UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

Annex 2 - Scholarships fact sheets

BIOMEDICAL AREA

SCIENTIFIC AREA

SOCIAL SCIENCES AREA

TECHNOLOGICAL AREA

HUMANITIES AREA

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DRUG RESEARCH AND INNOVATIVE TREATMENTS

Director prof. Carla Ghelardini

CUP	D.M. 351/2022	B12B22000380007

D.M. 351/2022	NRRP Research
TITLE OF THE SCHOLARSHIP	**Organoids and 3D in vitro models for pharmacological studies and targeted advanced therapy**
RESEARCH TOPIC	Organoids are self-organized three-dimensional tissue cultures derived from stem cells. Organoids allow a detailed view of how organs form and grow, providing new insights on human development and disease as well as the possibility to evaluate drug interaction and effectiveness. They are potentially revolutionizing the field of drug discovery and opening new approaches to personalized medicine. The main objective is to establish a multidisciplinary environment to develop and validate organoids (in particular intestine organoids), and 3D cellular models originated from iPSCs obtained from patients, animals or gene-edited cell lines. To this end, the project combines an advanced expertise in the fields of cellular biology and pharmacology. We aim to establish a trustworthy and reproducible platform to gain insight into the pathophysiological mechanisms underlying several diseases. We envision the possibility to transfer new technologies and knowledge to the public and private sectors, to the benefit of the regional health system and local biotech and pharma companies. The use of organoids as well as of iPSCs will serve as models to study the therapeutic or toxic effects of different treatment strategies, including modern gene-therapy approaches, to optimize drug delivery systems, with the final goal of reducing the use of non-sustainable laboratory animals. The project is incorporated in a research ecosystem (in the PNRR program) dedicated to new materials and technologies for innovation on the Tuscan territory, well known for the widespread industrial competence in life sciences, with an impact on the social and economic environment as well as on the health system.

MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
-	6	italian/english	August 23rd 2022	09:00 a.m.	In-person*	Cubo 2 Viale G. Pieraccini, 6 Firenze Aula C

* In the application form candidates residing abroad may ask to conduct the interview remotely

UNIVERSITÀ DEGLI STUDI FIRENZE

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MUR

BIOMEDICAL SCIENCES

Director prof. Fabrizio Chiti

CUP	D.M. 352/2022	B12B22000650007

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of innovative preclinical models (in vitro and in vivo) for the characterization of molecules with potential therapeutic use**
RESEARCH TOPIC	Personalized medicine identifies that set of strategies prevention and treatment that take into account individual variability. Combining diagnostics and therapy allows you to outline the characteristics of each patient also from multiple points of view (for example genetic and metabolic), in order to identify a therapy that acts directly and in extremely specific and personalized way on the cause of the disease. Despite its enormous potential, precision medicine presents still numerous critical issues that doctors and researchers are trying to address exceed. Prospective and randomized studies for the identification and validation of biomarkers and biosignatures will have to provide robust evidence to help ensure faster reimbursement decisions and encourage the introduction and dissemination of personalized care. Preclinical research needs study models that can provide complete, reliable and reliable information relating to the biological phenomenon of interest. If until recently the biological models available were consisting only of cell lines and animals, researchers today have a available a much wider and more versatile range of ex vivo and in models vitro for preclinical studies. The expansion of knowledge has made it possible development of 2D and 3D systems capable of supporting primary crops of organ, tissue or embryo and to allow genetic manipulation. From DIVAL has been involved for many years in national and international projects multidisciplinary aimed at developing new models in the field of cultivation and manipulation of primary and stem cells (both single and in co-culture with mesenchymal cells) and organoids. The project aims at fine tuning of innovative systems complementary or alternative to experimentation in vivo preclinical, both to reduce high costs and overall time necessary for the identification and study of a target or lead compound, which to overcome the limitations of 2D cell cultures. It is proposed the optimization of 3D organoid systems from normal or tumor tissues for toxicity studies of functional molecules or conventional drugs ed innovative, and for the correlations with the response to these molecules / drugs, according to to the stratification of the individual, receptorial and genetic patterns of the respective ones models, also from a personalized medicine perspective. In specific organoid systems, the microbiota / organoid interaction will also be analyzed and the sensitivity of bacterial cultures to functional molecules or drugs conventional or innovative.
COMPANY	Di.V.A.L. Toscana Srl

MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
18	6	italian/english	August 23rd 2022	09:30 a.m.	In-person*	Dipartimento di Scienze Biomediche Sperimentali e Cliniche "Mario Serio" Viale Morgagni, 50 - Firenze Aula A

* In the application form candidates residing abroad may ask to conduct the interview remotely

UNIVERSITÀ DEGLI STUDI FIRENZE

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MUR

EVOLUTIONARY BIOLOGY AND ECOLOGY

Director prof. Duccio Cavalieri

CUP	D.M. 351/2022	B12B22000360007

D.M. 351/2022	Digital and Environmental Transitions
TITLE OF THE SCHOLARSHIP	**Biodiversity of the bacterial epigenome and its role on transcriptional control of microorganisms useful in sustainable agriculture**
RESEARCH TOPIC	In prokaryotes DNA methylation is known to play roles during cell cycle and gene transfer with few data only on the role in transcriptional control and in the population structuring [1–6]. Indeed, bacterial genomes are often very diverse within the same species and characterized by a large fraction of horizontally transferred genes (the so called open pangenome structure). May this genomic variability relate to genome-wide methylation patterns and to have epigenetic impact on transcriptional control? By investigating the genome-wide methylation patterns in a group of Sinorhizobium meliloti strains, a nitrogen-fixing plant symbiotic species [7] highly relevant for sustainable agriculture [8], the project aims at understanding the functional relevance of epigenomic modifications in view of the rational exploitation of this bacterium under the Agenda 2023 and REACT-EU objectives [9,10]. A computational pipeline needs to be developed by the candidate to analyze methylation pattern, to parse the methylated positions within the genome and detect methylated-enriched genome regions. The software needs to define the presence of core and of strain-specific set of DNA methylation patterns, showing differential abundance with respect to gene position (e.g. promoter vs. coding sequence) and genomic locations. The candidate will work on already sequenced genomes of strains from the above-mentioned species and will produce new experimental data on methylation profiles either on wild-type and mutant strains. Phenotype testing is also expected as well as transcriptomic analyses to understand the role DNA methylation in gene expression and phenotypic variation in S. meliloti. Strains will also be tested for pairwise gene transfer efficiency to highlight the role of DNA methylation on pangenome structuring. References 1 Seong, H.J. et al. (2021) Prokaryotic DNA methylation and its functional roles. J. Microbiol. 59, 242–248 2 Anton, B.P. and Roberts, R.J. (2021) Beyond Restriction Modification: Epigenomic Roles of DNA Methylation in Prokaryotes. Annu. Rev. Microbiol. DOI: 10.1146/annurev-micro-040521-035040 3 Mouammine, A. and Collier, J. (2018) The impact of DNA methylation in Alphaproteobacteria. Mol. Microbiol. 110, 1–10 4 Sánchez-Romero, M.A. et al. (2020) Contribution of DNA adenine methylation to gene expression heterogeneity in Salmonella enterica. Nucleic Acids Res. 48, 11857–11867 5 Casselli, T. et al. (2018) DNA methylation by restriction modification systems affects the global transcriptome profile in Borrelia burgdorferi. J. Bacteriol. 200, 6 Kumar, S. et al. (2018) N4-cytosine DNA methylation regulates transcription and pathogenesis in Helicobacter pylori. Nucleic Acids Res. 46, 3429–3445

<table>
<tr><td colspan="2"></td><td colspan="5">7 Jones, K.M. et al. (2007) How rhizobial symbionts invade plants : the Sinorhizobium – Medicago model. Nature 5, 619–633
8 Cangioli, L. et al. (2021) Legume tasters: Symbiotic rhizobia host preference and smart inoculant formulations. Biol. Commun. 66, 47–54
9 diCenzo, G.C. et al. (2022) Methylation in Ensifer Species during Free-Living Growth and during Nitrogen-Fixing Symbiosis with Medicago spp . mSystems 7, e01092-21
10 Fagorzi, C. et al. (2020) Dissecting transcriptomic signatures of genotype x genotype interactions during the initiation of plant-rhizobium symbiosis. mSystems 6, e00974-20</td></tr>
<tr><td colspan="2">MANDATORY EXPERIENCES</td><td colspan="5">INTERVIEW</td></tr>
<tr><td>COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)</td><td>ABROAD (months)</td><td>LANGUAGE</td><td>DATE</td><td>TIME</td><td>MODE</td><td>PLACE</td></tr>
<tr><td>6</td><td>6</td><td>italian/english</td><td>August 22nd 2022</td><td>10:30 a.m.</td><td>In-person*</td><td>Dipartimento di Biologia
Via Madonna del Piano, 6
Sesto Fiorentino (Firenze)</td></tr>
</table>

* In the application form candidates residing abroad may ask to conduct the interview remotely

EARTH AND PLANETARY SCIENCES

Director prof. Sandro Moretti

CUP	D.M. 351/2022	B12B22000390007
	D.M. 352/2022	B12B22000530007

D.M. 351/2022	NRRP Research					
TITLE OF THE SCHOLARSHIP	**Procedures relating to the resolution of problems in the field of prevention and mitigation of geological risks**					
RESEARCH TOPIC	Study relating to the prevention and mitigation of geological risks through the application of new technologies for the protection of the territory, the infrastructures of real estate, tangible and intangible assets and the protection of citizens, with particular regard to anthropic impact and climate change. The research starts from the national need to carry out a synergistic study in the field of safeguarding the territory and cultural heritage from anthropogenic and natural risks. The use of innovative technologies (also non-invasive through active sensors: laser, lidar, georadar; and passive optical sensors: near and far thermal, hyper and multispectral) both for the surveillance and management of the territory and places with the presence of cultural heritage it is one of the main focuses together with the development of analysis techniques of the soils and materials making up the environmental system with its anthropogenic and cultural heritage components.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
-	6	italian/english	August 22nd 2022	10:00 a.m.	Remotely (videocall)	

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Geo-structural monitoring of linear infrastructures**
RESEARCH TOPIC	The project aims to implement specific methods for the use of data deriving from three-dimensional surveys for infrastructure monitoring. The most common three-dimensional data available are those from laser scanner surveys. In order to extract useful information for evaluating structural behavior it is necessary to process the

		data acquired from the surveys through specific and innovative techniques. As part of the research project, autonomous data processing techniques will be examined and fine-tuned, aiming at improving the efficiency of the application of these techniques in the framwork of geo-structural monitoring. In particular, the following points will be considered: - Analysis in the spatial domain, data extraction and combination algorithms, 3D and 2D data synthesis; - Analysis in the time domain, by comparing subsequent surveys and complementary geomorphological study; - Integration and comparison with monitoring data deriving from other instrumental measurements or analysis techniques; - Identification of case studies and field application, results validation; - Techniques to improve usability and result presentation for an immediate understanding of the on-going phenomenas. The partner company operates in the field of geo-structural monitoring. The research developments represent an innovative means impacting fundamental aspects of infrastructure managment, e.g. the investigation of deformation phenomena, temporal evolution of the instability events, causes identification/prevention, soil-structure interaction studies.			
COMPANY		PIZZITERRA Srl			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	6	italian/english	August 22nd 2022	10:00 a.m.	Remotely (videocall)

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MUR

INTERNATIONAL DOCTORATE IN STRUCTURAL BIOLOGY

Director prof. Lucia Banci

CUP	D.M. 352/2022	B12B22000610007

D.M. 352/2022	Scholarships co-funded by Companies					
TITLE OF THE SCHOLARSHIP	**NMR methods for structural biology: improved experiments and workflows**					
RESEARCH TOPIC	The present doctoral project aims to design and set up nuclear magnetic resonance experiments suitable for the study of biomolecules at very high field. The experiments should be implemented taking into account the optimization of the workflow necessary for the complete characterization of a protein. They should allow for - the definition of the fingerprint of the biomolecule, - its structural and dynamic characterization, - the study of its functional interactions in solution and in-cell. Bruker and CERM have a long-standing tradition of cooperation in the development of novel experiments and methods to study at the molecular level structure, dynamics, and function of biomolecules. Bruker Biospin is a major manufacturer of Magnetic Resonance based Spectrometers and Imaging Systems. The successful candidate will access state-of-the-art instrumentation both at the University and at Bruker. S/he will also have the possibility to interact with leading scientists and applicationists in a truly international setting. The project thus promotes basic and applied research and technological innovation (mission 4) and drug development (mission 6). The characterization of biological processes at the atomic level using cutting-edge spectroscopic techniques with frontier instrumentation and methods may in fact represent a strategic advantage for companies operating in the sector, with important and positive effects on human health and the national economy.					
COMPANY	BRUKER					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
6	6	english	August 26th 2022	12:00 p.m.	In-person*	Centro Risonanze Magnetiche (CERM) via Sacconi, 6 Sesto Fiorentino - Firenze

* In the application form candidates residing abroad may ask to conduct the interview remotely

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MUR

CHEMICAL SCIENCES

Director prof. Anna Maria Papini

CUP	D.M. 352/2022	B12B22000660007

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Identification of biologically active peptides by innovative liquid chromatographic-mass spectrometric technologies in self-recoverable proteinaceous materials to be translated in active ingredients**
RESEARCH TOPIC	The research project aims to implement key technologies of purification and identification of bioactive peptides by chromatography and mass spectrometry in self-recoverable protein materials to be translated in active ingredients to be exploited in the following fields of application: 1) Biomaterials also for biomedical applications 2) Cosmeceutics; 3) Nutraceutics. The identified bioactive peptides shall demonstrate optimal sustainability, circularity, health, and safety profiles in the optic of circular economy. The project will be organised in the following steps: - Set up of the advanced methodologies to extract proteins from vegetal and/or animal source, to be selected on the basis of the characteristics of the active ingredients to be exploited in the above-mentioned fields - Preparation of hydrolisates, chromatographic purification (CEX, SEC, etc.), MS-MS analysis of the obtained peptides and use of bioinformatic tools for characterization of their properties as active ingredients in the above mentioned fields - Chemical synthesis of the characterized peptides and control of their properties by specific assays designed to verify the possible exploitation in the fields of application - Scale up of the optimised processes of extraction, isolation, and final characterization. Optimization of the properties of the bioactive peptides also with semi-synthetic strategies. At the end of the project the PhD student will be involved in the phase of industrial exploitation of the new products. All the phases of the project will be developed in strict cooperation with Fischer Analytics. In particular the PhD student will take advantage of knowledge, skills, and instrumentation available at the Interdepartmental Research Unit of Peptide and Protein Chemistry and Biology (PeptLab, www.peptlab.unifi.it) at the Scientific Campus of Sesto Fiorentino. Moreover, during the research periods at Fischer Analytics GmbH (Bingen, Germany), the PhD student will have access to the instrumentation such as mass spectrometers (single quadrupole, -TOF, MS-MS, etc) coupled to liquid chromatographic systems (LC, HPLC, U-HPLC, FPLC, FCPC, SMB) with dedicated detectors (ELSD, ECD, CAD, etc.), including bioinformatic tools (https://www.fischer-analytics.com).

COMPANY		Fischer Analytics GmbH (GERMANIA)			
MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 23rd 2022	08:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Synthesis of agrochemicals against canker of kiwifruit**
RESEARCH TOPIC	The project aims to identify and develop novel safe crop protection products, which guarantee sustainable agriculture for farmers and healthy and nutritious food for consumers, in full agreement with the PNRR Mission 2 (Green revolution and ecological transition. Development of the main industrial chains of the ecological transition). The focus of the project is represented by safe bactericides, in particular new natural compounds derived from inexpensive carbohydrates, which are non-toxic for humans and plants, but are able to interact with specific targets for the bacterium (e.g. levansucrase, a glycosidase enzyme), to fight against the recently emerged canker kiwifruit pandemic. The project will address the following issues: - Development of straightforward strategies for the synthesis of mono- and multivalent glycomimetics, widely known as glycosidases inhibitors. - Use of carbohydrates or cellulose derivatives from renewable sources as starting materials, green solvents, and development of innovative one-pot procedures. - In collaboration with Dipartimento di Scienze Biomediche, Sperimentali e Cliniche "Mario Serio" (DSBSC, UNIFI) the inhibitory activity of the newly synthesized compounds will be assessed in cloned and expressed levansucrases of Pseudomonas syringae pv actinidiae (Psa 3), which has been recently fully characterized. - For the best inhibitors, X-ray crystallography and docking studies will be performed to shed light on the mechanism of inhibition. - The validation of the best compounds on plants, e.g. Actinidia chinensis (kiwifruit), will be carried out in collaboration with Syngenta AG (Basilea, CH). - The period in Syngenta AG will be also devoted to the investigation of alternative control methods aimed at inducing host plant resistance to the pathogen, with the ultimate goal of implementing precision agriculture. The candidate will be trained on the synthesis, purification, and characterization of complex organic compounds with the aid of full equipped laboratories, exploiting techniques such as 1D- and 2D-NMR spectroscopy and ESI-MS spectrometry. In the company, the candidate will learn to improve the synthesis of

		compounds on a larger scale, working in agreement with company guidelines (Good Manufacturing Practice).			
COMPANY		Syngenta Crop Protection AG (SVIZZERA)			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	6	italian/english	August 23rd 2022	08:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Study of the physicochemical properties of Ground Granulated Blast Slag -based formulations and of their hydration reactions**
RESEARCH TOPIC	The aim of the research project is to study the physico-chemical properties of low carbon binders based on supplementary cementitious materials (SCM) such as ground granulated blast slag (GGBS) and their hydration reactions. GGBS is a by-product of the iron and steel production process in blast furnaces. The pozzolanic properties of this material are well known and its high potential as a low-carbon alternative to Portland cement is already well-established for many applications. However, to fully exploit the potential of GGBS, a deeper understanding of hydration mechanisms is crucial. In the course of the project, the effects of the addition of components that increase the pozzolanic properties of GGBS and/or other dross will be assessed. In particular, they will be varied: - activating components. These may be alkali or sulphate-based. Knowledge of the effect of these additives especially on hydration kinetics is a very important aspect in order to enhance the material properties; - filler. The practical use of these cementitious materials cannot ignore the presence of fillers that are generally of siliceous or carbonate nature and that often do not constitute a completely inert component but contribute to the development of the final properties; - superfluidificants. Organic additives capable of fluidizing cement mixtures with low water content are fundamental components for the development of cement formulations. The project will focus on: - Development of thermal analysis methodologies for the study of hydration kinetics of blast furnace slags. Through these techniques it will be possible to obtain thermodynamic data on hydration kinetics and

	evaluate how the presence of additives and fillers changes these parameters. In this way it will be possible to quantitatively determine the effectiveness of the different formulations. - Study of the chemical nature of hydrated phases, their morphology and the structure of hydrated materials. In particular, the porosity of the samples and their microstructure will be studied and related to the initial composition of the formulation. - Study of mechanical properties: the composition and structure of the various formulations will be related to the mechanical properties of the various samples. This investigation aims to fully exploit the pozzolanic potential of GGBS and other SCM cementitious formulations, thus limiting the global production of Portland cement, which has a very high carbon footprint. Since GGBS is a by-product of iron and steel production processes, this topic perfectly meets the principles of the circular economy and fits fully into the PNRR Mission 2 "Green Revolution and Ecological Transition". The research will be carried out in close collaboration with the company Ecocem, leader in the field of low carbon cement products technology. Ecocem has considerable technology and know-how in the development, production, marketing and application of GGBS, slag cements, low carbon special binders and mixtures for low carbon concretes. During the project, the PhD student will be involved, in the activities of the company, and therefore he/she will have the opportunity to deal with industrial research activities and to experiment with the practical applications of the studied materials and with the problems related to these applications.
COMPANY	Ecocem Materials Ltd (IRLANDA)
MANDATORY EXPERIENCES	**INTERVIEW**

COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 23rd 2022	08:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of analytical platforms for a high throughput analytical approach based on chromatographic techniques coupled with mass spectrometry for the identification and quantification of organic micropollutants in environmental matrices**

RESEARCH TOPIC	The research project aims to develop analytical platforms with high analytical throughput based on chromatographic techniques coupled with mass spectrometry for the identification and quantification of organic micropollutants in environmental matrices. In particular, the research activities will focus on the development and application of (i) "online SPE-LC-MS/MS" analytical methods for the determination of emerging organic micropollutants in aqueous samples, (ii) automatic extraction methods of emerging organic micropollutants from solid environmental matrices, their preconcentration and "online SPE-LC-MS/MS" analysis, (iii) "untargeted" and "suspect screening" chromatographic analytical platforms based on liquid chromatography and high resolution mass spectrometry (LC-HRMS) for the construction of databases containing information on the presence of emerging organic micropollutants in drinking, surface and waste water.The research topic proposed falls within the Italian PNRR Mission 2: Green revolution and ecological transition. Security of supply, sustainable and efficient management of water resources.
COMPANY	Publiacqua Spa

MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	6	italian/english	August 23rd 2022	08:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of immersion and / or runoff measurement techniques for determining the concentration of Urea in water and organic liquids**
RESEARCH TOPIC	The research activity that will be performed at the Department of Chemistry "Ugo Schiff" (DICUS) and at the Company Chemitec, will be focused on the development of an innovative urea sensor that monitors the urea concentration in flow conditions. In particular, at least an electrochemical sensor that measures the urea concentration in water samples and/or in biological liquids will be developed. The research activity will be based on: - The development of amperometric and potentiometric transducers. In particular, for the development of the transducers, the possibility of using recycled carbonaceous materials obtained from the pyrolysis or gasification of waste biomass as well as the use of biocompatible metals for the realization of the conductive parts will be evaluated. In order to increase the selectivity and stability of the transducer different functionalization processes will be optimized.

		- The development of bioreactors or biomembranes, containing suitable biocatalysts, for the sensitive and reproducible detection of Urea in the chosen matrices. Suitable innovative "green" materials will be studied, in line with the concepts of the sustainable development and the circular economy. In order to improve the selectivity, sensitivity and stability of the sensor for Urea, different functionalization processes of the biocatalyst will be optimized. - The validation of the sensor as well as the monitoring of any interferents and other organic components present in the samples will be performed through the HPLC-HRMS analysis using analytical protocols ad hoc implemented. At the end of the project the PhD student will be involved in the phase of industrial exploitation of the new product. All the phases of the project will be developed in strict cooperation with Chemitec. Moreover, during the research periods at Chemitec, the PhD student will have access to the instrumentation for the control and analysis of water samples as well as to the know-how in fabrication techniques, optimized production systems, industrialization processes and design of electronics for sensors and actuators.				
COMPANY		Chemitec Srl				
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 23rd 2022	08:30 a.m.	Remotely (videocall)	

DEVELOPMENT ECONOMICS AND LOCAL SYSTEMS (DELOS)

Director prof. Donato Romano

CUP	D.M. 351/2022	B12B22000360007

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**Effects on socio-demographic, nutrition and health indicators of health reforms and exogenous environmental, economic and conflict shocks**					
RESEARCH TOPIC	Shocks related to climate change, health and economic crises, and conflicts have become increasingly frequent in recent years. Such events usually produce adverse effects on the well-being of individuals, especially in contexts where insurance and credit markets are absent or dualistic, or where public social protection programmes are weak. The absence of formal institutions often leads individuals and communities to resort to informal institutions as a form of livelihood, which, in some cases (e.g. child labour, polygamous marriages, early marriage and pregnancy), have further medium- and long-term negative effects on human capital. The implementation of socio-economic or health reforms can limit these multiple effects. Using quasi-experimental or non-experimental econometric tools, and combining household survey data with geo-referenced climate and conflict data, this project aims to study the effects of health reforms, and exogenous environmental, economic or conflict-related shocks on socio-demographic, nutritional and health indicators by identifying possible heterogeneities within a given population. Furthermore, the underlying mechanisms that would explain such effects and possible heterogeneities will be researched.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	english	August 23rd 2022	09:30 a.m.	Remotely (videocall)	

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Learning and transfers of regional digital transition policies**
RESEARCH TOPIC	The digital transition requires strong policy support. In turn, policymakers need guidance for action, which to some extent can be based on the outcomes of evaluating past interventions. However, the results of evaluations of the same

	intervention to support the digital transition carried out at different points in time or in different socio-economic contexts might not be directly comparable, even if the beneficiaries of the incentive had very similar characteristics. Previous research aimed at identifying elements that had led to successful policy replication from one place to another has been mainly qualitative. Only in recent years, the literature has begun to examine methodological solutions to assess the transferability over time or across space of estimates of policy effects. However, this literature is still in its infancy and still lacks significant empirical applications. Our research project aims to fill this gap. We focus on the geographical transferability of the results of previous quantitative evaluations related to policies supporting the digital transition of firms, and we analyze: i) to what extent can impact estimates related to a policy implemented in places with certain characteristics be generalised or transferred to places with partially different characteristics? ii) How can policies be adapted from strong territorial contexts (e.g., clusters or regions that are leading the technological transition) to weaker ones? The empirical analysis will focus on regional policies adopted in Europe.

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	english	August 23rd 2022	09:30 a.m.	Remotely (videocall)

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Micro-macro modeling for development policy simulations and impact analysis**
RESEARCH TOPIC	Macroeconomic models (like computable general equilibrium – CGE) are often combined with microsimulation (MS) models to perform distributive impact analysis for fiscal or structural policies, or external shocks. This type of combined CGE-MS models has been used widely to evaluate the distributive impacts of macroeconomic shocks and policies such as public expenditures (changes in size or composition), tax/subsidy policies, structural reforms such as trade liberalization, privatization and labor market reforms, and global price and climate shocks. CGE (or other aggregate) models allow the modeller to focus on winners and losers at the sectoral level, and to estimate the impact on macroeconomic variables and general equilibrium price effects. However, they are not an adequate tool to perform distributional analysis given the lack of individual/household results and the representative agent assumption. On the other hand, MS models focus on household and/or individual behaviour. They are the key methodology to capturing distributional effects of a policy change due to heterogeneity at the household or

		individual level. Similar ex-ante approaches can be particularly useful to assess the heterogeneous effects of economic reforms carried out to curb the impact of a health crisis (e.g., COVID-19 confinement measures) or to oppose a conflict crisis (e.g., interruption of gas import from Russia). Likewise, to invest public money effectively, they are also critically important to size the macroeconomic and distributive effects of recovery measures. This project aims to improve the use of such analytical tools and provide new evidence on the macro and microeconomic effects of socio-economic policies that are key to development.			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	english	August 23rd 2022	09:30 a.m.	Remotely (videocall)

LEGAL SCIENCES

Director prof. Alessandro Simoni

CUP	D.M. 351/2022	B12B22000460007
	D.M. 352/2022	B12B22000690007

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**Asylum seekers' labour: between social inclusion and exploitation**					
RESEARCH TOPIC	According to many researches and many international documents, asylum seekers are among the subjects most exposed to labor exploitation, at the same time according to art. 19 c. 1.1. T.U.I. the work carried out by asylum seekers is considered an essential indicator of the social inclusion required to obtain a special protection permit. This ambiguity creates considerable problems for the Territorial Commissions and the Specialized Immigration Sections and some perverse effects. The risk is on the one hand to exclude from complementary protection the exploited workers, i.e. the socially more fragile or even vulnerable persons, and, on the other hand, to transform this protection in an instrument on which the exploiters rely. The research of the PhD student will have to examine the case history of Florentine decisions and their motivations to make available to the deciding bodies (Commission and Specialized section) a map that functions as a reference system. Moreover, taking advantage of the next start (Autumn 2022) of the regional project to combat labour exploitation (Soleil), whose development s/he will have to follow, s/he will verify if a possible way out can be represented by the rapid social protection and labour reintegration of the exploited workers who can be accompanied / supported by the complementary protection pursuant to art. 19 c.1.1. T.U.I.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	14:00 p.m.	Remotely (videocall)	

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**The quality of regulation in the most recent regional experiences**					
RESEARCH TOPIC	The laws and policies adopted by public authorities today will affect both citizens and businesses for generations to come. With the right regulatory settings, governments can strengthen people's capacity to understand and comply with the law, to exercise democratic control, and increase trust in public institutions. But the quality of regulation also affects the capacity of governments to address more efficiently a growing number of concerns, such as improving the well-being of citizens, increasing inclusion, or driving a greener recovery. In recent years, phenomena such as the economic, environmental and pandemic crises, or the incredible technological development in progress, are influencing the content and methods of law-making and regulatory strategies; but the response to these phenomena is in turn influenced by new tools and conceptions in legislation and regulation.Therefore, at the supranational level, we have seen significant developments in the quality of regulation since the OECD Recommendations of 2012 and the EU Commission's better regulation agenda of 2002. At the national level, the Italian Government and Parliament have set up structures, adopted policy documents and refined techniques to achieve high standards of quality regulation in response to emerging needs, achieving significant results but also bringing to light many critical aspects. Italian Regions, in turn, are presenting themselves as laboratories where they can experiment with new practices of good regulation, giving rise to a varied landscape in which there are virtuous, cutting-edge examples and realities that still pay little attention to these aspects. Constitutional jurisprudence, expecially in judgments of legitimacy on state and regional laws, is giving increasing prominence to the quality of regulation. The research aims to analyze the latest practices on the quality of regulation in place, with specific focus on the regional level. The research will frame the state of the art of policies and instruments on the quality of regulation at the European and national levels, and will focus on ongoing experimentations at the regional level, with particular regard to the issues of motivation of legislative acts, techniques of ex ante analysis and ex post evaluation of normative acts, planning of legislative interventions, and practices of maintenance and coordination of existing regulation. Specific attention should be paid to the case of the Tuscany Region					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	14:00 p.m.	Remotely (videocall)	

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**Cultural heritage management: models of criminal law protection**					
RESEARCH TOPIC	The research project aims to reconstruct the issues surrounding the protection of cultural heritage from a systematic perspective, focusing on the role that criminal law plays. The research will be developed around the following four points, each of which is susceptible to further articulation. A) First of all, an exhaustive definition of the subject area is strongly needed, with special regard to national and European legislation. At the same time, the identification of the competent public administrations and the analysis of their powers is equally crucial. B) Secondly, the project will deepen the study of crimes directed against cultural heritage. The section of Title VIII of the Criminal code is still under initial interpretations, and is particularly relevant. Each crime will be examined analytically, in order to verify its suitability for the protection purpose pursued. C) Thirdly, given the publicistic nature of the interests involved, an equal in-depth examination will be devoted to offences against the public administration in the management of assets of cultural significance. D) Fourthly, the research will offer an overall assessment of the subject matter, which will be open to criminal policy proposals aimed at improving the regulatory framework. In terms of method, the research should take into account comparative experience, with particular attention to those countries that possess a cultural heritage of inestimable value.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	14:00 p.m.	Remotely (videocall)	

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Organisation of museums and enhancement of museum heritage**
RESEARCH TOPIC	The research focuses on two issues. First of it is aimed at analyzing of the regulatory framework of museum organization, to be carried out in a comparative perspective, in order to verify its adequacy with respect to the efficient realization of public interest objectives. In this regard, it will be necessary to consider the different types of museums, taking into account their territorial dimension, and to

		identify the instruments for the coordination and optimization of the museum offer. This will be followed by the study of the instruments for the valorization of the museum heritage, both with respect to the promotion of fruition by the community and in relation to the economic exploitation of the works that compose it, taking into account the new technologies and highlighting the potential to be exploited and the limits to be observed.			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 26th 2022	14:00 p.m.	Remotely (videocall)

D.M. 352/2022		Scholarships co-funded by Companies			
TITLE OF THE SCHOLARSHIP		**Agricultural exceptionalism: the rules of antitrust law and contracts in the agri-food market**			
RESEARCH TOPIC		The research focuses on the study of the antitrust law in agriculture and, in particular, on the functioning of producer organizations ("Op") and interbranch organizations ("Oi") with reference to the internal regulations of these organizations and the system of agreements with the agricultural producer, in addition to the operating procedures of the corporate bodies with reference also to their impact on the production system and on supply chain relations. These involves also the strategy on sustainability and, at the same time, the power of the companies among the agri-food chain. A further area of the research, connected to the first, is the one related to the internal and external contractual profiles of these organizations and their implications along the agri-food chain: starting from the structural weakness of the farmer, aims to verify the types of contracts that are placed in be in the context of supply chain relations and the related regulations. An issue that also involves the objective position of economic dependence in which farmers are forced to undergo negotiation methods and substantially unbalanced contractual clauses for the benefit of counterparties and from these imposed			
COMPANY		LCA Studio Legale			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 26th 2022	14:00 p.m.	Remotely (videocall)

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

ARCHITECTURE AND DESIGN CULTURES, KNOWLEDGE AND SAFEGUARDING OF CULTURAL HERITAGE

Director prof. Francesco Collotti

CUP	D.M. 351/2022	B12B22000350007

D.M. 351/2022	Cultural Heritage
TITLE OF THE SCHOLARSHIP	**Conservation of historic centers: reduction of seismic vulnerability and innovative reinforcement interventions compatible with the principles of restoration. The case study of the UNESCO area of Florence**
RESEARCH TOPIC	The Italian architectural heritage consists not only of isolated monuments but also, above all, of extensive built stocks and in strong relationship with the territories and cultural environments. The historical centres are the maximum expression of this form. The reduction of the seismic vulnerability of this heritage is a pressing urgency in the context of territorial management. Unfortunately, the many seismic events, up to the most recent ones, testify to how complex it is to carry out safety interventions that are effective and respectful of the cultural values to be preserved. This integration requires research and experimentation, and the training of professionals of superior technical and scientific capacity. In this PhD program, methods for assessing and reducing the seismic vulnerability of historic buildings in aggregate will be investigated and developed, through an interdisciplinary and multi-scale approach that optimizes the tools available in relation to the specificities of monumental historic centers. The research will develop by integrating the disciplines of restoration, aimed at the knowledge, conservation, management and enhancement of the heritage, with methods of structural analysis and experimental investigations for the applicability of new technologies and innovative materials. The research will take as a case study the historic center of Florence, a UNESCO heritage site and a unique example of a widespread monument to be preserved in its extensive expression. In particular, the results from historical and typological investigations on construction techniques and materials will be integrated with vulnerability assessment studies at urban scale, at the scale of the aggregate and of the single building, with the aim of deepening the knowledge on the city center also by enriching the digital platforms already available, including the HECO project, developed in collaboration with the UNESCO Florence Office of the Municipality. In the more general context of urban regeneration actions, strategies will be defined for conservation and enhancement interventions that allow a significant increase in structural safety through traditional or innovative systems, including specifically those based on fiber-reinforced materials, while maintaining compatibility with the principles of restorationSusanna Caccia Gherardini (2021). The game of two charters. Theoretical codification for restoration. RESTAURO ARCHEOLOGICO, vol. special issue, pp. 11-17, ISSN:2465-2377

		Susanna Caccia Gherardini (2021). GIRO DI CARTE (DEL RESTAURO). LA DIFFICILE CODIFICAZIONE DEL DIBATTITO DISCIPLINARE. ANANKE, vol. 2021, pp. 12-14, ISSN:1129-8219 Stefanini S.; Rovero L.; Tonietti U. (2021). Seismic Vulnerability Assessment of Historical Masonry Aggregate Buildings. The Case of Fes Medina in Morocco. INTERNATIONAL JOURNAL OF ARCHITECTURAL HERITAGE, pp. 1-20, ISSN:1558-3058 Palazzi N.C.; Favier P.; Rovero L.; Sandoval C.; de la Llera J.C. (2020). Seismic damage and fragility assessment of ancient masonry churches located in central Chile. BULLETIN OF EARTHQUAKE ENGINEERING, vol. 18, pp. 3433-3457, ISSN:1570-761X Alecci, Valerio; Focacci, Francesco; Rovero, Luisa; Stipo, Gianfranco; De Stefano, Mario (2017). Intrados strengthening of brick masonry arches with different FRCM composites: Experimental and analytical investigations. COMPOSITE STRUCTURES, vol. 176, pp. 898-909, ISSN:0263-8223.				
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	10:00 a.m.	Remotely (videocall)	

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

SUSTAINABLE MANAGEMENT OF AGRICULTURAL RESOURCHES, FORESTRY AND FOOD

Director prof. Erminio Monteleone

CUP	D.M. 351/2022	B12B22000410007
	D.M. 352/2022	B12B22000560007

D.M. 351/2022	NRRP Research					
TITLE OF THE SCHOLARSHIP	**Circularity in agri-food production**					
RESEARCH TOPIC	The project aims at enhancing food production according to a logic of product and process innovation that combines sustainability and digitalization of production processes. We want to develop research that leads to the enhancement of processing residues through the extraction of new functional compounds that can, through their nutritional and / or structural and / or sensory value and / or extension of shelf life, find application as ingredients of food products. Research will also be able to optimize food production for the purpose of reduction in the consumption of environmental resources, processing residues and production defects, through the increasing use of production traceability indicators that are the subject of predictive mathematical models for the design and control of processes.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
-	6	italian/english	August 26th 2022	11:00 a.m.	In-person*	Dipartimento di Scienze e Tecnologie Agrarie, Alimentari, Ambientali e Forestali (DAGRI) Piazzale delle Cascine, 18 – Firenze Aula Magna

* In the application form candidates residing abroad may ask to conduct the interview remotely

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Capturing the dynamics of sensory and emotional experience for sustainable product innovation**

RESEARCH TOPIC		The project will be aimed at the development of new methodologies to evaluate the sensory-emotional profile of new personal-care products characterized by higher environmental sustainability to promote the green transition (e.g., reduced water and other natural resource consumption; use of new ingredients reducing environmental impact including natural ingredients). New methods will be developed to capture the changes in sensory perception, liking and emotional experience of a product during its use. The "global" experience of a product will be considered integrating the sensory, emotional and functional dimensions. The research activity will be carried out at the SensoryLab (DAGRI-University of Florence) and at the premiss of the company L'Oreal - Research & Innovation, where the PhD candidate will have the possibility to develop methods and run pilot studies in the sensory and cognitive science labs and to interact with the international and multidisciplinary innovation team.				
COMPANY		L'Oreal - Research & Innovation				
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
6	6	italian/english	August 26th 2022	11:00 a.m.	In-person*	Dipartimento di Scienze e Tecnologie Agrarie, Alimentari, Ambientali e Forestali (DAGRI) Piazzale delle Cascine, 18 – Firenze Aula Magna

* In the application form candidates residing abroad may ask to conduct the interview remotely

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

INFORMATION ENGINEERING

Director prof. Fabio Schoen

CUP	D.M. 351/2022	B12B22000420007
	D.M. 352/2022	B12B22000570007

D.M. 351/2022	NRRP Research
TITLE OF THE SCHOLARSHIP	**Study of physiological correlates acquired through wearable systems**
RESEARCH TOPIC	**RESEARCH TOPIC:** For the past few years, what seemed like absolute certainties have been becoming sources of concern. The idea of steady progress, eradication of disease, peace and widespread prosperity is becoming a concern about the climate, successive economic crises, increasingly extreme social inequalities and, more recently, pandemic and war. However, difficult times can offer resilience and opportunity for people, communities and societies. We need to focus our efforts on increasing communities' economic, energy and climate change resilience. The conflict between Russia and Ukraine is directly and indirectly forcing a "rethinking" and redesigning the energy supply chain and consumption dynamics. This new era also offers an opportunity to reduce our impact on the environment and address climate change with an urgency never before experienced. Influencing citizens' environmental behaviors will provide concrete economic, distributed and collective benefits. The purpose of this research theme stems from a simple concept: instead of returning to the "old" fossil energy sources (coal, oil), thus abdicating the recent COP26 agreements in Glasgow, we should tap into the greatest potential the world has: social engagement. The ambitious vision of the fathers and mothers of "The Internet of Things" was to create a pervasive Internet capable of supporting end users in their daily lives, empowering them through the extraordinary computational power of artificial intelligence and machine learning and the exploitation of distributed information within their environments. Probably the most important missing pillar of the technological era of the Internet of Things, which has caused its partial failure, has been a "bad approach" to citizen involvement and participation. The adoption and diffusion of disruptive technologies (e.g., smartphones) involve complex social dynamics mediated by many factors, such as technological readiness and effectiveness, ergonomics (perceptual, cognitive, psychosocial), ease of use, and affordability. This overall vision necessitates the design and development of platforms to support the mitigation of sustainability, energy consumption, and climate change. Enabling the interaction of several key scientific fields, including psychology, cognitive science, computer science, bioengineering, and game design, facilitating linkage between academia and business in a multidisciplinary way to enable advanced immersive multi-sensory (XR) reality, the content of which will be able to support the reduction of energy consumption and environmental footprint of citizens, and enabling interaction with real-time contextual information triggered by intuitive sensory triggers (e.g., visual and auditory). Underlying the development is the understanding of the state of the subjects involved through the implementation of

	models for the interpretation of electrophysiological correlates that will allow an investigation of the activity of autonomic and central nervous systems, which combined with game-based learning, Artificial Intelligence (A.I.) and Machine learning models, and visualization tools, biosensing systems, and distributed computing will be able to: (1) improve the immersiveness, accessibility, engagement, and participation of end users.(2) employ new technologies to address complex societal problems (e.g., climate change) in line with the European Green Deal program. One of the most challenging goals will be to improve the robustness and accuracy of current mapping and positioning systems (in real and virtual environments). The main measurable outcomes of the research should aim to develop models to describe cognitive load, sustained and focused attention, fatigue, emotional load, valence and arousal, immersiveness, readiness to change, and implicit attitudes. This will allow for a fundamental assessment of the affordance and ergonomics of the users' extended reality (XR) experience and produce a plethora of biofeedback from users that is critical to creating an A.I. designed to support the user and adapt the XR. **PhD project:** Specifically, the doctoral project should aim to assess the psychophysiological state of users to infer the level of cognitive load, engagement, fatigue and emotional response. Research results have shown many studies on emotional detection in social contexts. These results were achieved due to significant efforts in developing new technologies and advanced biomedical signal processing methods to correctly measure internal user reactions (e.g., emotions) exploited by humans in specific situations.Such technologies have been instrumental in noninvasively measuring the central and autonomic nervous system (CNS and ANS) response induced by human reactions. The project should investigate the CNS through electroencephalographic acquisition systems and information acquired from eye pattern (i.e., gaze and pupil size dynamics). At the same time, the ANS can be examined through physiological signals (e.g., HRV, SpO2, blood pressure). Furthermore, the literature suggests that the evolution of cognitive and emotional dynamics is often neither predictable nor linear, revealing a complex structure of hidden inter-individual relationships. Indeed, many biological systems have been described as nonstationary, and the biological processes that regulate cognitive load, attention dynamics, emotional state, and fatigue in humans follow the same rules. It is noteworthy that human emotions have been studied using Dynamic Systems Theory (DST), often applied to describe complex, nonlinear biological phenomena (i.e., where complex mathematical laws can characterize the cause-and-effect relationship). The project through the application of DST to physiological data should aim to discriminate cognitive load, attention dynamics, emotional state and fatigue over time. The results will be the input to AI models for psychophysiological assessment. Specifically, the project will need to design Machine Learning and Deep Learning models, based on physiological results, for recognition and prediction of users' levels of engagement and attention of emotion, and to study the direction of information transferred during game-based experimental phases.Causality and complexity relationships will play a crucial role in 'AI learning during the dynamics of cognitive and emotional engagement of humans during gamification. In addition, new information technologies (especially social media), it is now possible to harness the intelligence of huge numbers of people, and games ("serious games") are beginning to be used with the purpose of social change. Literature has shown how

		these games may be able to educate and guide players' behaviors, especially when new technologies widely used by citizens support them (e.g., smartphone apps). Some of them ncluded learning about complex systems and increased concern about climate change (e.g., World Climate Simulation; ClimateKids; ClimateChallenge). With this in mind, the research project will be able to leverage research findings to create experimental conditions based on gamification in virtual or extended reality contexts. These may focus on specific issues related to climate change and energy conservation			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
-	6	italian/english	August 25th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Advanced Doppler echographic methods**
RESEARCH TOPIC	Esaote is an international company involved in the research, production, and marketing of technological solutions for applications in the healthcare field. Today Esaote is a leading industrial group that supplies medical imaging systems for ultrasound and magnetic resonance, integrated with Information Technology solutions for healthcare. The company, based in Italy, has production sites and research and development laboratories in Genoa, Florence, and Maastricht (Holland). Furthermore, through an international network of branches and distributors, it operates in more than 80 countries around the world. Esaote dedicates about 20% of its resources to the research and development department, which has a long experience in ultrasound technology, and in the development of new imaging techniques. The proposed research topic, in line with Esaote's interests, has the general goal of studying, developing, and implementing advanced Doppler-type signal processing methods on ultrasound systems. In particular, the focus will be on ""ultrafast"" flowmetry and vector Doppler. Research topics of interest include: 1) the definition of multi-angle transmission and coherent recombination strategies in reception for high frame rate imaging 2) the development of post-processing algorithms for the quantitative estimation of the direction and speed of blood flow and the generation of two-dimensional maps over an extended area 3) the implementation of these algorithms on commercial ultrasound scanners 4) the test of the new algorithms, through simulations and experiments based on phantom and, where possible, on pre-clinical tests (in vivo tests)
COMPANY	ESAOTE Spa

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 25th 2022	09:30 a.m.	Remotely (videocall)

INDUSTRIAL ENGINEERING

Director prof. Giovanni Ferrara

CUP	D.M. 352/2022	B12B22000580007

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Analysis of possible technical and economic scenarios for the application of hydrogen in hard-to-abate companies and energy communities**				
RESEARCH TOPIC	The experience gained in the modular simulation of power plants and gas distribution networks makes it possible to simulate more complex energy systems and the interactions between the electricity and gas sectors, with the possibility of analysing in detail the implementation of hydrogen in hard-to-abate companies. The project will be divided into the following points: • analyze the energy consumption of some energy-intensive companies and the hard to abate companies in particular. • The possibility of developing cogeneration (Combined Heat and Power) plants for energy efficiency using fossil fuels will be evaluated. • Development of a tool able to simulate typical components for the production of "green hydrogen", such as solar panels (PV), wind turbines, electrolysers, tanks, fuel cells, heat pumps, boilers, etc. • Scenario analysis for the introduction of hydrogen in Hard-To-Abate companies and preliminary economic evaluation of plants. Therefore, the scenarios will be evaluated both from an energy and economic point of view. The results will help identify the best solutions for companies towards a climate-neutral system. • Integration solutions in Energy Communities will also be evaluated.				
COMPANY	ESTRA Spa				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Analysis and Development of Environmentally Sustainable Subtractive Processing**
RESEARCH TOPIC	The research project aims to develop an approach for measuring, modelling and optimising the electrical and material consumption for different machining processes. In the first phase of the project, an analysis of the state of the art will be carried out in order to understand which are the best models for analysing

		cutting processes, also assessing the areas of weakness of existing strategies and possibly developing a specific model for the machining operations under consideration. These models will then be applied to the reality of the removal processes in place at the company, with the aim of identifying strategies to reduce their environmental impact, balancing this objective with the need to maintain high productivity and low production costs. The strategies defined by the PhD student will be discussed with the company to assess which solutions are really feasible. This will be followed by a planning of the implementation phase and an analysis of the results actually achieved to understand the effectiveness of what has been developed. At the end of the research activity, the possibility of extending the developed solutions to other production processes will be evaluated.			
COMPANY		Nuovo Pignone Tecnologie Srl			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Application of ML and AI algorithms for the development of advanced techniques in monitoring & control of natural gas distribution networks**
RESEARCH TOPIC	"During the PhD course, it is planned to deepen the advanced monitoring techniques such as artificial intelligence and machine learning to gas distribution networks and its components. The project will be divided into the following points: • Bibliographical research on distribution networks and their main components • 1D fluid dynamics simulation of some gas distribution networks • 1D fluid dynamics simulation of some gas distribution networks with hydrogen under transient conditions • Bibliographic research and understanding of artificial intelligence and machine learning techniques. • Application of machine learning techniques to determine the diffusion of a contaminant (for example, an odorant and/or hydrogen in blending) in a gas distribution network. • Realization of a thermodynamic model of a Gas City Gate • Technical application to Gas City Gate to estimate and optimize energy efficiency • Technical application to the Regulation and Measurement (rowing) booths to monitor the pressure drop"
COMPANY	CENTRIA Srl

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Design, Engineering and Industrialisation of Mechanical Solution for Marine Litter Collection in Ports**
RESEARCH TOPIC	The doctoral path of the student foresees her/his involvement in a multi-annual collaboration project among UNIFI DIEF, Arbi Dario SPA and the Blue Resolution Association aimed at fighting the problem of marine litter, with particular emphasys on harbour environmennts. The doctorate will be developed on the following activities: - Study of the state of the art of existing (industrial and research) solutions of "SeaBin" type devices. - Study of a Proof Of Concept in collaboration with the co-funding company Arbi Dario SPA. In this phase, the student will have to select one or more sustainable solutions. - Development of a "simple" mechanical solution, with scalability and low maintenance features. Also this phase will be performed in strict collaboration with the co-funding company. - After the first design phase, the doctoral student will develop the detailed design solution as well as the prototyping and testing. Arbi Dario SPA relies on an existing collaboration with a network of mechanical workshops which will be involved for the production of the prototype and the following series production (the last issue will not be a part of the doctoral project). - The prototype would find immediate application, thanks to an active marine litter recovery project with local stakeholders.
COMPANY	ARBI DARIO Spa

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Pyrolysis process modelling and experimentation for circular carbon and raw material recovery in hard-to-abate industries**
RESEARCH TOPIC	The integrated process of pyrolysis and chemical upgrading of solid products, applied to organic-based residues, co-products and waste, offers important opportunities for end-of-waste material recovery and the valorisation of industrial waste. Through this process, for example, it is possible to combine the recovery of carbon and valuable inorganic elements contained in numerous industrial and civil wastes, producing intermediates (precursors) and finished products that can replace or supplement carriers or raw materials of fossil origin, such as coal, in so-called hard-to-abate industrial sectors, allowing the introduction of a share of carbon of biological (or recycled) origin into processes, benefiting their carbon intensity (which is reduced). Furthermore, the pyrolysis process offers interesting industrial synergies with energy-intensive processes since, as it requires input matrices with a low moisture content and is technically endothermic, in that it needs a heat input at temperatures around 400-600 °C, it can be partially fuelled by exploiting the thermal waste available at numerous industrial sites. In addition, a substantial fraction of the chemical energy of the charge is given to non-solid products (condensable gases and vapours), which can be used to supply energy to the process or as energy carriers of related processes. The effectiveness of the integrated pyrolysis and chemical upgrading process to separately recover inorganic compounds and carbon is, and has been, the subject of numerous case studies focusing on the valorisation of sewage sludge and digestate. In order to promote the industrial development of integrated pyrolysis and chemical upgrading processes, it is now necessary to further investigate the system modelling aspect of the two processes and their integration with the most promising industrial or production contexts, such as metallurgical processes such as electric arc furnaces, blast furnaces, sintering and furnaces for the production of silicon metal, whose plants are characterised not only by a high consumption of carbon, today mainly of fossil origin, but also by the availability of residual thermal energy from the processes themselves, which is often not fully utilised. Alternatively, the integration of the system with industrial plants producing the waste to be treated may represent a solution of equal interest, as in the case of chemical or biochemical plants which, in addition to producing the waste of interest, may have thermal waste that is still unused. The research project will therefore focus on studying in detail various solutions for integrating the pyrolysis and chemical upgrading process with industrial plants affected by the process itself. The research project therefore proposes to advance the state of knowledge by combining a purely system modelling activity with an experimental campaign on pilot plants fuelled with industrial and civil waste, which will be used as a benchmark for the starting data and as a test case for the validation of the model. The activities described are ascribable to the Intelligent and Sustainable Industry, Energy and Environment thematic area in the development trajectories "Innovative high-efficiency energy processes for sustainability".

		RE-CORD will provide its own facilities and instrumentation to conduct the research activity, as well as the analytical laboratory where process product analyses will be conducted. The research project will be integrated into the broader activities existing at RE-CORD, which boasts numerous EU research projects on the use of pyrolysis processes for the valorisation of residues, waste and rejects and a consolidated know-how in the same area, which is the subject of intellectual property protection measures.			
COMPANY		Consorzio per la Ricerca e la Dimostrazione sulle Energie Rinnovabili (RE-CORD)			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Numerical modelling for improving the energy efficiency of HVAC&R components**
RESEARCH TOPIC	Air conditioning is the fastest growing item in the energy consumption of buildings. Energy demand for air cooling has seen a threefold increase since 1990. The research project foreseen within this PhD position should deliver a technical-scientific contribution to the analysis and optimization of HVAC systems, with special emphasis on heat exchangers. The activity will be organized as follows. • An initial period of bibliographical research and study of the subject, both at a theoretical and applicative level, will be spent at DIEF. • During the first year, the training course will include 6 months of research and development activities at the Venice factory. Here, the student will be able to collaborate closely with the group's heat exchangers and learn the know-how required to be able to develop the work independently once back at the university. • Back at the University, the student will work on the development of the numerical models that are the subject of the PhD thesis, staying in close contact with Danfoss experts. • A second 6-month period, in the first half of the third year, is planned at the Danfoss Group's plant in Lyon, where the student will work with our thermodynamic modelling expert to improve the models developed and complete the work. Here, the student will be able to supervise the experimental tests, carried out on the company's test benches, which are useful for validating the results obtained. • The last part of the PhD course will be dedicated to concluding the last parts of the work and writing the final paper. Along the whole 3-year course, the PhD student will have access to the computational resources of the "Fisica Tecnica" group. When necessary, these

		resources will be integrated with others available in other DIEF research groups or outside.			
COMPANY		DANFOSS Srl			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Robotic Systems for surgery and rehabilitation**
RESEARCH TOPIC	Analysis, implementation, experimentation and evaluation of Key Enabling Technologies such as Artificial Intelòligence and Collaborative Robotics in the framework fo orthopaedic surgery, supported by innovative design and evaluation mechanisms aimed at identifying needs, priorities, challenges, opportunities and weakness of the reference ecosystem. This project intends to give answers to needs of the medical sector, emphasized by the COVID 19 pandemics, such as designing surgical interventions with less risks for the patient and implement paradigms of personalized treatment and verification of the expected surgical oucomes. In particular, the research project will be integrated with the ROBIN project that the co-funding company is performing with the aim of building the demontrator of a collaborative robotic system devoted to orthopaedic surgery. The robotic system will be integrated with navigation tools (which are already produced by the company) by means of suitable real time communicationn protocols. The robotic system to be realized in the framework of the project has the following goals: • To be able to operate without the use of pre-operative imaging and planning. • Support the surgeon suring the bone resections required for total knee arthroplasty; in particular, the system will allow to identify and secure the resection planes based on the geometric information obtained by means of the "BLUE IGS" navigation system produced by the company, allowing the surgeon to move the cutting tool in compliance with the connstraints imposed by the chosen resection planes. The decision on the choice of the resection planes and the cutting actions will remain under strict control of the surgeon. • essere semplice e veloce da poter essere utilizzato in sala operatoria da personale sanitario adeguatamente formato senza bisogno di tecnici ad hoc. • avere dei costi di produzione molto competitivi da un punto di vista economico.

	Per raggiungere gli obiettivi di cui sora il progetto di ricercà affronterà un lavoro specifico con particolare riguardo ai seguenti ambiti: • Programmazione software di controllori per robot antropomorfi collaborativi quali LBR medicale fornito da Kuka. Tali componenti software dovranno riguardare sia la precisione di posizionamento dei tool collegati al robot sia un'interazione semplice ed intuitiva del sistema robotico con operatori umani, • Interazione uomo-macchina ottimale orientata all'efficacia clinica; analisi della correlazione tra efficacia e livello di automazione offerto dalla piattaforma robotica e conseguente studio della sicurezza. • Realizzare meccanismi di annotazioni strutturate basate su vocabolari/dizionari ad hoc per rappresentare la specifica procedura chirurgica, quale ad esempio: la chirurgia di protesi totale di ginoccchio. Tale rappresentazione avrà l'bbiettivo di definire sia: azioni, soggetti, modalità e tempi delle singole fasi delle chirurgia. La cooperazione con l'Impresa consentirà al personale dell'Università di recepire le esigenze di mercato effettive per guidare lo sviluppo del futuro della robotica in ambito medico. L'impresa si impegna ad assicurare che il Dottorando sia inserito e ossa interagire con un team altamente qualificato sia da un punto di vista tecnico che applicativo.
COMPANY	ORTHOKEY Italia Srl

MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Study of embrittlement phenomena in hydrogen pipelines (hydrogen transport) and analysis of possible internal coatings with polymeric materials to contain the same phenomenon**
RESEARCH TOPIC	As part of this project, metallic gas pipeline specimens can be taken and tested for embrittlement depending on the duration and mode of exposure to hydrogen-containing mixtures. Having ascertained the variation in mechanical properties with respect to the basic materials not subjected to hydrogen, the consequent variations in the structure of the specimens can be highlighted both by means of X-ray diffraction techniques for variations or deformations in the crystalline structure itself, and, in the case of the occurrence of macro- and micro-cracks, by means of liquid penetrants and scanning electron microscopy (SEM) and, if necessary, computerised micro-CT (micro-CT) absorption X-ray micro-tomography, which allows the internal structure of materials to be investigated in a non-destructive manner. On previously selected metal specimens, protective surface treatments can then be carried out to alleviate the problem of hydrogen

		embrittlement. This can be done by applying commercial coatings of various kinds and, on these specifically tried and tested specimens, evaluate which treatment proves most efficient under the specific industrial conditions of use.			
COMPANY		ESTRA Srl			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Study of CO2 sequestration systems on thermal and MCI machines and implementation of solutions for carbon dioxide methanation with a view to energy transition. and H2 as a tool for sustainable power generation**
RESEARCH TOPIC	The research project aims to study innovative and environmentally friendly solutions for Carbon Capture&Sequestration from Geothermal systems and traditional primary generators (TV, TAG, MCI). The topic of the research is highly topical both for environmental problems and climate change, but also for the current energy transition. The project is driven by an industrial group operating in the world of electric generators, mostly with MCI technology, with the aim of making their technology sustainable. The results would have a very large scale impact in the event of success in both developed and, above all, emerging countries. Specifically, electricity penetration in emerging countries is still very low, (in less developed countries, we are talking about numbers in the order of only 9-10%). The development plans promoted by various world and governmental institutions often refer to Renewable technologies with balancing and backup with MCI generators. Specifically, it is intended to work on two fronts: 1) CO2 capture and removal 2) Methanisation of CO2, which under specific conditions binds with hydrogen to form CO2 and H2O in an exothermic process. Project areas of interest a) CCS in GEOTHERMIC plants b) CCS in cogeneration plants based on MCI technology The activities described are ascribable to the Intelligent and Sustainable Industry, Energy and Environment thematic area in the development trajectories 'Innovative high-efficiency energy processes for sustainability'. These represent an opportunity for technological progress for the business partner that would have the chance to innovate its products and production processes in a green key.

		From a scientific point of view, there is a clear opportunity to deepen knowledge in the field of CCS, which is extremely topical and viewed with ever-increasing attention, both for the technological spin-offs also in the entire power generation sector, and for the social importance given to the unstoppable growth of emerging countries that passes through lower-cost technologies, often found in those being decommissioned in more developed countries. Of certain relevance is the opportunity for advanced training for the enhancement of human capital, and the close collaboration with the company PRAMAC (leader in the sector at an international level) will encourage the exchange between the world of research and the world of production, guaranteeing a leading perspective at a national level.			
COMPANY		PRAMAC Industrial Srl			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Study and Development of Micro-CAES Systems for Off-Grid Applications**
RESEARCH TOPIC	The context of energy transition pushes towards an increasingly marked use of Renewable Energy Sources, whose intrinsic characteristic of discontinuity and possible unavailability places serious demands on the organisation of the distribution network, rather than requiring adequate energy storage systems. The context of off-grid applications makes this need even more pronounced, highlighting on the other hand, an even more pronounced demand for the containment of environmental impact and sustainability of the intervention. In this context, the use of small- to medium-sized Compressed Air Energy Storage (CAES) systems represents a significant opportunity, offering high reliability, reduced environmental impact and extended life cycles. The greatest problem with micro-CAES systems lies in their low storage efficiency, generally below 30 per cent, which makes them particularly susceptible to significant efficiency upgrades that can further enhance their use. One of the elements with the greatest potential is the optimal integration of a thermal storage system that subtracts heat during the compression phase and then makes it available to the compressed air destined for expansion, but the design and development of dedicated high-efficiency turbo-exhausts is also an element with high potential for improving performance. The evaluation of the use of volumetric expanders should also be investigated and compared with more conventional solutions.

		Interaction with industry will allow methodologies and possible solutions to be applied to prototypes that have already been developed, enabling a field evaluation of improved solutions in terms of efficiency, operability and continuity of service integrated with renewable energy sources most suitable for off-grid systems such as micro-wind and photovoltaic.			
COMPANY		GFM Spa			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022		Scholarships co-funded by Companies			
TITLE OF THE SCHOLARSHIP		**Pressure gain combustion for efficiency improvement in gas turbines**			
RESEARCH TOPIC		The research project aims to develop and optimise 'pressure gain combustion' technology for gas turbine applications. The company has developed an innovative combustion technology that can be applied in all sectors where gas turbines are typically used. This technology has the potential to reduce fuel consumption, and the resulting CO2 emissions, by up to 20%. In addition, the combustion system has been developed for the flexible use of different types of fuel, including methane and hydrogen, making it particularly suitable for the energy transition process required to achieve the targets set by the European Union for the coming years. The research project will initially focus on studying the thermodynamics of the proposed new cycle and the combustion process. It will then proceed to the development of physical-mathematical models capable of correctly representing the combustion process. These models will be validated with experimental results made available by the company. The PhD student will also be involved in the experimental campaign at the company's laboratories in the Netherlands and Finland. Finally, these models will be used to optimise the performance of the combustion chamber and to simulate its integration into different types of gas turbines.			
COMPANY		Finno Exergy Oy			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Development of innovative approaches for the control of pollutant, noise and CO2 emissions in heat engines for motorbike applications**				
RESEARCH TOPIC	As is well known, the entire two- and four-wheeler mobility sector is affected by a strong need to contain environmental impact. In particular, alongside a growing demand to contain pollutant emissions (in the motorbike sector we are moving towards the EURO 5 + standard expected for 2024), the need to contain noise emissions (also in racing) and, above all, emissions of CO2, a climate altering gas, is becoming increasingly pressing. The motorbike sector is therefore faced with the need to take a significant step forward, which is only possible by integrating innovative calculation tools and experimental methodologies that allow detailed control of fluid-dynamic and combustion phenomena. In this context, the PhD course will have to be oriented towards the systematisation of the thermo-fluid-dynamic simulation tools already available, their integration with those of mechanical stress analysis, and any innovative modules to be developed ad hoc. In addition, it will be necessary to develop innovative experimental methodologies that allow not only to validate the numerical results but also to verify the actual validity of the solutions developed (in particular in terms of limiting harmful and CO2 emissions).				
COMPANY	BETAMOTOR Spa				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of models for techno-economic assessments of coupling renewable energy and energy storage systems**
RESEARCH TOPIC	The current energy landscape requires an effort from all actors involved in the energy transition from fossil to renewable sources. In this context, it is of paramount importance for companies in the energy sector to develop storage systems to be coupled with renewable energy plants in order to mitigate the random effects of renewable energy sources and minimise energy waste. The research project aims to develop advanced numerical models, possibly with an open-source programming language, for modelling the production of electrical energy from renewable sources (primarily, but not exclusively, onshore and offshore bottom fixed/floating solar photovoltaic and wind power) and their optimal coupling with electrical storage systems such as different types

		of batteries, supercapacitors, etc., and the production of green hydrogen using electrolysers. Different installation contexts will be investigated, including the offshore sector, with particular reference to the Mediterranean area. The aforementioned technical models will be integrated with economic economic models, so as to make possible wide-ranging techno-economic assessments. wide-ranging techno-economic assessments. These will be applied to different installation contexts, economic scenarios and plant solutions.			
COMPANY		Ansaldo Green Tech Spa			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of integrated power generation systems based on the combined use of H2 from renewable sources**
RESEARCH TOPIC	In the field of distributed power generation, the possibility of integrating systems based on a wide variety of energy sources is becoming increasingly relevant. In particular, as is well known, production from renewable sources is characterised by extreme randomness and forces the use of integrated solutions with fossil sources or, more hopefully, with energy storage systems. With this in mind, the production of hydrogen at times of excess production from renewable sources makes it possible to compensate for the aforementioned variability through the direct use of hydrogen or hydro-methane mixtures in internal combustion engines or through the use of fuel cells. On the other hand, the system becomes very complicated and requires in-depth development of various subsystems: from electrolysers, to storage systems, to compression systems, etc. The research activity will therefore have to involve - an initial strong interaction with the company to identify the most feasible objectives; - an analysis of the scientific literature and the market to identify the most promising and/or highest TRL suitable technologies; - the study of the overall system to identify the most appropriate sizing of sub-groups (generator, electrolyser, storage, compressor systems, etc.) - the setting up of a development activity of the engine part for the use of pure hydrogen or methane-hydrogen blends, including a testing phase of possible solutions - the construction of a pilot plant.

COMPANY	PRAMAC Industrial Srl				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of advanced fluid-structure interaction calculation solutions by creating ANN systems for defining optimal geometry on multi-physics domains**
RESEARCH TOPIC	The research project aims to develop advanced solutions for the study of fluid-structure interaction in turbomachinery and the related multi-physics optimisation of components of interest. The project will consist of the following points: - development of advanced methodologies for the multi-physics simulation of fluid-structure interaction in turbomachinery. The methodologies in question will cover mechanical phenomena as well as those of a thermal and fluid-dynamic nature. Particular attention will be given to the modelling of separation surfaces between the solid and fluid domains. - Development of advanced methodologies for multi-physics optimisation in turbomachinery. In line with the previous point, the development of optimal geometries will be pursued through the study of multi-physics structural optimisation techniques encompassing both mechanical and thermal/fluid phenomena. The research will mainly focus on topological and parametric structural optimisation techniques. - Identification of experimental test cases for the validation of the developed procedures. The validation of the techniques developed in the previous points will be carried out in collaboration with Nuovo Pignone. In particular, validation will be based on specific components of existing machines of particular interest to the company. - Application of the methodologies developed to some new-generation machines of particular interest to Nuovo Pignone. Once the procedure has been validated, the new methodologies will be applied to the development of new-generation components. This phase will also be carried out in close collaboration with the company. For the entire duration of the project, the test benches and measuring instruments of the Dynamic Modelling and Mechatronics Laboratory (MDM LAB) at the three sites in Florence, Calenzano and Pistoia will be made available to the PhD student. The renewal of software licences necessary for the development of the models envisaged in the research programme will also be guaranteed.
COMPANY	Nuovo Pignone Tecnologie Srl

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development of advanced solutions for the thermal management of turbomachinery operating with unconventional fluids**
RESEARCH TOPIC	The research project aims to study sealing systems and their thermal management in unconventional turbomachines. The general context of the project is related to the development of turbomachinery (compressors and blowers) operating with non-conventional fluids and/or with high levels of pressure (>250 bar) and density (>500 kg/m3), for which it is not normally possible to use common shaft sealing systems but it is necessary to introduce special gas seals. The use of such systems is strongly influenced by the limited maximum operating temperatures of gas seals, which often require the introduction of special cooling systems. The research project aims to develop a design methodology and associated thermal calculation tools for the dimensioning and verification of the thermal management system of non-conventional seals. The project will also benefit from experimental validation data obtained from tests on prototypes made by the company or its suppliers. The analyses and solutions investigated will be aimed at guaranteeing the correct operating temperature of the system and the minimisation of cooling flows, seeking to identify general design criteria and best-practices.
COMPANY	Nuovo Pignone Tecnologie Srl

MANDATORY EXPERIENCES		INTERVIEW			
COMPANY (months)	ABROAD (months)	LANGUAGE	DATE	TIME	MODE
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Development, validation and application of virtual sensors for real-time monitoring of gas turbine operations**
RESEARCH TOPIC	The research project aims to develop, validate, and apply virtual sensor Technology to estimate key physical quantities of a heavy duty gas turbine, where there is no dedicated instrumentation available, or it is technically not possible to have a direct measurement.

		The general context of application of the virtual sensors is the engine supervision and monitoring system, where lifetime, engine availability as well as health monitoring is required. In synthesis, virtual sensors aim to deliver essential information about crucial locations that cannot be instrumented in hardware e.g., due to cost or technical restrictions. The virtual probes are developed on the base of a thermo-mechanical Digital Twin of the Gas Turbine already available at Ansaldo Energia (WEM - Whole Engine Model). This digital twin utilises the available standard instrumentation of the gas turbine to calculate the transient thermal field as well as the mechanical deflections at each point of the gas turbine The additional information of virtual sensors can be used in combination to a hardware measurement to understand a deviation between expected and measured engine behaviour, that is essential to understand engine malfunctions as well as enabling systems with capabilities of diagnostics and predictive analysis.			
COMPANY		Ansaldo Energia Spa			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 25th 2022	09:00 a.m.	Remotely (videocall)

INTERNATIONAL DOCTORATE IN CIVIL AND ENVIRONMENTAL ENGINEERING

Director prof. Luca Solari

CUP	D.M. 351/2022	B12B22000430007
	D.M. 352/2022	B12B22000600007

D.M. 351/2022	NRRP Research					
TITLE OF THE SCHOLARSHIP	**Enhancement of natural capital for the development of resilient green communities**					
RESEARCH TOPIC	Green communities represent a model of sustainable development of rural and mountain areas, aimed at the management of the main resources available (primarily water, forests and landscape) so as to make explicit the importance of the ecosystems present and trigger processes of territorial equalization on an ecosystem basis that favor a subsidiary relationship with urban and metropolitan communities. The concept of green communities has assumed particular relevance at the national level with Law 221 of 2015 (Art. 72), which introduces the national strategy for green communities and defines its characterizing elements. In this context, the research activity aims to develop new management models to address the so-called "water-energy-food nexus" through the key of ecosystem services assessment and the introduction of innovative solutions for their management such as the development of smart contracts for the payment of ecosystem services. In fact, the proper assessment and mapping of ecosystem functions and the benefits they produce at the socioeconomic level on the territory becomes an essential element for designing and implementing interventions that translate the general concept of ecological transition into concrete actions and whose effectiveness is measurable. This is accompanied by the need to introduce tools that facilitate the governance of ecosystem services (in accordance with Law 221/2015, art.70) through the design of new exchange mechanisms for ecosystem services and the emergence of new local economies.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
-	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)	

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Criteria and methodologies for a sustainable management of river sediment**				
RESEARCH TOPIC	Evolutionary processes at different time scales produce changes in the river structure that can be associated to morphological, hydraulic, sedimentological and ecological aspects. Such changes can trigger different and complex interactions between the various components of the river system. River sediments represent a fundamental component of the river system which, interacting with the other hydraulic and ecological components, determine the structure of the watercourse. The management of river sediments can be referred to different spatial scales. For example, at the basin scale in the production areas, the quantity and quality of the sedimentological and hydrological input for the relevant hydrographic network is determined. Based on this input, the water courses self-model to tend to the morphodynamic conditions of equilibrium. The latter are influenced, in addition to natural factors, by anthropic activities conducted both at the basin scale (land use, forestation, urbanization) and at the riverbed scale (weirs, dams, embankments). To the factors mentioned are added the effects of climate change. The purpose of the research program is to identify, on the basis of the most advanced scientific knowledge, criteria and modeling tools on which to design a management strategy for river sediments such as to favor the evolution of water courses towards morphological configurations of dynamic equilibrium and value, taking into account the ecological aspects, the hydraulic safety requirements and the sustainable uses of river resources. The research will include a case-study agreed with CERAFRI-LAV.				
COMPANY	Cerafri - Lav Srl				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Water Safety Plan (WSP)**
RESEARCH TOPIC	The Research aims to develop the Water Safety Plan approach to the typical situation of that part of the Italian territory, characterized by the presence of numerous sources of supply and locally developed aqueduct systems. The research must therefore start from a complete bibliographic analysis, both of a scientific and technological-applicative nature. The methods identified will be tested in the specific case-study of the area served by Nuove Acque SpA, providing for the involvement of all the Bodies involved in various capacities in the issues of control, planning and management of resources destined for drinking water use. The risk

		assessment methods will use innovative data analysis techniques, also through modeling approaches, in order to represent the source-target relationships in a coherent and scientifically adequate way. The representation of the results will involve the use of web oriented GIS technologies.			
COMPANY		Nuove Acque SpA			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022		Scholarships co-funded by Companies			
TITLE OF THE SCHOLARSHIP		**Recovery of carbon and critical raw materials from civil sludges throught integrated thermochemical processes**			
RESEARCH TOPIC		The research project aims to study innovative solutions to increase the environmental sustainability of civil wastewater treatment plants through the development of integrated thermochemical systems aimed at maximizing the recovery of raw materials and organic carbon starting from sewage sludge deriving from wastewater treatment. In fact, it is known that sewage sludge is composed not only of organic carbon, which often does not exceed a concentration of 40% on a dry basis, but also, for 40-50%, of ashes containing high concentrations of p2o5, cao , al2o3 and sio2. The simple thermochemical treatment of sewage sludge by pyrolysis, or hydrothermal carbonization, allows to concentrate the dry substance present in the sludge, producing a solid carbonaceous product, but without enabling a selective recovery of carbon and inorganic compounds. However, in order to really recover their value, a selective separation of the carbon and the different inorganic compounds is necessary. Phosphorus and calcium, for example, have great value in agriculture, while aluminum can be recovered as a flocculant and silicon returned to its metallic form to be reused as a semiconductor, while carbon represents a valid substitute for hard coal. For this reason, the project will consist in the study of hydrothermal carbonization, slow pyrolysis and chemical upgrading processes, and their integration, for the selective recovery of carbon, phosphorus and other minerals (si, ca, al, mg) contained in the civil sewage produced by wastewater treatment plants.			
COMPANY		Consorzio per la Ricerca e la Dimostrazione sulle Energie Rinnovabili (RE-CORD)			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Wastewater Based Epidemiology (WBE)**				
RESEARCH TOPIC	The research aims to calibrate a regional monitoring network to implement epidemiological surveillance falling within the so-called Wastewater Based Epidemiology (WBE). Numerous managers of the Tuscan water service, the Tuscany Water Authority and the Tuscany Region will participate in the project. The PhD student will be hosted for part of his activity by Ingegnerie Toscane srl, an engineering company that operates in the water services sector on behalf of public companies. The experimentation will be based on the processing of data collected by a monitoring network already started a few months ago, which provides for the quantification of the SARS-CoV-2 genome, on a weekly basis in about ten sampling points at the entrance to the most relevant wastewater treatment plant (WWTP) in Tuscany. For each sample, a series of accessory quality parameters are determined in order to represent the characteristics of the wastewater. Data from a WWTP, monitored since spring 2020, are also available. The Ph.D. student will deal with the analysis of the data collected in the monitoring network, also through the integration of the same with other data sources (mobility, participatory tools, social media, ...) useful for the representation of the epidemiological evolution of diseases and in particular of COVID-19. The expected result is the development of a numerical model based on the hydraulic-sanitary simulation of the different sewage systems. The characteristics of the sewer networks will be made available by the managers and integrated into a GIS platform by Ingegnerie Toscane srl.				
COMPANY	INGEGNERIE TOSCANE srl				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Dynamics of groups of wind turbine towers with focus on wind-structure interaction**
RESEARCH TOPIC	The research deals with the broad area of offshore wind energy with particular focus on wind-structure interaction of towers arranged in (regular) groups with small center-to-center distance, which is typically the configuration adopted for pre-assembly operations at the harbor quayside and on the installation vessel. The dynamic response of such a system, further complicated by the interference between close structures, is not comprehensively addressed in the literature and should be further developed to understand, among others, the relevant aeroelastic phenomena, how they interact to each other, and which are therefore the design

		criteria. Moreover, the regularity of the geometry (basically a group of cylinders) makes the topic very attractive from a research perspective, considering the necessity and the aim to generalize the results for a class of problems. The investigation may be based both on wind tunnel tests on scale models, which should be carried out at the CRIACIV Boundary Layer Wind Tunnel at the University of Florence, and on the analysis of full-scale measurement data, which should be provided by the Company			
COMPANY		Siemens Gamesa Renewable Energy A/S			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	9	english	August 24th-25th 2022	09:30 a.m.	Remotely (videocall)

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR Ministero dell'Università e della Ricerca

SMART COMPUTING

Director prof. Stefano Berretti

CUP	D.M. 352/2022	B12B22000700007

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Knowledge capture from AI-assisted analysis of technical documentation**				
RESEARCH TOPIC	The idea behind the research project is to provide an environment capable of extracting domain knowledge by analyzing the technical documentation with machine learning tools. Specifically: (1) Obtain implicit configuration rules with data mining procedures from historical BOMs; (2) Obtain the CAD feature selection / activation rules from the analysis of drawing tables or CAD models through dedicated neural networks; (3) Obtain the defining parameters from the analysis of functional specifications and / or commercial technical documentation; (4) Correlate the defining parameters with the selection and configuration rules. The availability of an environment as described above would have significant repercussions in the process of acquiring knowledge, making it much more robust and consistent with company practice and know-how. In order to use the knowledge acquired for the development of software applications, the use of this environment would be a productivity multiplier. As a further research activity, innovative methods for the automatic search of CAD objects in digital archives will be studied. In the industrial field, complex mechanical objects are designed using Computer Aided Design (CAD) tools. Such objects can comprise a number of simpler components ranging from a few tens to thousands. Understanding whether similar / compatible CAD models are already present among those produced by a company can lead to significant savings, reducing the time and costs of a new CAD component. The aim of the research will be to develop techniques for the representation of CAD objects based on the extraction of shape characteristics with machine learning methods. In the literature there are no specific representation / retrieval techniques for CAD objects, while the possibility of evaluating the similarity between these objects directly using the most popular CAD formats (e.g. STEP) has the potential to improve the effectiveness and efficiency of industrial design processes. of mechanical parts.				
COMPANY	CONFIGURATORI.IT Srl				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	6	italian/english	August 23rd 2022	10:00 a.m.	Remotely (videocall)

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

SUSTAINABILITY AND INNOVATION FOR THE DESIGN OF BUILT ENVIRONMENT AND SYSTEM PRODUCT

Director prof. Giuseppe Lotti

CUP	D.M. 352/2022	B12B22000710007

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Energy efficiency and environmental sustainability of retail buildings of the large-scale retail trade in the context of the green economy for environmental, urban and social regeneration aimed at sustainable development**				
RESEARCH TOPIC	The research activity planned for the PhD program aims to study the thermophysical and energy performance of buildings and plant systems of the points of sale and shopping centers of the large-scale retail trade (GDO). The research will be based on experimental empirical data and on dynamic analysis of building and plant systems with the nZEB perspective and on the efficiency and effectiveness of the plant solutions proposed in view of the energy transition and the green economy. Scenarios for environmental, urban and social regeneration based on a systemic approach will be developed. The research will also aim to develop a smart grid energy management and planning network capable of adapting to any environmental, energy, economic and financial change, applicable to the network of different types of stores and shopping centers. System-integrated models will be implemented and an updatable tool will be developed to be used for the planning of interventions and the management of plants and buildings. With this in mind, advanced technologies based on the Internet of Things will be implemented. Each proposed solution and scenario will have to make use of digital tools such as Building Information Modeling BIM and Digital Twin DT connected to the concept of "transept" precisely to define scenarios and solutions at a territorial and urban level on different survey and application scales.				
COMPANY	PAC2000 A Soc. Coop.				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies				
TITLE OF THE SCHOLARSHIP	**Innovative buildings Technologies for the Green and Digital Transition**				
RESEARCH TOPIC	The research aims to identify and test innovative technological solutions, which can improve the adaptive behavior of the building envelope of existing and new buildings, aiming both at the architectural integration of renewable energy (BIPV), and solutions in line with a nature based approach (NBS) and with the application of recycled and reused materials, such as plastics or textile fibers, for an energy transition and a green and circular economy in the construction sector. To respond to the increasingly widespread demand for sustainable and energetically active buildings, the focus will be on identifying case studies on which to develop a digital twin, in which to simulate and test integration scenarios of innovative solutions, with a view to green and digital transition of the building process, applicable to the new construction and recovery of the existing building stock. The strong synergy with the company will allow on the one hand the approach to the production sector, on the other hand the management of stakeholders and participation in international research projects. The research and experimentation of adaptive solutions will focus on three axes in particular: BIPV - architectural integration of renewable energies; NBS and Green envelope; Recycled material - Textile / Plastic The application of the Digitl Twin methodology will allow the creation of architectural integration scenarios in case studies and pilot projects, verifying the dimensional and technological characteristics. It will be interesting to verify the performance data in different climatic contexts (energy performance simulations) by also carrying out LCA analyzes of the different configurations. Of particular importance will be the communication and involvement of stakeholders by aiming to increase qualitative assessment methods, through specific communication and user experience / user engagement actions.				
COMPANY	ETA Srl				
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Strategies for improving energy efficiency, environmental sustainability in the logistics area (warehouse and office buildings) of the large-scale retail trade towards the energy transition and sustainable development**
RESEARCH TOPIC	The PhD research activity will concern the identification, analysis and comparison between the possible building, plant engineering and management and control

		solutions of logistics systems, i.e. buildings with various uses, offices and executive offices, warehouses and deposits as well as cold rooms. The research will be based on an integrated and systemic approach capable of defining network intervention scenarios with the application of advanced techniques and technologies for energy efficiency, environmental sustainability, and the reduction of energy and environmental costs. The methodological approach will have to make use of digital tools such as Building Information Modeling BIM, and Digital Twin DT, to identify and compare efficient and effective solutions aimed at the energy transition and sustainable development. The research will allow the development of dynamic practical operational models useful for the energy transition and the green economy, capable of adapting to any environmental, energy, economic and financial change. System-integrated models will be implemented and an approach for the design of logistic areas will be developed on the basis of the concept of "transect" verified with thermodynamic and environmental indicators.			
COMPANY		PAC2000 A Soc. Coop.			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
18	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

UNIVERSITÀ DEGLI STUDI FIRENZE

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MUR

PHILOLOGY, ITALIAN LITERATURE, LINGUISTICS

Director prof. Paola Manni

CUP	D.M. 351/2022	B12B22000400007

D.M. 351/2022	NRRP Research						
TITLE OF THE SCHOLARSHIP	**Linguistic corpora and digital lexicographic tools**						
RESEARCH TOPIC	The research topic to be developed aims at the creation of diversified linguistic corpora and in parallel at the realisation of integrated lexicographic tools (dictionaries or glossaries). Particular attention will be paid to: a) drafting of specific terminological dictionaries; b) creation of tools to assist for writing clear and transparent texts according to the target audience; c) valorisation of the Italian language as an intangible cultural heritage. Technical dictionaries relating to the various fields of knowledge, thanks to their digital layout and use, can be made available to researchers or the public, to make more accessible any kind of text, over all the technical texts with high impact and wide audience. They also can be implemented in a international perspective by the addition of specific translators in the main languages of Europe and the world, for guaranteeing the multilingualism that safeguards the specificities every culture. The development of writing aids, possibly integrated with the main word processing programmes, is a fundamental starting point for effective transparent communication, especially the institutional communication. But the current readability indices (and more generally readability tools) must be updated and diversified according to the medium of communication and the addressee, and prepared for interaction with common writing software. Finally, in the current political geography, with Italy being part of Europe, the valorisation of all the Union languages as intangible cultural heritage is fundamental and consistent with the MIC3 component of the PNRR (M1 Digitalisation, Innovation, Competitiveness, Culture and Tourism, Component 3 Tourism and Culture).The whole research line contributes to strengthening the basic and applied research systems envisaged in PNRR component M4C2 (M4 Education and Research, Component 2 From Research to Enterprise).						
MANDATORY EXPERIENCES		**INTERVIEW**					
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**	
-	6	italian	August 26th 2022	09:00 a.m.	In-person *	Dipartimento di Lettere e Filosofia Via della Pergola, 60 - Firenze Sala La Pergola	

* In the application form candidates residing abroad may ask to conduct the interview remotely

COMPARATIVE LANGUAGES, LITERATURE AND CULTURES

Director prof. Fernando Cioni

CUP	D.M. 351/2022	B12B22000440007

D.M. 351/2022	NRRP Research					
TITLE OF THE SCHOLARSHIP	**The international and intercultural foundation of Florentine cultural heritage**					
RESEARCH TOPIC	The project aims to promote new creative and innovative ways for literary, linguistic and philologic disciplines to elaborate critical reflections out of the comparison of present and past ideas, values, languages, and cultures. The activity hereby proposed pertains to both multiculturalism and multilingualism and aims to advance both research and interdisciplinary dialogue. A deeper understanding of our history, our traditions and culture (in both its material and non-material assets) provides fundamental tools to respond to queries and needs of both individual and collective identities. In particular, a focus on past documents, and on the historic memories they keep and preserve, increases the awareness of the international and intercultural foundations of the Florentine heritage, and adds to its social value. Rediscovering historical documents not only implies a potential of growth and innovation that increases the knowledge of the local heritage, but above all creates connections among multiple cultural, national, and linguistic contexts.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
-	12	italian/english	August 26th 2022	09:00 a.m.	Remotely (videocall)	

EDUCATION SCIENCES AND PSYCHOLOGY

Director prof. Vanna Boffo

CUP	D.M. 351/2022	B12B22000450007
	D.M. 352/2022	B12B22000680007

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Bullying and mental health among adolescents: a commtment for prevention policies**
RESEARCH TOPIC	WHO and the European Union recognize health as one state of complete physical, mental and social well-being. As for children and young people, the importance of acquiring a feeling of positive identity, the ability to manage one's thoughts, emotions and to be able to create interpersonal relationships, is emphasized, promoting a full participation in the social life. Bullying represents a serious obstacle to the health of children and adolescents and is recognized by the World Health Organization (WHO 2014) as the most widespread form of violence among minors. Many studies have recognized the potential serious consequences on mental health of the involvement of young people in bullying and cyberbullying phenomena (Wolke et al. 2019) and the potential interconnection between behavioral phenomena and conditions of personal and social difficulties. Law n.71 of 2017 and RT law n. 71 of 2019 provide for the need to combat the phenomena of bullying and cyberbullying in all their manifestations, with actions of prevention and intervention at school and in the family. The goal of the project is to develop one or more intervention components aimed at combating bullying and potentially health-threatening behaviors in adolescents, including aggressive and delinquent behaviors, self-harm and social isolation behaviors. The project is aimed at students of lower secondary schools and upper secondary schools. From a methodological point of view, in line with the Notrap! Model, an integrated methodology will be used, with face-to-face components of adult intervention and peer education and an online component capable of modifying the processes underlying risk behaviors through interventions of psycho-education carried out through the use of open access APPs aimed at regulating the basic components of each risk behavior. In relation to the impact, it is expected to involve about 1000 male and female students 100 teachers, and 30 health workers in the Tuscany area (psychologists and prevention workers).

MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**Learning and organizational innovation in Life-Skills framework. Exploratory study about effects of the informal competences effects in the teaching and its repercussions on School Training Policies**					
RESEARCH TOPIC	In recent decades, pedagogical reflection has been dedicated several times to the ongoing and permanent formation of teachers exclusively through the formal-explicit and direct perspective of education. The acquisition of technical and cognitive components can certainly realize an improvement in professional action. However, the European Skill Agenda 2030 (EU 2020) underlined the need to create systems that could integrate the skills acquired in the informal contexts with the formal ones and improve the overall well-being of professional life (actions 2-8-9). This is particularly necessary in training contexts, where the transition between life (Life Skills) and formal experience (Professional skills) is fundamental and constitutive the nature of the organizations involved. An integration between direct and indirect aspects in the continuous training of the teaching profession can therefore favor better well-being, but also promote a real innovation of the school organization, with significant repercussions on the quality of students' learning. Learning strategy innovation as well as organizational innovation, this is the hypothesis, can only pass through training practices capable of favoring a continuous transition between the informal and formal dimension of teachers. To this end, the project aims to study the effects and the impact that the skills acquired in an indirect and informal way by teachers brings to the quality of students' learning and the effects that these Life-skills can have on the Organization in terms of well-being and innovation. The research, in a mixed-method perspective, applied to a specific case study compared with other national and international contexts, aims to provide a scalable model, through the identification of devices useful for the enhancement of an integrated vision of training (formal-unformal-informal) of teaching professionalism and the transformative effects that it can favor in didactic action and organizational action.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)	

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Collaborative research for the strengthening of educational and training policies at the local level, the enhancement of natural and cultural resources, the creation of new employment circuits**
RESEARCH TOPIC	Areas distant from large service delivery centers (education, health and mobility), but rich in important environmental and cultural resources and highly diversified by nature and centuries-old anthropization processes, can contribute to the recovery of social and economic development in Italy . About a quarter of the Italian population lives in these areas, in a portion of the territory that exceeds 60% of the total (SNAI 2014-2020). A significant part of the so-called ""internal areas"" has progressively suffered a process of marginalization characterized by a demographic decline, a reduction in employment and land use, with the risk of degradation of the cultural and landscape heritage. The doctoral research, thanks to a case study in Casentino, (made possible by the extension of an existing collaboration between the Department and the Union of Municipalities within the SNAI), intends to investigate the factors that favor or hinder the processes of innovation with particular attention to the sector of educational and training policies, as a strategic sector for the sustainable development of the territory in line with the 2030 Agenda and in line with the needs of ecological transition, contrasting educational inequalities, attention to the younger generations, strengthening of economic activities. In line with the final objective of the territorial policy, namely the fight against depopulation and the strengthening of the local production system in terms of employment potential, the research is configured as an institutional capacity building process for the governance of training and integration policies, in synergy with development policies. The research will be strongly contextualized thanks to the possibility of participating in the government, organization and strategic management of the Union of Municipalities. This participation will make it possible to identify and test innovative tools in the various governance models in a comparative key between policy sectors (training and economic development) and between national cases, through a survey of good practices in other internal areas. The collaborative research process will favor forms of strengthening administrative capacity in relation to the formulation and planning of territorial strategies strongly oriented towards users and the enhancement of resources. An impact is expected on the setting of innovative governance processes, on the development of diagnostic and management skills and on the coordination of the policy cycle (in particular in support of the Conference of Mayors for Education as required by Law 32) with regard to stages of problem definition, solution identification, decision making, implementation and evaluation. The wealth of knowledge, reflections, experiences resulting from the research work will define operational models for the definition and implementation of governance processes in the field of training policies, models that will be made available to other internal areas at regional and national level.

MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
12	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

D.M. 351/2022	Public Administration					
TITLE OF THE SCHOLARSHIP	**Survey and analysis of the incidence of SEN and SLD students with disabilities in the internal area of Tuscany, Union of the Val di Bisenzio Municipalities**					
RESEARCH TOPIC	The latest reports from the Regional School Office of Florence show that the entire area of the Prato province has the highest number of school dropouts nationwide. These reports underline that the internal area of the Union of Municipalities of the Val di Bisenzio, located north of the city of Prato, has the highest percentage number of students with SEN, SLD or disability, again on a nationwide. This type of student belongs to the Comprehensive Institutes of the two largest municipalities in the area, Vaiano and Vernio, highlighting a real socio-educational (but also cultural and political) problem that needs to be investigated and managed. The PhD scholarship aims to activate research on the structure of the demographic ecosystem of the territory, on the reasons for the educational and scholastic fragility highlighted by the data, on the scientific and pedagogical inputs that can help to define and relaunch improvement strategies, on the implementation of permanent support activities.These activities want to involve not only the school (students, managers, families) but the entire network of local authorities in the area. Comparative work is foreseen with other Italian internal areas and with international realities.					
MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	
6	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)	

D.M. 352/2022	Scholarships co-funded by Companies
TITLE OF THE SCHOLARSHIP	**Standardization and effectiveness evaluation of a protocol of indicated actions for bullying and victimization episodes**
RESEARCH TOPIC	Over the past 30 years, the prevention of bullying is mainly based on a universal approach which is not sufficient for a consistent reduction of the phenomenon (Gaffney et al., 2019). Indeed, the multilevel nature of bullying implies the need to integrate intensive and individualized support (Indicated prevention) for adolescents already involved in bullying (Cook et al., 2010) with universal interventions. The phenomenon of bullying has a significant impact on public

		health, influencing the adaptive development trajectories of children and adolescents in a short and longer term (Guzman-Holst et al., 2022). In accordance with the research and innovation area of the PNR (Health) and with the Sustainable Development Goals n. 3 (Good health and well-being) and n. 4 (Quality Education) (SDGs of the United Nations 2030 Agenda) this project aims to promote the well-being of adolescents involved in bullying and victimization, to prevent chronic psychological suffering and to improve the quality of life in the educational context through the definition of an indicated prevention protocol. The literature on the topic of Indicated Prevention in bullying is still scarce and innovative evidence-based approaches integrating digital environments in their actions are needed (Ingram et al., 2019). In Italy, a pilot protocol of indicated actions has been developed and tested (Menesini, Fiorentini, & Nocentini, 2021) although to date no study has rigorously evaluated the effectiveness of the different strategies proposed by the protocol itself (Menesini et al., 2021). The PhD project intends to standardize a psychological indicated intervention in cases of bullying and victimization, defining an innovative protocol that integrates face-to-face and digital components (i.e. Mobile Apps), and evaluating its effectiveness according to the standards of evidence and advanced methodologies. The ultimate goal of the project is to validate an innovative intervention protocol with a high scientific reference that becomes a national reference for the indicated actions in the bullying phenomenon.			
COMPANY		EbiCo Società Cooperativa Sociale ONLUS			
MANDATORY EXPERIENCES		**INTERVIEW**			
COMPANY (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**
6	6	italian/english	August 26th 2022	09:30 a.m.	Remotely (videocall)

UNIVERSITÀ DEGLI STUDI FIRENZE

Finanziato dall'Unione europea NextGenerationEU

MUR

HISTORICAL STUDIES

Director prof. Teresa De Robertis

CUP	D.M. 351/2022	B12B22000470007

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Actors and contexts of publishing production in Florence between the 16th and 19th centuries**
RESEARCH TOPIC	The project is connected to SAGAS 2018-2022 excellence plan, focused on the study and enhancement of cultural heritage (https://www.ereditaculturali.sagas.unifi.it/), and to various relative initiatives - research, teaching, third mission - developed in cooperation with public and private subjects and institutions. The general objective of the project is to extend and deepen the research on Florentine publishing activities in modern age (16th to 19th century) and on its relations with the dynamics of the cultural, economic and social history of the Italian area and the international context. This research is fully consistent with the objectives identified in art. 9 of DM 351, with reference to the theme "History of heritage and cultural assets" relating to area 11. It will be focused on major or minor actors of Florentine publishing history, on the contexts of book production and the conditions of its development and evolution, on the building of public or private documentary collections that constitute an eminent value of the local and national cultural heritage. In particular, the research will be oriented towards the reconstruction of the biographical profiles and operational context of the publishers, the material aspects of book production, the research and analysis of documentary collections - books and manuscripts - relating to printers and publishers, the relations established by them with subjects and institutions characterising the social, economic and cultural context of the time, the valorisation and communication of the research results also on the web, the translation of these results into activities of third mission. The recipient of the additional grant will carry out 6 months of activity abroad and 6 months of research activity in one of the following public administrations, depending on the content of the selected project: Archivio di Stato di Firenze, Archivio storico del Comune di Firenze, Archivio storico Giunti Firenze, Biblioteca Laurenziana, Biblioteca Marucelliana, Biblioteca Nazionale Centrale di Firenze, Biblioteca Riccardiana e Moreniana, Gabinetto Vieusseux.

MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
6	6	Italian (english for foreign candidates)	August 25th 2022	10:00 a.m.	In-person*	Plesso Capponi via Capponi, 9 - Firenze Aula 2

* In the application form candidates residing abroad may ask to conduct the interview remotely

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**A contribution to the "Archivio nazionale dei possessori. Reconstruction and stratigraphy of the Libreria Strozziana**
RESEARCH TOPIC	In agreement with the PAs involved, the project aims at contribute to the reconstruction of the history and ownership passages of one of the largest collections of manuscripts and printed books now belonging to the three most important state libraries in Florence (Biblioteca Nazionale Centrale, Biblioteca Medicea Laurenziana, Biblioteca Riccardiana), starting from the registration of any information that can be interpreted as a trace left by an owner, be it an individual or an institution: possession notes, coats of arms, stamps, markers of private collections or ancient public libraries. Similar initiatives are active in other Italian libraries (https://archiviopossessori.it/biblioteche-aderenti) and a national IT infrastructure, to which the project will be linked, is already in operation. The open format of the catalogue will allow immediate availability of data and continuous implementation, with obvious advantages for both users and the PA. As its peculiarity, the Florentine project will have to combine the libraries' need to preserve and share their collections by deepening their knowledge with the university's need for research. Unlike the other initiatives mentioned above, the project will not only involve the collections of the three Florentine libraries in a transversal manner, focusing on a historical collection of great importance divided among the three sites, but will also take the form of a virtual reconstruction - thanks to the digital approach - of the original unity of the collection, which is no longer recognisable as such. Integration and connection with archival documentation (inventories, purchase lists, etc.) is also planned. The project will concern the Libreria Strozziana, acquired to the patrimony of the then Grand Duchy of Tuscany to avoid a dispersion that began immediately after the death of Alessandro Strozzi (1784), the last heir of the family. The collection was chosen because of the quantity and quality of the books attributable to it, but also because these books come from more or less well-known Florentine collections from the 14th-16th centuries. These different provenances, once registered in the National Owners' Archive, with totally open access and interoperable data, will be linked to the information already present in the Archive itself and in other national descriptive databases (SBN index, OPAC BNCF, MOL) and will be part of a new and important national cultural infrastructure, to which further information may be aggregated in the future. The ideal candidate should have expertise in palaeography and the history of manuscript and printed books, as well as proven research/collaboration experience in the library sector.

MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
12	6	Italian (english for foreign candidates)	August 25th 2022	10:00 a.m.	In-person*	Plesso Capponi via Capponi, 9 - Firenze Aula 2

* In the application form candidates residing abroad may ask to conduct the interview remotely

D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**Africa as seen from Italy: the Angelo Del Boca's archive**
RESEARCH TOPIC	The project is grounded in the awareness of the relevance, in contemporary Italy, of the relationship with populations, cultures and civilizations from other continents. In this perspective, rethinking the national colonial past and its decolonization are central. In this field, at the national level, the contribution by Angelo Del Boca (1925-2021) is highly important. Del Boca, an honorary citizen of Crodo, was the leading scholar in the history of Italian relationships with Africa, for nineteenth-twentieth centuries. A journalist by training and an author of many books, his research on Italian colonialism in East Africa and Libya are internationally recognized as the most important publications in Italy. They have also been translated abroad. Del Boca left in Crodo, at the Vittorio Resta Library-Piero Ginocchi Study Center, an impressive and important archive that collects many unpublished papers and above all an impressive, systematic and continuous collection of clippings of articles from Italian newspapers dealing with Africa. The hundreds of files, already organized by theme and by period, in his archive allow us to follow the evolution of Italy from her colonial past, studied by Del Boca in his researches, up to today her postcolonial, democratic and republican present. Unfortunately, this archive is not currently available, given that the Municipality of Crodo and the library where it is deposited is not able to organize and use it. Studying and - totally or partially – digitizing this relevant archive can offer a best practice in making cultural heritages available in small organizations or municipalities. The project builds upon academic skills present in the Doctoral Teaching Body on the topics of the history of Italian colonial expansion, and it connects them to the administration of a small municipality library such as Crodo's one – which obviously cannot have all the internal skills in order to enhance and promote such an important cultural heritage.

MANDATORY EXPERIENCES		**INTERVIEW**				
COMPANY / PUBLIC ADMIN. / RESEARCH CENTER (months)	**ABROAD (months)**	**LANGUAGE**	**DATE**	**TIME**	**MODE**	**PLACE**
6	6	Italian (english for foreign candidates)	August 25th 2022	10:00 a.m.	In-person*	Plesso Capponi via Capponi, 9 - Firenze Aula 2

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D.M. 351/2022	Public Administration
TITLE OF THE SCHOLARSHIP	**New investigations into the cuneiform text collection of the National Archaeological Museum of Florence: formation, layout, and digitialization**
RESEARCH TOPIC	The project is part of the initiatives for the enhancement of the Extra-European cultural heritage present on the Italian territory. In particular, its objective is the enhancement of the collection of cuneiform texts present in the National Archaeological Museum of Florence, in agreement with the PAs involved in the project. This is one of the richest collections in Italy related to the cultures of Ancient Near Eastern between the 3rd and 1st millennium BC. The project, inevitably, will be developed by interfacing with other projects currently underway, such as that of the University of Florence aimed at the complete edition of the cuneiform texts of the Florentine collection (with the re-edition of the 165 tablets already published by Karl Oberhuber between 1958 and 1960), and that conducted by the project ARCOA (Archivi e Collezioni dell'Oriente Antico) which is of national relevance. In particular, the project described here aims to specify the formation of the collection and the identification of specific diagnostic features peculiar to the inscribed objects. In fact, aspects of their layout will be studied (e.g., shape of the tablet, arrangement of the of textual and figurative content on the support), with the aid of both photographs and autograph copies and new digital acquisitions of the objects themselves. Research inherent to the materiality of the graphic support will be conducted in parallel. Since it is a heterogeneous collection, the research program will be subdivided into phases focused on the various textual contents and how texts and sealings interact, also taking into account the different supports (tablet, cone, brick, seal). The project will therefore be an opportunity for the Ph.D. student to be trained in a multidisciplinary context. A selection of cuneiform tablets from the Ur III period (21st cent. BCE) will be studied as part of the research, with the perspective of analyzing the content and formal aspects of these texts to establish their possible site of provenance, which is not known since these objects were purchased on the antiques market. This group of texts is the best represented in the collection. They are administrative texts, many of them dating to the great king Shulgi, who had a very long reign of 48 years and made radical changes in the administration. As well as the enhancement of the collection, the project is also aimed at the communication of the research results, which will be available to a wide audience of users (third mission) through the filing of texts and their publication in contemporary media contexts (e.g., web page set-up). The candidate should have expertise in cuneiform paleography, Assyriology, and History of the Ancient Near East. The recipient of the grant will carry out 6 months of activity abroad and 6 months of research activities in the following public administrations: Archaeological Museum of Florence, ISPC (Istituto di Scienze del Patrimonio Culturale), CNR.

MANDATORY EXPERIENCES		**INTERVIEW**				
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