



UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Prof. Maria Gabriella
Ceravolo

Dept. of Experimental and Clinical Medicine
(DIMSC)

Project idea: Mapping EEG
activity to assess neuroplasticity
changes under immersive virtual
reality intervention



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Supervisor:
**Prof. Maria
Gabriella Ceravolo**

Prof. Maria Gabriella Ceravolo, female ♀, H-index = 42; MD, PhD,
Neurologist, Psychiatrist

Position: Full Professor Physical and Rehabilitation Medicine – [SSD
MEDS-19/B /GSS 06/MEDS-19: Musculoskeletal disorders and
Physical and Rehabilitation Medicine]

Institution: Università Politecnica delle Marche (UNIVPM), Italy

Brief CV & Academic Track

Senior researcher with expertise in rehabilitation of people with
acquired neurological disorders following brain injury or
neurodegenerative diseases (Parkinson's disease).

Extensive experience in EU-funded research and international
collaborations

ORCID: <https://orcid.org/0000-0002-2694-4638>

Total publications: **[210]** (Scopus)

5 Selected Recent / Significant Publications

Andrenelli E, ...Ceravolo MG. (2025) Parkinsonism Relat Disord.

Capecchi M.... Ceravolo MG. (2025) NPJ Parkinsons Dis.

Alia S.... Ceravolo MG. (2025) Nutrients

Sopranzi FM... Ceravolo MG. (2024) Amyotroph Lateral Scler

Frontotemporal Degener

Ceravolo MG et al (2023) Eur J Phys Rehabil Med



Funded Projects & Awards

Horizon Europe / FP7 / H2020:

- Horizon 2020 project "CAREGIVERSPRO-MMD", N 690211;
- Horizon 2020 project "MAGIC" PCP PHC-27 Call on "Self-Management of Health & Disease & Patient Empowerment Supported by ICT";
- Erasmus+ project I-TRAIN "Mobile Digital Training for Direct Care Workers dealing with Stroke Survivors" N. 2019-1-CY01-KA202-058338;
- HORIZON-HLTH-2022-TOOL-12-01-t] project "PREPARE" Personalized rehabilitation via novel AI patient stratification strategies,

Mentorship & Leadership

Supervisor of **8 PhD candidates** and **45 MSc theses**

Member of the European Academy of Rehabilitation Medicine,
Chair of the Marche Polytechnic Unit at Cochrane Rehabilitation
Functioning and Disability Thematic group

Education Committee of the International Society of PRM

Honorary member of the European Society for PRM

ISPRM delegate within the World Rehabilitation Alliance

Chair of the Oncology and Palliative Care Working group within the
UEMS Section for PRM –PPC

Past President of the UEMS Board for PRM

Research Interests & Potential MSCA Area

Telerehabilitation and telemonitoring with wearable sensors

Immersive Virtual reality for neurorehabilitation

EEG mapping /surfaceEMG analysis during motor training to track
motor recovery after brain lesion.

➔ Potential project domain:

Mapping EEG activity

during immersive virtual reality rehabilitation

for people with brain disorders



HR EXCELLENCE IN RESEARCH



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Supervisor: Prof. Maria Gabriella Ceravolo
Department & Research Environment



Host Department: Experimental and Clinical Medicine — UNIVPM

A multidisciplinary environment supporting research in:

- Rehabilitation of people with neurological disorders through robots, action-observation, tele-rehabilitation, immersive virtual reality
- Non-invasive brain stimulation (tDCS) for subjects with neurological diseases
- Movement analysis through inertial accelerometer / gyroscope systems

Research Group Description

Based at Neurorehabilitation Clinic , Ancona University Hospital, inpatient and outpatient rehabilitation facility, regional referral centre for the management of people experiencing chronic disability due to neurodegenerative diseases, as Parkinson's disease, and cerebrovascular diseases

Neurorehab Clinic

Research Team composition: 1 Full PRM professor, 2 PRM Associate professors, 1 Engineer Assistant Professor , 3 postdocs, 7 PhD students

Staff also includes 6 Physical and Rehabilitation Medicine doctors, 16 physiotherapists, 4 speech therapists, 1 occupational therapist, 1 neuropsychologist and 16 resident doctors.

Strong international network and collaborations:

- Cochrane Rehabilitation Functioning and Disability Thematic Group
- International Society for PRM; European Society for PRM;
- Partnership with European universities (Clinical and Engineer staff) within the Horizon project

Key Infrastructure & Laboratories

Movement analysis Lab equipped with PocketEMG BTS-Italia, FreeEMG BTS-Italia, sis. ELITE - BTS-Italia; G-sensor BTS) ; Virtual reality rehabilitation: NIRVANA ; THYRO MOTION, REHALAB

Neuroplasticity response LAB, equipped with Motor Evoked Potential analysis device and 32 channel-EEG mapping through a STAR-STIM headset

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Training & Career Development Opportunities

Access to doctoral school courses, transferable skills training

Support for Open Science, dissemination, and stakeholder engagement

Opportunities for **secondments and non-academic placement**





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Project idea – *MAPPING EEG ACTIVITY TO ASSESS NEUROPLASTICITY CHANGES UNDER IMMERSIVE VIRTUAL REALITY INTERVENTION*

Overall Goal

The project aims to develop **Profiles of brain activity during motor training in immersive virtual reality** contributing to:

Scientific advancement in **Neurophysiology of experience-based brain plasticity**

Innovation potential in **Neurosciences – Rehabilitation – Bioengineering**

Strengthening European research excellence

Specific Objectives

Investigate **EEG activity changes as a proxy of cortical reorganization following motor training**

Develop **A neuroplasticity assessment protocol to be applied both for research and clinical purposes**

Validate results through **a pre-post study of subjects with brain disorders**

Novelty & Interdisciplinarity

Combines expertise in **clinical rehabilitation + neurophysiology + EEG signal processing**

Strong potential for academic + non-academic impact

Expected Outcomes

High-impact publications

New methodology / prototype / dataset

Enhanced career perspectives for the fellow

