

# Andrea Canessa

Fixed-term assistant professor

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## *Education and training*

2011

### **PhD in Bioengineering**

Visuomotor interactions in 3D spatial sensing motor influences on distributed representations of binocular disparity

University of Genova - Genova - IT

2007

### **MSc in Bioengineering (curriculum Neuroengineering)**

Adaptive representations of the visual signal based on predictive coding - 110/110 cum Laude

University of Genova - Genova - IT

2004

### **BSc in Biomedical Engineering**

Analysis of a cortical architecture for the perception of relative depth in a static scene - 107/110

University of Genova - Genova - IT

## *Academic experience*

2017 - ONGOING

### **Assistant Professor**

University of Genova - Genova - IT

2014 - 2017

### **Post-doctoral fellow**

University of Genova - Genova - IT

Parkinson's disease EEG DBS TMS-hdEEG Gait impairment Virtual Reality Rehabilitation

2013 - 2014

### **Post-doctoral fellow**

Italian National Research Council - Genova - IT

Serious Game cognitive disability

2011 - 2013

### **Post-doctoral fellow**

Università di Genova - Genova - IT

Stereopsis neuromorphic distributed architectures Eye movements modelling Early Vision RGBD devices Virtual Reality visuomotor rehabilitation

2008 - 2011

### **Doctoral fellow**

Università di Genova - Genova - IT

Stereopsis neuromorphic distributed architectures Eye movements modelling Early Vision RGBD devices Virtual Reality visuomotor rehabilitation

## ***Language skills***

### **Italian**

Mother tongue

### **English**

Independent

## ***Teaching activity***

### **Didactic activity**

**2019** Teaching of the course “Biomechanics and bioengineering of movement” for the Master Degree in Science and techniques for the preventive motor activity at the University of Genova

### **Support of Didactic activity**

**2017 - 2018** Teaching support of the course 'Biomedical instrumentation and bioimages' for the Master Degree in Bioengineering at the University of Genova

**2010-2011-2012** Teaching support of the course 'Computer Vision' for the European Master on Advanced Robotics (EMARO), at the University of Genova

**2008-2009** Teaching support of the course 'Perceptual systems modelling' for the Master Degree in Bioengineering at the University of Genova

**2007-2008** Teaching support of the course 'Informatics Fundamentals' for the Bachelor Degree in Biomedical Engineering at the University of Genova

## ***Postgraduate research and teaching activity***

### **Supervision of PhD students, residents and post-doctoral fellows**

Co supervisor of one PhD student for the PhD School in Bioengineering and Robotics of the University of Genova

### **PhD committees membership**

Member of the teaching board for the PhD School in Bioengineering and Robotics of the University of Genova

### **Postgraduate (PhD) teaching activity**

**2017 -2018** Teaching of the PhD course “Brain Connectivity” for the PhD

## ***Research interests***

My research interests are in the fields of system neuroscience, neurorehabilitation and computational neuroscience.

For the first two I am interested in the study of the electrophysiological alterations in movement disorder syndromes, with a special focus on Parkinson's syndrome and on the largely unknown pathophysiology of freezing of gait. The principal goal is to investigate alterations in the functional and effective connectivity and in the cortical excitability. In my research I adopt a multimodal approach including cortical electrophysiological recordings (hdEEG) and subcortical recordings with innovative devices that allow on-demand recording of local field potential from the chronically implanted electrodes for deep brain stimulation (DBS) (the Aactiva PC+S®, Medtronic, PLC and the AlphaDBS, Newronika S.r.l.), electromyographical recordings, techniques for neuromodulation (e.g. TMS and TMSEEG) and stimulation based on Virtual and Augmented Reality. I work in close collaboration with the European Foundation for Biomedical Research (FERB) in Milano and with the Department of Neurology, University Hospital and Julius-Maximilian-University, Würzburg, Germany.

For what concerns the computational neuroscience side I am interested in study the cognitive role that ocular movements have when we are engaged in an active exploration of peripersonal space. Natural extension of this vision is the study of the mutual interaction between action and perception. I worked on the development of different neuromorphic architectures for the distributed representation of peripersonal space (stereoscopic disparity estimation, vergence movement control, disparity-vergence behaviour). I developed "GENUA PESTO", a database of stereoscopic images and disparity map mimicking the strategy adopted by human in natural fixation of peripersonal space. I implemented a rendering methodology in which the camera pose mimics realistic eye pose for a fixating observer, thus including convergent eye geometry and cyclotorsion.