Francesca Peveri

Nationality: Date of birth: 15/07/1996   **Gender:**

📞 **Phone number:**

✉ **Email address:**

✉ **Email address:**

📍 **Home:**

EDUCATION AND TRAINING

Postdoctoral researcher in Bioengineering and Robotics

University of Genoa - DIBRIS department [01/11/2023 – Current]

City: Genova | **Country:** Italy | **Field(s) of study:** Bioenineering and Robotics

PhD in Bioengineering and Robotics

University of Genoa - DIBRIS department [01/11/2020 – 01/11/2023]

Field(s) of study: Bioengineering and Robotics | **Thesis:** Interactive manipulation of visuomotor contingencies . A visual stimulation paradigm to investigate depth cue integration in static and dynamic conditions

Using virtual reality tools and 3D stimulus delivery devices (3D monitors), I investigated stereoscopic perception and in particular how active motor training can influence depth visual cue integration processes. I performed psychophysics experiments and also investigated neural correlates using EEG techniques.

Master degree in Bioengineering (MSc)

University of Genoa [09/2018 – 12/2020]

Address: Via All'Opera Pia, 15, 16145 Genova (Italy) | **Website:** https://www.dibris.unige.it/ | **Field(s) of study:** Neuroengineering | **Final grade:** 110 e Lode | **Thesis:** Cortical - like motion detectors based on neuromorphic spiking networks.

Bachelor degree in Biomedical Engineering (BSc)

University of Genoa [09/2015 – 12/2018]

Address: Via All'Opera Pia, 15, 16145 Genova (Italy) | **Field(s) of study:** Bioengineering | **Final grade:** 104/110 | **Thesis:** Experimental session for the assessment of attention in Immersive Virtual Reality (VR) environments.

Diploma from scientific high school

Scientific High School "Angelico Aprosio" [2015]

Address: Via Don Bruno Corti, 7, 18039 Ventimiglia (Italy) | **Website:** http://www.liceoaprosio.it/ | **Final grade:** 90/100

WORK EXPERIENCE

Waitress

Restaurant "2F" [06/2019 – 01/2020]

City: Genova | **Country:** Italy

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

Inglese

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Programming & SW

Android Developer / C++ / C# / Shader Graph / MATLAB / Python / Arduino IDE / Base OpenGL / Psychopy / Unity 3D engine / C / Psychtoolbox / Unity shaders / openCV / Visual C - Visual Studio

CAD

Autodesk Fusion360

EEG

Brainstorm, Matlab / Analyzing EEG Data with EEGLAB (Matlab) / BrainVision Recorder and Analyser

Technologies

Eye tracking (SMI and Pupil Labs) / Virtual Reality (VR) / HTC Vive / Pupil Core

PUBLICATIONS

[2021]

A Cortically-inspired Architecture for Event-based Visual Motion Processing: From Design Principles to Real-world Applications Abstract

We developed and tested the architecture of a bio-inspired Spiking Neural Network for motion estimation. The computation performed by the retina is emulated by the neuromorphic event-based image sensor DAVIS346 which constitutes the input of our network. We obtained neurons highly tuned to spatial frequency and orientation of the stimulus through a combination of feed-forward excitatory connections modeled as an elongated Gaussian kernel and recurrent inhibitory connections from two clusters of neurons within the same cortical layers. Sums over adjacent nodes weighted by time-variable synapses are used to attain Gabor-like spatio-temporal V1 receptive fields with selectivity to the stimulus' motion. In order to gain the invariance to the stimulus phase, the two polarities of the events provided by the neuromorphic sensor were exploited,which allowed us to build two pairs of quadrature filters from which we obtain Motion Energy detectors as described in [2]. Finally, a decoding stage allows us to compute optic flow from the Motion Detector layers. We tested the approach proposed with both synthetic and natural stimuli.

Proc. of IEEE Conf. Comput. Vis. Pattern Recog. Workshops (CVPRW)

[2023]

Time - frequency analysis of brain response to 3D slant texture and stereo cues Abstract

Visual system estimate surface slant from different visual cues, but on how and where these cues are integrated there is still much to be understood. The aim of this study is to fill the gap we identified regarding brain activity elicited by complex visual stimulation defined by different cue to slant. We used electroencephalography (EEG) and time – frequency analysis to characterize the cortical responses to monocular and binocular cues. We design slanted surfaces defined only by texture and binocular disparity, and surfaces defined by the two cues combined in a conflictual and non - conflictual configuration. The processing of these visual stimuli enhanced the same pattern of spectral modulation in all investigated ROIs but with different latencies and different patterns depending on the available visual cue.

Proc. of the Italian National Bioengineering Group Conference (GNB'23)

CONFERENCES AND SEMINARS

[19/05/2022 – 22/05/2022] Rochester (NY)
32nd Biennial Center for Visual Science Symposium on "Active Vision" Poster presentation - Title: "Virtual Reality for dynamic manipulation of visuomotor contingencies: toward an interactive visual stimulation paradigm".

[21/06/2023 – 23/06/2023] Padova (IT)
VIII Congress of the Italian National Group of Bioengineering (GNB) Poster presentation - Title: "Time - frequency analysis of brain response to 3D slant texture and stereo cues".

[27/06/2023 – 30/06/2023] Brusselles (BE)
21st International Multisensory Research Forum (IMRF) Poster presentation - Title: "Effects of dynamic alteration of depth cues during continuous dynamic interaction".

[27/08/2023 – 31/08/2023]
European Conference on Visual Perception (ECVP) Poster presentation - Title: "Effects of dynamic alteration of depth cues during continuous dynamic interaction".

PROJECTS

[2022 – Current]
Participation to the NIH project "ARBi - Assessment and Rehabilitation of Binocular Sensorimotor Disorders"

[2023 – Current]
Participation to the project "RAISE - Robotics and AI for Socio-economic Empowerment" supported by European Union - NextGenerationEU Contribution to the organization of "Experiential workshop with end-users" (May 25th, 2023 c/o IIT, Genoa)

[05/2019 – 09/2019]
Master course: Motor control and human performance assessment "PoweReps" - A wearable device for performance monitoring
"PoweReps" is a wearable device based on *Arduino UNO*, equiped with a wifi module, able to evaluate ROM (range of motion) of classic gym exercises (Squat, PullUp, PushUp) and quantify the power expressed. The device is coupled with a smartphone application design with *Android Studio* for exercise selection and real time evaluation of valid repetitions.

HONOURS AND AWARDS

[26/11/2022] ASI
Personal Trainer Certification - Project Invictus Project Invictus is a Training School affiliated with ASI, Fitness & Wellness Sector. ASI is a National Sports Promotion Body (EPS) recognized by CONI and the Ministry of Labour and Social Policies.

SCIENTIFIC ACTIVITY

[2021 – 2024]
Teaching Assistant

MSc Course in Bioengineering: *"Perceptual System and Interaction"* (Official teacher: Silvio P. Sabatini)
Academic years: 2021-2022, 2022-2023, 2023-2024

[12/2022]
Co-supervision of BSc Final Project in Biomedical Engineering

- **Thesis title**: " Study of visual evoked potentials during motor interaction with conflicting visual stimuli".
  Supervisors: Andrea Canessa, Gabriele Arnulfo

[12/2023]

Co-supervision of MSc thesis in Biomedical Engineering

- **Thesis title**: "Design and development of active 3D visual settings: an application for dynamic stereoacuity tests in natural conditions".

Supervisors: Silvio P. Sabatini

Seminar (MSc students)

(12/2021) - **Title:** "Continuous active interchange of perseption: a new motor perspective for perceptual learning"
(12/2022) - **Title:** "Dynamic manipulation of visuomotor contingencies"

(3/2024) - **Title**: "Assessment of functional vision and rehabilitative approaches for binocular visual impairments" for MSc Course in Bioengineering "*Neurosensory Engineering*" (Official teacher: Andrea Canessa)

Supervision of MSc Research Tracks in Bioengineering

- *"Eye tracking and visual assessment"* - (Official teacher: Andrea Canessa) - Academic years: 2021-2022, 2022-2023
- *"Multisensory EEG"* - (Official teacher: Gabriele Arnulfo) - Academic years: 2021-2022
- *"Vision Psychometrics"* - (Official teacher: Silvio P. Sabatini) - Academic years: 2021-2022
- *"Vision Psychometrics"* - (Official teacher: Silvio P. Sabatini) - Academic years: 2023-2024

SCIENTIFIC TRAINING

[18/07/2022 – 22/07/2022]

8th International Summer School of Neuroengineering Massimo Grattarola "Artificial and augmented sensing for humans and humanoids"

Genova (IT)
Poster presentation - Title: "Virtual Reality for dynamic manipulation of visuomotor contingencies: toward an interactive visual stimulation paradigm".

[2021]
PhD Couse: "An introduction to Open Science & Research Data Management"

[2021]
PhD Course: "Computational model of visual perception"

[2021]
PhD Course: "Ethics and Bioethics in Bioengineering and Robotics "

[2021]
PhD Course: "Perceptual systems"

[2021]
PhD Course: "Theatrical technique for scientific presentation"

[2021]
PhD Course: "Microcontroller programming couse"

[2022]
PhD Course: "Grant writing"

[2022]
PhD Course: "Paper writing"

[2023]
PhD Course: "Advance EEG couse"