

**PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 4 EARLY SYAGE GRANTS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENTS/CENTERS OF UNIVERSITY OF BERGAMO
PICA CODE 20AR022**

announced with decree of the Chancellor Rep. no. 338/2020 of 21.07.2020 and posted on the official registry of the University on 30.07.2020

RESEARCH PROJECT - CODE N. 1

“Development of smart control systems for building energy management”

Research structure: Department of Engineering and applied sciences

Duration of the grant: 24 months

Scientific Area: 09 – Industrial and information engineering

Academic recruitment field: 09/C1 – Fluid machinery, energy systems and power generation

Academic discipline: ING-IND/09 – Energy systems and power generation

Scientific Director: Prof. Giuseppe FRANCHINI

The research project focuses on the development of smart solutions for monitoring, managing and controlling energy fluxes (both thermal and electrical) in buildings. The objectives of the research activity are: to develop and use simulation codes for building energy systems aiming to design optimized and smart solutions; to study and supervise retrofit interventions in pilot buildings.

RESEARCH PROJECT – CODE N. 2

“The Stelvio National Park: from naturalistic tourism to responsible and aware tourism”

Research structure: Centre for territorial studies “Lelio Pagani” - CST

Duration of the grant: 12 months

Scientific Area: 08 – Civil engineering and architecture; 11 – History, philosophy, pedagogy and psychology; 13 – Economics and statistics; 14 – Political and social sciences

Academic recruitment field: 08/F1 – Urban and territorial planning and design; 11/B1 – Geography; 13/A4 – Applied economics; 14/D1 – Economic sociology, sociology of work, urban and environmental sociology

Academic discipline: ICAR/20 – Urban and regional planning; ICAR/21 – Urban design and landscape; M-GGR/01 – Geography; M-GGR/02 – Economic and political geography; SECS-P/06 – Applied economics; SPS/10 – Urban and environmental sociology

Scientific Director: Prof. Emanuela CASTI and Prof. Fulvio ADOBATI

Within the activities carried out by the Regional Authority for Services to Agriculture and Forests (ERSAF), exactly by the Stelvio Park Management and Protected Areas Coordination for the enhancement of the protected Alta Valtellina area, the Centre for territorial studies of the University of Bergamo offers a research project aimed at studying current and potential tourist flows and analyzing the possibilities of territorial enhancement of the Stelvio National Park area, through the following activities: - Theoretical-methodological setup of the research through the preliminary identification of a vision to be adopted and a goal to pursue based on the most advanced national and international studies in the territorial field; - Study of the current tourist flows and analysis of territorial enhancement actions, also through the recovery of relevant aspects of the Stelvio National Park from a naturalistic environmental and historical-cultural point of view, in an integrated outlook, and its connections with the 2026 Winter Olympics; - Realization of a Stelvio National Park presentation video clip that summarizes its valuable naturalistic-environmental and historical-cultural elements, highlighting the potential for territorial enhancement of the park in a tourist perspective, as a basis for the subsequent activation of a participatory process involving the residents. Given these premises, the research objectives can be summarized as follows: - study of tourist flows with data on arrivals and presences at the various territorial scales; - study of the naturalistic-environmental and historical-cultural aspects of the Park; - soil survey; mapping construction in the different research phases; - drafting of the Research Report.

RESEARCH PROJECT - CODE N. 3

“Sustainability, technology and organization in manufacturing companies”

Research structure: Centre for territorial studies “Lelio Pagani” - CST

Duration of the grant: 12 months

Scientific Area: 09 – Industrial and information engineering

Academic recruitment field: 09/B3 – Business and management Engineering

Academic discipline: ING-IND/35 – Business and management Engineering

Scientific Director: Prof. Matteo Giacomo Maria KALCHSCMIDT

Manufacturing companies are currently facing several challenges. Sustainability and technological progresses are indeed at the center of several key processes companies need to revise given their role in future progress of economic and social systems. The project aims to study the interrelationships among sustainability, technology and organization that companies should consider in order to design and manage properly manufacturing systems. The project will be organized around a structured literature review on the topic and the development of an empirical research by means of either case studies or survey.

RESEARCH PROJECT – CODE N. 4

“Development of applications for neuro-cognitive rehabilitation processes by means of virtual reality technologies and motion capture systems”

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. Andrea VITALI

The research project concerns the development of applications for neuro-cognitive rehabilitation. Today cognitive rehabilitation processes are based on a series of traditional approaches that have shown in some cases an ineffective recovery of daily actions by the involved patients. The ineffective recovery is a consequence relative to a low ability of current rehabilitation processes to emulate real life situations in which the patient will be involved after being discharged from the rehabilitation center. Furthermore, there is an increasing need for innovative tools that allow an objective intra-operator and inter-operator measurement of the patient's condition during the rehabilitation process.

In this context, the proposed research activity will aim to develop innovative applications for the objective evaluation of rehabilitation processes in the neuro-cognitive field with particular attention to rehabilitation procedures necessary after serious brain injuries. The applications developed in this area will be based on virtual reality technologies and motion capture systems. These technologies allow creating interactive environments, which permit to simulate actions of daily life and therefore, better rehabilitation tasks more useful for the recovery of neuro-cognitive abilities.

The project is subdivided in three main phases. The first phase will concern the development of application prototypes. In this phase, the most appropriate hardware and software technologies will be identified for the creation of the final solutions. The chosen technologies will belong to consumers, free and Open-Source categories. The availability of these technologies are important to ensure the real introduction of the developed solutions as rehabilitation tools in the medical practice.

The second phase will concern the usability analysis of the developed prototypes in order to make them usable by both medical staff and patients. This phase will be carried out in collaboration with the rehabilitation unit of the Papà Giovanni XXIII Hospital in Bergamo and the Quarenghi Private Clinic in San Pellegrino (BG).

The third and final phase will concern the clinical experimentation of the solutions developed at the mentioned hospitals by involving patients.

Final results will be published on international scientific journals and international conference proceedings.