valley – USA** (***Prof. Janette Strasburger***), for the application of different ICA algorithms to separate fetal cardiac signals in multiple pregnancy fMCG data recorded in Chieti (Italy) and Madison (USA). Moreover, different techniques to separate the fetal cardiac signals were compared.
7) **Laboratory of Computational Neuro-engineering**, Dept. of Radiology, **California State University at San Francisco**, California – USA (***Dr. Kenneth E. Hild II and Prof. Srikantan S. Nagarajan***), to quantify the performances of different ICA algorithms for the extraction of the fetal signal from fetal magnetocardiograms.
8) **Fetal Magnetoencephalography Laboratory, University of Arkansas** in Little Rock – USA (***Dr. Hubert Preissl e Dr. Hari Eswaran***) to compare the performance of ICA with that of Project Operator (PO). FMCG data recorded with two different systems (ATB Argos 200, Chieti - Italy, and SARA system, Little Rock, Arkansas - USA) were used for this study.
9) **Department of Physics, Facultade de Filosofia, Ciências e Letras de Riberão Preto, Universidade de São Paulo – Brazil** (***Prof. Oswaldo Baffa, Prof. Draulio de Araujo, Prof. Eder Rezende Moraes, Prof. Luiz Otavio Murta***) for the following studies:
    a) the identification of linear and nonlinear parameters suitable to characterize the fetal cardiac function and fetal states;
    b) the development of a new segmented ICA algorithm for the separation of higher SNR fetal cardiac signals from fetal magnetocardiograms affected by non-stationarity;
    c) the development of a new SW platform for the analysis of fMCG data that includes linear and nonlinear processing tools.
10) **Department of Biomagnetism, Faculty of Medicine, University of Witten Herdecke, Bochum** – Germany (***Prof. Peter van Leeuwen***), to compare the performance of ICA, that is based on the spatial distribution of the fetal magnetocardiograms, with the performance of the template matching technique (TMT), which is based on the temporal analysis of fMCG data. FMCG data recorded with two different systems (ATB Argos 200, Chieti -

Italy, and 4D Neuroimaging Magnes 1330C, Bochum - Germany) were used for this study.

During the same period, Silvia Comani has collaborated with Prof. Allan Kardec Barros (**PIB-Laboratory for Biological Information Processing, Federal Univ. Maranhão, São Luís** – Brazil) for the application of ICA to the processing of adult ECG data and its compression for telemedicine purposes.

From 2007 until present, Silvia Comani has established several **international scientific collaborations** in the fields of **signal processing, neuroscience and its application to human movement science**, as listed below:

1) **Center for Complex Systems and Brain Sciences, Florida Atlantic University - Boca Raton (FL - USA)** (***Prof. JAS Kelso***), and **Human Cognition and Neural Dynamics Laboratory, Western Washington University - Bellingham (Washington – USA)** (***Prof. KJ Jantzen***) to study the neural correlates of different bimanual coordination patterns in tasks that imply spontaneous or intentional switching using a 3T fMRI system and a HR-EEG, each system in combination with kinematic data.
2) **Biomedical Research and Integrative NeuroImaging (BRaIN Imaging) Center, Health Sciences Center, University of New Mexico, Albuquerque – USA** (***Prof. Yoshio Okada e Dr. Julia Stevens***) to study the **functional response (Mu-rhythm) to prehension in children from 1-month-old to 6-years-old** using a paediatric MEG system (Baby-SQUID) and dedicated tests to assess the psycho-motor development of the infants.
3) The **Institute of Biomedical Engineering and Informatics at the Technical University Ilmenau, Germany** (***Prof. Jens Haueisen***) and the **Department of Biomagnetism, Faculty of Medicine, University of Witten Herdecke, Bochum – Germany** (***Prof. Peter van Leeuwen***), to develop an **automatic system -** based on the nonlinear information contained in adult MCG traces **- for the categorization of patients affected by Coronary Artery Disease (CAD)**.
4) The **Social Interaction and Performance Science Laboratory (SINAPSE), School of Psychology, University of Central Lancashire, Preston (United Kingdom**) (***Dr. Edson Filho***) for the following studies:
    a. to develop a **novel social neuroscience approach to identify neuro-psycho-physiological markers of team mental models**;
    b. to detect ***hyperbrain* connectivity during cooperative motor tasks** in juggling dyads within the theoretical framework of Team Mental Models and using Graph Theory concepts to characterize functional connectivity maps at the *hyperbrain* level;
    c. to investigate the **influence of expertise on the *hyperbrain* functional connectivity calculated at source level** in dyads of collaborating jugglers.
5) **Mechanical Engineering Research Center, Universidade do Porto, Portugal (*Prof. Carlos Fonseca*) for the development of a novel type of gel for wet electrodes**. This study was performed within the framework of the **European ANDREA Project** and in

collaboration with *Prof. Jens Haueisen and Dr. Patrique Fiedler* from the Institute of Biomedical Engineering and Informatics at the University of Ilmenau, Germany.

6) **Institute of Biomedical Engineering and Informatics at the University of Ilmenau, Germany (*Prof. Jens Haueisen and Dr. Patrique Fiedler*)** for the following studies, performed within the framework of the **European ANDREA Project**:

    a. development of an **automatic method for the classification of physiological artifacts affecting EEG recordings (the Fingerprint Method)**. The method employs ICA and Support Vector Machine (SVM) classification on EEG data.

    b. development of an **Optimized Fingerprint Method for the classification of physiological artifacts affecting EEG recordings during sports science applications**.

    c. **assessment of the efficacy of dry electrode EEG monitoring in sports science** application, particularly during endurance cycling.

7) **Faculty of Engineering, Division ESAT-STADIUS, of the Katholieke Universiteit Leuven, Belgium (*Prof. Sabine van Huffel and Prof. Maarten De Vos*) and Faculty of Medicine, Institute of Clinical Medicine, University of Helsinki, Finland** (***Prof. Sampsa Vanhatalo***) for the following studies, performed within the framework of the **European INFANS Project**:

    a. development of an **automatic method for the detection and deletion of artefactual segments in the neonatal EEG**.
    b. development of a **method based on microstate analysis for the quantification of the neonatal maturation**, in term and preterm neonates, both healthy and in pathological conditions.

8) **Institute of Biomedical Engineering and Informatics at the University of Ilmenau, Germany (*Prof. Jens Haueisen*)** for the following studies, performed within the framework of the **European INFANS Project**:

    a. comparison of **automatic methods for the removal of physiological artifacts from the neonatal EEG**.

9) **Universidad Complutense de Madrid, Madrid, Spain (*Prof. Fernando Maestù, Dr. Lucìa Vaquero*) and BRAINVESTIGATIONS SL, Las Rozas de Madrid, Spain (*Dr. Daniel Morera, Dr. Tania Ortuño*)** for the following studies, performed within the framework of the **European EMBRACE Project**:

    a. development of a **new study protocol** suitable to simultaneous monitor the kinematic and neuro-physiological signals in a dyad of volunteers during **cooperative and competitive joint action**.
    b. development of **methods for the multi-level analysis of the multimodal data acquired during joint action**.

Silvia Comani coordinated the international collaborative research activities of most of the studies listed above, which led to the publication of several scientific papers published in international peer-reviewed journals, where she is last author.

Other occasional international scientific collaborations have been established by Silvia Comani during her career. **Please refer to section 4.3 "Scientific collaborations"** for the full list of her scientific collaborations. The international ones are highlighted in light orange.

Also, **please refer to section 4.2 "Detailed description of the research activity"** for a detailed description of the research work of Silvia Comani.

5.3 Research projects funded by International Institutions, based on competitive calls implementing a peer-review selection process

1 Feb 2021 – 31 Oct 2025 **European Project EMBRACE** (Grant Agreement N. 101007521) *"tEchnology for Multimodal inter-BRain dynAmiCs invEstigation"* – Call identifier **H2020-MSCA-RISE-2020**. WEBSITE: www.projectembrace.eu

The project network includes academic and industrial partners, with 6 beneficiaries from Italy, Germany, and Spain. Technical university partners include: University "G. d'Annunzio" of Chieti-Pescara (Italy) – Coordinator; Technical University of Ilmenau (Germany); Universidad Complutese de Madrid (Spain). Industrial partners include: eemagine Medical Imaging Solutions GmbH, Berlin (Germany); BTS S.p.A., Milano (Italy); BraInvestigations, S.L., Madrid (Spain).

The purpose of the EMBRACE project is to develop: **1)** a new mobile and wireless dry electrode EEG system suitable for monitoring brain activity during full body movements; **2)** novel bodynetwork sensors and a multimodal alignment system for simultaneously recording neural, physiological and kinematic signals from two interacting subjects; **3)** novel analytical solutions for motion artefact removal and multi-level analysis of multimodal data; **4)** a new research dyadic paradigm to exploit the technological advances.

Silvia Comani is the Primary Coordinator of the EMBRACE project, responsible for coordinating the scientific and administrative aspects of the project at the University "G. d'Annunzio" of Chieti-Pescara (Italy) and among all partners. The project will be implemented in close collaboration with the project partners through intensive international and intersectoral staff exchange (secondments). The BIND-UdA unit (f which Silvia Comani is the scientist is charge) will be in charge of: **(1)** defining a new study paradigm for the multimodal study of cooperative and competitive dyadic interactions; **(2)** collecting multimodal data; **(3)** developing new analytical solutions to remove noise and motion-related artefacts and for the cognitive-behavioral-social analysis of the multimodal dyadic data.

Total Project Funds: € 818.800,00

Funds to BIND-UdA partner: € 193.200,00

2019-2022 **European Project INFANS** (Grant Agreement N. 813483) *"INtegrating Functional Assessment measures for Neonatal Safeguard"* – Call identifier **H2020-MSCA-ITN-2018** – WEBSITE: http://www.infansproject.eu/.

The project network includes academic, industrial and clinical partners, with 8 beneficiaries and 2 associated partners from Germany, Italy, Belgium, Finland, Iceland, the Netherlands. Technical university partners include: University of Ilmenau (Germany) - Coordinator, University "G. d'Annunzio" of Chieti-Pescara (Italy), Catholic University of Leuven (Belgium). Medical university partners

include: University of Helsinki (Finland), University Medical Center of Utrecht (Netherlands). Industrial partners include: eemagine Medical Imaging Solutions GmbH, Berlin (Germany), Artinis Medical Systems B.V., Elst (Netherlands), Kvikna ehf, Reykjavik (Iceland).

The purpose of the INFANS project is to develop a novel dry electrode/optode solution for EEG, NIRS and simultaneous EEG-NIRS monitoring for neonatal functional brain monitoring, to develop novel analytical methods for the pre-processing, analysis and classification of EEG and NIRS features, and to assess and optimize the performance of the novel EEG-NIRS prototype and analytical tools in real clinical settings.

Silvia Comani is the Local Coordinator of partner BIND-UdA (Università "G. d'Annunzio", Chieti - Italy). Silvia Comani is responsible for coordinating the scientific and administrative aspects of the project at the University "G. d'Annunzio" of Chieti-Pescara (Italy). Three PhD students have been recruited, and, under the supervision of Silvia Comani, they will develop EEG denoising methods based on BSS approaches to remove artefacts affecting neonatal EEG recordings, and to develop analytical methods for evaluating the functional connectivity and efficiency of the developing neonatal brain.

Total Project Funds: € 3.950.394,84

Funds to BIND-UdA partner: € 784.499,04

2014-2017

European Project ANDREA (Grant Agreement N. 610950) *"Active Nanocoated DRy-electrode for Eeg Applications"* – Call identifier **FP7-PEOPLE-2013-IAPP**. WEBSITE: https://www.andreaproject.eu/

The project network included academic, industrial and clinical partners from Italy, Germany, and Portugal. In particular: 3 Universities (Università "G. d'Annunzio", Chieti – Italy, Coordinator; University of Ilmenau, Germany; University of Porto, Portugal), 2 companies (Casa di Cura Privata Villa Serena, Città S.Angelo - Italy, eemagine Medical Imaging Solutions GmbH, Berlin - Germany), of which one is a private hospital (Casa di Cura Privata Villa Serena).

The purpose of the ANDREA project was to develop a novel dry electrode EEG system with adjustable cap network provided with an automated sensor positioning mechanism, active preamplification and a SW toolbox for physiological artefact removal. The novel technologies address the requirements of high signal quality and reliability, mobility, high patient/subject comfort and long-term use, and were validated in clinical and non clinical populations to produce a prototype optimized for broad EEG employment.

Silvia Comani has been the Primary Coordinator of the European Project ANDREA. Silvia Comani was responsible for coordinating the administrative aspects of the project, and for supervising the scientific activities at the University "G. d'Annunzio" of Chieti-Pescara (Italy). One post-doc researcher was recruited to work under the supervision of Silvia Comani to develop an EEG denoising method based on BSS approaches for the removal of artefacts affecting adult EEG

recordings, to test it in EEG recordings acquired in athletes and neurological patients, and to integrate it into a SW toolbox for EEG signal pre-processing.

Total Project Funds: € 1.595.310,46

Funds to BIND-UdA partner: € 467.188,64

2006-2009 **INTERLINK Project n.II04CD8G5A "New methods to reconstruct and analyze the fetal cardiac signals recorded by magnetocardiography"** funded by the Italian Ministry for University and Research (MIUR).

The purpose of this project was to develop and implement analytical methods and instrumentation to promote the use of fetal magnetocardiography for diagnostic purposes.

Silvia Comani was the Primary Coordinator of the INTERLINK Project n.II04CD8G5A. The project network included 3 academic partners: the Università "G. d'Annunzio", Chieti (Italy), the University of San Paolo (Brazil) and the University of Wisconsin at Madison (USA).

Funding: € 242.000,00

5.4 Coordination of international research groups

From 2006 until present, Silvia Comani has coordinated / is coordinating international research groups, as described in section 5.1 "International research activity and collaborations", and within the framework of the **international research projects** that were assigned based on competitive calls implementing a peer-review selection process:

- **2021-2025: European Project EMBRACE** (Grant Agreement N. 101007521 - *"t**E**chnology for **M**ultimodal inter-**BR**ain dyn**A**mi**C**s inv**E**stigation"* – Call identifier H2020-MSCA-RISE-2020 - https://cordis.europa.eu/project/id/101007521), with partners from Germany and Spain;
- **2019-2022: European Project INFANS** (Grant Agreement N. 813483 - "INtegrating Functional Assessment measures for Neonatal Safeguard" – Call identifier H2020-MSCA-ITN-2018 - http://www.infansproject.eu/), with partners from Germany, Belgium, Finland, Iceland, the Netherlands;
- **2014-2017: European Project ANDREA** (Grant Agreement N. 610950 - "Active Nanocoated DRy-electrode for Eeg Applications" – Call identifier FP7-PEOPLE-2013-IAPP - https://www.andreaproject.eu/), with partners from Italy, Germany and Portugal;
- **2006-2009: INTERLINK Project** n.II04CD8G5A "New methods to reconstruct and analyze the fetal cardiac signals recorded by magnetocardiography", with partners from Brasil and the USA.

Silvia Comani has coordinated / is coordinating also international research groups within the framework of the multimodal studies performed at the BIND Center on the neural correlates of motor performance and of inter-personal coordination (**please see section 5.1 "International research activity and collaborations"**).

The above listed research collaborations have led to the publication of several **scientific articles in peer-reviewed international journals**, **where Silvia Comani is last author**.

5.5 Other research related international activities

Scientific organizational activity

Silvia Comani has organized four international Workshops, and four international summer schools, which were held in Switzerland, France, Germany, Italy and Japan.

Please refer to section 4.6 “Scientific organizational activity” for details on the international events that Silvia Comani organized, which are highlighted in light orange.

Invited speaker

Silvia Comani has been invited speaker at 12 international research centers and 11 international congresses and summer schools, which were held in Italy, Czech Republic, Germany, Brazil, France, United Kingdom, and USA.

Please refer to section 4.7 “Invited speaker and lecturer” for details on the international events to which Silvia Comani contributed, which are highlighted in light orange.

Conferences

Silvia Comani has participated as speaker at 16 international conferences, which were held in Switzerland, Portugal, France, The Netherlands, Spain, Czech Republic, USA, Italy, and Austria.

Please refer to section 4.8 “National and International Conferences and Schools” for details on the international conferences to which Silvia Comani participated as speaker, which are highlighted in light orange.

Visiting scientist

Silvia Comani has been visiting scientist at 11 international research centers in Germany, Portugal, United Kingdom, USA, and Brazil.

Please refer to section 4.9 “Visiting scientist” for details on these visits, which are highlighted in light orange.

6. SCIENTIFIC PUBLICATIONS

Silvia Comani is author and co-author of:

- **80 full length peer-reviewed articles** published in international indexed journals (of which 2 are not indexed in Scopus)
- **23 extended peer-reviewed proceedings papers** published in international indexed journals (of which 12 are not indexed in Scopus)
- **119 abstracts** in Proceedings of International Congresses
- **3 book chapters**

H-index = 24

https://orcid.org/0000-0001-8100-457X

6.1 Full length articles published in international peer-reviewed journals

1. Cláudia Lopes, Patrique Fiedler, Marco S. Rodrigues, Joel Borges, Maurizio Bertollo, Eduardo Alves, Nuno P. Barradas, **Silvia Comani**, Jens Haueisen, and Filipe Vaz (**2021**). Me Doped Ti-Me Intermetallic Thin Films Used for Dry Biopotential Electrodes: A Comparative Case Study. *Sensors*, 21, 8143 DOI: 10.3390/s21238143; Q2 in: Electrical and Electronic Engineering AND Information Systems AND Instrumentation; IF = 3.576
2. **Silvia Comani**, Maurizio Bertollo, Jens Haueisen (**2021**). Editorial: Dry electroencephalography for brain monitoring in sports and movement science. *Frontiers in Neuroscience* (Section: Brain Imaging Methods) 15:809227. DOI: 10.3389/fnins.2021.809227; Q1 in: Neuroscience (miscellaneous); IF = 4.677
3. Gabriella Tamburro, Pierpaolo Croce, Filippo Zappasodi, **Silvia Comani** (**2021**) Automated Detection and Removal of Cardiac and Pulse Interferences from Neonatal EEG Signals. *Sensors* 21, 6364 – published online on 32/09/2021 DOI: 10.3390/s21196364; Q2 in: Electrical and Electronic Engineering; IF = 3.576
4. Mohammad Khazaei, Khadijeh Raeisi, Pierpaolo Croce, Gabriella Tamburro, Anton Tokariev, Sampsa Vanhatalo, Filippo Zappasodi, **Silvia Comani** (**2021**) Characterization of the Functional Dynamics in the Neonatal Brain during REM and NREM Sleep States by means of Microstate Analysis. *Brain Topography* 34(5):555-567 DOI: 10.1007/s10548-021-00861-1; Q1 in: Medicine (Radiology, Nuclear Medicine and Imaging); Health Professions (Radiological and Ultrasound Technology); IF = 2.759 (anno 2019/2020)
5. Gabriella Tamburro, Pierpaolo Croce, Filippo Zappasodi and **Silvia Comani** (**2021**). Is brain dynamics preserved in the EEG after automated artefact removal? A validation of the Fingerprint Method and the ARCI approach based on microstate analysis. *Frontiers in Neuroscience* (Section: Brain Imaging Methods) 14:577160. DOI:

10.3389/fnins.2020.577160; Q1 in: Neuroscience (miscellaneous); IF = 3.707 (anno 2019)

6. Salvatore CAMPANELLA, Kemal ARIKAN, Claudio BABILONI, Michela BALCONI, Maurizio BERTOLLO, Viviana BETTI, Luigi BIANCHI, Martin BRUNOVSKY, Carla BUTINELLI, **Silvia COMANI**, ……. , and Oliver POGARELL (**2021**). Special Report on the Impact of the COVID-19 Pandemic on Clinical EEG and Research and Consensus Recommendations for the Safe Use of EEG. Invited Editorial, *Clinical EEG and Neuroscience* 52(1), pp. 3–28 DOI: 10.1177/1550059420954054; Q2 in: Medicine (miscellaneous); IF = 1.765 (anno 2019)
7. Gabriella Tamburro, Selenia di Fronso, Claudio Robazza, Maurizio Bertollo and **Silvia Comani** (**2020**). Modulation of brain functional connectivity and efficiency during an endurance cycling task: a source level EEG and Graph Theory approach. *Frontiers in Human Neuroscience* 14:243 - Section: Cognitive Neuroscience. DOI: 10.3389/fnhum.2020.00243; Q1 in: Psychiatry and Mental Health; IF = 2.673 (anno 2019)
8. Selenia di Fronso, Patrique Fiedler, Gabriella Tamburro, Jens Haueisen, Maurizio Bertollo and **Silvia Comani** (**2019**). Dry EEG in sport sciences: a fast and reliable tool to assess individual alpha peak frequency changes induced by physical effort. *Frontiers in Neuroscience* 13:982 - Section: Brain Imaging Methods. Research Topic: Dry Electroencephalography for Brain Monitoring in Sports and Movement Science. DOI: 10.3389/fnins.2019.00982; Q1 in: Neuroscience (miscellaneous); IF = 3.648 (anno 2018)
9. David B. Stone, Gabriella Tamburro, Edson Filho, Selenia Di Fronso, Claudio Robazza, Maurizio Bertollo and **Silvia Comani** (**2019**) Hyperscanning of interactive juggling: expertise influence on source level functional connectivity. *Frontiers in Human Neuroscience* 13:321 – Section: Brain Imaging and Stimulation. DOI: 10.3389/fnhum.2019.00321; Q1 in: Psychiatry and Mental Health; IF = 2.870 (anno 2018)
10. Gabriella Tamburro, David B. Stone, **Silvia Comani** (**2019**) Automatic Removal of Cardiac Interference (ARCI): a new approach for EEG data. *Frontiers in Neuroscience* 13:441 – Section: Brain Imaging Methods. Research Topic: Dry Electroencephalography for Brain Monitoring in Sports and Movement Science. DOI: 10.3389/fnins.2019.00441; Q1 in: Neuroscience (miscellaneous); IF = 3.648 (anno 2018)
11. Selenia di Fronso, Gabriella Tamburro, Claudio Robazza, Laura Bortoli, **Silvia Comani** and Maurizio Bertollo (**2018**) Focusing Attention on Muscle Exertion Increases EEG Coherence in an Endurance Cycling Task. *Frontiers in Psychology* 9:1249. DOI: 10.3389/fpsyg.2018.01249; Q1 in: Psychology (miscellaneous); IF = 2.129
12. David B. Stone, Gabriella Tamburro, Patrique Fiedler, Jens Haueisen, **Silvia Comani** (**2018**) Automatic removal of physiological artifacts in EEG: the Optimized Fingerprint Method for sports science applications. *Frontiers in Human Neuroscience* 12:96. DOI: 10.3389/fnhum.2018.00096; Q1 in: Behavioral Neuroscience AND in: Neurology; IF = 2.870
13. Gabriella Tamburro, Patrique Fiedler, David B. Stone, Jens Haueisen, and **Silvia Comani** (**2018**) A new ICA-based fingerprint method for the automatic removal of physiological artifacts from EEG recordings. *PeerJ* 6:e4380 DOI: 10.7717/peerj.4380; Q1 in: Medicine (miscellaneous); IF = 2.353

14. Paulo Pedrosa, Patrique Fiedler, Lorenzo Schinaia, Beatriz Vasconcelos, Ana C. Martins, Maria H. Amaral, **Silvia Comani**, Jens Haueisen, and Carlos Fonseca (**2017**) Alginate-based hydrogels as an alternative to electrolytic gels for rapid EEG monitoring and easy cleaning procedures. *Sensors and Actuators B: Chemical*: 247: 273–283. DOI: 10.1016/j.snb.2017.02.164; Q1 in: Electrical and electronic engineering, in Instrumentation, and a number of other categories. IF = 5.667
15. Selenia di Fronso, Claudio Robazza, Edson Filho, Laura Bortoli, **Silvia Comani**, Maurizio Bertollo (**2016**) Neural markers of performance states in an Olympic Athlete: An EEG case study in air-pistol shooting. *Journal of Sports Science and Medicine* 15(2):214-22. eCollection 2016 Jun. PMCID: PMC4879433 Q1 in: Orthopedics and Sports Medicine, and in Physical Therapy, Sports Therapy and Rehabilitation; IF = 1.797
16. Edson Filho, Maurizio Bertollo, Gabriella Tamburro, Lorenzo Schinaia, Jonas Chatel-Goldman, Selenia di Fronso, Claudio Robazza, **Silvia Comani**. (**2016**) Hyperbrain features of team mental models within a juggling paradigm: a proof of concept. *PeerJ* 4:e2457 DOI: 10.7717/peerj.2457; Q1 in: Medicine (miscellaneous); IF = 2.177
17. Maurizio Bertollo, Selenia Di Fronso, Edson Filho, Silvia Conforto, Maurizio Schmid, Laura Bortoli, **Silvia Comani**, Claudio Robazza (**2016**) Proficient brain for optimal performance: the MAP model perspective. *PeerJ* 4:e2082. DOI: 10.7717/peerj.2082; Q1 in: Medicine (miscellaneous); IF = 2.177
18. **Silvia Comani**, Lucia Velluto, Lorenzo Schinaia, Gianluigi Cerroni, Antonio Serio, Sandro Buzzelli, Sandro Sorbi, Biancamaria Guarnieri (**2015**) Monitoring neuro-motor recovery from stroke with high-resolution EEG, robotics and virtual reality: a proof of concept. *IEEE Transactions on Neural System and Rehabilitation Engineering*, 23(6):1106-16. DOI: 10.1109/TNSRE.2015.2425474; Q1 in: Biomedical Engineering AND Computer Science Applications AND Medicine (miscellaneous); IF = 3.077
19. Marika Berchicci and **Silvia Comani** (**2015**) Editorial "Bridging the gap before and after birth: methods and technologies to explore the functional neural development in humans" *Frontiers in Human Neuroscience* 9:571. DOI: 10.3389/fnhum.2015.00571; Q1 in: Behavioral Neuroscience AND Neuropsychology and Physiological Psychology AND Neurology; IF = 3.634
20. Carmen D'Anna, Maurizio Schmid, Daniele Bibbo, Maurizio Bertollo, **Silvia Comani** and Silvia Conforto (**2015**) The effect of continuous and discretized presentations of concurrent augmented Visual Biofeedback on postural control in quiet stance. *PLoS ONE* 10(7): e0132711. OI:10.1371/journal.pone.0132711; Q1 in: Medicine (miscellaneous); IF = 3.057
21. Marika Berchicci, Gabriella Tamburro, **Silvia Comani** (**2015**) The intrahemispheric functional properties of the developing sensorimotor cortex are influenced by maturation. *Frontiers in Human Neuroscience* 9:39. Research Topic "Bridging the gap before and after birth: methods and technologies to explore the functional neural development in humans" DOI:10.3389/fnhum.2015.00039; Q1 in: Behavioral Neuroscience AND Neuropsychology and Physiological Psychology AND Neurology; IF = 3.634
22. Edson Filho, Maurizio Bertollo, Claudio Robazza, **Silvia Comani** (**2015**) The juggling paradigm: A novel social neuroscience approach to identify neuropsychophysiological markers of team mental models. *Frontiers in Psychology* (Specialty Section: Movement

Science and Sport Psychology) 6:799. DOI: 10.3389/fpsyg.2015.00799; Q1 in: Psychology (miscellaneous); IF = 2.463

23. Maurizio Bertollo, Selenia di Fronso, Edson Filho, Vito Lamberti, Patrizio Ripari, Victor Machado Reis, **Silvia Comani**, Laura Bortoli, Claudio Robazza (**2015**) To focus or not to focus: Is attention on the core components of action beneficial for cycling performance? *Sport Psychologist* 29: 110 -119 DOI: 10.1123/tsp.2014-0046; Q2 in: Sport Science, Applied Psychology; IF = 1.104
24. Luiz Otavio Murta Jr, Mario G. Guzo, Eder R. Moraes, Oswaldo Baffa, Ronald T. Wakai, **Silvia Comani** (**2015**) Segmented Independent Component Analysis for improved separation of fetal cardiac signals from non-stationary fetal magnetocardiograms. *Biomedical engineering - Biomedizinische Technik*. 60(3):235-244, DOI: 10.1515/bmt-2014-0114; Q3 in: Medicine (miscellaneous); IF = 1.650
25. Roberta Vastano, Valentina Sulpizio, Martin Steinisch, **Silvia Comani** and Giorgia Committeri (**2014**) Embodied and disembodied allocentric simulation in high schizotypal subjects. *Experimental Brain Research* 232(10):3023-3033. DOI: 10.1007/s00221-014-3991-0; Q2 in: Neuroscience (miscellaneous); IF = 2.036
26. Martin Steinisch, Maria Gabriella Tana, **Silvia Comani** (**2013**) A post-stroke rehabilitation system integrating robotics, VR and high-resolution EEG imaging. *IEEE Transactions on Neural System and Rehabilitation Engineering* 21(5):849-59. DOI: 10.1109/TNSRE.2013.2267851. Q1 in: Biomedical Engineering AND Computer Science Applications AND Medicine (miscellaneous); IF = 2.522
27. Maurizio Bertollo, Laura Bortoli, Gianfranco Gramaccioni, Yuri Hanin, **Silvia Comani**, Claudio Robazza (**2013**) Behavioural and Psychophysiological Correlates of Athletic Performance: A Test of the Multiple-Action Plan Model. *Applied Psychophysiology and Biofeedback* 38(2): 91-99. DOI: 10.1007/s10484-013-9211-z; Q2 in: Applied Psychology AND Neuropsychology and Physiological Psychology; IF = 1.593
28. Raffaella Franciotti, Walter N. Falasca, Laura Bonanni, Francesca Anzellotti, Valerio Maruotti, **Silvia Comani**, Astrid Thomas, Armando Tartaro, John-Paul Taylor, Marco Onofrj (**2013**) Default Network is not hypoactive in dementia with fluctuating cognition: an AD/DLB comparison. *Neurobiology of Aging* 34: 1148-1158 DOI: pii: S0197-4580(12)00471-X.0.1016/j.neurobiolaging.2012.09.015; Q1 in: Neuroscience (miscellaneous) AND Neurology (clinical)AND Aging AND Developmental Biology; IF = 4.853
29. Martin Steinisch, Paul R. Torke, Jens Haueisen, Birgit Hailer, Dietrich Grönemeyer, Peter Van Leeuwen, **Silvia Comani** (**2013**) Early detection of coronary artery disease in patients studied with Magnetocardiography: An automatic classification system based on signal entropy. *Computers in Biology and Medicine* 43:144-153 DOI: 10.1016/j.compbiomed.2012.11.014; Q2 in: Computer Science Applications AND Health Informatics; IF = 1.475
30. Eder R. Moraes, Luiz Otavio Murta Jr., Oswaldo Baffa, Ronald T. Wakai, **Silvia Comani** (**2012**) Linear and non-linear measures of fetal heart rate patterns evaluated on very short fetal magnetocardiograms. *Physiological Measurement* 33: 1563-1583 DOI: 10.1088/0967-3334/33/10/1563; Q2 in: Biophysics AND Physiology (medical); IF = 1.496

31. Maurizio Bertollo, Claudio Robazza, Walter N. Falasca, Massimiliano Stocchi, Claudio Babiloni, Claudio Del Percio, Nicola Marzano, Marco Iacoboni, Francesco Infarinato, Fabrizio Vecchio, Cristina Limatola, **Silvia Comani** (**2012**) Temporal pattern of pre-shooting psycho-physiological states in elite athletes: A probabilistic approach. *Psychology of Sport and Exercise* 13: 91-98 DOI: 10.1016/j.psychsport.2011.09.005; Q2 in: Applied Psychology AND Sports Science; IF = 1.719
32. Martin Steinisch, Valentina Sulpizio, Angelo A. Iorio, Alessandra Di Naccio, Jens Haueisen, Giorgia Committeri, **Silvia Comani** (**2011**) A virtual environment for egocentric and allocentric mental transformations: a study on a non clinical population of adults with distinct levels of schizotypy. *Biomedical engineering - Biomedizinische Technik*, 56(5): 291-299 DOI: 10.1515/BMT.2011.107; Q2 in: Medicine (miscellaneous); IF = 0.860
33. Marika Berchicci, Tongsheng Zhang, Lucinda Romero, Amanda Peters, Robert Annett, Ursina Teuscher, Maurizio Bertollo, Yoshio Okada, Julia Stephen, **Silvia Comani** (**2011**) Development of mu-rhythm in infants and preschool children. *Developmental Neuroscience* 33(2): 130-143 DOI: 10.1159/000329095; Q1 in: Neurology; IF = 3.627
34. Claudio Del Percio, Marco Iacoboni, Roberta Lizio, Nicola Marzano, Francesco Infarinato, Fabrizio Vecchio, Maurizio Bertollo, Claudio Robazza, **Silvia Comani**, Cristina Limatola, Claudio Babiloni (**2011**) Functional coupling of parietal alpha rhythms is enhanced in athletes before visuomotor performance: a coherence electroencephalographic study. *Neuroscience* 175: 198–211. DOI: 10.1016/j.neuroscience.2010.11.031; Q1 in: Neuroscience; IF = 3.380
35. Aba N. Mensah-Brown, William J. Lutter, **Silvia Comani**, Janett Strasburger, Ronald T. Wakai (**2011**) Independent Component Analysis of normal and abnormal rhythm in Twin pregnancies. *Physiological Measurement* 32(1): 51-64. DOI: 10.1088/0967-3334/32/1/004; Q2 in: Biophysics AND Physiology (medical); IF = 1.677
36. Laura Bortoli, Maurizio Bertollo, **Silvia Comani**, Claudio Robazza (**2011**) Competence, achievements goals, motivational climate, and pleasant psychobiosocial states in youth sport. *Journal of sports sciences* 29(2): 171-80. DOI: 10.1080/02640414.2010.530675; Q1 in: Medicine (Orthopedics and Sports Medicine) AND Health Professions (Physical Therapy, Sports Therapy and Rehabilitation); IF = 1.931
37. Cinzia De Luca, Maurizio Bertollo, **Silvia Comani** (**2010**) Non-magnetic equipment for the high-resolution quantification of finger kinematics during functional studies of bimanual coordination. *Journal of Neuroscience Methods* 192: 173-184. DOI: 10.1016/j.jneumeth.2010.07.018; Q2 in: Neuroscience(miscellaneous); IF = 2.100
38. Cinzia De Luca, Kelly J. Jantzen, **Silvia Comani**, Maurizio Bertollo, J.A.S. Kelso (**2010**) Striatal activity during intentional switching depends on pattern stability. *Journal of Neuroscience* 30(9):3167-74. DOI: 10.1523/JNEUROSCI.2673-09.2010; Q1 in: Neuroscience(miscellaneous); IF = 7.271
39. Maurizio Bertollo, Marika Berchicci, Attilio Carraro, **Silvia Comani**, Claudio Robazza (**2010**) Blocked and Random practice organization in the learning of rhythmic footstep dance sequences. *Perceptual and Motor Skills* 110 (1): 77-84. DOI: 10.2466/PMS.110.1.77-84; Q4 in: Experimental and Cognitive Psychology; IF = 0.492
40. Claudio Del Percio, Claudio Babiloni, Maurizio Bertollo, Paolo M. Rossini, Nicola Marzano, Marco Iacoboni, Francesco Infarinato, Massimiliano Stocchi, Claudio

Robazza, **Silvia Comani**, Fabrizio Eusebi (**2009**) Visuo-attentional and sensorimotor alpha rhythms are related to visuo-motor performance in athletes. *Human Brain Mapping* 30(11):3527-40. DOI: 10.1002/hbm.20776; Q1 in: Neurology and in Radiology, Nuclear Medicine and Imaging; IF = 6.256

41. **Silvia Comani**, Peter van Leeuwen, Silke Lange, Daniel Geue, Dietrich Grönemeyer (**2009**) Influence of gestational age on the effectiveness of spatial and temporal methods for the reconstruction of the fetal magnetocardiogram. *Biomedical engineering - Biomedizinische Technik* 54(1): 29-37. DOI: 10.1515/BMT.2009.005; Q3 in: Biomedical Engineering; IF = 0.592
42. Denner Guilhon, Allan K. Barros, **Silvia Comani** (**2007**) ECG compression by efficient coding. *Lecture Notes in Computer Science* 4666 (Independent Component Analysis and Signal Separation, ISBN: 978-3-540-74493-1) ISSN 0302-9743; pages:593-600; Q2 in: Computer Science (miscellaneous); IF = 0.402 (anno 2005)
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6.2 Extended proceedings papers published in peer-reviewed journals

1. C. D'Anna, D. Bibbo, M. Bertollo, S. Di Fronso, **S. Comani**, M.R. De Blasiis, V. Veraldi, M. Goffredo, and S. Conforto (**2016**) State of Alertness During Simulated Driving Tasks. E. Kyriacou et al. (ed.), CD-ROM IFMBE Proceedings, Springer International Publishing Switzerland, Vol. 57, pp: 907-912. XIV Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2016, 31 March - 2 April 2016, Paphos (Cyprus). DOI: 10.1007/978-3-319-32703-7_177; IF = 0.25
2. **S. Comani**, Lorenzo Schinaia, Gabriella Tamburro, Lucia Velluto, Sandro Sorbi, Silvia Conforto, Biancamaria Guarnieri (**2015**) Assessing neuro-motor recovery in a stroke survivor with high-resolution EEG, hobotics and Virtual Reality. Conf Proc IEEE Eng Med Biol Soc. 2015 Aug 2015, pages:3925-3928. IEEE Publisher. 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, MiCo - Milano Conference Center - Milan, Italy, August 25-29 2015. DOI: 10.1109/EMBC.2015.7319252; IF = 5.13
3. S. Conforto, A.M. Castronovo, C. De Marchis, M. Schmid, M. Bertollo, C. Robazza, **S. Comani**, T. D'Alessio (**2013**) The fatigue vector: a new bi-dimensional parameter for muscular fatigue analysis. L.M. Roa Romero (ed.), CD-ROM IFMBE Proceedings, Springer International Publishing Switzerland 2014, Vol. 41, pp: 149-152. XIII Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2013, 25-28 September 2013, Seville (Spain). DOI: 10.1007/978-3-319-00846-2_37; IF = 0.22
4. M. Schmid, I. Bernabucci, **S. Comani**, S. Conforto, B. D'Elia, B. Fida and T. D'Alessio (**2014**) Haptic feedback affects movement regularity of upper extremity movements in elderly adults. L.M. Roa Romero (ed.), CD-ROM IFMBE Proceedings, Springer International Publishing Switzerland 2014, Vol. 41, pp: 1771-1774. XIII Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2013, 25-28 September 2013, Seville (Spain). DOI: 10.1007/978-3-319-00846-2_437; IF = 0.22
5. **S. Comani**, L. Bortoli, S. Di Fronso, E. Filho, C. De Marchis, M. Schmid, S. Conforto, C. Robazza and M. Bertollo (**2014**) ERD/ERS patterns of shooting performance within the multi-action plan model. L.M. Roa Romero (ed.), CD-ROM IFMBE Proceedings, Springer International Publishing Switzerland 2014, Vol. 41, pp: 141-144. XIII Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2013, 25-28 September 2013, Seville (Spain). DOI: 10.1007/978-3-319-00846-2_35; IF = 0.22
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7. **S. Comani**, S. Di Fronso, E. Filho, A. M. Castronovo, M. Schmid, L. Bortoli, S. Conforto, C. Robazza and M. Bertollo (**2014**) Attentional focus and functional connectivity in cycling: an EEG case study. L.M. Roa Romero (ed.), CD-ROM IFMBE Proceedings, Springer International Publishing Switzerland 2014, Vol. 41, pp: 137-140. XIII Mediterranean Conference on Medical and Biological Engineering and Computing - MEDICON 2013, 25-28 September 2013, Seville (Spain). DOI: 10.1007/978-3-319-00846-2_34; IF = 0.22
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10. **S. Comani**, H. Preissl, D. Mantini, Q. Campbell, G. Alleva, H. Eswaran (**2007**) Comparison of algorithms for fetal signal reconstruction: Projector Operator vs. Independent Component Analysis. *International Congress Series 1300*: 733-736. DOI: 10.1016/j.ics.2007.01.002; IF = 0.24
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21. S. Conforto, **S. Comani**, S.N. Erne', J. Ehrich (**1994**) Automatic detection of Migrating Motor Complexes using Neural Networks on magnetic Recordings of gastric activity. Bio-Medical Technik (BMT) Kongress '94, Rostock (Germany). Published in *Biomedical engineering - Biomedizinische Technik* 39(S1):127–128. DOI: 10.1515/bmte.1994.39.s1.127.
22. **S. Comani**, S. Conforto, M. Basile, D. Di Nuzzo, S.N. Erne'. (**1994**) Gastromagnetism: non invasive detection of Migrating Motor Complexes. Bio-Medical Technik (BMT) Kongress '94, Rostock (Germany). Published in *Biomedical engineering - Biomedizinische Technik* 39(S1):125–126. DOI: 10.1515/bmte.1994.39.s1.125
23. K. Brockmeier, **S. Comani**, S.N. Erne', C. Del Gratta, S. Di Luzio, A. Pasquarelli and G.L. Romani (**1992**) Magnetocardiography and exercise testing: data acquisition and data processing. IEEE, Computer Society Press Publications, p. 561-564. IF = 0.524

6.3 Abstracts in Proceedings of International Congresses

1. Filippo Zappasodi, Tim Herman, Mohammad Khazaei, Khadijeh Raeisi Nafchi, Pierpaolo Croce, Gabriella Tamburro, Maarten De Vos, Anton Tokariev, Sampsa Vanhatalo, **Silvia Comani (2022)** EEG Microstates for monitoring the developing neonatal brain. International conference on "50 Years of Microstates: present state and future directions", 31 Aug – 3 Sept 2022, Bern, Switzerland.
2. Croce Pierpaolo, Tecchio Franca, Tamburro Gabriella, Fiedler Patrique, **Comani Silvia**, Zappasodi Filippo (2022) Brain electrical Microstates for the control of a steady state motor output. International conference on "50 Years of Microstates: present state and future directions", 31 Aug – 3 Sept 2022, Bern, Switzerland.
3. de Frutos-Lucas J, Doval-Moreno S, Bruña-Fernández R, Cabrera J, de Fano A, Fielder P, Tamburro G, Haueisen J, Zanow F, Ros B, Pusil S, Vaquero L, **Comani S (2022)** Applying novel EMBRACE technological solutions to measure and optimize brain response to exercise. AAIC 2022, Alzheimer's Association International Conference, July 31 – Aug. 4, 2022 | San Diego, USA and Online.
4. Khazaei M, Raeisi K, Croce P, Tamburro G, Tokariev A, Zappasodi F, Vanhatalo S, **Comani S** (**2022**) Toward Dynamic Functional Connectivity Characterization in the Newborn Brain. Joint Annual Conference of the Austrian, German and Swiss Societies for Biomedical Engineering, 28-30 September 2022, Special Track Workshop "Facing the challenges of neonatal brain monitoring" (Hybrid).
5. Raeisi K, Khazaei M, Croce P, Tamburro G, **Comani S,** Zappasodi F (**2022**) A Spatio-Temporal Graph Convolutional Network for Neonatal Seizure Detection. Joint Annual Conference of the Austrian, German and Swiss Societies for Biomedical Engineering, 28-30 September 2022, Special Track Workshop "Facing the challenges of neonatal brain monitoring" (Hybrid).
6. Chuen Rue Ng, Patrique Fiedler, Levin Kuhlmann, David Liley, Beatriz Vasconcelos, Carlos Fonseca, Gabriella Tamburro, **Silvia Comani**, Troby Lui, Chun-Yu Tse, Indhika Fauzhan Warsito, Eko Supriyanto, Jens Haueisen (**2022**) "Multi-center comparison of gel-based and dry EEG recordings", Special Symposium "Ubiquitous electroencephalography", IUPESM WC2022 - World Congress on Medical Physics and Biomedical Engineering, Singapore 12-17 June 2022 (Hybrid).
7. **Silvia Comani** (**2022**) "Artefact rejection for dry electrode recordings in sport science", oral presentation, Special Symposium "Ubiquitous electroencephalography", IUPESM WC2022 - World Congress on Medical Physics and Biomedical Engineering, Singapore 12-17 June 2022 (Hybri).
8. Raeisi K, Khazaei M, Croce P, Tamburro G, **Comani S**, Zappasodi F: Neonatal Seizure Detection Using a Graph Convolutional Neural Network. **OHBM 2022**, International Conference of the Organization for Human Brain Mapping, Glasglow (Scotland), hybrid, June 19-23, 2022.
9. Smets L, **Comani S**, De Vos M, Dereymaeker A: Fully automated quiet sleep quantification in preterm infants. 13th International Newborn Brain Conference, Clerwater Beach (Florida – USA), hybrid, February 10-12, **2022**.

10. Khazaei M, Raeisi K, Croce P, Tamburro G, Zappasodi F, **Comani S**: Functional Connectivity Alternations before and during Neonatal Seizure. 13th International Newborn Brain Conference, Clerwater Beach (Florida – USA), hybrid, February 10-12, **2022**.
11. Hermans T, Khazaei M, Raeisi Nafchi K, Croce P, Tamburro G, Dereymaeker A, De Vos M, Zappasodi F, **Comani S**: Assessing maturational effects on brain dynamics in preterm neonates using microstate analysis. 13th International Newborn Brain Conference, Clerwater Beach (Florida – USA), hybrid, February 10-12, **2022**.
12. Tamburro G, di Fronso S, Robazza C, Bertollo M and **Comani S.**: Modulation of Brain Functional Connectivity and Efficiency During an Endurance Cycling Task: A Source-Level EEG and Graph Theory Approach. 2nd International Symposium on Automation, Information and Computing (ISAIC 2021), online, December 3rd-6th, **2021**. Conference proceedings to be published in Journal of Physics: Conference Series (JPCS).
13. Smets L, Tamburro G, Jansen K, Dereymaeker A, Naulaers G, De Vos M and **Comani S**.: Automated selection and deletion of artefactual segments in neonatal EEG. OHBM 2021 Annual Meeting, online, June 21-25, **2021.**
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122. S. Di Luzio, G. Obletter, **S. Comani**, C. Del Gratta, G.L. Romani. Magnetic mapping of DC fields related to tissue susceptibility in the human body. in *Advances in Biomagnetism*, S.J. Williamson, M. Hoke, G. Stroink and M. Kotani editors, Plenum Press, New York , p. 505-508, **1989**

6.4 Book Chapters

Comani S. Principi Fisici di Risonanza Magnetica in "*Senologia 8: Risonanza Magnetica"*, A. Carriero ed., Casa Editrice IDELSON GNOCCHI Srl, Napoli (Italia), **2008**

Comani S. Magnetocardiografia e magnetocardiografia fetale in "*Enciclopedia Treccani*" **2005**

Comani S. Principi Fisici di Risonanza Magnetica in "*Risonanza Magnetica: Principi Fisici, sequenze e safety"*, A. Carriero ed., SIRM Publ., Novara (Italia), **2005**

7. TEACHING ACTIVITY

7.1 Organizational activity

2011 - present	**Coordinator** of the integrated course of **Chemistry, Biochemistry and Physics Applied to Human Movement Science**, Bachelor degree in Human Movement Sciences (1st year), Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara (Italy).
2009 - 2013	**Coordinator** of the integrated course of **Basic Sciences,** Bachelor degree in Occupational Therapy (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).
2002 - 2011	**Coordinator** of the integrated course of **Physics and Informatics Applied to Human Movement Science**, Bachelor degree in Human Movement Sciences (1st year), Faculty of Human Movement Sciences, University "G. d'Annunzio" of Chieti-Pescara (Italy).

7.2 Official courses for Bachelor and Master degrees, and for Specialization schools

Courses taught by Silvia Comani for the Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy):

2013 - present	**Teacher,** course of **Biomechanics and basics of Bioengineering** (5 CFU), Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).
2011 - present	**Teacher,** course of **Physics Applied to Human Movement Science and Informatics** (6 CFU), Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).
2008 - 2012	**Supervisor**, **Lab. of Physics**, Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).
2002 - 2012	**Supervisor**, **Lab. of Informatics**, Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).
2002 - 2011	**Teacher,** course of **Physics and Informatics Applied to Human Movement Science** (9 CFU), Bachelor degree in Human Movement Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).
1999 – 2002	**Teacher**, courses of **Physics, Biophysics, Statistics and Informatics,** Bachelor degree in Human Movement Sciences (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

Courses taught by Silvia Comani for Bachelor and Master degrees in Medicine and Health Care Professions, University "G. d'Annunzio" of Chieti-Pescara (Italy):

2009 - 2013	**Teacher** of the course of **Applied Physics** (2 CFU), Bachelor degree in Occupational Therapy (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).
2005 - 2009	**Teacher and Coordinator,** course of **Physics** (2 CFU), Bachelor degree in Occupational Therapy (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).
1999 – 2008	**Supervisor**, **Lab. of Magnetocardiography**, Master degree in Medicine (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1999 – 2002 **Teacher**, course of **Electric and Electronic Measurements,** Bachelor degree in Medical Radiology (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1998 – 2000 **Teacher**, course of **Biomedical Physics,** Master degree in Medicine (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1994 – 1995 **Teacher**, course of **Basics in Medical Informatics,** School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1993 – 1995 **Teacher**, course of **Biomedical Physics,** Bachelor degree in Diabetes Sciences (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

Other university courses taught by Silvia Comani:

2019 – 2020 **Teacher,** course of **Physics** (5 CFU), Bachelor degree in Geology Sciences (1st year), University "G. d'Annunzio" of Chieti-Pescara (Italy).

2000 – 2004 **Teacher,** course of **Physics Principles of Magnetic Resonance Imaging,** Specialization in Radiology and radio-diagnostics, School of Medicine**,** University "G. d'Annunzio" of Chieti-Pescara (Italy).

1999 – 2006 **Teacher**, courses of **Basics in Electronics**, **Basics in Signal Processing** and **Physics Principles of Magnetic Resonance Imaging**, PhD Training course in Biomedical Technologies and Functional Bioimaging, School of Medicine**,** University "G. d'Annunzio" of Chieti-Pescara (Italy).

1999 – 2000 **Teacher**, course of **Experimental Physics,** Bachelor degree in Geology (1st year), Faculty of Mathematical, Physical and Natural Sciences, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1996 – 1997 **Teacher**, course of **General Physics,** Master degree in Environmental Sciences (1st year), Faculty of Mathematical, Physical and Natural Sciences, Molise University, Isernia (Italy).

1993 – 1994 **Teacher**, course of **Electromagnetic signals in the human body,** Bachelor degree in Nursery (1st year), School of Medicine, University "G. d'Annunzio" of Chieti-Pescara (Italy).

1988 – 1989 **Teacher**, course of **Physics,** Master degree in Agricultural Sciences (1st year), Faculty of Agricultural Sciences, Molise University, Campobasso (Italy).

1988 – 2017 **Teacher**, course of **Physics,** Specialization in Anaesthesiology, School of Medicine**,** University "G. d'Annunzio" of Chieti-Pescara (Italy).

7.3 Supervision and tutoring activity

Since 2000, Silvia Comani has been / is Supervisor and Tutor of the following Bachelor, Master and PhD students, and post-doc researchers.

March 2022 – Feb 2023 **Primary Supervisor of a PhD student (Tim KALLA)** recruited within the framework of the **ETN EU Project INFANS**. Research project title "Novel method for artefacts removal in neonatal EEG signals"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA.

Nov 2020 – Feb 2022 **Primary Supervisor of a PhD student (Laura SMETS)** recruited within the framework of the **ETN EU Project INFANS**, eligible for the **Double Doctoral Degree in "Neuroscience and Imaging"** at the University of Chieti, XXXVI Cycle, **and in "Engineering Science: Electrical Engineering"** at the Catholic University of Leuven (Belgium). Research project title "Novel BSS-based fingerprint method for the real-time correction of artefacts in infant EEG signals"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA.

Nov 2019 – Oct 2022 **Primary Supervisor of a PhD student (Antonio DE FANO)**, enrolled in the **Doctoral School in "Neuroscience and Imaging"** at the University of Chieti, XXXV Cycle. Research project title "Multimodal and multidisciplinary study of the neuro-psycho-physiological correlates of human movement during interactive motor tasks"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA.

Nov 2019 – Oct 2022 **Primary Supervisor of a PhD student (Mohammad KHAZAEI)** recruited within the framework of the **ETN EU Project INFANS**, enrolled in the **Doctoral School in "Neuroscience and Imaging"** at the University of Chieti, XXXV Cycle. Research project title "Estimation of neonatal brain efficiency by means of functional network properties"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA.

Oct 2019 – Sept 2022 **Secondary Supervisor of a PhD student (Milana KOMOSAR)** recruited within the framework of the **ETN EU Project INFANS at the project partner Technical University of Ilmenau, Germany**, enrolled in the Doctoral training in Biomedical Engineering (Primary Supervisor: Prof. Sascha Klee). Research project title "Novel Spatial Harmonic Decomposition for real-time dimension reduction of EEG signals.

Sept 2019 – Aug 2022	**Secondary Supervisor of a PhD student (Tim HERMANS)** recruited within the framework of the **ETN EU Project INFANS at the project partner University of Leuween (Belgium)**, enrolled in the **Doctoral School in "Engineering Science: Electrical Engineering"** at the Catholic University of Leuven, Belgium (Primary Supervisor: Prof. Sabine Van Huffel). Research project title "Automated assessment of cerebral autoregulation and coupled dynamics using NIRS and EEG scoring".
Feb 2018 – Jan 2019	**Tutor of a post-doc researcher (David Stone)**. Research project title "Studio della dinamica neurale e della connettività funzionale in compiti motori complessi tra due o più soggetti (Hyperbrain Studies"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA.
Sept 2016 – Dec 2017	**Tutor of a post-doc researcher (David Stone) recruited for the Marie Curie Fellowship** position available at the BIND Center within the framework of the **EU ANDREA Project** (Coordinator: Prof. Silvia Comani). Research project title "Development and implementation of advanced processing methods for the detection and rejection of artifacts from electroencephalographic (EEG) signals recorded with systems using wet and/or dry electrodes, and their validation in multimodal studies in athletes populations"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Medicine and Aging Sciences, UdA.
Jan 2016 – Aug 2016	**Tutor of a post-doc researcher (Jonas Chatel-Goldman) recruited for the Marie Curie Fellowship** position available at the BIND Center within the framework of the EU ANDREA Project which Prof. Silvia Comani coordinates. Research project title "Development and implementation of advanced processing methods for the detection and rejection of artifacts from electroencephalographic (EEG) signals recorded with systems using wet and/or dry electrodes, and their validation in multimodal studies in athletes populations"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Medicine and Aging Sciences, UdA.
July 2014 – present	**Tutor of a post-doc researcher (Gabriella Tamburro)** for several research projects dedicated to (1) developing new methods for the removal of artefacts from EEG signals, and (2) studying the functional brain organization during the performance of individual and dyadic (*hyperbrain* studies) motor tasks performed by athletes and/or neurological patients; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; premises: BIND Center, Department of Medicine and Aging Sciences, UdA.

2013	**Co-supervisor of a Master student (Nastasia Ruggiero)** of the **Electronic Engineering Course, Master Degree in Bioengineering**, **University Roma3, Roma (Italy)**. Thesis: "Uso della teoria dei grafi per la tipizzazione dell'efficienza corticale nell'endurance training ciclistico".
Oct 2011 – July 2012	**Supervisor of Miss Alexandra Oetzel from the Faculty of Computer Science and Automation, Ilmenau University of Technology (Germany)**, **LEONARDO Programme**, **for internship and thesis** "Literature review: recent advances in the use of robotic devices for stroke rehabilitation" for the degree of Bachelor of Science.
June 2011 – April 2014	**Tutor of a post-doc researcher (Maria Gabriella Tana)** for the research project "Analisi e modellizzazione della dinamica comportamentale e funzionale nella coordinazione motoria e nella transizione tra configurazioni diverse in popolazioni speciali"; scientific area 02 Physics, scientific sector FIS/07 Applied Physics; Department of Human Movement Sciences, UdA.
July 2009 – April 2010	**Supervisor of Mr. Paul Rudi Torke** from the Faculty of Computer Science and Automation, **Ilmenau University of Technology (Germany), ERASMUS Programme**, **for internship and thesis** "Development and evaluation of an automatic system for the classification of Coronary Artery Disease based on Magnetocardiographic data" for the degree of Bachelor of Science.
Febr - July 2007	**Supervisor of Mr. Denner Guilhon from Sao Luis University (Brazil)**, who received a "**Young Researcher Grant**" for foreign students assigned by the University "G. d'Annunzio", Chieti – Italy
Febr - July 2006	**Supervisor of Mr. Vairavan Srinivasan from Multimedia University, Malaysia,** who received the first "**Young Researcher Grant**" for foreign students assigned by the University "G. d'Annunzio", Chieti - Italy
2004 - 2013	**Supervisor of 2 PhD students** of the **Doctoral School in "Functional Neuroimaging: from cells to systems"** of the University "G. d'Annunzio", Chieti (Italy): - **Giovanna Alleva**, thesis "Misure di complessità per la caratterizzazione di sorgenti nella magnetocardiografia fetale" - **Cinzia De Luca**, thesis "The Neurophysiology of Intentional Switching Between Behavioral States: a Coordination Dynamics Approach"
2004 - 2013	**Supervisor of 3 PhD students** of the **Doctoral School in "Human Movement Sciences"** of the University "G. d'Annunzio", Chieti (Italy): - **Marika Berchicci**, thesis "Motor Learning and Development: From Behavioral Analysis to Neural Signature"

- **Martin Steinisch**, thesis "Integrating a passive robotic device, VR technology and high-resolution EEG for the rehabilitation of post-stroke patients"
- **Walter Nicola Falasca**, thesis "Sviluppo di algoritmi di dinamica causale applicati alle neuroscienze "

2002 - 2005 **Co-supervisor of 1 PhD student** (**Dante Mantini)** of the Doctoral School in "**e-Learning**" of the Department of Information Engineering, **Università Politecnica delle Marche, Ancona** (Italy). Thesis: "Progetto di formazione e-Learning per professionisti della salute in ambito ginecologico"

2000 - present **Supervisor of 58 Bachelor degree students** during the preparation of their thesis, School of Medicine and Faculty of Human Movement Sciences, University "G. d'Annunzio", Chieti (Italy).

7.4 Participation in the Board of Teachers of Doctoral Schools

Since 2003, Silvia Comani has been a member of the Board of Teachers of the following Doctoral Schools.

2013 - present:

Member of the Board of Teachers of the **Doctoral School in NEUROSCIENZE E IMAGING** of the University "G. d'Annunzio" CHIETI-PESCARA (3 years duration).

2008 - 2009:

Member of the Board of Teachers of the **Doctoral School in SCIENZE BIOMEDICHE, CITOMORFOLOGICHE E MOTORIE** of the University "G. d'Annunzio" CHIETI-PESCARA (3 years duration).

2003 - 2007:

Member of the Board of Teachers of the **Doctoral School in SCIENZE DEL SISTEMA MOTORIO** of the University "G. d'Annunzio" CHIETI-PESCARA (3 years duration).

2003 - 2004:

Member of the Board of Teachers of the **Doctoral School in TECNOLOGIE BIOMEDICHE E BIOIMMAGINI FUNZIONALI** of the University "G. d'Annunzio" CHIETI-PESCARA (3 years duration).

7.5 Participation in National and International selection procedures

Since 2014, Silvia Comani has participated in the following National and International selection procedures:

February 2022 **President of the international Selection Committee** in the comparative selection for the recruitment of a young researcher (**Marie Curie Fellowship**) within the framework of the EU INFANS Project. Positions available at BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA (Italy). Other members of the Selection Committee: Prof.s Vittorio Pizzella and Filippo Zappasodi (Department of Neuroscience, Imaging and Clinical Sciences, UdA, Italy).

December 2021 **Member of the Selection Committee, with the role of verbalizing secretary,** for the comparative selection procedure for an experienced researcher position (RTD/A) in the scientific sector FIS/07 (D.R. 1747_2020) at the University of Bari (Italy); Selection Committee named with Rectoral Decree n.4364, 06/12/2021.

March 2021 **Member of the Selection Committee, with the role of verbalizing secretary,** for the comparative selection procedure for a Full Professor position at the Department of Physics of the University "Aldo Moro" of Bari (Italy); selection procedure announced by Rectoral Decree n. 3104 of the 12/11/2020; Selection Committee named with Rectoral Decree n. 458 del 12/02/2021.

Oct.-Nov. 2020 **President of the Selection Committee** for the comparative selection procedure for an experienced researcher position (RTD/A) in the scientific sector FIS/07 (D.R. 1747_2020) at the University of Bari (Italy); Selection Committee named with Rectoral Decree n.2789, 20/10/2020.

September 2020 **President of the international Selection Committee** in the comparative selection for the recruitment of a young researcher (**Marie Curie Fellowship**) within the framework of the EU INFANS Project. Positions available at BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA (Italy). Other members of the Selection Committee: Prof. Filippo Zappasodi (Department of Neuroscience, Imaging and Clinical Sciences, UdA, Italy) and Prof. Maarten De Vos (Catholic University of Leuven, Belgium).

Sept. 2020 **President of the Selection Committee** for the comparative selection procedure for a scientific technician position (2020-1TECNECC1; D.D.Rep.N.56/2020) at the University "G. d'Annunzio" of Chieti-Pescara (Italy); Selection Committee named with D.D.Rep.N.262/2020, 04/08/2020.

Sept. 2020 **Member of the Selection Committee** for the comparative selection procedure for a post-doc researcher position for the research project entitled "Sviluppo di metodi multivariati per la caratterizzazione delle interazioni cerebrali Funzionali" at the University "G. d'Annunzio" of Chieti-Pescara (Italy); Selection Committee named with Rectoral Decree n. 893, 22/07/2020.

Sept. 2020 **President of the international Selection Committee** for the comparative selection procedure for the recruitment of a young researcher (**Marie Curie Fellowship** ESR3/2020) at the University "G. d'Annunzio" of Chieti-Pescara (Italy) within the framework of the EU INFANS Project. Other members of the Selection Committee: Prof. Filippo Zappasodi (Department of Neuroscience, Imaging and Clinical Sciences, UdA, Italy) and Prof. Maarten De Vos (KU Leuven, Belgium). Selection Committee named with D.D.Rep.N.2020, 10/09/2020.

March 2020 **Member of the Selection Committee, with the role of verbalizing secretary,** for the comparative selection procedure for an experienced researcher position (RTD/A) at the University of Sassari (Italy), named with Rectoral Decree n.342, Prot. 9776 31/01/2020, and published on the Gazzetta Ufficiale della Repubblica Italiana – IV Serie Speciale — Concorsi ed Esami n. 13 del 14/02/2020.

24-27 June 2019 **President of the international Selection Committee** in the comparative selection for the recruitment of 3 young researchers (**Marie Curie Fellowship**) within the framework of the EU INFANS Project. Positions available at BIND Center, Department of Neuroscience, Imaging and Clinical Sciences, UdA (Italy). Other members of the Selection Committee: Prof. Filippo Zappasodi (Department of Neuroscience, Imaging and Clinical Sciences, UdA, Italy) and Dr. Frank Zanow (eemagine Medical Imaging Solutions GmbH, Berlin, Germany).

6 March 2018 **Effective member of the Evaluation Committee for Doctoral Defence of the Doctoral School** in "Nuove Tecnologie Avanzate in Fisiologia Clinica e Imaging Multimodale Cardiaco", Catholic University of Rome, Italy.

20 Oct 2015, 91-10 Nov 2015, 12 July 2016 - **President of the international Selection Committee** in the comparative selection for the recruitment of an experienced research (**Marie Curie Fellowship**) within the framework of the EU ANDREA Project. Position available at BIND Center, Dept. Medicine and Aging Sciences, University of Chieti (Italy). Other members of the Selection Committee: Prof. Jens Haueisen (Technical University of Ilmenau, Germany) and Dr. Ralf Hauffe (CEO, eemagine Medical Imaging Solutions GmbH, Berlin, Germany).

2 Sept 2014 **Effective member of the international Selection Committee** in the comparative selection for the recruitment of an experienced research (**Marie Curie Fellowship**) within the framework of the EU ANDREA Project. Position available at the Institut für Biomedizinische Technik und Informatik, Technical University of Ilmenau, Ilmenau (Germany). Other members of the Selection Committee: Prof. Jens Haueisen (President of the Selection Committee, Technical University of Ilmenau, Germany) and Dr. Patrique Fiedler (Technical University of Ilmenau, Germany).

20 May 2014 **Effective member of the international Selection Committee** in the comparative selection for the recruitment of an experienced research (**Marie Curie Fellowship**) within the framework of the EU ANDREA Project. Work position at eemagine Medical Imaging Solutions GmbH, Berlin (Germany). Other members of the Selection Committee: Dr. Ralf Hauffe (President of the

Selection Committee, CEO eemagine Medical Imaging Solutions GmbH, Berlin, Germany), Dr. Sampsa Vanhatalo, Head of Children's Neurophysiology, University of Helsinki, Finland.

Chieti, 26 May 2022

Prof. Silvia Comani