ANNEX 1/a

PhD program: CITIES AND LANDSCAPES: ARCHITECTURE, ARCHAEOLOGY, CULTURAL HERITAGE, HISTORY AND RESOURCES

XXXVIII CYCLE – a.y. 2022-2023

Department	**Department of European and Mediterranean Cultures: Architecture, Environment, Cultural Heritages (DICEM) - Matera**	
Coordinator	Prof.ssa Antonella Grazia Maria Immacolata Romana GUIDA e-mail: antonella.guida@unibas.it	
Duration	3 years	
Web site	http://dicem.unibas.it/site/home/ricerca/dottorati-di-ricerca.html	
Admission requirements	a) University degree obtained under the previous educational systems (ex ante D.M. 509/99, whose legal course has at least a four-year term); b) Laurea specialistica/magistrale (D.M. 509/99 and D.M. 270/2004); c) Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.	
Available positions	**Tech4You**	**11 scholarships**
	Other	**1 scholarship CNR-IPSP** **1 scholarship INPS**

SCHOLARSHIPS

Ecosistema dell'Innovazione "Tech4You - Technologies for climate change adaptation and quality of life improvement" - ambito di intervento "5.Climate, Energy and Sustainable Mobility"

Codice identificativo ECS00000009 – CUP C43C22000400006

Scholarship n. 1	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.1 - PP 2.1.2**

Research topic

Administrative procedures for the ecological transition and the circular economy: simplification models

Topic description

The PhD programme entitled Administrative Procedures for the Ecological Transition and the Circular Economy: Models of Simplification aims to train legal skills that are useful for supporting the ecological transition and models of CE, particularly in the area of administrative organisation and management and in relations between business and public administration. The multi and interdisciplinary training and research course will start from a general framework of the Italian and European ecological transition strategy and the definition of a conceptual framework also for the interventions envisaged by the National Recovery and Resilience Plan (NRP), in order to create the conditions for acquiring a competence capable of supporting productive realities and public and private institutions in the transition from the linear to the circular model. The doctoral dissertation and prodromeic research should focus in particular on: - identifying legal instruments for the circular

economy and environmental sustainability in the reuse of secondary raw materials; - the development of a legal system for the certification of the process of recovery and reuse of second raw materials ; - the development of a technical-legal framework to support an IT platform for the management of the environmental regulatory system and the recovery of secondary raw materials with a view to the circular economy.

Scholarship n. 2	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.1 - PP 4.1.2**

Research topic

The memory of sound, from sources to performance. A basic competence in music, theater and multimedia is required, whichallows the candidate to follow the work from the filing and study of the sources of southern musicians of the past, in particular authors born in Basilicata, to their edition and dissemination through the production of accessible and inclusiveshows also in co-creation with the territory and the schools.

Topic description

The selected candidate will afford a research project in three phases: initially she/he will have to organize and control, under the guidance of the teacher-tutor, the digital acquisition in a single repository of documental archives and musical sources by authors born in Basilicata (for example, the fund of documents related to the family of the prince-musician Carlo Gesualdo which is still not digitized in the Castle of Venosa; the music output of the Matera composer Egidio Romualdo Duni with over 200 manuscripts and prints owned by the Bibliothèque Nationale de France in Paris; and other). A second level consists in cross-referencing the digitized materials with other existing Italian and foreign databases in order to complete the information. Both the first and second level of research will be carried out at a specialized firm which will be able to supply the necessary hardware and software instrumentation, after a period of training for the candidate. The third and most important work will be to make all the resulting information available to the community both in a form that can be consulted online and with the development of educational exhibitions, concerts and co-creation shows with local artists and international specialists to be presented in theatres, associations, festivals spread across the Lucanian or southern territory in general. The resulting doctoral thesis will give an account of the methodologies followed for the acquisition of data and the related study (phases 1 and 2); a second part of the thesis should describe in detail the results of the research (inventory, register, indices, apparatus, etc.) and the forms of scheduled dissemination.

Scholarship n. 3	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.2 - PP 4.2.1**

Research topic

Monitoring of cultural heritage with innovative technologies involving self-sensing materials

Topic description

The project aims to develop alternative technologies to those traditionally used for monitoring cultural heritages involving sensors installations (e.g., accelerometers) and data processing of locally detected signal to be correlated with structural damage. The planned research activities, on the other hand, is aimed to develop advanced technologies through the proposal of intelligent selfdiagnosing materials/elements, such as mortars or masonry blocks to be inserted within the existing masonry texture, for the monitoring and preservation of cultural heritages. The main goal is to make 'artificial permanent sensors' that perfectly blend with the supports where they are applied allowing, by measuring the variation of their own electromechanical characteristics, to estimate the variation of their own deformation state, detecting any anomalies within the structures (walls, vaulted structures). Research activities will be addressed to define the most appropriate mixtures to be used, obtained by combining traditional and possibly nanocomposite materials. In order to provide a protocol for the diagnosis and monitoring of cultural heritage, several approaches will be considered for measuring elements where these materials/elements will be applied.

Scholarship n. 4	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.2 - PP 4.2.1**

Research topic

Semantic definition of the architectural elements of the cultural and identity heritage, in relation to local materials, architectural quality and construction techniques, imported into a digital twin model

Topic description

During preliminary phases of conservation projects, a considerable amount of heterogeneous datasets are produced, gathered, analysed and interpreted. Abundant researches have gradually proven that Historic Building Information Modelling (HBIM) is a relevant alternative for the collaborative management of information related to existing structures. Apart from the obvious benefits of HBIM for information exchange among stakeholders during conservation project, the potential of such processes to support preservation strategies should not be neglected. Moreover, the recent developments of HBIM web-interfaces illustrate the need for additional investigation in strengthening the relationships between the digital model and the real-world to better support preventive conservation of heritage places. Besides, values-based approaches for the elaboration of conservation strategies have been gradually adopted in the last decades, both in academic and professional sector. The aim of research is to develop a comprehensive methodology to structure and integrate the cultural significance of tangible and intangible elements into HBIM models to be further taken into account in the analysis and simulation of data. The issue of the research is the application of Digital Twin (DT) principles to support site managers in the preventive conservation of their assets. Based on the analysis and simulations of data captured by onsite sensors, threats to the site integrity and corresponding preventive solution can be predicted in the DT environment. The integration and structuration of Heritage Values in HBIM models allow further evaluation process to estimate the impact of each suggested interventions on the conservation of features of significance.

Scholarship n. 5	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.3 - PP 4.3.1**

Research topic

Identifying species in urban green project and green solutions, developing irrigation and fertilization management plans aimed at optimizing natural resources

Topic description

The research activity has the main objective of developing a methodology for the analysis of green areas in an urban environment and for the measurements of its functions. The main types of urban greenspace, representative of the city of Matera, and case studies will be identified for each type. Nature Based Solutions (NBS) projects will be developed. The research intends to identify the main plant species (herbaceous, shrubby, tree) that are most suitable for the soil and climatic conditions that characterize the different sites. The study activity will allow the quantification of ecosystem services (ES) provided by urban greenspace (CO_2 sequestration, removal of atmospheric pollutants, infiltration and storage of water resources, mitigation of soil and atmospheric temperatures) through the monitoring of environmental parameters (soil and air temperature, soil water content, atmospheric pollutants) and vegetation parameters (vegetation growth rates, plant ecophysiological parameters - transpiration, stomatal conductance, photosynthesis) and the use of softwares. The aim of the research is to develop and evaluate management protocols of urban greenspaces through the definition of sustainable management plans for irrigation, fertilization and pruning and the identification of good agricultural practices (GAPs). The study will also include a digitized mapping of urban greenspaces of Matera city, which will be implemented with information related to irrigation, nutrition and pruning management plans.

Scholarship n. 6	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.3 - PP 4.3.1**

Research topic

Investigating co-creation process using approaches and tools of innovative languages (storytelling and design for all)

Topic description

The research activity will be carried out within the action "Cultural landscape and narrative itineraries"of pilot project OR4.3-PP1 Green Shapes for the Urban Regeneration Processes, Environmental, Social, Cultural and Tourism Sustainability. It aims to define and tell the network of slow use of the edge (extra-urban and peri-urban) and marginal (internal and fragile areas) territories as a device that generates value and multiplies the meaning of the landscapes crossed in its material and immaterial components. It intends also to promote the attractiveness of minor landscapes and to support the digital and green transition in the tourism and culture 4.0 sectors. The research will be oriented through co-creation processes (crowdsourcing) and the application of inclusive project methodologies (design for all). To achieve the objectives, integrated systems (ITstorytelling) will be used and innovative languages (gamification) will be tested. Physical networks will be identified and mapped and immaterial networks narrated. The definition of the outputs will be an integral part of the research. The candidate will have to demonstrate to be able to decode and manage complex processes. The candidate is also required to have basic knowledge of the research topic and the innovative languages connected to it.

Scholarship n. 7	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.3 - PP 4.3.1**

Research topic

Investigating the evolution of taste and food traditions in relation to lifestyles, territorial resources and the construction of cultural landscapes

Topic description

The research aims to study food traditions as parts of cultural systems and of the daily life of people. Food traditions are elements of continuity between different life experiences and between generations and inform the memory, habits, ties and daily practices. The research also intends to study, through ethnographic observation, food production as a central dynamic in the construction of cultural landscapes; the production of food, indeed, enables human groups to construct "anthropological places made up of words, memories, stories, people and relationships" (Teti, 2019). The investigation will also address food consumption patterns, meant as sets of practices that allow for the reconstruction of forms of memory and collective elaborations of taste and sensations, through the observation of the acts of eating, the rituals of preparing food and the methods of sharing the convivial moment in which the meal is consumed. From this perspective, food traditions are considered as complex cultural forms, which bring with them a whole series of ties and meanings linked to everyday life and shared forms of production, consumption and exchange.

Scholarship n. 8	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.3 - PP 4.3.2**

Research topic

Survey and analysis of geomorphic markers of climate change from inner areas of the chain and foredeep domains

Topic description

The research activity is related to the topic "Analysis and monitoring of morpho-sedimentary markers of climate change and environmental hazard in rural landscapes" of the Progetto Pilota G4.3-PP2 "Parks, forests, landforms, rural landscapes, and multifunctional agriculture". The goals of such a research line aim to define - by field survey, remote sensing, and geomorphological modeling - the erosion rates from inner rural areas of both the southern Apennines and Bradano foredeep, with particular emphasis to the sites where accelerated denudation phenomena linked to the global change are present. To this scope, UAV- and satellite-derived remote sensing techniques, and connected detectors (Internet-of-Things) for the acquisition of data useful to the definition of topographic, soil, and vegetation features, will be used and supported by advanced statistical methods (e.g. machine learning). Outcomes may represent a base for the standardization of measurements and data proveining from the different acquisition methods and for the establishment of a protocol of best practices with the goal to better estimate the climate change impact on wider areas of Basilicata and Calabria, so implementing the protection strategy in the agronomic productive sectors.

Scholarship n. 9	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.3 - PP 4.3.2**

Research topic

Knowledge, interpretation, planning and design of the territory and landscape with reference to the processes of ecological transformation

Topic description

The research activity provides skills in theoretical and practical elaborations aimed at the knowledge, interpretation, planning and design of the territory and landscape with reference to the processes of ecological transformation. Particular attention will be given to: (i) organizational and relational arrangements in settlement, infrastructural, rural and natural systems, at different scales; (ii) the definition of integrated, interscalar and inclusive strategies for the redevelopment, regeneration and territorial rebalancing. The activities will be placed in a perspective of enhancement of the historical and cultural heritage and of the new patrimonialization processes with particular regard to the reconstruction of local policies and their implications for the improvement of the quality of the landscape, the environment and the living conditions. taken into account as factors for improvement, ecological interconnection and the increase in biodiversity, equity and social inclusion, spatial justice and environmental, social and economic sustainability.

Scholarship n. 10	**Spoke 3 - Tecnologie intelligenti per una filiera alimentare e forestale sostenibile** **GOAL 3.3 - PP 3.4.1**

Research topic

Irrigation management and the interaction of Water with Soil-Plant-Atmosphere Systems

Topic description

The Research activity will be carried out within the Action TT: Application and demonstration of developed technologies and optimized models to the irrigation districts of Calabria and Basilicata Regions (Sothern Italy) - Pilot Project TT3.3-G3.3-PP1: Valorization and management models of water resource in high-value crop systems - OR SMART WATER - SPOKE 3 - SMART TECHNOLOGIES FOR SUSTAINABLE AGRI-FOOD CHAIN AND FORESTRY. The research Project tends to determine, through the creation and evaluation of decision support systems (DSS), strategies aimed at: - a correct irrigation scheduling; - an efficient, sustainable and geo-referenced use of water resources. The research activity will make use of lysimetric studies, ecophysiological studies and soil-plantatmosphere water flow modeling for a sustainable use of water resources in herbaceous cropping systems. The expected results can represent a reference platform for the management of the acquired data, contributing to: - reduce the environmental impact of irrigation and fertilization techniques; - improve crop yields and quality; - make available to the farmers several expert systems and platforms for a rational management of irrigation technique in the Basilicata and Calabria areas.

Scholarship n. 11	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.2 - PP 4.2.1**

Research topic

Data management for risk assessment of cultural heritage

Topic description

The project focuses on the development of strategies for data management aimed at cultural heritage risk assessment. Firstly, the activities will involve a state-of-art study, with particular reference to multilevel approaches. The latter, starting from qualitative information, make possible to carry out territorial assessments, capable of providing decision-making tools for the identification of intervention priorities. Afterwards, acquiring more information, punctual assessments will be considered, requiring the implementation of specific numerical models for the response assessment and the interventions design.
The project will be addressed to propose a multilevel method for the knowledge and risks assessment of cultural heritage, starting from the data collected in order to develop numerical models with different approximation levels. The research will allow the development of techniques for incremental information management and consultation, considering only the main quantities contributing to the assessment of the different risks considered. Any information collected through instrumental monitoring and/or performed with innovative methodologies will also be taken into account in this approach.

OTHER SCHOLARSHIPS

Scholarship n. 1	**CNR-IPSP "Consiglio Nazionale delle Ricerche-Istituto per la Protezione Sostenibile delle Piante"**

Research topic

Development of innovative plant-derived formulates for a sustainable management of parasites and pathogens of agricultural crops

Topic description

The ban of most synthetic pesticides have raised an increasing demand for new innovative pesticide products suitable for an effective and environmental safe control of crop pests and pathogens. Presence in many plant species of a large variety of biocidal compounds (glucosinolates, terpenes, alkaloids and more) highly active on crop pests (insects, nematodes) and pathogens (fungi, bacteria) suggests their use of new safe pesticides. The exploitation of this pesticidal potential is limited by the lack of technical formulations suitable for the application in agriculture of these potential plantderived products and by the scarce information on their mechanisms of action and their impacts on plant and beneficial soil components. The research activity of the PhD project will be focused on the development of new innovative formulations of plant products (extracts, oils or their constituents) through the use of nanoencapsulation and plasma technologies and the evaluation of their efficacy on crop parasites and pathogens as well as on their impacts on plant health and soil microflora. The pesticidal activity of the new products will be tested on selected crop pests, such as phytoparasitic nematodes, either by in vitro assays on the infective stages of the target pests and experiments in soil in controlled conditions (growth chamber, greenhouse). Molecular pathways involved in the mechanisms of biocidal activity of the new products on target crop pests will be elucidated by RNA-PCR techniques, following the expression of selected nuclear and mitochondrial genes involved in key functions such as viability, motility, protein synthesis, membrane integrity and stress response. Plant response to the experimental products will be investigated by phenotyping and biochemical analyses of stress markers (ROS, H2O2 etc) as well as by transcriptomic analyses (e.g RNA-seq and/or RT-qPCR) for identifying differentially modulated genes and pathway involved in plant growth and defence responses. Impact of the experimental formulates on rhizosphere microbiome biodiversity will be investigated through metabarcoding NGS-based approach, PCR-based molecular methods and/or conventional microbiology techniques.

Scholarship n. 2	INPS

Research topic

Formulation of new high-efficiency biofertilizer products for application in sustainable agriculture

Topic description

The proposed research is consistent with the disciplinary areas and expected spin-offs of the 4.0 program. The focus is on the development and integration of innovative technologies that can optimize production processes. Greater flexibility and productivity of processes aimed at obtaining biofertilizer products is pursued. A growing interest of both research and private industry is devoted to the development of products that can restore and/or improve soil quality and fertility while fully respecting human health and the environment. One innovative technology that aims to address this challenge is the development of new biofertilizers containing beneficial microorganisms that can improve soil functionality. Biofertilizer products will be defined based on selected microorganisms that, when applied in a given fruit-growing ecosystem, are able to establish beneficial synergistic interactions with the native microbial component of the soil and the plant. Starting with a laboratory approach, the evaluation of biofertilizers in the field will be continued in order to estimate their efficacy and persistence, which are influenced by the multiple variables of the fruit system.

A period in the company or research center (max 6 months) and abroad (max 6 months) is mandatory.

Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian and English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing (Tech4You, other) **c) video conference interview** using google meet	
Evaluation criteria	**a) evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **15 points** **b) interview:** up to a maximum of **75 points** the interview is passed for a score not less than **45 points** **Minimum total score: 60 out of 100.**	
Assessable qualifications	**Graduation Thesis** (The candidate must also submit a summary in Italian or English of the thesis of max 16.000 characters)	max **7** points
	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	max **12** points

	Scientific publications (Articles in national and international scientific journals, proceedings of scientific conferences, books or book chapters)	max **3** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	max **3** points
Interview program	The interview, which can be held in Italian, Spanish or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.	
Foreign language	**English** (knowledge of a foreign language will be assessed during the interview)	
Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>January 26, 2023</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>January 30, 2023 - 10:30 a.m.</u>**	

ANNEX 1/b

PhD program: ENGINEERING FOR INNOVATION AND SUSTAINABLE DEVELOPMENT

XXXVIII CICLO – a.a. 2022-2023

Department	**Engineering School (SI-UniBas) - Potenza**	
Coordinator	Prof.ssa Aurelia SOLE e-mail: aurelia.sole@unibas.it	
Duration	3 years	
Web site	http://ingegneria.unibas.it/site/home/offerta-formativa/dottorati-di-ricerca/articolo64.html	
Admission requirements	a) University degree obtained under the previous educational systems (ex ante D.M. 509/99, whose legal course has at least a four-year term); b) Laurea specialistica/magistrale (D.M. 509/99 and Dm 270/2004); c) Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.	
Available positions	**Tech4You**	**5 scholarships**
	Other	**1 scholarship Regione Basilicata - FSC** **1 scholarship CNR-IMAA** **2 scholarships INPS**

SCHOLARSHIPS

Ecosistema dell'Innovazione "Tech4You - Technologies for climate change adaptation and quality of life improvement" - ambito di intervento "5.Climate, Energy and Sustainable Mobility"

Codice identificativo ECS00000009 – CUP C43C22000400006

Scholarship n. 1	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.1 - PP 2.1.1**

Research topic

Use of treated urban wastewater for applications in bio-energy chains

Topic description

The possibility of producing ligno-cellulosic biomass on a large scale at low cost and zero emission impact lies in the availability of water for the irrigation of bio-energy crops. To this end, it is unthinkable to use the water destined for the conventional, civil, industrial and agricultural sectors), while the reuse of the large quantities of waste water currently discharged into the sea or into the terminal stretches of watercourses is particularly interesting.
For these resources, if intended for the irrigation of non-food crops, there is also the possibility of carrying out simplified purification treatments for the recovery of nitrogen and phosphorus fertilising materials.
The sector can have quantitatively significant developments and widespread diffusion on the territories in plants from a few tens to a few thousand hectares of interested hectares. By way of example, consider that a quantity of water corresponding to the discharge of 10,000 inhabitants allows the irrigation of about 200 hectares and the production of over 400 tons/year of dry mass.
The research activity proposed for this PhD scholarship involves the construction of a pilot unit for wastewater treatment and irrigation. The activities will be carried out in collaboration with the Acquedotto Lucano S.p.A. which will host the PhD student for the stage period.

Scholarship n. 2	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.5 - PP 2.5.2**

Research topic

Impact of Renewable Energy Sources plants on Ecosystem Services

Topic description

Ongoing climate changes and increasing people's awareness call for an even more urgent reflection on territorial resilience, decarbonization processes and ecological transition, and efficient use of natural resources.
If on one side, there is a growing awareness of environmental aspects, on the other side, the financing plan implemented by the Italian government (National Recovery and Resilience Plan), based on significant interventions, could create several conflicts. This trend has been accelerated by the significant increase in energy demand due to the Ukrainian war. All these aspects produce a complex process of territorial transformation of clean energy production, unfortunately, not supported by an accurate monitoring system that identifies significant impacts on other territorial values.
Starting from a temporal evolution of Renewable Energy Sources plants, the research activity includes the construction of a multidimensional performance-based planning system where alternative low-carbon transition scenarios could be compared to consider territorial specializations and identity assets as a tool to drive decision-making in a sustainable planning perspective.
The evaluation of the scenarios for the development of renewable energy sources through indicators of multifunctionality of ecosystem services on a territorial scale allows to measure the territorial impact concerning the following fundamental categories:
• life support (such as nutrient cycling, soil formation, and primary production),
• supply (such as the production of food, drinking water, materials, or fuel),
• regulation (such as climate regulation, water purification, pollination, and pest control),
• cultural values (including aesthetic, educational, and recreational ones).
The research activity is developed in a multidisciplinary framework and includes interaction with the research group involved in the implementation of the Teach4You Spoke 2 Goal 2.5 PP2 pilot project.

Scholarship n. 3	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.2 - PP 4.2.2**

Research topic

Advanced tools and techniques for the territorial assessment of tourism ecosystems: data driven approaches and multiscalar applications of Machine Learning and Artificial Intelligence

Topic description

The research activity includes the construction of data-driven territorial models for the assessment of the demand and supply of tourist services. These complex information structures represent a decision support systems (DSS) for the design, management and monitoring of territorial development programs based on the tourist enhancement of the territorial heritage.
The main components of the research refer to:
- evaluation and selection of analytical methodologies based on AI and ML for the spatial analysis of complex phenomena;
- implementation of a spatial data infrastructure including selected data sources relevant to the research objectives and case studies;
- definition of methodologies for the interpretation of analytical models addressing the mainstream programs for territorial development;
- dissemination of research results.
The research products will be applied within local actions in sample contexts aimed at the co-design (participatory planning) of development scenarios for territorial tourist ecosystems.
The research activity is developed in a multidisciplinary framework and includes interaction with the research group involved in the implementation of the Teach4You Spoke 4 Goal 4.2 PP2 pilot project.

Scholarship n. 4	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.2 - PP 4.2.2**

Research topic

Tourism ecosystems and innovations in territorial development models for inland areas: from the evaluation of niches of territorial value to the co-design of sustainable local development

Topic description

The research activity includes the definition of an evaluation system of territorial development processes and strategies based on the tourist enhancement of territorial heritage. This is based on a systemic territorial knowledge that integrates the quantitative dimension of spatial phenomena evaluation with the perception of anthropic-cultural factors determining the tourist potential of the places. The focus concerns marginal territories (inland areas) where the models of mass tourism, specialized tourism, major attractions as infrastructure investment generating the preconditions for tourism, do not allow the construction of sustainable scenarios in the medium-long term. The territorial structures in the study contexts will be evaluated according to a polycentric approach aimed at verifying the relationships among attractors (specific values of the cultural and environmental heritage), tourist facilities (services and equipment), tourist flows.
The main components of the research refer to:
- literature state of the art on tourism development models and best practices in marginal territorial contexts
- evaluation and selection of analytical methodologies for the quantitative analysis of the territorial processes in selected sample areas
- construction of a spatial data infrastructure relevant to the research objectives and the sample contexts
- application of participatory planning methods and procedures for the development of territorial tourist ecosystems
- definition of adequate "Place Branding" processes with the key actors in the case studies tourism ecosystems - dissemination of research results.
The research activity is developed in a multidisciplinary framework and includes interaction with the research group involved in the implementation of the Teach4You Spoke 4 Goal 4.2 PP2 pilot project.

Scholarship n. 5	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.1 - PP 2.1.1**

Research topic

Energy managment control in microgrid powered by renewable sources and hybrid battery/hydrogen storage

Topic description

The research activity aims at the investigation of the performance of a microgrid serving a small community of consumers, with energy production from renewable sources and hybrid energy storage in battery pack or in the form of compressed hydrogen. The renewable source must be preferentially photovoltaic or a combination of photovoltaic and wind. Objective of the investigation is to achieve the highest possible degree of autonomy for the community of consumers addressed by the study, including the disconnection from the main grid (offgrid mode).
The research activity can include:
• modeling of the main components of the microgrid (energy production system, electrical load, battery, electrolyzer, fuel cell, voltage and current converters);
• Cost analysts and optimization of the microgrid component sizes;
• Development of energy management strategies for the microgrid, in particular through the use of forecasting models able to predict in advance electrical load and energy production profiles;
• Development of strategies for the profitable interaction of neighboring hybrid microgrids.

OTHER SCHOLARSHIPS

Scholarship n. 1	**Regione Basilicata -FSC**

Research topic n. 1

Structural health monitoring of existing structures and infrastructures

Topic description

High vulnerability of existing structural, infrastructural and monumental heritage, together with the necessity of a better control of safety related to strategic structures and infrastructures located in sensitive areas, is driving researchers to perform in-depth studies to develop advanced techniques for structural monitoring at different scales, from the territorial one up to a single building or infrastructure. In recent years, structural monitoring has received increasing interest from both scientific and professional communities. The main reason of this interest lies on the one hand, from the limitations associated to the use of traditional methods based on visual inspections and, on the other hand, in the great potential offered by an automatic system able to detect in real time o quasi-real time the state of the health of structures in terms of reliability and useful to reduce costs of maintenance. An ever-growing number of structures and infrastructures, all over the world, are subject to the signs of time with deterioration of the mechanical characteristics due to aging and/or inadequate maintenance. Structural Health Monitoring, continuous or discrete, can be very useful to quickly identify criticalities occurred and to provide useful support for a rational planning of maintenance interventions (reliable and economically sustainable), guaranteeing updated information about the state of health of structures and infrastructures. That is also important for the management of critical events due to natural or anthropic sources. In fact, continuous monitoring can provide multi-level information on structures just before and after a critical event driving the first recovery interventions.

Research topic n. 2

Design of green interventions to reduce landslide hazard in the view of climate change

Topic description

The research project is focused on landslide risk mitigation in urbanized slopes affected by landslides, by means of innovative monitoring and stabilization systems that guarantee both the conservation of ecosystems with their biodiversity and the reduction of climate change impact.
The case studies are represented by landslides in the Basento river valley - both in the Apennine chain area and in the Bradanic Trough (Basilicata region, Italy) - which affect the towns arising on the mountains and on the hills and their main infrastructures. Two different types of clay landslides will be considered that respond differently to the climatic changes expected for the area. For each of the two types, efficient monitoring systems and interventions will be studied - from the alimentation zone to the accumulation in the river valley - to reduce the hazard. New systems for monitoring the deformations of landslides and structures based on the use of optical fibres will also be tested. The possible triggering factors of the movements will be analysed in depth, among them: 1) hydraulic permeability distribution in the subsoil and its influence on pore water pressure distribution along the shear zone, 2) mechanical deterioration caused by changes in the pore fluid composition. In the considered landslides the experimentation on the intervention will consider: a) eco-compatible improvement of the mechanical characteristics of the soils by modifying the composition of the pore fluid, b) planting of proper vegetation, c) design of innovative deep drainage systems reaching the critical zones of the subsoil where shear strains and displacements occur. Economic and environmental sustainability, green transition and technological innovation are the basic inspiring criteria.
The project includes laboratory and field experimentation as well as numerical simulation of the observed phenomena for the prediction of the effects of climate change and of the proposed risk reduction systems.

Scholarship n. 2	CNR-IMAA

Research topic

Data Science and Applied Geophysics for seismic risk mitigation in urban areas

Topic description

Italy is characterised by the presence of a large number of medium-large cities and historic centers where most of the population lives with a high seismic risk. For the mitigation of this risk, it is necessary to plan innovative actions aimed at making the territory and the built environment safe. Science is making a fundamental contribution in this direction because the knowledge and technological development has reached such a point that it is possible to integrate a wide spectrum of geophysical methodologies for the seismic characterization of the urban subsoil, for the structural characterization of the built environment and its interaction with the urban soils during seismic events. Knowing the seismic response in every part of the cities and how the urban subsoil interacts with overlying buildings during seismic events is of fundamental importance for correct planning and for the safety of our built heritage and for seismic risk mitigation purposes. Furthermore, the development of non-invasive and low-cost seismic sensors, electromagnetic sensors and advanced data analysis methods (seismic interferometry, machine learning, etc...) make it possible to acquire and analyze a large amount of data in real time for real-time control of the state of health of critical structures (hospitals, schools, prefectures, etc.) and infrastructures (bridges, tunnels, dams, energy pipelines, etc.).

Scholarship n. 3	INPS

Research topic

Earth Observation Big-Data for sustainable flood risk management

Topic description

The flood risk is rapidly increasing due to several factors: hazard (due to climate change), exposure and vulnerability (due to land consumption and uncontrolled urbanisation) and to their interactions. On the other hand, the growing availability of numerical tools and data allows a quantification of the risk both for the prevention and for the mitigation with a view to sustainable and smart development of our territories.
The proliferation of satellite systems generates large volumes of increasingly complex data, which can be defined as big data. Such resources will be used to develop low complex techniques, with machine learning algorithms, useful in areas where, the application of traditional numerical models, is difficult. Remote sensing big data will be used to obtain direct information on flooding and to better represent the extention of the flooded area and the temporal dynamics of the event. This approach is particularly useful in areas where data is insufficient to enforce of numerical models. Potential applications include prevention, emergency management in time real and post-event (damage assessment; reconstruction activity).

Scholarship n. 4	INPS

Research topic

COllaboRative Smartlogistics 4 SUstainable REmanufacturing [CORS4SURE]

Topic description

The proposal acts in the field of ReManufacturing. The project aims at identifying operative and logistics (using a cloud based approach) modules to sustain technical and economic and social sustainability. The main objective is: to define agents and rules acting in a ReManufacturing scenario; to select tools and variables for monitoring and controlling in ReManufacturing; to evaluate product adaptability to ReManufacturing solutions. The project aims at considering reuse and disposal for electrical and electronic components with application in the automotive sector. The proposal has to integrate ReManufacturing strategies in the perspective of information sharing with cloud approach

A period in the company or research center (max 6 months) and abroad (max 6 months) is mandatory.	
Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian and English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing (Tech4You, other) **c) video conference interview** using google meet
Evaluation criteria	**a) evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **15 points** **b) interview:** up to a maximum of **75 points** the interview is passed for a score not less than **45 points** **Minimum total score: 60 out of 100.**

Assessable qualifications	**Graduation Thesis** (The candidate must also submit a summary in Italian or English of the thesis of max 16.000 characters)	max **12** points
	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	max **8** points
	Scientific publications (Articles in national and international scientific journals, proceedings of scientific conferences, books or book chapters)	max **3** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	max **2** points

Interview program	The interview, which can be held in Italian or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.
Foreign language	**English** (knowledge of a foreign language will be assessed during the interview)

Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>January 26, 2023</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>January 30-31, 2023 - 10:30 a.m.</u>**

ANNEX 1/c

PhD program: SCIENCE

XXXVIII CYCLE – a.y. 2022-2023

Department	**Department of Sciences - Potenza**	
Coordinator	Prof.ssa Patrizia FALABELLA e-mail: patrizia.falabella@unibas.it	
Duration	3 years	
Web site	http://scienze.unibas.it/site/home/didattica/offerta-post-laurea.html	
Admission requirements	a) University degree obtained under the previous educational systems (ex ante D.M. 509/99, whose legal course has at least a four-year term); b) Laurea specialistica/magistrale (D.M. 509/99 and D.M. 270/2004); c) Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.	
Available positions	**Agritech**	**1 scholarship**
	Tech4You	**3 scholarships**
	Other	**1 scholarship Regione Basilicata - FSC** **1 scholarship ENEA** **2 scholarship INPS**

SCHOLARSHIPS

"National Research Centre for Agricultural Technologies" - tematica "Tecnologie dell'Agricoltura (Agritech)"

Codice identificativo CN00000022 - CUP C33C2200025000

Scholarship n. 1	**Spoke n. 2 – Crop Health: a multidisciplinary system approach to reduce the use of agrochemicals** **WP 2 - TASK 2.2.4**

Research topic

Fungal phytotoxins and their synthetic analogues as environmentally friendly biopesticides

Topic description

The obtainment of new environmentally-friendly, selective, and not-toxic agrochemicals is a major goal for the development sustainable agriculture. In this framework, bio-pesticides based on metabolites extracted from plants and microorganisms constitute one of the most promising approaches. In fact, natural compounds usually present high specificity toward the target pathogens, lower toxicity than synthetic pesticides, and faster degradation in the environment, thus decreasing the risk of water and soil pollution, as well as lowering the toxicity risk towards animals and humans. Among the most promising bio-

pesticides, fungal phytotoxins have an increasing role. In fact, these metabolites have often very high target specificity and low toxicity profile towards not-target plants and animals, so that their possible applications as selective herbicides, fungicides, bactericides, nematocides, and insecticides have been widely demonstrated. The main problem with fungal bio-pesticides is their low availability from natural source, because fungal cultures produce very low amount of compound and the metabolites production is highly variable depending on growing conditions and fungal strain genetic variation. It follows, that to carry out extensive studies and field application of bio-pesticides of fungal origin the development of their chemical synthesis is mandatory. The aim of the PhD project will be then the development of novel synthetic strategies for promising bio-pesticides and of their analogues, to carry out structure-activity-relationship (SAR) studies and, eventually, large scale studies in green houses or field. Moreover, given that fungal phytotoxins are chiral compounds, the development of enantioselective total syntheses for their obtainment in optical active form and of novel practical and reliable approaches for their stereochemical characterization will be carried out.

Ecosistema dell'Innovazione "Tech4You - Technologies for climate change adaptation and quality of life improvement" - ambito di intervento "5.Climate, Energy and Sustainable Mobility"

Codice identificativo ECS00000009 – CUP C43C22000400006

Scholarship n. 1	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.1 - PP 2.1.1**

Research topic

Novel Materials for Energy Production from Solar Source

Topic description

The unrelenting exhaustion of the fossil energy sources pushes to research for renewable and alternative energies, such as photovoltaics. In this scenario, the new organic photovoltaics (OPV) technology took the interest of an increasing number of researchers. The OPV panels are very appealing due of their versatility and cheapness, being obtainable by ink-jet printing on large and flexible surfaces, and then being much more suitable than traditional silicon-based panels for architectural purposes. However, the efficiency of OPV photovoltaic technology is still lower than silicon panels, thus the need of new molecular materials for OPV is still a major task of the research in this field. Among the materials employed in OPV, tetrapyrroles have a major role. In fact, they exhibit intense spectral response bands in the UV-vis region and possess good chemical, photo-, and thermal stability, providing good potential candidates for photovoltaic applications. In the last years, the group which proposes this Ph.D. Project focused its research activity on the the development of new photovoltaics materials based on porphyrazines, a particular class of tetrapyrrroles. This allowed to obtain efficient photovoltaic devices based on nanocomposites of porphyrazines with both carbon nanotubes and graphene, as well as dye sensitized solar cells (DSSC) with hydroxy or carboxy substituted porphyrazines. The topic of this Ph.D. project will be the development of new porphyrazines as promising donor materials for the preparation of OPV solar cells. This will be obtained by (a) synthesizing new molecules bearing polar groups suitable for TiO_2 anchoring or extended aromatics capable ·-· interactions with nanocarbons; (b) investigating the spectral and electrochemical properties of the new compounds; (c) preparation of nanohybrids of these materials with carbon nanotubes and graphene; (d) construction of OPV solar cells and evaluation of their photovoltaic efficiency.

Scholarship n. 2	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.1 - PP 4.1.3**

Research topic

Innovative tools and methodologies for diagnostic and conservation of archeological cultural heritage

Topic description

The proposed Ph.D. project is consistent with objective 11.4 of the 2030 Agenda and with the National Recovery and Resilience Plan (P.N.R.R). The project proposes research that considers the archaeological artifacts of the Basilicata Region to contribute, in an innovative and environmentally friendly way, to the conservation and protection of our archaeological heritage: memory and cultural wealth to enhance the territory and its economic, touristic and social potential. After visual analysis and macroscopic evaluation of the state of deterioration (chemical and biological) on the assets, non-destructive diagnostic analyzes will be carried out for the chemicalphysical characterization of the constituent materials in order to

determine their vulnerability and identify suitable methods of rehabilitation and conservation. After the identification of the biodeteriogens present on the surfaces of the works to be safeguarded, using biomarkers and suitable sequencing techniques, the surfaces will be cleaned using extracts of wild plants, fungi and bacteria with marked biocidal activity which, unlike synthetic products, are effective at low concentrations, do not interfere with the constituent material of the asset and safeguard the health of operators in the sector and the environment. All the activities will be carried out thanks to the synergistic and multidisciplinary action of skills put in place by UNIBAS (Contact person: Prof. L. Scrano), by the Management Group SRLS (Contact person: S. Del Brocco), a restoration company registered in the Register of the Ministry Beni Culturali specialized in the sector of conservation treatments of cultural heritage and by the Foreign Partner "Centre Interdisciplinaire de Conservation et Restauration du Patrimoine (CICRP)", located in Marseille (Contact person: Dr. P. Bromblet) which deals with curative and preventive conservation and the study of the phenomena of degradation of materials and their restoration.

Scholarship n. 3	**Spoke 3 - Tecnologie intelligenti per una filiera alimentare e forestale sostenibile GOAL 3.3 - PP 3.4.1**

Research topic

Breeding of bioconverter insects for the valorisation of by-products into valuable substances

Topic description

The PhD project involves the setting up of a pilot farm of the bioconverter insect Hermetia illucens, fed with residual biomasses (by-products) derived from the agri-food chain, aimed at the production of new raw materials for various applications. At the end of the bioconversion process, various products of high biological, ecological and economic value are expected to be obtained, including the larvae which will be destined for the production of wholemeal flour to be used as feed, larval frass, which will be chemical and microbiological characterized and subsequently used as fertilizer in agriculture, and chitosan, deriving from chitin extracted from pupal exuviae and dead adults. Chitosan, following a chemical-physical characterization, will be used as biostimulant on selected plant species, in order to evaluate the potential antibacterial, antifungal and elicitory effect (stimulation of the natural defense mechanisms of plants), as well as potential bioinsecticide.
The achievement of the project objectives will represent an important milestone in the search for alternative and sustainable protein sources for animal feed (pet food, aquaculture, poultry and pigs) and in the future for human nutrition, and in the search for new materials of natural origin to be used in the agricultural sector, in order to replace or reduce harmful chemical substances, with a view to environmental protection.

OTHER SCHOLARSHIPS

Scholarship n. 1	**Regione Basilicata - FSC**

Research topic n. 1

New technologies for the purification of wastewater and polluted water

Topic description

Emerging contaminants (ECs) are defined as newly identified or previously unrecognized pollutants. They include products used daily, such as surfactants and surfactant residues, pesticides, pharmaceuticals, and personal care products. Many of these substances escape to conventional activated sludge wastewater treatments allowing them to reach surface water streams and distribute in the environment. For most ECs, occurrence, risk assessment, and ecotoxicological data are unavailable; therefore, it is difficult to predict their health effects on humans and living organisms. Many processes have been described for the removal of organic compounds in polluted water, including advanced oxidation processes (AOPs) and filtration on natural materials. The application of AOPs has become of real importance since it has the potential to oxidize a wide range of organic compounds that are difficult to degrade biologically in wastewater, leading to their complete mineralization or to the formation of more biodegradable intermediates. At the same time, the removal of pollutants by adsorption via filtration columns remains a widely used technology since it is advantageous in terms of energy, area demand, and cost. However, there is still a large gap in information on the growing number of new potential contaminants that are appearing, especially in their unpredictable transformation products. The complexity of the matrices and the low

concentrations at which these contaminants are present in the samples require highly selective and sensible analytical methods for their identification.
This project aims to evaluate the effectiveness of different AOPs and different natural sorbent for the purification of wastewater and polluted water and to perform the analytical determination of emerging pollutants and their degradation products in the investigated matrices using Liquid Chromatography or Gas Chromatography coupled with Mass Spectrometry (LC-MS or GC-MS).

Research topic n. 2

Development of precision anticancer therapies through the use of molecules capable of inhibiting or reprogramming the activity of new and specific molecular targets

Topic description

It is widely accepted that cancer cells alter their metabolic pathways to generate more fatty acids for lipogenesis, to meet the increasing energy demand for rapid cell division and propagation. This reprogramming of the metabolic pathways of cancer cells is due to the alteration of the expression of some genes, which directly control glycolysis, lipogenesis and nucleotide synthesis, and have the potential to be considered prognostic markers and therapeutic targets in the development of new anticancer drugs. A classic example of a reprogrammed metabolic pathway in cancer is the Warburg effect or aerobic glycolysis, which is characterized by an increased rate of glycolysis, resulting in high lactic acid production despite having sufficient oxygen.Reprogramming of glucose metabolism and related metabolic pathways may contribute to the design of new therapeutic strategies to improve the efficacy of cancer therapy.A regulatory molecule of multiple physiological and pathophysiological processes such as insulin secretion, inflammation, neurological disorders and cancer is citrate. The anticancer properties of citrate have been reported on several cancer cell lines however, the effects of citrate to support cell proliferation have also been described. Citrate is an essential intermediate in the tricarboxylic acid (TCA) cycle There is growing evidence suggesting that exogenous citrate may provide the anticancer effect by regulating some key enzymes of glycolysis, TCA cycle, gluconeogenesis and acid synthesis fat. Furthermore, since citrate is the molecule that supplies the acetyls necessary for both lipogenesis and histone acetylation, it exercises epigenetic control of the expression of numerous genes. In this context it is proposed to epigenetically modify the tumor cells with citrate and from the analysis of the transcriptome to choose the most suitable treatment

Scholarship n. 2	**ENEA - Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile**

Research topic

Recovery substances with antipathogenic effects from organic agro-industrial waste using suitable microorganisms.

Topic description

Agro-industrial by-products of major importance in the territory will be used as substrate for the growth of suitable microorganisms, microbial consortia or unicellular vegetable organisms. This task will study the optimal operating conditions for growth, as well as the best formulation of agro-industrial substrates and any required pre-treatments. Microorganisms, such as Bacillus subtilis, can grow advantageously on residues from the dairy or brewing sector, and synthesize substances with a strong antipathogenic action, such as iturin. The biomass deriving from the bioreaction process is concentrated and then dehydrated in such a way as to maximize the conservation period and the microorganism's vitality. In a circular perspective, the culture broth is treated to recover the iturin and other interest compounds. The process optimized on a bench scale is developed and optimized on a pilot scale. In vitro and in vivo tests using the microorganisms' biomass will be conducted to verify its antipathogenic activity.
The objectives of this activity are the development and scaling up of the production processes of substances with antipathogenic activity starting from agro-industrial waste, after their sustainable conversion based on the use of microorganisms. This task will lead to at least 2 antipathogenic substances to replace agrochemicals, valorizing at least 3 agro-industrial by-products. The task will aim at a sustainable increase in plant growth of at least +40%.

Scholarship n. 3	**INPS**

Research topic

Bi-hyaluronic: Hyaluronic acid-inspired biomaterials

Topic description

The general objective of the proposed research activity is the production of electrospun hydrogels and matrices consisting of hyaluronic acid conjugated to bioactive peptides, for the production of innovative patches bio-eco-compatible by technologies falling within the framework of the additive manufacturing to develop in the pharmaceutical industry, such as the elettrospinning and 3D printing.

Scholarship n. 4	**INPS**

Research topic

Identification and characterization of new insect-derived antimicrobial peptides: an innovative approach against antibiotic resistance

Topic description

The proposed research project aims at the identification and characterization of Antimicrobial Peptides (AMPs) from innovative sources, insects in particular, in response to antimicrobial resistance (AMR), a global health and social priority. AMPs, molecules involved in innate immunity, do not act on eukaryotic cells but selectively on a broad spectrum of microorganisms, including those resistant to antibiotics, due to their chemical-physical characteristics, including the net positive charge, which allows them to interact with the bacterial wall and membrane, negatively charged, causing their lysis but they do not interact with positively charged eukaryotic cells. This mechanism of action, different from that of traditional drugs, makes the development of AMR a mechanisms very rare. Furthermore, AMPs show synergistic activity with conventional antibiotics. Although all organisms produce AMPs, insects represent the richest and most unexplored source of them due to their high biodiversity and to the adaptive strategies developed throughout their evolutionary history. The project in line with the scientific-disciplinary fields of the PhD Programme and with the composition of the Academic Board is consistent with the National Smart Specialization Strategy. It is coherent with "Health, nutrition, quality of life" area and with the "Biotechnology, bioinformatics and pharmaceutical development" trajectory, recognizing biotechnology's contribution to improving the quality of life by offering better treatment options.

A period in the company or research center (max 6 months) and abroad (max 6 months) is mandatory.

Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian and English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing (Agritech, Tech4You, other) **c) video conference interview** using google meet

Evaluation criteria	a) **evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **15 points** b) **interview:** up to a maximum of **75 points** the interview is passed for a score not less than **45 points** **Minimum total score: 60 out of 100**	
Assessable qualifications	**Graduation Thesis** (The candidate must also submit a summary in Italian or English of the thesis of max 16.000 characters)	max **5** points
	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	max **16** points
	Scientific publications (Articles in national and international scientific journals, proceedings of scientific conferences, books or book chapters)	max **2** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	max **2** points
Interview program	The interview, which can be held in Italian or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.	
Foreign language	**English** (knowledge of a foreign language will be assessed during the interview)	
Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>January 26, 2023</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>January 30, 2023 - 10:30 a.m.</u>**	

ANNEX 1/d

PhD program: AGRICULTURAL, FOREST AND FOOD SCIENCES

ASSOCIATED WITH SALERNO UNIVERSITY

XXXVIII CYCLE – a.y. 2022-2023

Department	**School of Agriculture, Forest, Food and Environmental Sciences (SAFE) - Potenza**	
Coordinator	Prof. Giovanni Carlo DI RENZO e-mail: dottoratosafe@unibas.it	
Duration	3 years	
Web site	https://sites.google.com/unibas.it/safe-phd/	
Admission requirements	a) University degree obtained under the previous educational systems (ex ante D.M. 509/99, whose legal course has at least a four-year term); b) Laurea specialistica/magistrale (D.M. 509/99 and Dm 270/2004); c) Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.	
Available positions	**Agritech**	**3 scholarships**
	Tech4You	**2 scholarships**
	Other	**1 scholarship CREA**

SCHOLARSHIPS

"National Research Centre for Agricultural Technologies" - tematica "Tecnologie dell'Agricoltura (Agritech)"

Codice identificativo CN00000022 - CUP C33C2200025000

Scholarship n. 1	**Spoke n. 7 – Integrated models for the development of marginal areas to promote multifunctional production systems enhancing agro-ecological and socio-economic sustainability** **WP 2 - TASK 7.2.2**

Research topic

Provision of Ecosystem Services to implement smart policies, to improve economic and social benefits and for to develop of agro-forestry supply chains in marginal areas

Topic description

Evaluation and mapping ecosystem services (ESs) is essential to understand how ecosystems contribute to human wellbeing and to support policies that have an impact on natural resources. This implies that mankind is strongly dependent on well-functioning ecosystems and natural capital that are the basis for a constant flow of ES from nature to society. Starting from the identification of the ESs offered by the different terrestrial biomes, PhD will investigate the services provided by specific land types (e.g. forest and woodlands).

ES maps constitute a very important tool to promote the efficiency use of agro-forestry products and by-products in order to increase the relationship between the forestry sector, energy and food; strengthen the connection between the actors involved in the harvesting and processing forest products (food and no-food) in order to obtain economic and social benefits and, at the same time, guarantee the local sustainability of the resource.
To obtain this objective the PhD will develop approaches, models and tools to prioritize alternative and strategies able to strengthen the provision of ESs. The "economic/ecological" ES value has implications in the decision-making process in terms of future economic resource allocation (i.e. investments rather than suppression), defining priority areas for management or suppression activities.
Therefore, the activity will be focused on: 1. bibliography collection and cataloging of ESs for specific land biomes.2: Collection of quantitative data on the consistency and reproducibility of regional forest resources to obtain homogeneous areas, according to socioeconomic factors and land use data; 3. Optimization of a spatial analysis model aimed at evaluating the opportunity costs of the development of supply chains; 4: identification of new investments aimed at updating the range of uses of the resources and at compensating the owners of the forest resource for the supply of services to the community.

Scholarship n. 2	**Spoke n. 7 – Integrated models for the development of marginal areas to promote multifunctional production systems enhancing agro-ecological and socio-economic sustainability** **WP 4 - TASK 7.4.2**

Research topic

Models for the evaluation of the Quality of Life, for the identification of the smart socioeconomic development strategies and for the reduction of inequalities in inner marginal areas

Topic description

Marginal areas continue to face structural challenges, notably due to a combination of population loss and population ageing, making it more difficult to maintain their own living conditions. The proposed overall objective is to improve quality of life in marginal areas as a prerequisite to reducing youth out-migration and ensuring that marginal areas and communities remain attractive places to live and work. The drive of this Phd project is to identify and evaluate the most important territorial services, infrastructure, and geographic factors in order to measure several dimensions of quality of life in rural areas. By identifying the ex ante determinants of quality of life, the design, targeting, monitoring, and evaluation of policies can be more effective. In this way we want to identify any critical issues, as a low standard of quality of life may compromise any possibility of development.
Since quality of life is a multidimensional, integrated concept to evaluate the living states of people, and it often involves economic, social, cultural, political, ecological and other aspects, the PhD Project that we propose consists in: 1. Delineating the boundaries that define the dimension and value of well-being, both in terms of material elements (income, housing, infrastructure) and non-material elements (culture, landscape, spirituality) implemented through statistical-descriptive analysis; 2. Generating a Decision Support Tool (DSS) capable of increasing the effectiveness of the analyses and at the same time obtaining a composite view of the phenomena at work; 3. Setting up a sequence of procedures that start from local needs, develop through stakeholder participation and flow into the generation of efficient policies to aid the development of Marginal Areas.

Scholarship n. 3	**Spoke n. 2 – Crop Health: a multidisciplinary system approach to reduce the use of agrochemicals** **WP 3 - TASK 2.3.3**

Research topic

Precision farming, smart technologies and proximal sensing for a sustainable agriculture using less chemicals

Topic description

Agriculture and environment are emerging sectors for artificial intelligence (AI) applications. Precision farming, either digital or cognitive, relies on the collection and analysis of "big data" (often via drones, planes, or satellites), to provide farmers with decision support systems (DSS) allowing them to optimize production, reduce use and waste of resources and improve product quality. AI techniques are applied to genotyping and phenotyping to select climate-ready, stress-resilient and sustainably produced plants and farm animals.
The activity concerns the application of precision agriculture and digital technologies to the mechanization with a view to the sustainability of agricultural systems.
The state of the art of sensors of proximal remote sensing in the agricultural field will be examined. The focus is on the definition and design of a system for the monitoring of the health status of greenhouse crops. A multispectral sensor is used

being transported by the developed system in order to scan the crop.
The planned activities is focused on the approach of precision agriculture and smart technologies to reduce the use of agrochemicals through the use of "proximal sensing" systems for autonomous mapping of crop health in the field.
The activity aims to develop an intelligent system suitable for precision pesticide distribution and harvesting assistance. The activity includes the definition of the strategy, the selection of hardware / software components, the development of the prototype project, the cost analysis. The expected development is totally Open Access, using hardware currently available on the market and Open Access software for robotic development (Robot Operating System ROS). In addition, the system will allow to create a database useful to the farmers both for decision support and for real-time monitoring of crop health.

Ecosistema dell'Innovazione "Tech4You - Technologies for climate change adaptation and quality of life improvement" - ambito di intervento "5.Climate, Energy and Sustainable Mobility"

Codice identificativo ECS00000009 – CUP C43C22000400006

Scholarship n. 1	**Spoke 2 – Tecnologie per ridurre il consumo energetico e salvare la biodiversità** **GOAL 2.1 - PP 2.1.1**

Research topic

Economic and environmental sustainability evaluation in the use of end-of-cycle outputs

Topic description

The PhD project aims at assessing the economic-environmental sustainability of practices related to the utilisation of end-of-pipe outputs (wastewater, sewage, production waste, etc.) in agro-forestry production systems. This assessment will require a careful analysis of the production process and the technical and organisational changes required to utilise the new inputs, as well as the identification of the socio-economic factors influencing the adoption of innovations at farm level. These elements will be the basis for assessing the economic sustainability of the new practices and for identifying any aspects that need to be addressed for their diffusion. The economic and social effects will be integrated with the analysis of environmental impacts on biodiversity, ecosystem services, fertility, impacts assessed through techniques such as Life Cycle Assessment (LCA) and direct and indirect estimation methods. The analysis of trade-offs and complementarities between economic and environmental sustainability of the end-of-life products' management system will be carried out using integrated models (e.g. ecological-economic and bio-economic models) that will be suitably structured to take into account the specific characteristics of the production and territorial system.

Scholarship n. 2	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.3 - PP 4.3.2**

Research topic

Validation of management models of territories and their promotion

Topic description

The potential candidates will present a research proposal based on the pilot topic "Development of sustainable management models for the conservation and valorization of forests characterised by a prime ecological value in marginal areas". The high structural and biological complexity of old-growth forests represents a great ecological, environmental and cultural value. Thus there is a need to protect and enhance these sites through the adoption of innovative and sustainable management measures. For example, the adoption of multi-criteria analysis methods constitutes a useful tool in the evaluation procedures, especially in environmental contexts where the information is extremely diverse and hard to be compared. The research activities will be focussed on: i) to characterize the ecological and structural level of old-groth forests; ii) to identify an innovative parameter capable of quantifying the old-growtness value in the sites analysed; iii) to define new multi-criteria models aimed at ensuring higher efficiency in the conservation and enhancement of old-growth forest sites.

OTHER SCHOLARSHIPS	
Scholarship n. 1	**CREA "Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria"**

Research topic

Innovative plants for energy saving, precision and quality control of dairy products

Topic description

The proposed project intends to improve the quality, environmental sustainability and added value of dairy production, with a particular focus on traditional southern products, through an in-depth theoretical experimental study aimed at introducing plant innovations to improve dairy processes, reduce water and energy consumption in production, optimize logistics and distribution, and promote precision control of raw milk and dairy products.
Methodologically, the project intends to use many of the hardware and software tools currently commercially available, with the aim of developing low-cost user-friendly tools for process monitoring. The research pathway will include the following activities: a) preliminary investigation aimed at defining the technological level and critical issues of the current setting of the southern dairy industry, b) theoretical experimental study of the chemical-physical and qualitative properties of dairy products collected from representative companies, c) design definition of a prototype for the inteligent monitoring of energy consumption during dairy processing; d) innovative interventions for the precision control of critical points in the process of milk processing into dairy products.
The results of the PhD project, will be transferred continuously to companies in the sector, identifying one or more companies to be used as demonstrators in order to introduce and validate the proposed innovations and the results of the research, evaluate the effectiveness in bringing better competitive conditions and better economic and commercial conditions.

A period in the company or research center (max 6 months) and abroad (max 6 months) is mandatory.

Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian and English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing (Agritech, Tech4You, other) **c) video conference interview** using google meet di Google	
Evaluation criteria	**a) evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **15 points** **b) interview:** up to a maximum of **75 points** the interview is passed for a score not less than **45 points** **Minimum total score: 60 out/100.**	
Assessable qualifications	**Graduation Thesis** (The candidate must also submit a summary in Italian or English of the thesis of max 16.000 characters)	max **10** points

	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	max **10** points
	Scientific publications (Articles in national and international scientific journals, proceedings of scientific conferences, books or book chapters)	max **3** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	max **2** points
Interview program	The interview, which can be held in Italian or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.	
Foreign language	**English** (knowledge of a foreign language will be assessed during the interview)	
Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>January 26, 2023</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>January 30, 2023 - 10:30 a.m.</u>**	

ANNEX 1/e

PhD program: HISTORY, CULTURE AND KNOWLEDGES OF MEDITERRANEAN EUROPE FROM ANTIQUITY TO CONTEMPORARY AGE

XXXVIII CYCLE – a.y. 2022-2023

Department	**Department of Human Sciences (DiSU) - Potenza**	
Coordinator	Prof. Michele BANDINI e-mail: michele.bandini@unibas.it	
Duration	3 years	
Web site	Dottorato DiSU (unibas.it)	
Admission requirements	Degree/Master in one of the following classes of degrees: LM-2, LM-11, LM-14, LM-15, LM-19, LM-37, LM-39, LM-43, LM-49, LM-62, LM-63, LM-65, LM-78, LM-84, LM-85, LM-85 bis, LM-89, LM-90, LM-92, 2/S, 15/S, 16/S, 17/S, 18/S, 24/S, 42/S, 44/S, 55/S, 70/S, 93/S, 94/S, 95/S, 96/S, 97/S, 98/S, 99/S, 101/S. Old system Degrees treated in the same classes or master degrees above according to Ministerial Decree 9th July 2009. Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.	
Available positions	**Tech4You**	**2 scholarships**

SCHOLARSHIPS

Ecosistema dell'Innovazione "Tech4You - Technologies for climate change adaptation and quality of life improvement" - ambito di intervento "5.Climate, Energy and Sustainable Mobility"

Codice identificativo ECS00000009 – CUP C43C22000400006

Scholarship n. 1	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale)** **GOAL 4.1 - PP 4.1.2**

Research topic

Cataloging, digitization and dissemination of intangible sources (film and radio-television), through the intersection of innovative technologies and physical pathways, for the sustainable recovery and reuse of memory and territorial identities in a differentiated regionalism

Topic description

The Ph.D. program will ensure the acquisition of adequate knowledge as well as of effective theoretical and methodological tools, so to allow one to operate with specific disciplinary but also multi-disciplinary and inter-disciplinary skills, in a conscious dialogue between humanistic and technical-scientific knowledge, in the study, analysis and interpretation of the multiple connections that link Basilicata to cinema, audiovisual, radio-television productions and ecology so to reflect on the different forms and ways through which the different historical-social and cultural contexts, city and rural, of the region have been

variously expressed and represented. The objectives of the Ph.D. project must include all or some of the following elements:
- census, cataloguing and networking of film, audiovisual and/or radio-television materials that deal with or have been produced in Basilicata;
- creation of a digital, immersive and interactive archive that encourages study and research, but also the dissemination of the cultural heritage of the region, as well as the sharing of documents with other Italian and foreign research institutes as well as their use by local schools, associations and so on for the promotion of the territories;
- forging of audiovisual, multimedia, immersive and interactive products, as well as interactive maps, in VR and XR (Extended Reality) environments, including Second Life and Metaverso;
- implementation of an innovative cultural project aimed at improving the quality of life of the population, through a conscious management of its cultural heritage;
- dissemination of research results through web channels, social networks, and creation of appropriate platforms to communicate content through an intuitive and inclusive language;
- enhancement and wide dissemination of results through cultural and spectacular events, exhibitions, meetings that involve the local population and encourage tourist flows.

Scholarship n. 2	**Spoke 4 – Resilienza e accessibilità per la valorizzazione del patrimonio locale (culturale e naturale**) **GOAL 4.1 - PP 4.1.3**

Research topic

Innovative and integrated systems in archaeological research: diagnostics, excavation documentation, and communication of archaeological heritages

Topic description

Certainly, in the spectrum of the humanities, archeology is the closest to scientific disciplines. Despite of this, the use of new technologies - now pervasively introduced into our lives - is not always fully reflected in the processes of archaeological work. Some segments of the complex and articulated chain that makes up the work of the archaeologist (from field excavation, to inventorying, filing, studying and scientific edition of the data) have already transited to digital; others, by contrast, continue to use traditional recording methods: paper and pencil. Diagnostic technologies are also still too underutilized and poorly integrated with photogrammetry and the wide range of documentation and information that remote sensing provides. The topic of the three-year research will therefore be to experiment with and test new ways of transitioning to digital applied to some of the segments of the archaeologist's work chain: from diagnostics to data recording and inventorying, from using the broad spectrum of archaeological prospecting, to public archeology.

A period in the company (max 6 months) and abroad (max 6 months) is mandatory.

Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian and English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing (Tech4You) **c) video conference interview** using google meet
Evaluation criteria	**a) evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **15 points** **b) interview:** up to a maximum of **75 points** the interview is passed for a score not less than **45 points** **Minimum total score: 60 out/100.**

Assessable qualifications	**Graduation Thesis** (The graduate candidate must attach the entire thesis; the candidate graduating a summary of the thesis project, in Italian or English, of max 16.000 characters)	max **8** points
	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	max **8** points
	Reference letters (attach two letters of presentation from university professors, at least one of which is external to the University of Basilicata)	max **2** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	max **7** points
Interview program	The interview, which can be held in Italian or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.	
Foreign language	**English or French or German or Spanish** (knowledge of a foreign language will be assessed during the interview)	
Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>January 26, 2023</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>January 30, 2023 - 10:30 a.m.</u>**	