Prof. Arcangelo Merla

Dipartimento di Neuroscienze, Imaging e Scienze Cliniche

Università degli Studi G. d'Annunzio di Chieti-Pescara

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Position	Associate Professor
SSD	FIS/07 – Physics applied to Medicine and Biology
Since	01/10/2015
Department	Department of Neuroscience, Imaging and Clinical Sciences, University "G. d'Annunzio" of Chieti-Pescara (Italy)

DEGREES

M.Sc. in Physics, University of Bologna, 1994
Postgraduate M.Sc.Degree in Physics, University of Bologna, 1995
Ph.D. in Biomedical Technologies, University of Chieti-Pescara, 2002

CAREER

- Annual Fellowship - Laboratory of Biomechanics, Orthopedic Institutes Rizzoli, Bologna - Software interface development for robot guided spinal interventions,from 01-04-1996 to 22-12-1996.

- Technology Consultant - Tecnopolis Research and Technological Development Center - IMI, Valenzano, Bari - Development of algorithms for the automatic recognition of skin defects, from 10-01-1998 to 30-06-1998.

- Annual Fellowship - ITAB - Institute of Advanced Biomedical Technologies, G. d'Annunzio University, Chieti-Pescara - Characterization and development of a biomedical thermal infrared imaging system, from 01-06-1998 to 30-12-1998.

- Ph.D. in Biomedical Technologies XIV Cycle (with bursary) - Department of Clinical and Bioimmagini Sciences, University of G. d'Annunzio, Chieti-Pescara - Functional Infrared Imaging: development methodology and clinical applications, from 01-11-1998 to 31-12-2001.

- Research Scientist (FIS / 07) - Department of Clinical Sciences and Bioimmagini, University of G. d'Annunzio, Chieti-Pescara - Development of biomedical applications and modeling of infrared functional imaging data, from 01-01-2001 to 01-09-2002.
- Research Scientist (SSD FIS / 07) - University of G. d'Annunzio, Chieti-Pescara - Infrared Imaging Laboratory - Research activity: Development of biophysical models on thermal imaging data for medical

diagnostics; Development of models of computational psycho-physiology on data from thermal imaging; Man-machine interaction; Functional near-infrared spectroscopy (fNIRS): Modeling of fast optical signals; Modeling of physiological artifacts, Multi-modal integration and wireless fnirs, from 01-09-2002 to 30-09-2015.

- Visiting Senior Scientist - Computer Sciences Department, University of Houston, Houston, TX, USA - Development of skin heat transfer control and transfer models for computational psychophysics and its applications in the field of security and defense,from 01-08-2003 to 01-08-2004.

- Associated Researcher - CERSGEO - Experimental Research Center for Geotechnologies, G. d'Annunzio University, Chieti-Pescara - Characterization by multigenerational spectrophotometric imaging of biogas emissions from Landfill Dumps, from 01-01-2007 to 2016.

- Director of the Infrared Imaging Lab - ITAB Center - Institute of Advanced Biomedical Technologies, G. d'Annunzio University, Chieti-Pescara, from 01.01.2014 to today.

- Founder and Scientific Responsible of NEXT2U srl, spin-off University of Chieti-Pescara - Main scientific activity: Design, implementation and distribution of diagnostic devices and for research based on infrared imaging; Technology transfer in Human-Machine interaction, from 24-11-2014 to today.

- Qualified as Professor of Applied Physics (FIS / 07) since 2017.

SCIENTIFIC PARTICIPATION IN INTERNATIONAL AND NATIONAL RESEARCH PROJECTS

- Leonardo da Vinci Project - RES: European Network for Scientific Education, 2007 - 2009. Lifelong Learning Program (2007-2013), LEONARDO DA VINCI MULTILATERAL TRANSFER TRANSFER OF PROJECTS - LDV / TOI / 2007 / IT / 372 - Duration 24 months - Role Position: Unit Leader, from 15-11-2007 to 14-11-2009

- EDE491779HSR Project, under the Computer Infrastructure Monitoring and Port Safety Gateway (MIC) Monitoring Project, under the Call for Proposals for the Grant of SME Aid under the Measure 3.17 of the POR Campania 2000/2006 'Framework Program for E-Government and Information Society, promoted by the REGIONAL GOVERNMENT OF CAMPANIA, Department of University and Scientific Research, Technological Innovation and New Economy - 24 months duration - Role: Unit Leader
from 24-12-2007 to 23-12-2009

- TESIS - Towards an Embodied Science of InterSubjectivity - FP7-PEOPLE-2010-ITN - Project Number 264828 - Duration 48 months - Role: Node Member, from 01-03-2011 to 28-02-2015

- Seeing the Rhythmic Temporal Beats of Human Language, funded by W.M. Keck Foundation, USA, 2015-2018 - duration 36 months - Role: Co-Principal Investigator (http://www.wmkeck.org/grant-programs/re search / medical-research-grant-abstracts / medical-research-2014 / 1581-medical-research-grant-abstracts-gallaudet-university)
from 15-01-2015 to today

- INSPIRE: The RAVE Revolution for Children with Minimal Language Experience during Sensitive Periods of Brain and Language Development, USA, 2015-2018 - Duration: 36 months - Role: Co-Principal Investigator (https://www.nsf.gov/awardsearch/showAward?AWD_ID=1547178) from 01-10-2015 to today

-ASTONISH Project - Advancing Smart Optical Imaging and Sensing for Health - Project ID: 692470
Funded under: H2020-EU.2.1.1.7. - ECSEL - Duration 36 months - Role – Unit Leader
(http://cordis.europa.eu/project/rcn/203399_en.html), from 01-06-2016 to today

RESULTS OBTAINED IN TECHNOLOGICAL TRANSFER (participation in the creation of new spin-offs, development, use and marketing of patents)

- Italian Patent RM2012A000497 - Method and system for controlling the residual effectiveness of man-machine interaction.

- Software Registration SIAE 2014000416 IRI ImagePro - Software-specific software for data analysis from biomedical functional infrared imaging.
- European patent BE29325 / EP2730448A1 Method and system for controlling the residual efficiency in the man-machine interaction
- Academic spin-offs: Next2U s.r.l. (www.next2u-solutions.com) - Role: Founder, Chairman of the Board and Scientific Responsible, from 24-11-2014 to today.
Software Registration SIAE 2016/010521 IRI ImagePro 2.0 - Upgrading the previous version with the addition of modules for real-time computational psycho-physiology.

ACHIEVEMENT OF FOR SCIENTIFIC ACTIVITIES

- Best Overall Presentation conferred by the European Association of Thermology, EAT 2012 - Conference of European Association of Thermology, Porto (Portugal), September 2012

- Best Paper Award, PHYCS 2014 International Conference on Physiological Computing Systems, Area: Special Session on Recognition of Affect Signals from Physiological Data for Social Robots, Lisbon (Portugal), January 2014

VISITING FELLOWSHIPS

- Visiting Senior Scientist, Computer Science Department, University of Houston, Houston, Tx, USA, from 08/2003 to 08/2004.
- Visiting Professor, Computer Science Department, University of Houston, Houston, Tx, USA, from 08/2004 to 08/2009.

TEACHING DUTIES at the University of G. d'Annunzio

- Since 2002, Applied Physics Course (FIS / 07), Graduate Course in Dentistry and Dental Prostheses,
- Since 2002, Imaging Infrared in the PhD in Neuroscience and Imaging.
- Since 2015 Physics (FIS / 07), Graduate Course in Geological Sciences.
- Since 2012, Physics (FIS / 07), for the Medical Specialization Schools of Radiology and Radiotherapy.
- Since 2017, Physics (FIS / 07) for the Medical Specialization Schools in Maxillofacial Surgery

PARTICIPATION TO EDITORIAL BOOKS, EDITORIALS, ENCYCLOPEDIES AND TREATMENTS

He is an editorial and referee for over 30 international scientific journals.

MAJOR COLLABORATIONS IN SCIENTIFIC SCIENTIFIC

1) Department of Psychology, Gallaudet University, Washington, D.C., USA (Prof. Laura-Ann Petitto)

2) Virtual Human Science Lab, University of Southern California (Ref. David Traum)

3) Robotics Science Lab, Yale University (Brian Scassellati)

4) Center for Brain and Cognitive Development, Birkbeck Institute, University of London, London (ref. Prof. Sarah Lloyd-Fox)

5) Department for Cognitive Neuroscience, Max Planck Institute, Leipzig, Germany (ref. Prof. Tania Singer)

6) Department of Psychology and Beckman Institute, University of Illinois, Urbana, Illinois, USA (Ref. Gabriele Gratton and Monica Fabiani)

7) Maryland Neuroimaging Center, University of Maryland, College Park, Maryland, USA (Prof. Kevin Niall Dunbar)

8) Technische Universität München Clinical Rechts der Isar - Psychosomatic Medizin und Psychotherapie - Munich (D) (Prof. Heribert Sattel)

9) Department of Neuroscience, University of Parma, Parma (Prof. Pier Francesco Ferrari)

Scientific Research Activities

The scientific activity of Dr. Merla is focused on the research and development of new applications in the biomedical and psycho-physiological field of infrared imaging, through the implementation of models of the biophysical processes, the development of platforms and processing algorithms, and the experimental validation of the methods and models .

An important research activity conducted by Dr. Merla, and his group, focuses on computational psycho-physiology and passive, non-contact evaluation of autonomic activity by infrared thermal imaging.

In this context, considering the thermal exchanges between tissues and blood vessels, Merla has developed models and procedures for calculating blood flow in surface vessels, skin perfusion and heart rate by thermal imaging of skin thermal imprints.

The estimate of the complexity of autonomic nervous activity by infrared thermal imaging opens the way for the use of thermal imaging in psycho-physiology and computational physiology. Infrared thermal imaging and methods developed by Dr. Merla, and his research group, have been applied in the field of development psychology in a series of studies aimed at investigating the autonomous signing of guilt in children, the presence of autonomic synchrony between mother and child in maternal and child empathy empathic modulation with parenting. More recently, Dr. Merla proposed the use of infrared thermal imaging as an information channel on the user's psychophysical status in the human-machine interaction or, more generally, man-artificial agent. The complex of knowledge has produced two patents, one national and one European, concerning the estimate of residual efficacy in human-machine interaction, where the psycho-physical state of humans is monitored by infrared thermal imaging.

He has extensive scientific production, with more than 120 international works published. It is considered to be one of the world's leading experts in the field of reference, with active collaboration and participation with imported international research centers.