
UNIVERSITÀ
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DELLE MARCHE

# Telerehabilitation and telemonitoring based on wearable sensor data analysis

**Prof. Maria Gabriella Ceravolo**

UNIVERSITÀ POLITECNICA DELLE MARCHE

# Supervisor: Prof. Maria Gabriella Ceravolo

## Research Group Description: the Supervisor

**Prof. Maria Gabriella Ceravolo**, MD, PhD.

Neurologist, **Full Professor in Physical and Rehabilitation Medicine**, DiSMC UNIVPM **Coordinator of the DiSMC section of Clinical Neurosciences Head physician and Coordinator of the Neurorehabilitation Clinic**, a rehabilitation facility based in the University Hospital of Marche – Ancona, Italy.

Member of the European Academy of Rehabilitation Medicine, Chair of the Education Committee of the International Society of PRM, Coordinator of the Special Interest Scientific Committee on Rehabilitation in Parkinson's disease, within the European Society of PRM.

More than 160 publications, focusing on prognostic factors of functional (motor and cognitive) recovery and the effectiveness of rehabilitation intervention in people with acute brain injury or neurodegenerative disorders, with special attention to people with movement disorders. https://orcid.org/0000-0002-2694-4638 (Publication List, H-index = 35)

Principal investigator of several international multicentre clinical trials

Promoter or Principal investigator of several international multicentre clinical trials

- European fundings:
  - "CAREGIVERSPRO-MMD" (H2020)
  - "**MAGIC**" PCP PHC-27 Call on "Self-Management of Health & Disease & Patient Empowerment Supported by ICT" (H2020)
  - Erasmus+ project **I-TRAIN** "Mobile Digital Training for Direct Care Workers dealing with Stroke Survivors"
  - "PREPARE" Personalized rehabilitation via novel AI patient stratification strategies - HORIZON-HLTH-2022-TOOL-12-01-t
- National funding
  - TREE-Tailored Rehabilitation for the Engagement and Empowerment of chronically disabled people-bandi Fesr;
  - ASSECURE: A Sustainable Framework for cyber SECURITY in E-healthcare: UNIVPM funded project;
  - RAPIDO – teleRehAbilitation for people with ParkInson's Disease at any mOment, CARIVERONA funded project;

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## Research Group Description: the Group

### University Hospital Neurorehabilitation Clinic

The Clinic is a European-level certified training center for postgraduate PRM (Physical and Rehabilitation Medicine) education (https://uems-prm.eu/) and is involved in training activities for medical students, PhD students, Physiotherapy and Speech therapy trainees

***STAFF*: Neurologists, Physiatrists, Physiotherapists, Occupational therapists and Speech therapists, Information Engineer,** *with long-lasting experience in the diagnosis, clinical and instrumental assessment, medical and surgical treatment (Deep Brain Stimulation), and inpatient/outpatient rehabilitation*

***CLINICAL RESEARCH ACTIVITY***

*EMG and ECO-Guided BOTULIN TOXIN treatment for spasticity and movement disorders*

*Rehabilitation of people with acquired neurological , movement disorders, musculoskeletal disorders, oncologic derived disabilities*


RESEARCH AND PUBBLICATIONS

https://orcid.org/0000-0002-2694-4638
https://orcid.org/0000-0002-1472-606X
https://orcid.org/0000-0001-7982-9871
https://orcid.org/0000-0003-1471-092X

**ACADEMIC STAFF (25): Professors (MED34) and researchers (MED34, ING/INF05), PhD Students,**

**Trainers in Physical and rehabilitation Medicine (MD)**

LABORATORY

Posture and Movement analysis and dynamic EMG

**EQUIPMENT**

**Tele-rehab experimental platform**

**https://www.rehab-univpm.it/public/#/home**

**Non invasive Brain Stimulation**

**Dept. Exp & Clin Med – DiMSC UNIVPM**

**Clinical Neuroscience Section**

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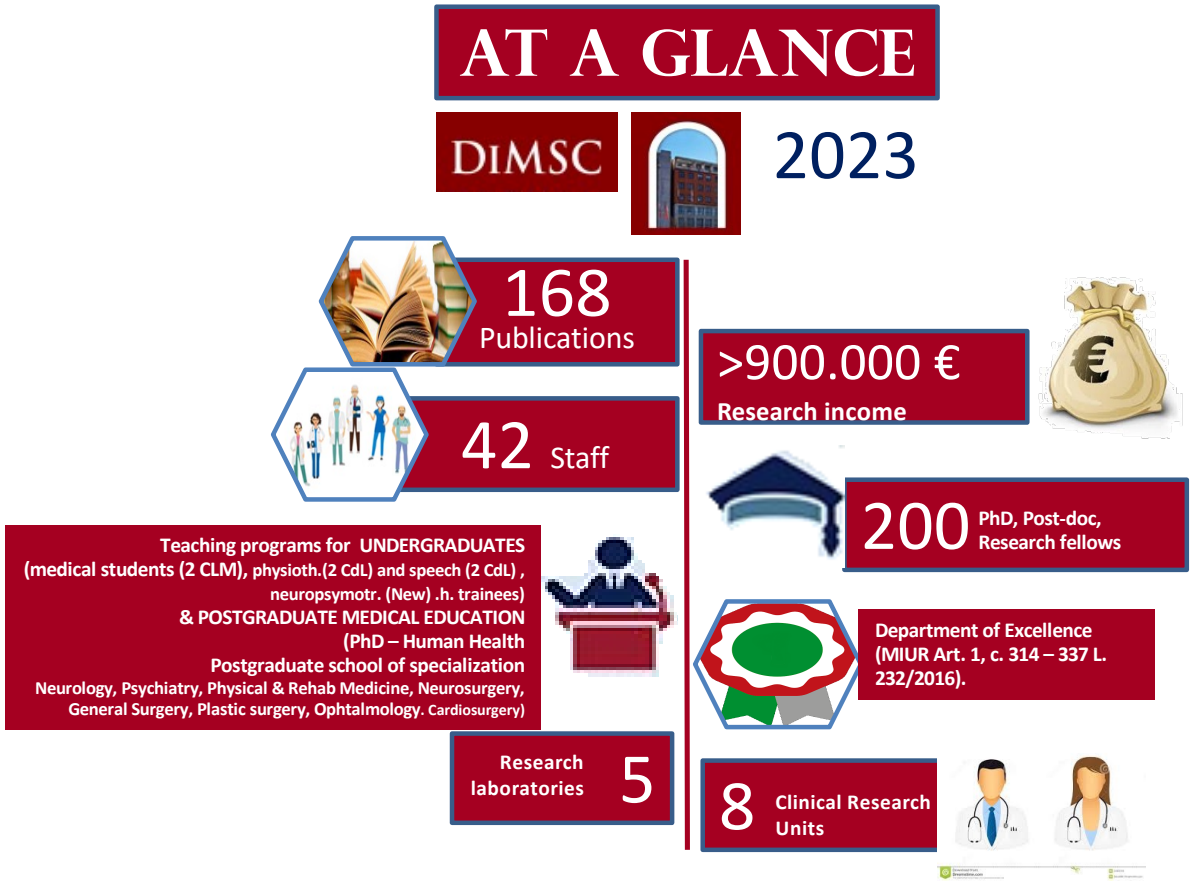
The Department of Experimental and Clinical Medicine DiMSC

**The Department of Experimental and Clinical Medicine** was established on the 1st July 2011, following a process of reorganisation of the University, from a merging of groups which came from the deactivated departments of Medical and Surgical Sciences, Neurosciences, Molecular Pathology and Innovative Therapies.
The Department is a self-managing organizational branch of the university which is dedicated to scientific research, teaching, and contributing to the so called Third Mission of the Higher Education Institution through the dissemination of scientific research findings amongst the community.
Its main aims are to plan, organize and regularly assess the quality of the research activity carried out in the scientific sectors and disciplines under its jurisdiction; to plan, organize and manage first level and master courses of the Faculty of Medicine and, last but not least, to provide cultural and educational activites and contribute to training and guidance activities according to the students needs in collaboration with the medical association.

https://www.dimsc.univpm.it/



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## Project Idea: TELEREHABILITATION AND TELEMONITORING BASED ON WEARABLE SENSOR DATA ANALYSIS

**Backgroud:** Rehabilitation is effective to promote health and prevent disability evolution at any age in any setting. It is not a service for the few! (https://vizhub.healthdata.org/rehabilitation/ ), in fact it addresses the most of non communicable disorders that affect up to 2,3 billion people in the world, being the major cause of chronic disability. In order to ensure fair, widespread and sustainable access to rehabilitation services, telemedicine is emerging as an effective opportunity.

**Project OBJECTIVE:**

- **to test the feasibility, safety and effectiveness of a tele-rehabilitation and tele-monitoring system,**
- **exploiting commercial wearable sensors,**
- **in a large population of people with disabling non communicable disorders, either due to neurological, oncological or musculoskeletal damage**