

**PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF MANAGEMENT, INFORMATION AND PRODUCTION ENGINEERING A.R.F. 09/A3 - INDUSTRIAL DESIGN, MACHINE CONSTRUCTION AND METALLURGY A.D. ING-IND/15 - DESIGN METHODS FOR INDUSTRIAL ENGINEERING (TYPE B)**

*announced with decree of the Chancellor Rep. no. 118/2019 of 27.02.2019 and posted on the official registry of the University on 04.03.2019*

**RESEARCH PROJECT**

**Development of medical solutions to monitor rehabilitation processes**

**Research structure:** Department of Management, information and production engineering

**Duration of the grant:** 12 months

**Scientific Area:** 09 - Industrial and information engineering

**Academic recruitment field:** 09/A3 - Industrial design, machine construction and metallurgy

**Academic discipline:** ING-IND/15 - Design methods for industrial engineering

**Scientific Director:** Prof. Daniele Regazzoni

Adherence to the physiotherapy prescriptions of non-hospitalized patients is notoriously poor. The lack of continuity of specific physical exercises can compromise the optimal recovery and dramatically reduce the effectiveness of the entire functional and motor recovery process.

The research project involves the development of applications that allow medical personnel to monitor the rehabilitation processes performed at home by the patient, with the aim of improving adherence to physiotherapy and checking the correctness of the work done autonomously by the patient.

The project involves the development of methods and procedures taking advantage of innovative and low-cost technologies such as Motion Capture systems, wearable devices and smartphones, and remote data management systems, including artificial intelligence techniques. The project will start with the acquisition of the medical knowledge inherent to rehabilitation processes for articular functionality (eg shoulder and hip). We will continue with the identification of the appropriate technologies to measure the parameters necessary for medical evaluation and the development of data acquisition procedures optimized for domestic environments. We will proceed with the design and development of the necessary software applications and the hardware configuration. Given the importance linked to the usability of the system on both the patient and the medical side, natural user interfaces (NUIs) will be developed.

The methods and procedures developed will be oriented to patient evaluation; reports and quantitative indexes will be generated to be used at different levels, e.g., for physiatrists, physiotherapists and patients.

The project will be carried out in collaboration with rehabilitation centers in the Bergamo area, in particular with the USC Riabilitazione Specialistica of the ASST Papa Giovanni XXIII of Bergamo.