

**PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 4 EARLY STAGE GRANTS LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENTS WITHIN THE FRAMEWORK OF THE 2020/ STARS PROGRAMME - I PART - CUP: F54I19000980001 (TYPE A)  
PICA CODE 20AR013**

*announced with decree of the Chancellor Rep. no. 98/2020 of 18.02.2020 and posted on the official registry of the University on 27.02.2020*

**RESEARCH PROJECT CODE 1**

***“Biobanks and protection of the rights of individuals”***

**Research structure:** Department of Law

**Duration of the grant:** 12 months

**Scientific Area:** 06 - Medicine

**Academic recruitment field:** 06/M2 - Forensic and occupational medicine

**Academic discipline:** MED/43 - Forensic medicine

**Scientific Director:** Prof. ROMOLO Francesco Saverio

Biobanks are non-profit service units, aimed at collecting, processing, storing and distributing human biological samples and data related to them. There are biobanks for research purposes, forensic biobanks and therapeutic biobanks.

One special feature of biobanks is the traceability of the collected samples to the personal, genealogical and clinical data of subjects from whom the stored material derived. For this reason, both principles governing the movement of body parts and products as well as those related to personal data treatment must be considered: the fundamental attribute of biological samples is their dual nature of materials and information.

Therefore, the use of biobanks must be regulated in compliance with the safeguarding of the human person and his privacy.

In relation to the forensic biobanks, in Italy the subject is regulated by the n. 85/2009 Law, which established the national DNA biobank. However, the discipline is inappropriate in the light of the guidelines provided by the ECHR's case law.

Biobanks for research purposes, instead, despite the sensitivity of the subject, lack of a systematic legislations setting specific rules aimed to protect all the interests involved. In practical terms, this situation of uncertainty has an adverse effect on medical research, because scientists using biobanks cannot clearly know in advance unlawful conducts and related penalties.

The project aims to study the biobanks criticalities from the medico-legal point of view and includes the collaboration as end-user with the Biological Resources Centre of the Mario Negri Pharmaceutical Research Institute, which collects and stores biological samples and related data for medical purposes in three different biobanks.

## **RESEARCH PROJECT CODE 2**

***“An empirical analysis of extortion and money laundering activities in the Italian provinces. What are the differences between North and South Italy?”***

**Research structure:** Department of Management, economics and quantitative methods

**Duration of the grant:** 12 months

**Scientific Area:** 13 – Economics and statistics

**Academic recruitment field:** 13/A2 – Economic policy

**Academic discipline:** SECS-P/02 – Economic policy

**Scientific Director:** Prof. LUCARELLI Stefano

The researcher will first of all verify whether the strategies of control of the territory implemented by criminal organizations (Mafia, Camorra, 'ndrangheta) – conducted through the crimes of extortion and money laundering – present differences between the provinces of Northern Italy and those of Central-Southern Italy. This research hypothesis can be justified by making different contributions: extortion and money laundering two crimes representative of the pervasiveness and penetration of the mafia organizations on the territory and in the economic system. The economic analysis dedicated to extortion (Konrad and Skaperdas 1998; Alexeev et al. 2004; Forno and Gunnarson 2009; Daniele and Marani 2011; Troitzsch and Klaus 2015) and the laundering of illicit capital (Masciandaro 1999, McDowell and Novis 2001, Levi and Reuter 2006, Schneider and Widinschbauer 2008, Gross and Kinninson 2011; Falcone and Turone 2015) as well as the investigations and inquiries carried out (Di Gennaro 2015) and the judicial acts (o.c.c. DNA) legitimize the hypothesis that the use of resources from extortion (enterprise syndicate) would serve to establish territorial control (power syndicate) preparatory to the acquisition of squares for the sale of drugs. However, something would change in the criminal strategies when the extortion activity assumes an entrepreneurial character. Only then would the mafia enterprise act on the legal market through illicit competition, or the criminal organization could take over or side by side with non-criminal entrepreneurs, entering into the management of the company. Alongside these studies, there are others that generally show that the modes of action of criminal organizations appear to be distinct according to where they operate (Sciarrone 2009, Transcrime 2013, DNA 2016).

The project will therefore focus on four main questions:

1. can the objective of extortion in the provinces of Northern Italy be functional to the closure of the business activities that suffer this crime?
2. can the objective of the extortions in the provinces of Southern Italy be functional to the control of the territory and the raising of a part of the capital necessary for the functioning and expansion of criminal organizations?
3. In which sectors of activity are the illicit capital collected in southern Italy and northern Italy directed?
4. What are the characteristics (in terms of size, technological intensity, markets of expertise) of the main companies in the sectors in which the illicit capital collected through extortion activities is directed? We will try to answer this last question by concentrating on the province of Bergamo only, using the data of the Chamber of Commerce and the information available from judicial documents.

The analysis will be conducted primarily from the data on extortion and money laundering offences published by ISTAT (I.stat database) and the Financial Intelligence Unit for Italy of the Bank of Italy (in this database we will look at the crimes reported by the police to the judicial authorities and the suspicious reports received from financial intermediaries, professionals and other operators).

The researcher will build and analyze the dataset during the first 4 months of his activity. The following 4 months will be used to develop a panel analysis to investigate specific territorial effects and possible substitution effects at sectoral level. The analysis will be conducted on data at the level of the Italian provinces and will cover the period 2000-2019. In the remaining 4 months the results will be organized in a working paper, presented and discussed in conferences and workshops.

Clarifying the differences between the strategies adopted by criminal organizations in the main cities of Northern and Southern Italy can help to refine the relevant tools for entrepreneurs' organizations and public administrations to defend themselves against the enterprise syndicate and the power syndicate. As pointed out also in the Horizon 2020 objectives "keeping citizens safe means fighting crime". Understanding the ways in which money laundering and extortion take place in different territorial

contexts can help to refine the interventions necessary to restore and strengthen legality in the territories. Therefore, we propose to build relationships with the institutions in the Bergamo area interested in these objectives (the Academy of the Guardia di Finanza, the Local Police, the Court, the Chamber of Commerce) which we will develop during the course of the research and, above all, at the end of it, in the dissemination of the results.

Scholars have never tested the hypothesis that the opening of new companies financed by money laundering takes place in the sectors in which the companies have ceased their activities following the extortion suffered. Since this is a junior research grant, however, we expect that the results we will obtain will be the focus of further research in the future.

### **RESEARCH PROJECT CODE 3**

***“Theoretical and numerical analysis and experimental tests of innovative mechanical systems and structures in nautical and aeronautical sectors”***

**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/14 – Mechanical design and machine construction

**Scientific Director:** Prof. BARAGETTI Sergio

The research project deals with the design of nautical and aeronautical components via theoretical models, finite element models and experimental tests and their comparison. In detail, the designed components must have high static and fatigue resistance, high stiffness and reduced mass, in order to minimize the use of material (reduced costs) and inertia (reduction in fuel or other energy sources consumption). Therefore, this activity is also eco-sustainable. The design will also be "defect tolerant": defects in mechanical components can be tolerated, however it is essential that they are taken into account in the design phase and that they are monitored in shape and growth rate. The work aims at studying the effect of the defects and the environment on various materials and/or components. The innovation of the project concerns the creation of high-performance components using emerging technologies such as additive manufacturing. The research project is therefore a multidisciplinary work, which conjugates Machine Design, Material Science and Mechanical Technology.

## **RESEARCH PROJECT CODE 4**

### ***“New futuristic interpretation of self-supporting historical techniques: development of robotized systems for masonry vaults”***

**Research structure:** Department of Engineering and applied sciences

**Duration of the grant:** 12 months

**Scientific Area:** 08 – Civil engineering and architecture

**Academic recruitment field:** 08/C1 – Design and technological planning of architecture

**Academic discipline:** ICAR/11 – Building production

**Scientific Director:** Prof. RUSCICA Giuseppe

The research project aims to investigate the possibility to develop effective self-supporting and automated construction systems, capable of considerably reducing the construction costs of masonry vaults. In order to obtain this, the study focuses on the evaluation of the possibility of increasing the economic efficiency of some historical construction systems, like the "herringbone" or the "Nubian" systems, through the help of innovative contemporary technological tools, like anthropomorphic robotic systems.

The year-long project yearns to prepare the ground for future trials, through:

- the identification of the historical construction techniques suitable for a possible use of robotic systems, and hence defining construction methods devoted to it and useful to a comprehensive reading of the architectural work;
- the development of rational methodologies for evaluating the load-bearing and self-supporting capacity of these structures.

The scheduling of the research work is structured in the following way:

- a) a starting period of 2 months dedicated to the identification of the most relevant self-supporting historical technologies, determining their main physical-mechanical properties and their load-bearing capacity during the construction phase;
- b) a subsequent period of 3 months dedicated to the study of the state of the art regarding the use of robotic systems and digital technologies for the automated construction of masonry structures. Researches on this topic are quite recent and, in most of them, robotic systems are used only for laying bricks. Actually, the recent development of such technologies can allow more advanced uses: during the construction phase they can indeed have an active role in the interactive support of arches and vaults.
- c) a further period of 3 months, during which the historical techniques assessed in phase a) will be evaluated, identifying the most suitable to the requested needs of the digital technologies examined in phase b), also regarding their mere architectural implications;
- d) a final stage of 4 months for the definition of adequate evaluation procedures on the load-bearing capacity of masonry vaults during their construction phase.