



Francesca Peveri

Date of birth: 15/07/1996 | **Nationality:** _____ | **Gender:** _____ |
Phone number: _____ | **Email address:** _____ |
 _____ | **Email address:** _____ |
Address: _____

● EDUCATION AND TRAINING

01/11/2020 – CURRENT Genova, Italy
PHD STUDENT IN BIOENGINEERING AND ROBOTICS University of Genoa

Title: "Dynamic manipulation of visuomotor contingencies: an interactive visual stimulation paradigm to investigate adaption and conditioning of perceptual integration".

In my research project I'm interested in investigating how motor interaction influences visual processing. To this end, I'm developing novel experimental paradigms and set-ups, which involve Virtual Reality technologies and graphics engines, aiming to move towards a new design for psychophysical experiments. I'm also employing electroencephalography (EEG) to study cortical neural correlates of visual perceptions.

Field of study Neuroengineering

09/2018 – 12/2020 Genova, Italy
MASTER DEGREE IN BIOENGINEERING (MSC) University of Genoa

Address Via All'Opera Pia, 15, 16145, Genova, Italy | **Website** <https://www.dibris.unige.it/> | **Final grade** 110 e Lode |

Thesis Cortical - like motion detectors based on neuromorphic spiking networks.

09/2015 – 12/2018 Genova, Italy
BACHELOR DEGREE IN BIOMEDICAL ENGINEERING (BSC) University of Genoa

Address Via All'Opera Pia, 15, 16145, Genova, Italy | **Final grade** 104/110 |

Thesis Experimental session for the assessment of attention in Immersive Virtual Reality (VR) environments.

2015 Ventimiglia, Italy
DIPLOMA FROM SCIENTIFIC HIGH SCHOOL Scientific High School "Angelico Aprosio"

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

● WORK EXPERIENCE

06/2019 – 01/2020 Genova, Italy
WAITRESS RESTAURANT "2F"

● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
INGLESE	C1	C1	C1	C1	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) | Pupil Core

● **ADDITIONAL INFORMATION**

PUBLICATIONS

[**A Cortically-inspired Architecture for Event-based Visual Motion Processing: From Design Principles to Real-world Applications**](#)

– 2021

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)

Time - frequency analysis of brain response to 3D slant texture and stereo cues – 2023

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 – Bruxelles (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*, equipped 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

Personal Trainer Certification - Project Invictus – ASI 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

2022 – 2023

Teaching Assistant

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

Seminar (MSc students)

(12/2021) - **Title:** "Continuous active interchange of perception: a new motor perspective for perceptual learning"

(12/2022) - **Title:** "Dynamic manipulation of visuomotor contingencies"

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

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

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 Course: "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 course"

2022

PhD Course: "Grant writing"

2022

PhD Course: "Paper writing"

2023

PhD Course: "Advance EEG course"

