



## Annex 2 - Scholarships fact sheets

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## DRUG RESEARCH AND INNOVATIVE TREATMENTS

Director prof.ssa Carla Ghelardini

<b>PROGRAMME</b>	Centri Nazionali – CN_3	<b>CUP</b>	B13C22001010001		
<b>SCHOLARSHIP</b>	1				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Gene therapy approaches to tackle neurodegeneration in progressive multiple sclerosis</b>				
<b>RESEARCH TOPIC</b>	<p>A clear identification of the mechanism contributing to progression would be of striking relevance to the understanding of progressive MS (PMS) pathogenesis. Unfortunately, the availability of drugs able to efficiently counteract progression still represents an unmet need. Axonal degeneration is an early, neuropathological hallmark of PMS and also occurs during progressive experimental autoimmune encephalomyelitis (PEAE) in mice. In this regard, studies aimed at identifying molecular mechanisms participating to axonopathy recently received great momentum in light of the key role that the so called “programmed axonal degeneration” (PAD) pathway plays in peripheral and central neuropathy. It is now acknowledged that PAD is operated by SARM1, a NAD-hydrolase kept inactive by axonal NMNAT2-dependent NAD supply. Indeed, SARM1 inhibition (either via dominant negatives or small molecules) results in neuroprotection in numerous models of neurological disorders.</p> <p>However, whether PAD participates to PMS pathogenesis waits to be investigated. On this basis, this research plan will investigate the pathogenetic relevance of PAD to PEAE by adopting of AAV-based and CRISPR/Cas9 gene therapy approaches aimed at overexpressing NMNAT2 and suppress SARM1 activity in the spinal cord column of mice during PEAE.</p>				
<b>Study/Research periods abroad</b>	1-3 months				
<b>INTERVIEW</b>					
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>	
Italian/English	30 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Department of NEUROFARBA V.le Pieraccini 6, - Florence Aula A	

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

<b>PROGRAMME</b>	Ecosistemi dell’Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001		
<b>SCHOLARSHIP</b>	3				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Rational design and synthesis of human carbonic anhydrase modulators for the treatment of the Alzheimer desaes</b>				
<b>RESEARCH TOPIC</b>	<p>Alzheimer’s disease (AD) is a neurodegenerative disease causing the most frequent type of dementia. Dementia defines a collection of symptoms including communication, thinking and memory impairments, and has been claimed as a priority condition by the World Health Organization (WHO). To date, there is no effective treatment for AD and current therapeutic strategies only alleviate its symptoms and do not delay its progression. Accordingly, researchers are looking for new multi-target drugs and combination therapies to treat AD, including anti-inflammatory, anti-amyloid, and antioxidant approaches. Recently, several studies proposed human (h) Carbonic Anhydrases (CAs, EC 4.2.1.1) as possible new targets for treating AD and memory disorders. CA activators (CAAs) showed to be valuable tools to improve memory deficits, cognitive performance, and learning, and lately, reinforce extinction memory. Contrariwise, CA inhibitors (CAIs) were demonstrated to act against AD progression protective</p>				

	<p>intervening in mitochondrial dysfunction, oxidative stress preventing memory loss induced by amyloid aggregates. The project combines an advanced expertise in the fields of molecular modelling and organic chemistry to create new potent compounds acting against AD and memory disorders by innovative mechanisms of action. A trustworthy and reproducible in silico protocol will be generated to lead the synthesis of CAAs and CAIs selectively modulating CNS-isoforms over off-target ones. The produced derivatives will be screening in house for their CA modulatory efficacy to select candidates for both in cell and in vivo tests. The project will design primarily multi-target CA modulators to tackle more efficiently these multi-factorial disorders. Attention will be dedicated for transferring new medicinal chemistry knowledge to the public and private sectors, to the benefit of the regional health system and local biotech and pharma companies. The project is incorporated in a research ecosystem (in the PNRR program) dedicated to neurosciences 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.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Multi-target approach for the therapy of multiple sclerosis and other demyelinating diseases: design, synthesis, and pre-clinic evaluation of A2A and A2B adenosine receptor antagonists hybridized with antioxidants</b>
<b>RESEARCH TOPIC</b>	<p>The multitarget approach is an increasingly pursued strategy in the search for new potential drugs for the treatment of neurodegenerative disorders linked to the dysregulation of multiple cellular mechanisms. Multiple sclerosis (MS) is a neurodegenerative disease characterized by demyelination and neurological damage. The neuromodulator adenosine plays an important role in the pathogenesis of MS. In particular, it modulates oligodendrocyte maturation and their ability to produce myelin, thus influencing the remyelination processes. The A2A and A2B adenosine receptor antagonists are effective in reducing neurological symptoms and myelin damage in animal models of MS and in reducing neurodegeneration in animal models of cerebral ischemia. Oxidative stress also plays a key role in inflammatory demyelinating processes. The antioxidant Edaravone (EDA), a drug used for the treatment of cerebral ischemia, reduces neuroinflammation and demyelination in animal models of MS. The project focuses on the identification of innovative compounds that can block A2A and A2B receptors, selectively or dually, and possess antioxidant properties. The candidate will be engaged in the design, synthesis, and structural characterization of new heterocyclic derivatives obtained through the hybridization approach i.e. by combining the pharmacophore of A2A and/or A2B receptor antagonists with EDA or other antioxidants. The most potent hybrid compounds on the target receptors will be tested for their radical scavenging ability. These studies are a part of a multidisciplinary project which will be completed by pharmacological investigations on the best hybrid derivatives obtained, which will be tested in vitro using electrophysiological and immunohistochemical techniques and in in vivo animal models of MS and cerebral ischemia. Compared with single-target molecules, the multitarget derivatives are expected to exert an enhanced neuroprotective activity against neuroinflammation associated with cerebral ischemia and MS. If this prediction is confirmed, the new compounds will serve as useful pharmacological tools for the characterization of the cellular and molecular pathways involved in demyelinating pathologies. They will also represent innovative therapeutic agents with potential clinical relevance and a high socioeconomic impact on the population.</p>
<b>Study/Research periods abroad</b>	3 months

<b>TITLE OF THE SCHOLARSHIP</b>	<b>Human-derived, organoids, tissue engineering and 3D in vitro models for pharmacological studies and targeted, advanced therapy</b>			
<b>RESEARCH TOPIC</b>	<p>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. Furthermore, recent innovations in the field of cell engineering and biomaterials paved the way for the development of 3D models based on human-derived cells reproducing the (patho)physiology of tissues and organs. Induced-Pluripotent Stem Cells (iPSCs) are increasingly employed to generate stable human cell lines retaining the genetic background of the human subject, thus capable of modeling both genetic and sporadic diseases.</p> <p>The main objective is to establish a multidisciplinary environment to develop and validate organoids, engineered tissues 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, pharmacology, clinical medicine and surgery. We aim to establish a trustworthy and reproducible platform to gain insight into the pathophysiological mechanisms underlying several diseases of genetic and acquired origin. 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 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.</p>			
<b>Study/Research periods abroad</b>	3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	30 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Department of NEUROFARBA V.le Pieraccini 6, - Florence Aula A

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<b>PROGRAMME</b>	Partnership Estesi – PE_8	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Microglia senescence in the pathogenesis and therapy of neurodegenerative diseases</b>		
<b>RESEARCH TOPIC</b>	<p>The average human life expectancy is increasing globally, making ageing a high burden on society. Sustaining a healthy aged population is key to diminishing the societal, medical, and economic impact of age-related infirmities. Therefore, decreasing the prevalence of diseases by "treating" ageing is the future trend of medicine. Ageing provokes heightened inflammation throughout many organ systems, and an increased</p>		



	<p>brain inflammation, or neuroinflammation, can be a key component of the etiology and progression of many ageing-related neurodegenerative diseases. Microglial cells are vital in recruiting these inflammatory mediators and microglial activation or dysfunction is associated with the progression of neuronal deficits in both normal and pathological ageing. Thus, the potential consequences of such chronically elevated activation of microglia during aging can contribute to the onset of neurodegenerative diseases. The main aim of this project is to establish a multidisciplinary environment to deepen the knowledge on cellular and molecular processes involved in microglia senescence to throw some light in the molecular pathways involved. This information will provide a better understanding of the pathogenesis of age-related neurodegenerative disorders and will identify innovative and personalized targets for therapy. The project is part of the PNRR program dedicated to a novel public-private alliance to generate socioeconomic, biomedical, and technological solutions for an inclusive Italian ageing society, and belongs to the thematic challenge devoted at improving the understanding of biology of ageing. We envision the possibility to transfer new technologies and knowledge to the public and private sectors, to the benefit of the health system and biotech and pharma companies.</p>			
<b>Study/Research periods abroad</b>	3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	30 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Department of NEUROFARBA V.le Pieraccini 6, - Florence Aula A

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## TUSCANY Ph.D IN NEUROSCIENCES

Director prof.ssa Maria Pia Amato

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001		
<b>SCHOLARSHIP</b>	1				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Tele-health for treatment and assessment of cognitive functioning in subjects with neurodevelopmental disorders or special educational needs</b>				
<b>RESEARCH TOPIC</b>	<p>The use of tele-health devices has notably increased for treatment and assessment of cognitive functioning in children and adolescents with neurodevelopmental disorders or special educational needs. Tele-evaluation and tele-intervention procedures can indeed have several advantages such as increasing accessibility, allowing physical distance, using multimedia content, intensifying exercise, and benefiting of self-adaptive and automatic scoring algorithms. To date only a few studies and tools of cognitive tele-evaluation in developmental ages are available and a challenge objective is to ameliorate and integrate them with standard face to face procedures. For what concerns tele-intervention, several platforms exist for clinical and educational purposes, but trainings are restricted to some components of the cognitive and learning development, physiological and emotional reactions of the subjects are not recorded, relevant social and cognitive parameters are not included in the self-adaptive algorithms, improvement's profiles during the training are not quantitatively analyzed, and efficacy struggles to generalize to ecological contexts. Aims of the proposal: 1) to implement and ameliorate tele-evaluation and tele-intervention tools covering the main cognitive functions developing during childhood and adolescence; 2) to select and include environmental (e.g. parents' attitude, digital competences, indoor noise) and individual (e.g. attention, emotions, fatigue and cognitive load) parameters in test and self-adaptivity algorithms; 3) to develop data mining algorithms distinguishing different profiles of cognitive and learning responses during the training; 4) to explore the sign-making processes and practices in the interaction with the tele-evaluation and tele-intervention tools; 5) to map the main steps in the meaning-making processes when using the digital tools; 6) to favor the generalization of the training efficacy by integrating tele-intervention with ecological activities. The sub-projects concern the development and integration of technologies and systems for life science, proposing concrete solutions for sensing human physiology in different applications, from monitoring and diagnosis to operating room and treatments.</p>				
<b>Study/Research periods abroad</b>	3 months				
<b>INTERVIEW</b>					
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>	
Italian	2 <sup>nd</sup> December 2022	10:00 a.m.	In-person*	Department of NEUROFARBA V.le Pieraccini 6, - Florence Aula A	

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## BIOMEDICAL SCIENCES

Director prof. Fabrizio Chiti

<b>PROGRAMME</b>	Centri Nazionali – CN_3	<b>CUP</b>	B13C22001010001	
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Cross-talk stroma-tumor in the tumoral microenvironment as target in the RNA personalized therapies</b>			
<b>RESEARCH TOPIC</b>	<p>The <math>\alpha V\beta 3</math> integrin subtype is overexpressed on several tumor entities including melanoma, glioblastoma, pancreatic, and breast carcinoma cells, as well on stromal cells of the tumor microenvironment (TME) such as proliferating endothelial cells or activated myofibroblasts. Thus, the expression of <math>\alpha V\beta 3</math> receptor became of high relevance in cancer research for the development of selective therapeutic systems with improved efficacy. Niosomes are artificial vesicles, synthesized from amphiphilic molecules that self-organise as a bilayer, with an aqueous core. Such nanostructures can be loaded with specific siRNA, or chemotherapeutics, and functionalized to optimize the target delivery against different types of cells of the TME. Recently, we successfully demonstrated efficient intratumoral drug delivery of RGD-functionalized liposome enriched with sunitinib, improving in vivo antitumor and antiangiogenic effects in melanoma. The PhD program will promote interdisciplinary education and training, enabling the student to gain cutting-edge knowledge in Chemistry/Biology and Medicine interface. The program will train a new generation creative scientist interested in i) drug delivery, ii) gene therapy, iii) cancer progression, and will give to the young researcher transferable skills such as project management, presentation skills, scientific writing, teamwork, time management and problem-solving abilities in order to suit to diverse careers and adapt to changing environments. Finally, thanks to establish an international network, the program will train to promote intersectoral and transnational mobility</p>			
<b>Study/Research periods abroad</b>	1 - 3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	29 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Dipartimento di Scienze Biomediche Sperimentali e Cliniche - Viale Morgagni 50, Florence

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<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001	
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Versatile and compact surface plasmon resonance analysis for biomedical applications</b>			

<b>RESEARCH TOPIC</b>	The surface plasmon resonance (SPR) technique has been efficiently applied to develop biochemical sensors and detect a plethora of different substances at high resolution, from heavy metal ions to biomolecules, using different measurement schemes and sensing formats. In the phenomenon of SPR, the collective electromagnetic oscillation of electrons at a metal / dielectric interface and the related confinement of light intensity are highly sensitive to chemical or physical changes. Thanks to this sensitivity it is possible to monitor in real time and at very high resolution the interactions that occur within a few hundred nanometers from the surface of the metal. To date, commercial analytical systems are generally very complex and expensive systems and usually require qualified personnel to manage measurements and / or maintenance.			
<b>Study/Research periods abroad</b>	1-3 mesi			
<b>SCHOLARSHIP</b>	<b>3</b>			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Biochar for intestine delivery of bioactive molecules in prevention &amp; treatment of gut pathologies and diabetes</b>			
<b>RESEARCH TOPIC</b>	The aim of the research project is to develop and characterize different types of biochar obtained from the slow pyrolysis of lignocellulosic matrices, as bioactive carrier to absorb and release biomolecules and compounds for nutraceutical and pharmaceutical use for prevention and treatment of gastrointestinal inflammatory and tumoral as well as metabolic pathologies. The research will be focused on 3 main aspects, requiring 3 differentiated research profiles: <ol style="list-style-type: none"> <li>1. Development and characterization of the biochart and conjugated molecules</li> <li>2. Analysis of the effects of these compounds in in vitro cell models of gastrointestinal inflammatory and tumoral as well as metabolic pathologies</li> <li>3. Evaluation of the effects in vivo in mouse models and in pilot studies conducted on affected patients, with particular interest on the analysis of intestinal microbiota involvement</li> </ol>			
<b>Study/Research periods abroad</b>	1 - 3 mesi			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	29 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Dipartimento di Scienze Biomediche Sperimentali e Cliniche - Viale Morgagni 50, Florence

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<b>PROGRAMME</b>	Partnership Estesi – PE_8	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	<b>3</b>		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Health literacy of the frail elderly people and their caregivers</b>		





<p><b>RESEARCH TOPIC</b></p>	<p>Health literacy (Health literacy in Anglo-Saxon, HL) is the set of knowledge and skills required of citizens to address the complex health requirements in today's society. Improvements in HL can significantly contribute to creating a new type of citizen "navigation" in the health system in general and with specific services and performances: adherence to therapy, health worker-patient relationship, empowerment.</p> <p>Levels of HL decrease over time, in an age-related manner: people over eighty appear to be the most vulnerable. Age-related decline in cognitive function appears to influence and determine the likelihood of decline in HL, but older people's social network skills, competences, and experiences may compensate for this (diffuse HL). Recent studies suggest associations between low HL of caregivers - formal or informal - of elderly subjects and taking charge and care of the same, with important consequences on the improper use of health services and loss of effectiveness of the response provided, as well as heralding economic consequences. Tools for increasing HL levels are considered cost-effective and easy to implement, as well as improving the outcomes of treatment and prevention processes.</p> <p>To assess the ability of healthcare organizations to address the HL problems of citizens and patients, the US Institute of Medicine developed the concept of literate healthcare organizations (HLHOs), i.e. the strategies adopted by healthcare organizations to make it easier to navigate, understand and use information and services, assist in decision making, eliminate or contain access barriers.</p> <p>These two dimensions of HL - individual and organizational - can be fundamental in caring for older people, with the full involvement of family, caregivers and institutional settings.</p>
<p><b>Study/Research periods abroad</b></p>	<p>1 - 3 months</p>
<p><b>TITLE OF THE SCHOLARSHIP</b></p>	<p><b>Muscle aging: molecular mechanisms in vitro e in situ analysis of small molecules as therapeutical tool</b></p>
<p><b>RESEARCH TOPIC</b></p>	<p>Loss of muscle mass, sarcopenia, is commonly related to impaired muscle performance which limits the everyday activities in elderly people. Our laboratory is engaged in researches aimed at investigating the molecular bases of muscle performance in health and disease by defining the structure-function relation of the contractile and regulatory proteins either in vitro or in situ at different hierarchical level of the organization of skeletal and cardiac muscle and testing drugs as possible therapeutical tools. The in vitro approach uses optical trap technology for defining the performance of a synthetic sarcomere like nanomachine powered by muscle myosin and actin purified from the models under study without the confounding effects of the other regulatory and accessory sarcomeric proteins that can then be integrated in the system one at a time. The in situ approach uses combined sarcomere level mechanics and x-ray diffraction to determine muscle performance in relation to muscle mass/protein quality at different ages in demembrated fibres from animal models or human biopsies. Both approaches allow quantitative tests of the effect, on the performance of the system, of small molecule effectors specific for a given contractile or regulatory protein, candidate to improve the quality of life with age.</p>
<p><b>Study/Research periods abroad</b></p>	<p>1 - 3 months</p>
<p><b>TITLE OF THE SCHOLARSHIP</b></p>	<p><b>Identification of misfolded protein oligomers and proteotoxicity in aging and neurodegeneration</b></p>



<b>RESEARCH TOPIC</b>	In particular, the aim of this project is to determine i) the effect of muscle ageing on the performance of contractile and regulatory proteins and their neurohormonal and metabolic regulation at different hierarchical levels of the skeletal and cardiac muscle, in particular determining how altered Ca <sup>2+</sup> handling and metabolic stress in muscle ageing and sarcopenia affect muscle structure and function; ii) the action mechanism of small molecule effectors candidate as new therapeutic tools to improve muscle function and exercise resistance in aged muscle.			
<b>Study/Research periods abroad</b>	1 - 3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
Italian/English	29 <sup>th</sup> November 2022	9:00 a.m.	In-person*	Dipartimento di Scienze Biomediche Sperimentali e Cliniche - Viale Morgagni 50, Florence

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## CLINICAL SCIENCES

Director prof. Lorenzo Cosmi

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Characterization of the microbiota-immunity axis in human inflammatory dysregulations</b>		
<b>RESEARCH TOPIC</b>	Role of the microbiota in human pathologies: analysis of the microbiota-immunity axis in pathologies associated with localized and / or systemic chronic inflammatory states		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>SCHOLARSHIP</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Creating a friendly, innovative, digital ecosystem for personalized and integrated diagnostic-therapeutic and rehabilitation pathways</b>		
<b>RESEARCH TOPIC</b>	To provide innovative health services by integrating digital services, devices and tools into easy-to-use open platforms that can be readily deployed to support patient empowerment and improve their independence, safety and capacity, as well as pursuing emotional well-being. The project aims to create user interfaces - physical and digital -, including medical devices, capable of guaranteeing maximum safety and usability of the phases of use through collaborative evaluation and design methods typical of the Human-Centered Design approach.		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>International Registry of COnservative or Radical Treatment of Localized Kidney Tumors - the i-RECOrd project</b>		
<b>RESEARCH TOPIC</b>	The overall objective of the i-RECORD project is to build a multicentre prospective observational Registry collecting data on the management of kidney cancer in consecutive patients treated at 50 tertiary referral Centers worldwide over a 2 years-period and with 5 years of follow-up. Specific objectives of the Project are: 1) to evaluate the differential impact of patients' comorbidities, tumors' complexity, surgeons' experience, country-related socio-cultural factors and hospital financial resources on the selection of the surgical strategy; 2) to compare the short-, mid- and long-term perioperative, functional and oncologic outcomes of PN, AT and RN for the treatment of RCC; 3) to evaluate and compare outcomes of non-surgical strategies vs surgery in appropriately selected patients with limited life expectancy and/or severe medical comorbidities; 4) to evaluate the impact of minimally-invasive surgery on perioperative, functional and oncologic outcomes after nephron-sparing surgery.		



<b>Study/Research periods abroad</b>	1 - 3 months			
<b>SCHOLARSHIP</b>	<b>1</b>			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Lung ultrasound and prediction of Interstitial Lung Disease Change in very early systemic sclerosis and definite systemic sclerosis</b>			
<b>RESEARCH TOPIC</b>	<p>Lung HRCT and lung ultrasound (LUS) have been used to screen and suspect ILD in systemic sclerosis. The effect of change over time (sensitivity to change) in these measures, however, has not been carefully examined. It would be useful to know if any of these modalities are effective, or more effective, than others to predict either evolution to disease in very early patients (VEDOSS) and the progression (worsening) and change in quality of life in definite SSc patients. Moreover, it still remains to be shown whether the modification of LUS number might be useful to indicate the appropriate timing to initiate the treatment as early as possible in the disease course.</p> <p>Therefore, we propose a comparative, hypothesis generating cohort study of VEDOSS and SSc patients to examine if LUS and/or CT are associated with change in evolution and disease improvement or worsening with change in quality of life or mortality and, further, to examine whether one of these modalities is more sensitive than the others for this purpose.</p>			
<b>Study/Research periods abroad</b>	1 - 3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italiano/English	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	AOUC – Padiglione 13 III piano - Largo Brambilla, 3 Florence

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<b>PROGRAMME</b>	Partnersiati Estesi – PE_8	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	<b>2</b>		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Implementations and validation of Multi-parametric office and remote monitoring in older patients with cardiovascular comorbidities</b>		
<b>RESEARCH TOPIC</b>	Implementation and development of clinical and remote monitoring systems for elderly patients with cardiovascular diseases, mainly for implantable or wearable devices and home monitoring systems. Frail elderly patients with mainly cardiovascular pathologies will be followed, but not only		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Role of imaging in the early diagnosing of rheumatic diseases associated with aging</b>		
<b>RESEARCH TOPIC</b>	Chronic inflammatory diseases are known risk factors for bone loss and early bone fractures. It is important to create a line of prevention and preventive follow-up in		



	rheumatic patients. Rheumatic diseases per se and the resulting therapies create an increased risk of bone fracture and preventing them would be an important target to achieve. In this context it is therefore of fundamental importance design appropriate interventions for slowing down progression in frail older patients, taking into account relevant contextual correction factors. It is important to perform differential diagnoses between osteoarticular pathologies also using ultrasound imaging and therefore to evaluate therapies at an early stage of the disease, to avoid the risks associated with chronic inflammatory conditions. It is important implement proof of concept to assess the innovative multidisciplinary stratified care pathways, activate collaborations and bidirectional consultancy with hospitals and associations.			
<b>Study/Research periods abroad</b>	1 - 3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
Italiano/English	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	AOUC – Padiglione 13 III piano - Largo Brambilla, 3 Florence

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## EVOLUTIONARY BIOLOGY AND ECOLOGY

Director prof. prof. Duccio Cavalieri

<b>PROGRAMME</b>	Centri Nazionali – CN_5	<b>CUP</b>	B83C22002910001	
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Advanced techniques for pollinator biomonitoring</b>			
<b>RESEARCH TOPIC</b>	<p>The development of effective biomonitoring schemes is an increasingly pressing urgency to assess the effects of human activities on biodiversity. Pollinating insects represent a group particularly at risk of decline, a risk that could lead to the loss of efficiency of a fundamental ecosystem service. Despite this, the techniques adopted in the biomonitoring of pollinators still suffer from methodological weaknesses, from the differences between the various data sources and sometimes from the difficulty of determining the specimens at the species level. The proposed project will have to envisage a multidisciplinary approach aimed at making effective the biomonitoring of pollinators (diurnal Lepidoptera and Apoidea) according to three main lines of research: 1) allow an estimate of the richness of species by limiting the sampling effort, 1b) facilitate the evaluation of the consistency of pollinator communities even with remote systems and that 1c) includes the behavioral component as a measure of the well-being of populations, in addition to their numerousness; 2) the creation of local DNA barcoding libraries of diurnal Lepidoptera and Apoidea that will facilitate the application of genetic-based biomonitoring (e.g., metabarcoding) in the future; 3) the harmonization of data of presence from different sources (literature, transects, citizen science) to objectively evaluate the persistence of populations even in the absence of previous monitoring, also checking for aesthetic bias (higher frequency of data for showy species) present in each dataset.</p>			
<b>Study/Research periods abroad</b>	3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	28 <sup>th</sup> November 2022	10:00 a.m.	In-person*	Dipartimento di Biologia, via Madonna del Piano 6 Sesto Fiorentino, FI

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

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	C23C22000450006	
<b>SCHOLARSHIP</b>	1			
<b>INSTITUTION</b>	Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA)			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Use of microbial bioinoculums to improve tomato performance and tolerance following biotic/abiotic stress</b>			
<b>RESEARCH TOPIC</b>	<p>The development and use of microbial bioinocula in agriculture is becoming very important in the effort to reduce the negative environmental effects generated by the excessive and/or improper application of chemicals, especially in vegetable and</p>			



	<p>fruit crops. However, the promising results observed in the confined environment are often overlooked in the open field. The activity aims to understand the interrelations between plants, soil and microorganisms in greenhouse and field tests, for an effective application of bioinocula in organic and/or IPM systems, through:</p> <ol style="list-style-type: none"> <li>1. characterization of the microbiome associated with tomato plants (rhizosphere, endophytes) subjected to biotic/abiotic stress, following treatment with bioinoculums (already available from project H2020 EXCALIBUR)</li> <li>2. Qualitative and quantitative evaluation of treatment effectiveness on stress response</li> <li>3. identification of the main metabolic pathways (e.g. lipid cross-talk) of the plant and microbiota involved in the activation of stress response processes</li> </ol> <p>The activity is divided into the following points: i) tests will be set up on tomatoes in pots/mesocosms (years 1 and 2) and in the open field (year 3); ii) the plants will be subjected to biotic (3) and abiotic (3) stresses and inoculated (and not) with specific formulates. For each objective the following actions will be carried out: 1) characterization of the structure of prokaryotic and eukaryotic communities associated with tomato plants (rhizosphere), by means of metabarcoding and bioinformatics analysis; 2) determination of the presence of pathogens by specific qPCR and phenotypic and physiological analysis of the plants with respect to the different stress factors; 3) analysis of microbial metabolism by Phenotype Microarray (BIOLOG) and of plant metabolism by mass spectrometry analysis (targeted and/or untargeted) of lipid signal molecules and / or VOCs will be carried out on plants (and soils) subjected to different factors of stress.</p>			
<b>Study/Research periods abroad</b>	1-3 mesi			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	28 <sup>th</sup> November 2022	10:00 a.m.	In-person*	Dipartimento di Biologia, via Madonna del Piano 6 Sesto Fiorentino, FI

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<b>PROGRAMME</b>	Centri Nazionali – CN_5	<b>CUP</b>	F83B2200050001
<b>SCHOLARSHIP</b>	1		
<b>INSTITUTION</b>	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS)		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>The impact of sensory pollution on coastal ecosystems</b>		
<b>RESEARCH TOPIC</b>	Coastal ecosystems are among the natural systems most impacted by anthropogenic activities, due to the historical aggregation of human population along coastlines and the consequent high rate of urbanization. Human activities are increasingly affecting the welfare and reproductive success of animals on a global scale; some of these activities are the source for 'sensory pollution', which includes light, noise and chemical pollution. Indeed, humans introduce chemical and physical stimuli into the environment that can be received by animals through multiple sensory channels, and potentially alter the natural physiological and behavioural responses of individuals. Such stimuli can also impact animals through indirect effects, mediated by a complex		

	network of biological interactions within ecosystems. Although the mitigation of the effect of sensory pollution is of relevant importance for the sustainability and functioning of coastal ecosystems, to date knowledge of the mechanisms underlying their impacts is rather lacking, both with respect to specific sources of pollution (light and noise) and the potential interactions among different types of disturbance. Indeed, the variety of urban anthropogenic activities implies the simultaneous input of stimuli (light, acoustic, or chemical) and substances (e.g., wastes, including plastics, heavy metals, POC) into coastal habitats, which add to potential disturbances related to climate change (e.g., global warming, ocean acidification, extreme events). As part of this project, the candidate will address sensory pollution through an experimental approach to the effect of multiple stressors, with a focus on key animal species for coastal ecosystems.			
<b>Study/Research periods abroad</b>	6 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian/English	28 <sup>th</sup> November 2022	10:00 a.m.	In-person*	Dipartimento di Biologia, via Madonna del Piano 6 Sesto Fiorentino, FI

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<b>PROGRAMME</b>	Partnership Estesi – PE_5	<b>CUP</b>	B53C22004010006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Innovative technologies for detection, analysis and control of microbial communities involved in biodeterioration of cultural heritage of historic centers</b>		
<b>RESEARCH TOPIC</b>	<p>Stone monuments exposed in urban environment are colonized by complex microbial communities which cause unwanted aesthetic and/or structural modifications (biodeterioration). Climatic agents of degradation and atmospheric pollutants influence the bioreceptivity of stone and favor biodeterioration. The strategies to control microbial growth are mainly based on the use of biocides, substances toxic to the operators and the environment.</p> <p>This proposal will be focused on the characterization of microbial communities involved in the biodeterioration of stone monuments and other cultural heritage objects of the historic center of Florence with the aim to assess the microbial diversity and activities, identify the microbial groups with deteriorogenic potential and clarify their ecology. The knowledge of the interactions among microbial populations, heritage materials and environmental factors will allow to elucidate the factors influencing their development and activity and to design more effective conservation strategies. Moreover, low-impact innovative treatments will be tested to control microbial growth and their effectiveness will be monitored in situ. The experimental approach will be culture-dependent as well as culture-independent (metagenomics with Next Generation Sequencing techniques). Moreover, microscopy and chemical and petrographic techniques will be used in collaboration with experienced researchers, to use a multidisciplinary approach for studying the ecology of biodeterioration. The work will be carried out in collaboration with the Institutions engaged in the protection of the monuments object of the study, such as the Opera di Santa Maria del Fiore of Florence, with whom we have had a fruitful collaboration in recent years.</p>		





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<b>Study/Research periods abroad</b>	3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
Italian/English	28 <sup>th</sup> November 2022	10:00 a.m.	In-person*	Dipartimento di Biologia, via Madonna del Piano 6 Sesto Fiorentino, FI

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## EARTH AND PLANETARY SCIENCES

Director prof. Sandro Moretti

<b>PROGRAMME</b>	Centri Nazionali – CN_5	<b>CUP</b>	B83C22002910001
<b>SCHOLARSHIPS</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Identification of natural and anthropogenic sources of heavy metals in river ecosystems and their impact on biodiversity</b>		
<b>RESEARCH TOPIC</b>	The proposed research aims to provide a detailed study on a river basin, specifically selected in accordance with the other units of Spoke 3 (CN5). The study will combine geochemical (major and trace elements) and isotopic (Sr, Nd, Pb) data on water, sediments and suspended load. The data will be combined with other physical variables (climatic, hydrogeological, biodiversity, anthropic pressure and sustainability parameters for the use of natural resources) to i) identify the natural and anthropic sources of potentially toxic elements, ii) determine specific cause-effect relationships related to perturbations of the system and iii) investigate the repercussions for the conservation of the biodiversity and the economic sustainability of the use of the resources in riverine environments		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Assessing and communicating biodiversity through novel approaches to the geopaleontological museum heritage.</b>		
<b>RESEARCH TOPIC</b>	The candidate will contribute to the creation of digital archives of paleontological samples from the Museum of Natural History of the University of Florence as well as from other national and international museums. Aim of the research will be defining the best digitization methodologies for the various types of paleontological samples, enhancing this cultural heritage through the development of Augmented Reality content, and valorizing the paleontological heritage with the public. The candidate's paleontological research can be addressed on any type of fossil, with the requirement to focus on the study of the biodiversity of the past and allow the enhancement of museum collections. The successful candidate will: (i) publish the results of the research in national and international scientific journals; (ii) participate to national and international meetings/workshops with the presentation of their research; (iii) make accessible (as a scientific publication and/or a procedure manual) the standard procedures of digitization and access to the paleontological heritage used.		
<b>TITLE OF THE SCHOLARSHIP</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	videocall



<b>PROGRAMME</b>	Infrastrutture di Ricerca – ITINERIS - ATLAS	<b>CUP</b>	B53C22002150006
<b>SCHOLARSHIPS</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Ground deformations hazard assessment through the application of forecasting models at a local and regional scale</b>		
<b>RESEARCH TOPIC</b>	The PhD student will have to work on the assessment of the hazard associated with ground deformations, with particular reference to landslides and subsidence. The PhD student, in particular, will have to deal with evaluating the applicability of spatial and temporal prediction models of ground deformations aimed at the development of early warning systems. The PhD student will have to work on the application of machine learning statistical models for the assessment of the susceptibility of ground deformations, on the application, calibration and validation of physically based and statistical models for the prediction of landslides at regional scale and on the development of forecasting models at local scale based on the analysis of monitoring data and remote sensing data.		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Assessment of the hazard associated with ground deformations through the integrated use of survey and monitoring data acquired through land and airborne platforms</b>		
<b>RESEARCH TOPIC</b>	The PhD student will have to work within the activities related to the assessment of the hazard associated with ground deformations, with specific reference to landslides and subsidence. The PhD student will have to deal with the processing and analysis of data acquired through different survey and monitoring technologies (both terrestrial and airborne) suitable for the characterization of the various types of instability phenomena, and the consequent creation and calibration of numerical models aimed at defining risk scenarios, even in emergency conditions.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_3 RETURN	<b>CUP</b>	B83C22004820002
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Methods for mapping geo-hydrological processes (landslides, erosion, subsidence) for the hazard and risk definition at national level</b>		
<b>RESEARCH TOPIC</b>	The PhD student will have to work within the activities related to the modelling of ground instability at national scale, in order to define some protocols for the hazard and risk reduction. The activities will be addressed to the integration of different mapping methods for high- and very high hazard areas, with a particular attention to the use of remote sensing techniques coupled with on-field validation systems. Moreover, the PhD student will have to analyse the integration between those		



	mapping approaches and the ground movement monitoring systems based on ground-, airborne-, and satellite sensors.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	videocall

<b>PROGRAMME</b>	Infrastrutture di Ricerca - GeoSciences	<b>CUP</b>	I53C22000800006
<b>SCHOLARSHIPS</b>	<b>2</b>		
<b>INSTITUTION</b>	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS)		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development of innovative approaches for hydro-geological risk assessment and management</b>		
<b>RESEARCH TOPIC</b>	<p>The PhD student will work on the assessment and management of the risk related to hydro-geomorphological processes. In the framework of this broad general topic, the PhD student will focus on one or more of the following specific subjects, developing innovative approaches and testing their applicability in real case studies: quantitative risk assessment; detection and modeling of indirect impacts on the socio/economic fabric; advanced modeling of risk components (hazard, vulnerability, exposure); analysis of the interrelationships between natural processes, extreme events and anthropic elements (such as the urban development); non-structural mitigation measures such as early warning systems, support to territorial planning, emergency management, innovative methods for the dissemination and the improvement of risk perception and awareness. The PhD student is expected to work with GIS systems, numerical modeling, databases, digital archives, statistical analyses, and geospatial analyses. Applications are expected at the regional or the national scale, also pursuing multi-scalar approaches.</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>New methods for the integration of multi-source landslide monitoring systems</b>		
<b>RESEARCH TOPIC</b>	<p>The PhD student will work on the monitoring of the risk related to hydro-geomorphological processes. The purpose of the research will be the design, test and validation of innovative methods for the monitoring of risk connected to hydro-geomorphological processes. In the framework of this broad general topic, the PhD student will focus on the assessment of applicability of innovative approaches for the strengthening and integration of different monitoring systems, consisting of satellite observations and ground-based sensors. The PhD student will have also to focus on the refinement of methods for data management and analysis for the characterization of active hydro-geomorphological processes. The final goal is the design of new paradigms for land monitoring, through the integration of different data sources to detail, spatially and temporally, the risks associated with hydro-geomorphological processes in an automatic way. The PhD student is expected to adopt consolidated and cutting-edge technologies and approaches, including GIS systems, statistical and geospatial analyses, modelling, creation of database, data</p>		



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	mining and artificial intelligence, to enhance information and highlight correlation between data. Applications are expected at the regional or the national scale, also pursuing multi-scalar approaches.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	videocall



## PHYSICS AND ASTRONOMY

Director prof. Raffaello D'Alessandro

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	B83C22002830001
<b>SCHOLARSHIP</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Numerical methods in high energy theoretical physics and astrophysics</b>		
<b>RESEARCH TOPIC</b>	The research concerns the development and application of advanced numerical methods to the study of theoretical aspects of high energy physics and cosmology.		
<b>Study/Research periods abroad</b>	1-3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development and application of computational methods for studying the interaction of coronal mass ejections with the solar wind and Earth magnetosphere.</b>		
<b>RESEARCH TOPIC</b>	<p>Coronal Mass Ejections (CMEs) are one of the most powerful event on the Sun that propagate through into the heliosphere and may impact the Earth magnetosphere, causing geomagnetic storm.</p> <p>Unfortunately we cannot predict yet their launch on the Sun, but the continuous monitoring of the solar corona provides real-time alerts and details of the CME that can be exploited to predict their arrival time and their geo-effectiveness. The former depends strongly on the interaction with the solar wind, the ambient medium through which the CME propagates, the latter depends on the kinetic energy of the CME and on its magnetic configuration with respect to that of the Earth magnetosphere. While the CME is a large scale structure, its dynamic and interaction with the solar wind and Earth magnetosphere are regulated by processes occurring at large Reynolds numbers. Attempting to simulate such system thus requires an enormous resolution that is not affordable with current methods.</p> <p>The project aims at developing numerical techniques and simulation strategies able to capture at the same time the CME large-scale structure and the relevant small-scale processes that regulate its interaction with the solar wind and the Earth magnetosphere. The goal is to provide a better estimate of their arrival time and their geoeffectiveness thanks to an improved modelling and understanding of the physical mechanisms at work.</p>		
<b>Study/Research periods abroad</b>	1-3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Centri Nazionali – CN_4	<b>CUP</b>	B13C22001000001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Research and development of innovative materials through the use of the Electron Paramagnetic Resonance (EPR) and Mössbauer spectroscopies for their characterization</b>		



<b>RESEARCH TOPIC</b>	The research concerns the development of innovative materials relevant for energy sustainability. The characterization of materials will be performed mainly through the use of the Electron Paramagnetic Resonance (EPR) and Mössbauer spectroscopies. In particular, the study may employ a recently implemented EPR technique, EFM (Electric Field Modulated)-EPR, apt for the investigation of magnetoelectric materials.		
<b>Study/Research periods abroad</b>	1-3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Neuro-aesthetic cognitive models and connection with wearable biometric sensors</b>		
<b>RESEARCH TOPIC</b>	The research concerns the development of cognitive models that represent in computational form and reproduce the experimental knowledge of the neural correlates of aesthetic experience, enjoyed individually or in groups. This model will be validated by comparison with experimental results and will serve to provide information on the correlations between aesthetic experiences and data from wearable sensors or, during the verification phase, measurements in the laboratory.		
<b>Study/Research periods abroad</b>	1-3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Infrastrutture di Ricerca – CTA+	<b>CUP</b>	C53C22000430006
<b>ENTE</b>	Istituto Nazionale di Astrofisica – Osservatorio Astrofisico di Arcetri (INAF)		
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Galactic Cosmic Ray acceleration and propagation in the CTA era.</b>		
<b>RESEARCH TOPIC</b>	The proposed research is aimed at the study of acceleration and escape of high energy particles from galactic cosmic ray sources, with a special attention to non-linear effects associated with plasma instabilities induced by the accelerated particles themselves. The project will be developed within the framework of scientific support activities for the upcoming Cherenkov Telescope Array (CTA).		
<b>Study/Research periods abroad</b>	1-3 months		

INTERVIEW			
LANGUAGE	DATE	TIME	MODE
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Infrastrutture di Ricerca – ITINERIS	<b>CUP</b>	B53C22002150006
<b>ENTE</b>	Istituto Nazionale di Fisica Nucleare (INFN)		
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Near real time elemental characterization of natural and anthropic aerosols by high time resolution sampling and in situ XRF analysis</b>		
<b>RESEARCH TOPIC</b>	The research activity is aimed at the development of analytical methods for the near-real-time elemental characterization of natural and anthropic aerosols by high time resolution sampling (1 hr) and in situ XRF analysis. In particular, the activity will focus on the use of the commercial system Xact, Ambient Continuous Multi-Metals Monitor, and in parallel on the development of a new device integrating a compact and efficient system for XRF analysis, based on the systems already employed in the INFN CHNet XRF portable scanners, to the high time resolution aerosol samplers STRAS, designed and developed by INFN. The project will be developed within the framework of the scientific support activity for the European research infrastructure ACTRIS.		
<b>Study/Research periods abroad</b>	1-3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_4	<b>CUP</b>	B83C22004940006
<b>SCHOLARSHIP</b>	5		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Quantum Machine Learning and optimization problems</b>		
<b>RESEARCH TOPIC</b>	The proposed research is aiming at designing new quantum machine learning algorithms to solve optimization problems in a hybrid mode via quantum accelerators with potential real-life applications and then in the performance analysis of such algorithms by means of tests on real NISQ (noisy intermediate-scale quantum) processors that are for instance available via cloud.		
<b>Study/Research periods abroad</b>	1-3 mesi		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Simulation, benchmarking and control of quantum many-qubit systems</b>		
<b>RESEARCH TOPIC</b>	The proposed research concerns the development of theoretical techniques for simulation, control and validation of many-qubits quantum systems. Classical simulations with tensor networks and quantum simulations with quantum hardware		



	will be considered. New methods will be developed to measure entanglement and to control the dynamics of complex quantum systems, also exploiting artificial intelligence algorithms.		
Study/Research periods abroad	1-3 months		
TITLE OF THE SCHOLARSHIP	<b>Atomic sensors with entangled quantum states</b>		
RESEARCH TOPIC	The proposed research is aiming to the development of atomic sensors based on atom interferometry with entangled quantum states to go beyond the standard quantum limit.		
Study/Research periods abroad	1-3 months		
TITLE OF THE SCHOLARSHIP	<b>New quantum simulators with ultracold atoms</b>		
RESEARCH TOPIC	The proposed research is aimed at the development of novel methods for next-generation quantum simulators based on ultracold-atom platforms. The research activities may include: development of new optical techniques for the manipulation of ultracold atomic gases; development of new methods for coherent control of atomic systems; development of methods for high-resolution imaging and new probes; development of techniques for modeling and validating atom-based quantum simulators.		
Study/Research periods abroad	1-3 months		
TITLE OF THE SCHOLARSHIP	<b>Quantum simulation of novel states of matter</b>		
RESEARCH TOPIC	The proposed research concerns the development of quantum simulation of exotic states of matter, from both experimental and theoretical points of view.		
Study/Research periods abroad	1-3 months		
<b>INTERVIEW</b>			
LANGUAGE	DATE	TIME	MODE
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

PROGRAMME	Partnership Estesi – PE_14	CUP	B83C22004870007
SCHOLARSHIP	1		
TITLE OF THE SCHOLARSHIP	<b>AI-enhanced future communications networks</b>		
RESEARCH TOPIC	The proposed research concerns the development of techniques and methodologies for the realization and optimization of networks communication also through the use of artificial intelligence.		



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<b>Study/Research periods abroad</b>	1-3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	1 <sup>st</sup> December 2022	2:00 p.m.	videocall

## INTERNATIONAL DOCTORATE IN ATOMIC AND MOLECULAR PHOTONICS

Director prof. Diederik Sybolt Wiersma

<b>PROGRAMME</b>	Infrastrutture di Ricerca – EBRAINS Italy	<b>CUP</b>	B51E22000150006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Monitoring of central and peripheral nervous system with biometric sensors during social interaction</b>		
<b>RESEARCH TOPIC</b>	To study the effect of social interaction on multi-modal biosignals in interacting subjects. The candidate will be involved in collection of biosignals in healthy human subjects such as Electroencephalogram (EEG), Electrodermal Activity (EDA), Heart Rate Variability (HRV) and Pupillometry. Background in biomedical engineering/cognitive sciences and the experience in collection of biosignals is a preferred criterion.		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>SCHOLARSHIP</b>	1		
<b>INSTITUTION</b>	CNR - Istituto Nazionale di Ottica (INO-CNR)		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development of imaging systems for the study of the neural activity of mouse models in social interaction</b>		
<b>RESEARCH TOPIC</b>	To study the effect of social interaction on the brain of awake freely moving animals using advanced optical neuroimaging tools based on calcium imaging. The ideal candidate would have some experience with animal work and a background in biomedical engineering/physics.		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Infrastrutture di Ricerca – SEE LIFE	<b>CUP</b>	B53C22001810006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Image analysis and system management of a fluorescence microscope on large-scale volumetric samples</b>		
<b>RESEARCH TOPIC</b>	The work on a processing pipeline in the field of high-resolution fluorescence microscopy for the mapping of human and mouse brains. The selected candidate will develop custom software applications to properly integrate several functionalities and controls of fluorescence microscopes on large-scale volumetric samples. Moreover, the PhD project will focus also on data management, in particular: image post-processing, storage, automatic neuronal feature		

	segmentation (e.g soma, fibers, etc) using artificial neural networks, and sharing of large datasets produced during the acquisitions. Programming expertise is preferred.		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	2:00 p.m.	videocall

<b>PROGRAMME</b>	Infrastrutture di Ricerca – I-PHOQS	<b>CUP</b>	B53C22001750006
<b>SCHOLARSHIP</b>	<b>2</b>		
<b>ENTE</b>	CNR - Istituto Nazionale di Ottica (INO-CNR)		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>New optical methods and advanced materials applied to the comprehension of biological systems</b>		
<b>RESEARCH TOPIC</b>	<p>The research activity is centred on the development of advanced optical platforms aimed at studying biological samples in vivo, ex vivo, as well as in engineered specimens. In this framework, two main research themes are present. On the one hand, there is the development of new hybrid organic/inorganic materials with versatile physical-chemical features, engineered towards different biomedical applications including scaffolding and biosensing (mainly combined with spectroscopy). On the other hand, there is the development and application of innovative methods for optical imaging and sample labelling aimed at the morpho-functional study of biological systems. The goal of the two PhD fellowships is to develop these two research themes, both on the technological development side and on proof-of-principle applications, also on pathological models. Research activities will be performed in a highly multidisciplinary environment with expertise encompassing physics, chemistry, bioengineering and biology. Therefore, no specific background is required, but flexibility and willingness to learn new competences.</p>		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>SCHOLARSHIP</b>	<b>3</b>		
<b>ENTE</b>	CNR - Istituto Nazionale di Ottica (INO-CNR)		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Photonics for molecular sensing</b>		
<b>RESEARCH TOPIC</b>	<p>Development of experimental photonic set-ups, in the spectral region from the near infrared to the far infrared. Use of optical resonators, quantum and interband cascade lasers (QCLs, ICLs), optical parametric oscillators and other nonlinear generation techniques. Use of continuous wave and ultrafast (fs) laser sources also for frequency comb generation for frequency metrology applications. Experimental set-ups to go beyond the classical noise limit: squeezed light and mode</p>		

	entanglement for quantum technologies and ultrasensitive spectroscopic set-ups. Applications to manipulation and precise physical measurements of atomic and molecular samples from room to ultra-cold temperatures conditions (nanoKelvin). Considering the wide spectrum of activities proposed, a special interest and a minimal basic competence is required to candidates.		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	2:00 p.m.	videocall

## INTERNATIONAL DOCTORATE IN STRUCTURAL BIOLOGY

Director prof.ssa Lucia Banci

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001		
<b>SCHOLARSHIP</b>	1				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Structural Biology of soluble proteins and metallo-proteins, potential pharmacological targets</b>				
<b>RESEARCH TOPIC</b>	The project objective is the production and optimization of potential drug targets, such as proteins and metallo-proteins. The production of these targets will allow their subsequent structural and functional characterization at the atomic level. Structural biology will be applied to characterize drug targets for the study of their interactions with proteins, nucleic acids and small molecules. Clarifying how the modulation of interactions between biomolecules can lead to the desired therapeutic result helps to validate specific proteins or domains as drug targets. This theme fits perfectly within the "THE-TUSCANY HEALTH ECOSYSTEM" project which provides for the establishment of a platform for structural biology applied to "drug discovery".				
<b>Study/Research periods abroad</b>	3 months				
<b>INTERVIEW</b>					
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>	
English	29 <sup>th</sup> November 2022	9:30 a.m.	In-person*	CERM Via Luigi Sacconi, 6 Sesto Fiorentino - Florence	

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

<b>PROGRAMME</b>	Infrastrutture di Ricerca – ITACA.SB	<b>CUP</b>	B53C22001790006		
<b>SCHOLARSHIP</b>	1				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Preparation and structural and dynamic characterization of biomolecules at the atomic level by means of cutting-edge biophysical and spectroscopic techniques for the study of biological processes at the molecular level</b>				
<b>RESEARCH TOPIC</b>	The aim of this PhD project is the atomic level characterization of proteins involved in relevant biological processes to understand the molecular mechanisms underlying their function. The ultimate goal is to be able to design drugs capable of modulating their activity or inhibiting functions that are potentially harmful to humans. The project will start from the bioinformatic analysis of the protein of interest, and then move on to the phase of heterologous expression of the same and its purification to obtain samples to be studied in vitro with various spectroscopic techniques, among which nuclear magnetic resonance will play a great role. The project, therefore, aims to promote basic and applied research for the development of innovative drugs. The characterization of biomolecules and their interactions at the atomic level using state-of-the-art spectroscopic techniques with frontier instrumentation and methods				

	also provides a wealth of knowledge useful for technology transfer to companies operating in the pharmaceutical and biotechnology sectors.			
<b>Study/Research periods abroad</b>	3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
English	29 <sup>th</sup> November 2022	9:30 a.m.	In-person*	CERM Via Luigi Sacconi, 6 Sesto Fiorentino - Florence

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

<b>PROGRAMME</b>	Partnership Estesi – PE_8 Age-it	<b>CUP</b>	B83C2200480006	
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>NMR-based metabolomics in biomedical research: applications to ageing and ageing related diseases</b>			
<b>RESEARCH TOPIC</b>	The object of the project is the application of NMR spectroscopy for the characterization of the biochemical mechanisms underlying the development of ageing and ageing related diseases. Metabolomics is a science that provides a dynamic portrait of metabolic status of individuals. Metabolomics studies the response of organisms to pathologies to characterize their mechanisms at the biochemical level. NMR spectroscopy permit to analyze human biofluids by producing a spectrum that accurately reproduce the molecular composition of the sample. Metabolomic analysis of human biofluids from individuals at different ages or with different diseases will reveal the altered metabolic pathways and will provide new biomarkers for diagnosis and prognosis. During the training doctoral student will acquire knowledge of the principles and methods of investigation based on NMR spectroscopy and will learn the main statistical techniques for metabolomic data analysis.			
<b>Study/Research periods abroad</b>	3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
English	29 <sup>th</sup> November 2022	9:30 a.m.	In-person*	CERM Via Luigi Sacconi, 6 Sesto Fiorentino - Florence

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



## MATHEMATICS, COMPUTERS SCIENCES, STATISTICS

Director prof. Matteo Focardi

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	B83C22002830001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Meshless methods for numerical simulation</b>		
<b>RESEARCH TOPIC</b>	Study of meshless methods for the numerical solution of linear and nonlinear differential problems on planar, tridimensional, or surface spatial domains. Analysis of data-driven techniques for the development of adaptive meshless schemes for accurate and efficient simulation of shocks. Test and analysis of the developed algorithms and their implementation also in parallel computing environments.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	30 <sup>th</sup> November 2022	9:30 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_8 Age-it	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Quantitative analysis of family life courses and family complexity</b>		
<b>RESEARCH TOPIC</b>	The project will address family life courses and family complexity in Italy (and in a pan-European perspective) using novel data (integration between administrative data and survey data as well as experimental data) and advanced statistical methods (methods for longitudinal data analyses and for policy evaluation). The specific project consists in the analysis of whether, and to what extent, economic factors as well as the mounting importance of uncertainty affect family life courses and family complexity. In addition, this theme analyses the impact of existing policies, at the national and (sub-)regional level, on individual and aggregate fertility in Italy, through the implementation of advanced methods for causal analysis.		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Quantitative analysis of family life courses in old age</b>		
<b>RESEARCH TOPIC</b>	The project will address family life courses and family complexity in Italy (and in a pan-European perspective) using novel data (integration between administrative data and survey data as well as experimental data) and advanced statistical methods (methods for longitudinal data analyses and for policy evaluation). The specific project consists in the analysis of family life courses in old		





	age (union dissolution, re-partnering, living apart together relationships). This theme will also examine the populations of kinless older adults by (i) investigating gender and socioeconomic differences in the likelihood of experiencing kinlessness and the health characteristics of these groups, and (ii) forecasting the prevalence of different types of kinlessness patterns, focusing in particular on the number of Italians who are likely to reach different ages with and without a partner, children, grandchildren and siblings.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	30 <sup>th</sup> November 2022	9:30 a.m.	videocall

## CHEMICAL SCIENCES

Director prof. Anna Maria Papini

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	B83C22002830001
<b>SCHOLARSHIPS</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Research activity aimed at the use of computational methods for the study of the correlations between the structure and the magnetic and electronic properties of hybrid systems containing organic molecular magnets and / or based on coordination compounds</b>		
<b>RESEARCH TOPIC</b>	Investigation of multi-qubit architecture made of molecular dimeric units containing transition metal centers at the atomic scale in gas and bulk phases as also adsorbed on surfaces, by ab initio and molecular mechanical calculations.		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Computational and theoretical study of structural and dynamic properties of molecular systems on solid surfaces</b>		
<b>RESEARCH TOPIC</b>	<p>The research project of the sub unit of CN1, that funds the doctoral position, is aimed to analyze the magnetic properties of extended systems adsorbed on solid surfaces. The PhD student will have to carry out studies at different levels of theory of systems characterized by molecular units containing open shell atoms or ions of heavy metals. These systems are particularly difficult to be studied using semi empirical force fields and, normally, those normally adopted fail in reproducing structural and dynamic properties in condensed phases and, therefore, they are to be reparametrized to perform studies on systems with nanometric dimensions.</p> <p>The structural and dynamic properties of crystals made up of the chosen coordination compounds will be studied by tight binding and density functional theory testing different functionals, the obtained results will be useful to reparametrize the force fields to be used in the project.</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	8:30 a.m.	videocall

<b>PROGRAMME</b>	Centri Nazionali – CN_3	<b>CUP</b>	B13C22001010001
<b>SCHOLARSHIPS</b>	3		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Design, characterization and optimization of nanostructured vectors for the delivery of RNA (siRNA and miRNA) - Smart nanomaterials for the delivery of therapeutic nucleic acids</b>		
<b>RESEARCH TOPIC</b>	The goal of this project is the synthesis and characterization of hybrid nanomaterials as innovative, efficient and biocompatible non-viral vectors for the development of cutting-edge drugs based on targeted delivery of genetic material.		

	<p>In particular, the project will focus on the development of modular lipid-based nanotechnology platforms (cubosomes and exosomes with different geometry / structure), doped with cationic lipids to encapsulate and transport nucleic acids for therapeutic purposes, and functionalized with sugars and / or peptides for vectorization to target cells and controlled and targeted release. various organic intermediates (glycosides and peptides) will be prepared appropriately derivatized for incorporation on ad hoc lipids. The PhD student will develop both synthetic and instrumental capabilities at the interface between organic chemistry and physical chemistry: the nanomaterials obtained will be analyzed with state-of-the-art methods, including nuclear magnetic resonance (NMR), transmission electron microscopy (TEM), infrared (IR) spectroscopy, dynamic light scattering (DLS), and optical spectroscopy.</p> <p>Furthermore, to foster interdisciplinarity and internationalization, the doctoral candidate will also focus on the study of bio / nano interactions through state-of-the-art facilities / equipment, including cryo-TEM, SAXS, confocal laser scanning microscopy (LSCM), correlation spectroscopy fluorescence (FCS), both in batch and in flow by microfluidic methods, and NMR. For the optimal development of this project, the PhD student will have to carry out a research stay abroad for at least three months.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Design, characterization and optimization of nanostructured vectors for the delivery of RNA (siRNA and miRNA) - Development and optimisation of intelligent vectors for RNA delivery to treat autoimmune/ inflammatory based diseases.</b>
<b>RESEARCH TOPIC</b>	<p>RNA interference (RNAi) offers a genetic approach against immune-mediated diseases, particularly important if traditional treatments are ineffective. In fact, using this molecular approach, the undesirable effects of anti-inflammatory medications can be reduced. The main problem of this approach is the low stability of RNAi in the biological behavior, the poor localization in target tissues and the quick removal from the blood. Nanomedicine has tremendous promise for regulating inflammation and treating immune-mediated diseases entrapping RNAi, protecting and effectively targeting inflammatory tissues. In this project our aim is the development and characterization of siRNA-based carriers aimed for the therapy of inflammatory immune-mediated disease. The most suitable drug delivery system will be selected among lipid-based siRNA nanocarriers, liposomes, and cationic lipids, stable nucleic acid-lipid particles, polymeric-based siRNA nanocarriers, polyethylenimine (PEI)-based nanosystems, chitosan-based nanoformulations, inorganic material-based siRNA nanocarriers, and hybrid-based delivery systems. Depending on the target, the component of the nanoparticles could be opportunely derivatized to obtain an effective targeting. The drug delivery systems will be characterized in terms of drug entrapment, release and stability in the biological behavior.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Design, characterization and optimization of nanostructured vectors for the delivery of RNA (siRNA and miRNA) - Characterization of nanostructured vectors for the delivery of siRNA, miRNA and other biologics at the atomic level by means of cutting-edge biophysical and spectroscopic techniques.</b>
<b>RESEARCH TOPIC</b>	<p>The aim of this PhD project is the characterization of nanostructured vectors designed to delivery RNA-based drugs and other biologics to cells. The studies will</p>

	<p>be carried out by integrating the most advanced biophysical and spectroscopic methodologies. The ultimate goal is the development of new nanostructured vectors optimized for the delivery of specific therapeutics. The ability to deliver large hydrophilic therapeutic biomolecules to pharmaceutical targets inside cells requires suitable vectors. The encapsulation capability and the delivery properties of the nanostructured vectors are often related to their structure and chemical composition. The biophysical and spectroscopic studies carried out during this PhD project will provide the way to select the chemical components and the suitable formulations for specific vectors by investigating their physical-chemical properties and morphology, and by characterizing the interactions with the encapsulated molecules.</p>		
<b>Study/Research periods abroad</b>	3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
English	29 <sup>th</sup> November 2022	8:30 a.m.	videocall

PROGRAMME	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	CUP	B83C22003920001
SCHOLARSHIPS	11		
TITLE OF THE SCHOLARSHIP	<b>Development and characterization of theranostic nanosystems for targeted cancer therapy</b>		
RESEARCH TOPIC	<p>The research project, object of this PhD call, requires the selected candidate to be involved in the development of theranostic nano-systems for controlled delivery of anticancer agents, such as fibroblast activation protein (FAP) inhibitors and carbonic anhydrase (CA IX / XII) inhibitors. These molecules will be synthesized by partners of the THE-spoke 1 consortium, also evaluating a possible multi-target approach. The final goal will be to obtain a targeted and effective cancer therapy, together with the opportunity of monitoring and imaging. The project will be organized in three main phases:</p> <ol style="list-style-type: none"> <li>1. Selection of suitable nanocarriers able to ensure a time- and space-controlled release of the loaded drug(s). For this purpose, based on the chemical-physical characteristics of the anticancer and diagnostic agents, different nano-systems will be evaluated (e.g., liposomes, niosomes, micelles, polymeric and inorganic nanoparticles).</li> <li>2. Preparation of the theranostic nano-formulations and their characterization in terms of encapsulation efficiency, particle size, zeta potential, morphological properties, drug release profile and stability.</li> <li>3. Optimization of the developed nanosystems based on both the results of the characterization studies carried out in phase 2, and the biological tests performed in parallel by the partners of the consortium.</li> </ol>		
Study/Research periods abroad	3 months		

<b>TITLE OF THE SCHOLARSHIP</b>	<b>Synthesis and surface engineering of a biocompatible nanomaterial for precision cancer therapy</b>
<b>RESEARCH TOPIC</b>	<p>The research project will to be carried out at the Department of Chemistry 'Ugo Schiff' and it concerns the study of the huge potential of nanomaterials in precision cancer therapy. Specifically, the development of biocompatible nanomaterials that can be functionalized through simple and reproducible methodology is high demanding. Biocompatibility and batch-to-batch reproducibility are two key points to ensure the use of these nanomaterials in the clinic.</p> <p>In this context, polysaccharides-based nanoparticles have unique and remarkable properties, such as biodegradability and biocompatibility, and non-immunogenicity that make them relevant tools for biomedical applications. The wide range of chemical modifications that can be carried out on their surface further expands the areas of application making them suitable for precision medicine approaches. Of note, these nanomaterials have a porous matrix that can be used for the delivery of drugs or tumor-sensitizers for specific treatments (i.e. radiotherapy).</p> <p>This research project will focus on the preparation of polysaccharide-based nanomaterials and their functionalization with small biological molecules (such as carbohydrates, peptides) that allow the active targeting of tumor. The project will be divided into:</p> <ul style="list-style-type: none"> <li>-Set up of the manufacturing process. Particular attention will be paid to the chemical-physical characterization of the nanomaterial and to the batch-to-batch reproducibility of the process;</li> <li>- According to the type of tumor type, selection and synthesis of targeting molecules able to provide the active targeting of the tumor;</li> <li>-Evaluation of the biological effect in terms of both drug release and tumor sensitization effects in radiotherapy treatments.</li> </ul> <p>Period abroad: 3 months, research laboratories in Europe with complementary skills for the evaluation of the biological effect of nanomaterials and their chemical-physical characterization.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Structural characterization of tumor associated enzyme complexes with new ligands for drug development of theranostics.</b>
<b>RESEARCH TOPIC</b>	<p>The aim of the project is the characterization of the binding mode and interactions of new ligands with tumor associated enzymes for the structure-based development of theranostic agents.</p> <p>This project will focus on inhibitors targeting the human Carbonic Anhydrase (CA) isoforms IX and XII, which are overexpressed in solid tumors and, in particular, on dual targeting Small Molecule-Drug Conjugates (SDMCs). The SDMCs will be composed of a CAIX/XII inhibiting warhead linked to an appended moiety specific for an additional validated tumor target (for example FAP, HDAC, human Telomerase and TSPO).</p> <p>The structure determination of the enzyme-inhibitor complexes will be performed through X-ray crystallography and will include the expression, purification and crystallization of the above-mentioned enzymes, preparation of the complexes with SDMCs, X-ray diffraction data collection at Synchrotron Facilities and structure solution and refinement.</p>
<b>Study/Research periods abroad</b>	3 months

<b>TITLE OF THE SCHOLARSHIP</b>	<b>Carbohydrate-conjugated nanostructured platforms for selective interaction with enzymes and targeted delivery</b>
<b>RESEARCH TOPIC</b>	<p>The research project aims to provide advanced solutions for the synthesis of new organic molecules capable of stabilizing, vectorizing and biofunctionalizing nanoparticulate systems for the development of new potential nanomedicines. In particular, it focuses on the design and preparation of nanoparticles (NPs) decorated with carbohydrate derivatives (glycosides) and their analogues, as targeting agents and selective modulators of the activity of enzymes involved in rare metabolic diseases (LSDs), chronic neurodegenerative pathologies (such as Parkinson's) and, more generally, pathologies due to an incorrect behaviour of proteins, including cancer.</p> <p>The project will be divided into the following points:</p> <ul style="list-style-type: none"> <li>- Synthesis and characterization of glycosidic compounds and their analogues capable of interacting with selected enzymes, using inexpensive carbohydrates as starting material and simple, robust, and reproducible synthetic processes.</li> <li>- Conjugation of the bioactive compounds to suitable linkers and subsequent grafting to NPs to obtain water dispersible, stable, biocompatible and biofunctional multivalent nanosystems.</li> <li>- Physico-chemical characterization of NPs and investigation of their behaviour in water and in biologically relevant media.</li> <li>- Study of the interactions of NPs with proteins involved in target pathologies, and in cell lines (toxicity, internalization, transport / release of the bioactive component) to prove their in vitro efficacy.</li> </ul> <p>The PhD student will work at the interface between organic chemistry and materials chemistry, receiving a multidisciplinary training that will favour the enhancement of high-profile skills, especially in the areas of Key Enabling Technologies. Particular attention will be paid to the exploitation of the results and its eventual technology transfer.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Smart nanomaterials in diagnosis and therapy</b>
<b>RESEARCH TOPIC</b>	<p>The research project concerns the production of composite nanomaterials based on nanocrystalline cellulose and/or functionalised graphene oxide. Both of these nanostructured materials have proven to be biocompatible and have great potential as drug transport systems or for the production of antibacterial materials depending on structural modifications.</p> <p>The functionalisation of the material will take place with biologically active molecules or nanoparticles with the aim of developing materials with antibacterial activity, aimed in particular at inhibiting the development of microbial films, which are often at the root of the resistance of certain strains to antibacterials and the loss of functionality of prosthetic devices. For this reason, it is also planned to use 3D printing processes for the formation of simple demonstration devices with resistance to the development of microbial films. The use of 3D printing processes will require a study of the formulation of the materials used.</p> <p>At the same time, the same materials, suitably functionalised using fluorescent probes and appropriate recognition systems, will find use in diagnostics. The different nature of nanocellulose and graphene oxide nanoparticles will require specific synthetic approaches for each substrate, exploiting the extensive literature already present on the subject, and will require an in-depth study of physical-chemical characterisation. The expected approach will therefore be</p>

	multidisciplinary, involving synthetic aspects, characterisation and verification of efficacy in the biological field.
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Nanofunctionalized architectures for diagnosis and therapy: from neurodegenerations to coronavirus diseases</b>
<b>RESEARCH TOPIC</b>	Aim of the research is the design, synthesis, and assembly of functionalized nanoarchitectures for the development of new diagnostic tools and therapeutic formulations. Nanosensors for the early diagnostics of neurodegenerations such as Parkinson's and Alzheimer's diseases will be fabricated by nanoassembly of newly synthesized receptors for the desired biomarkers on the surface of sensor chips for Quartz Crystal Microbalance (QCM) or Surface Plasmon Resonance (SPR) detection. Furthermore, the use of gold or silver nanoparticles conjugated with the receptor will be investigated to exploit plasmonic enhancement using Surface Enhanced Raman Scattering (SERS) for the detection of traces of the biomarker. The study will also focus on new inhibitors of SARS-CoV-2 helicase NSP13 that has so far been underexplored. The RNA binding site of NSP13 is the most conserved site in the entire proteome of SARS-CoV-2 and in general across coronaviruses, drugs binding to this site are expected to be effective against future pandemic threats. The candidate will synthesize new receptors that, according to recent computational studies, appear promising as effective NSP13 inhibitors. The binding to the protein will be tested in vitro and molecules with higher affinity will be selected for drug-delivery. To improve lung accumulation and treatment efficacy, the drug will be incorporated in aerosol nanocarriers based on liposomal formulations, chitosan nanoparticles or polymeric core-shell nanoparticles.
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Innovative analytical platforms for personalized, anticipated and low cost diagnostics</b>
<b>RESEARCH TOPIC</b>	Innovative platforms will be developed. Both optical based sensing using Surface Plasmon Resonance (SPR) and absorption and emission (fluorescence) spectroscopies will be applied for developing both sensing and micro wells plates-based systems with application to clinical molecular diagnostics and drug analysis i.e., biological drugs of use in immunotherapy. Innovative materials will be developed to produce affinity biomimetic receptors for the target molecule of interest; here green and sustainable molecular printed based polymers (MIP) based on catecholamines, will be addressed.
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Metallodrugs and Biomolecules</b>
<b>RESEARCH TOPIC</b>	This PhD program, focused on Metals in Medicine, has 2 main objectives: a) The design and identification of new metal-based substances of potential therapeutic application. b) The determination of the mechanism of action of metal-based substances of pharmacological interest by studying their interactions with probable biomolecular targets such as proteins and nucleic acids.

	<p>Therefore, the PhD program will include a more strictly Inorganic Chemistry phase where various metal-based compounds with potential pharmacological properties will be synthesized and characterized and a more properly Bioinorganic Chemistry phase where the interactions between metal compounds and their potential pharmacological targets will be studied in detail through a variety of biophysical methods.</p> <p>The candidate will make use of various skills and methods such as classical inorganic synthesis, the spectroscopic and analytical characterization of the resulting compounds, the characterization of the interactions of inorganic compounds with various biomolecules by means of spectroscopic techniques, an extensive use of mass spectrometry, the use of the emerging omics techniques.</p> <p>An internship in a foreign laboratory of at least 1 month is envisaged.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>NMR of Metalloproteins</b>
<b>RESEARCH TOPIC</b>	<p>The NMR structural characterization of metalloproteins, as well as the study of protein-protein and protein-ligand interactions, has peculiar aspects that needs to be addressed. The presence of a metal center which, in many cases is paramagnetic in at least one of its available oxidation states, requires the development of tailored experimental approaches in order to obtain structural and dynamics information arising from the hyperfine interaction between electron spin and nuclear spins.</p> <p>This project aims at developing NMR methodologies, mainly based on field dependent relaxation and cross correlation effects, to address the properties of the first coordination sphere of metal ion(s) and to monitor in a residue specific manner the interactions involving residues around the metal center. This will provide information on protein-protein interactions and will contribute to identify, in the case of drug target proteins such as the mitochondrial protein mitoNEET, the interaction with molecules of pharmacological interest. These approaches will also be applied to the study of metalloenzymes relevant for green chemistry, such as proteins involved into the biosynthesis of the iron-molibdenum cofactor (FeMo-co or M-cluster) present in Nitrogenases isolated from nitrogen-fixing organisms.</p> <p>The human proteins of the iron-sulfur cluster assembly machineries, either cytosolic or mitochondrial, will also be studied. Among possible applications of this project, we envisage the study of viral proteins containing Fe-S clusters involved into the immune response. This will be finalized to develop new-generation antiviral drugs based on the protac technology.</p> <p>The project will involve an intership abroad of a minimal duration of one month. The intership will take place in a foreign, EU or non EU laboratory, to be identified based on the ongoing collaborations.</p>
<b>Study/Research periods abroad</b>	3 months
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Advanced Sensors / Materials - Development of innovative materials and advanced sensors for life sciences</b>
<b>RESEARCH TOPIC</b>	<p>Smart- or intelligent- materials, able to respond to external stimuli by changing their properties (shape, refractive index, electrical properties, color and so on), are gaining more and more attention for the development of medical devices and engineered artificial tissues and are attracting interest also to implement and develop new sensors.</p>



	<p>New biocompatible, nanostructured and sustainable smart materials and sensing approaches will be investigated within this project in order to address chronic and acute diseases, including bacterial and viral infections.</p> <p>Because of the advancement of the proposed project, new generations of soft, light, flexible and anatomically-compliant electronics will be developed for their application in smart sensors. Smart materials will be also explored for the development of scaffolds leading to engineered artificial tissues and organoids and new medical devices, such as mechanical assistance devices for impaired muscular tissues (artificial muscles).</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Advanced Sensors / Materials - Development of wearable sensors for clinical parameter monitoring</b>		
<b>RESEARCH TOPIC</b>	<p>Self-health monitoring devices and point-of-care tools boost patient awareness and help the physician to better and timely manage the patient conditions.</p> <p>Devices such as wearable sensors, smart body-tattoos, smartphone applications, lateral-flow assays and lab-on-a-chip systems help in reaching these goals. For instance, wearable sensors have opened new paths for body-integrated electronics that were earlier difficult to achieve. The progress of wearable sensors has relied on researchers' creativity in combining sensing techniques with unconventional platforms and materials for developing useful tools such as textiles, gloves, medical bandages, mouthguards and tattoos among others. This has permitted a better bio-integration of wearable sensors, which in turn increases the acceptance levels of these devices in humans' lifestyle. Not to miss, this improves the well-being of the patient thanks to a real-time monitoring of the health status condition.</p> <p>New biocompatible, nanostructured and sustainable smart materials and sensing approaches will be investigated within this project in order to address chronic and acute diseases, including bacterial and viral infections.</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	8:30 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_3	<b>CUP</b>	B83C22004820002
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>(Micro)-plastics and emerging contaminants in aquatic environments</b>		
<b>RESEARCH TOPIC</b>	<p>Evaluation and characterization of point and diffuse sources, transport and distribution of (micro) -plastics and emerging contaminants in aquatic environments. Study of their effects on the marine and river ecosystems. Development of new technologies for sampling, analysis and removal of (micro) -plastics and contaminants emerging from water.</p>		

<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	29 <sup>th</sup> November 2022	8:30 a.m.	videocall

## LEGAL SCIENCES

Director prof. Alessandro Simoni

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Models of compensation for damages under tort law through the development of algorithmic technologies</b>		
<b>RESEARCH TOPIC</b>	<p>The PhD candidate will have to analyze health/medico-legal records and big data regarding medical malpractice claims of Careggi Hospital, a public tertiary hospital with high volumes of activity, developing and managing a targeted database. The cross-functional team (in which the PhD candidate will be enrolled) will develop algorithmic predictors of outcomes of medico-legal interest. Another endpoint will be to enhance the root cause analysis process, finding the actual causes of the claims, applying selection algorithms on the natural language of health/medico-legal records in order to develop predictive algorithms for the claims' risk, outcome and costs. In detail, there may be different objectives, like predicting the claims' risk, the complexity of the claims, the influence of different factors (type of the error and of the injury, legal variables, professional skills of medico-legal experts and lawyers, patient-related variables etc), the classification of the claims, the production of the syntheses, the claims' evolution and the economic impact.</p> <p>The PhD candidate will work at the Section of Medical Forensic Sciences of the Health Sciences Department of the University of Florence.</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	10:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_3	<b>CUP</b>	B83C22004820002
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Risk and environmental damage: the potential of consensual justice</b>		
<b>RESEARCH TOPIC</b>	<p>The research addresses the problems posed by environmental litigation and investigates the unexplored potential of consensual justice as a suitable path to prevent and manage conflicts and guarantee protection with reference to environmental damage. In fact, there are numerous critical issues to be found in the sector in question. Firstly, the scope of the interests involved, which are also of constitutional significance. Furthermore, the perspective is necessarily to be understood as an early warning with respect to the risk of damage and, therefore, facilitation paths are being studied to generate awareness and sharing of prevention measures. Qualified technical knowledge is indispensable in the management of</p>		



	<p>environmental litigation and requires adequate professionalism and structures dedicated to technical discussion. The management of phenomena related to the Nimby syndrome cannot be entrusted to judicial procedures and requires adequate paths and skills. The speed, very often the urgency, required in the approach to issues relating to environmental damage requires appropriate and above all collaborative methods of intervention, given the interest associated with the common nature of the environmental asset. The frequent need to restore the state of places and assets is compatible with the constructive nature of mediation relationships in search of options, even if not strictly legal.</p> <p>The project aims to investigate the conditions that favor the dialogic and participatory approach rather than the conflictual one, with reference to the resources that represent the common good, in the general and specific European and Italian regulatory framework</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	10:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_7	<b>CUP</b>	B83C22004830007
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Law and Regulation for a Better-Safe Cyberspace: from Cyber-security to Cyber-safety</b>		
<b>RESEARCH TOPIC</b>	<p>Cybersecurity, meaning the security of cyberspace, is more than a technical problem and does not only focus on protecting data and infrastructures from intrusions. It encompasses all the human, socio-legal and economic dimensions related to the development of the digital world in today's societies.</p> <p>The continuous evolution of technologies has made the transition to digital more convenient. However, the simple security of the networks and systems on which these services are based is not enough to guarantee the "health" of digital life and, in the future, the ever greater well-being of our communities. The mere security-oriented approach must be replaced by the awareness that the speed and breadth of technological change must be combined with a holistic perspective in which the technical aspects are combined with specific social, economic, cultural and legal aspects. From this perspective, see the establishment of the National Cybersecurity Agency (ACN) and the National Cybersecurity Strategy 2022-2026. In light of the described framework, the project aims to produce a new figure of scholar who knows how to combine the needs of cyber "health" with the classic topics of constitutional law: the protection of fundamental rights, the government of national and local public institutions, sources of law, sovereignty, citizenship, etc.</p> <p>Candidates will have to focus their research projects according to a holistic and multidisciplinary approach, combining the classic topics of constitutional law with the need to ensure that digital life leads to ever greater safety and well-being for all. Projects will be enhanced that will field practical solutions to real problems through an approach that knows how to combine technology, law, ethics and innovative organizational choices, such as the strengthening of key skills, technology and</p>		



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	knowledge transfer and the ability to increasingly integrate technologies. in systems and services.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	10:00 a.m.	videocall

## ARCHITECTURE AND DESIGN CULTURES, KNOWLEDGE AND SAFEGUARDING OF CULTURAL HERITAGE

*Director prof. Francesco Collotti*

<b>PROGRAMME</b>	Partnership Estesi – PE_5			<b>CUP</b>	B53C22004010006
<b>SCHOLARSHIP</b>	2				
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Protection and conservation of cultural heritage against climate changes, natural and anthropic risks</b>				
<b>RESEARCH TOPIC</b>	The research is aimed at the study of issues related to the conservation and restoration of monumental cultural heritage exposed to natural and anthropogenic hazards, with a focus on climate change. The dangers that undermine the protection of cultural heritage related to climate change, natural and anthropogenic hazards push towards new research perspectives, which at the base have a multidisciplinary and multi-scale approach. The main objective of the research is to try to identify new solutions for monitoring, verification and mitigation of the effects related to natural and anthropogenic hazards, especially for the purpose of restoration project design. The study should start from the examination of the state of the art, literature and existing scientific glossaries in the European context, to arrive, also through the analysis of a series of emblematic case studies preliminarily identified, at the definition of new tools and solutions for the conservation and restoration of monumental cultural heritage, with particular attention to the historic building.				
<b>Study/Research periods abroad</b>	1-3 months				
<b>INTERVIEW</b>					
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>	
Italian/English	29 <sup>th</sup> November 2022	12:30 p.m.	In-person*	DIDA - sede Santa Teresa aula sedie colorate via della Mattonaia, 8 Florence	

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



<b>PROGRAMME</b>	Partnership Estesi – PE_3		<b>CUP</b>	B83C22004820002	
<b>SCHOLARSHIP</b>	1				
<b>TITLE OF THE SCHOLARSHIP</b>	Safeguard and structural retrofitting of historical constructions				
<b>RESEARCH TOPIC</b>	<p>The extension, value and diffusion of the Italian historic built heritage make the safeguard and structural retrofitting a strategic sector characterized by a growing expansion in the near future. Especially in the context of high historic value, the technologies that will be developed must be in line with the fundamental principles of the conservation and restoration (non-invasive, reversibility, compatibility).</p> <p>In this context, seismic retrofit through composite materials represents an effective alternative compared to invasive and expensive interventions, since significant increase of resistance with no additional gravity loads are obtained together with ultimate deformation capacity (as required by seismic codes).</p> <p>The research project is aimed at identifying and validating through experimental tests new composite materials. In addition, new methods will be developed to design structural retrofit able to account for mechanical/structural performances, efficient safeguard and sustainability of the intervention.</p> <p>The use of such technologically advanced materials will be also evaluated considering the architectural and constructional characteristics of the historic constructions.</p>				
<b>Study/Research periods abroad</b>	6 months				
<b>INTERVIEW</b>					
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>	
Italian/English	29 <sup>th</sup> November 2022	12:30 p.m.	In-person*	DIDA - sede Santa Teresa aula sedie colorate via della Mattonaia, 8 Florence	

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

## SUSTAINABLE MANAGEMENT OF AGRICULTURAL, FORESTRY AND FOOD RESOURCES

Director prof. Erminio Monteleone

<b>PROGRAMME</b>	Centri Nazionali – CN_5	<b>CUP</b>	B83C22002910001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Soil and Water Bioengineering for Biodiversity and risk mitigation (I-NBS)</b>		
<b>RESEARCH TOPIC</b>	Soil and Water Bioengineering as Nature Based Solutions for the achievement of ecological purposes (ecological restoration) with an increase in the different levels of biodiversity (in particular specific and ecosystem / landscape), maintenance and increase of ecosystem functionality and the supply of ecosystem services, with technical-functional effects for the control of hydrogeological risk and with innovative and consolidated solutions in the tradition of watershed-management, as well as with saving of resources, employment opportunities and socio-economic effects. In particular, we deal with techniques with biodegradable materials combined with plants as building material, to carry out renaturalization works aimed at creating environments suitable for plant and / or animal species or communities and / or to obtain the defragmentation and improvement of habitats and ecosystems through the use of technical solutions and other measures aimed at providing favorable conditions for life.		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	30 <sup>th</sup> November 2022	09:30 a.m.	videocall

<b>PROGRAMME</b>	Centri Nazionali – CN_2	<b>CUP</b>	B13C22001020007
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Methods and indicators for sustainable water management in the Italian agri-food sector</b>		
<b>RESEARCH TOPIC</b>	The Ph.D. student will develop the project within Spoke 9 of the "AGRITECH" National Center, funded by the Next Generation EU plan. The research project will be aimed at the analysis and application of innovative methodologies for assessing the sustainability of specific agri-food products on the Italian territory, with indicators. Starting from the assessment of sustainability in the field of water resource management, the aim of the grant will be to integrate this assessment with other environmental sustainability indicators to create a complete assessment framework.		
<b>Study/Research periods abroad</b>	3 mesi		





INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	30 <sup>th</sup> November 2022	09:30 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_11	<b>CUP</b>	B83C22004890007
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	Circular and sustainable supply chains with particular focus on the timber chain		
<b>RESEARCH TOPIC</b>	<p>The stock of materials expresses the balance of the flow of different raw materials from the construction/production of goods, to their use, to their end-of-life management (reuse, recycling, waste). The dynamics of stock variation are a consequence of the functioning of the so-called social metabolism, which tends to reduce or increase the quantities of material in use. Knowledge of the systemic dynamics of the stocks in use, their lifetimes and end-of-life management (reuse, recycle, waste) is an important pillar for defining sustainable management strategies for material and energy flows in urban and industrial ecosystems. Increasing the stock of wood products is a winning strategy for increasing the environmental sustainability of urban systems, industrial systems and the wood production chain. Establishing regenerative systems within the wood processing chain, in which the use of raw materials, disposal, emissions, and energy needs are minimized by slowing down, closing and resizing closed material and energy cycles, represents a solution that can guarantee the maintenance of the stock level in urban and industrial ecosystems, useful to counter the increase due to the growth in demand for wood products. In particular, the project envisages Improving knowledge of the dynamics of the flows related to the stock in use and its variations, aimed at understanding the flows and building forecast models. Implement technological innovation related to recycled products so that their technical functionality can be improved, enabling them to replace an increasing number of product categories while maintaining their performance capabilities, and their further recyclability.</p>		
<b>Study/Research periods abroad</b>	3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	30 <sup>th</sup> November	09:30 a.m.	videocall

## INFORMATION ENGINEERING

Director prof. Fabio Schoen

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	B83C22002830001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development of an intelligent, distributed, reliable, and economic monitoring system to support the "green transition" and resilience in electricity distribution networks, based on artificial intelligence and machine learning techniques</b>		
<b>RESEARCH TOPIC</b>	<p>Considering that the electricity system is undergoing a phase of deep transformation due to the decarbonization processes, the transition to electric mobility and the wide of renewable energy, the impact on distribution networks can become critically. In this context, the research activities will be in the area of the green transition and digital transformation pillars, as defined by Regulation (EU) 2021/241. The first goal is to study the evolution of Advanced Metering Infrastructures (AMI) and their implementation under different scenarios, considering the development of loads and distributed generation. Then, the expected impacts on the infrastructures of different load profiles will be analyzed, evaluating possible investments to improve the efficiency of the electrical distribution network. The second goal will focus on the potential benefits of local flexibility schemes to level the load curve, improve the voltage profile and increase network reliability and resilience. The functional requirements of flexibility services, possible market models, and remuneration schemes will be explored. The research activity will also focus on the technological solutions needed to implement the algorithms based on artificial intelligence for detection and identification of faults in the grid and to procure local flexibility services on medium- and low-voltage networks.</p>		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	Videocall

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	3		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Artificial Intelligence methods and techniques for the understanding of texts and risk estimation, Predictive models for healthcare claims management</b>		
<b>RESEARCH TOPIC</b>	<p>The student will be able to enter the context of the DISIT lab for the development of the doctoral thesis and its training in the AI, Explainable AI and NLP (natural language processing) fields, in close collaboration with the Careggi University Hospital in the context of the ecosystem of innovation of the PNRR called "The Tuscany Health Ecosystem". The PhD student will have to deal with the study and development of AI solutions for understanding the text, for example with BERT techniques, Bidirectional Encoder Representations from Transformers, explainable BERT, for understanding</p>		



	<p>the text as well as the development of AI risk prediction models. The application domain is that of the medico-legal area, which specializes in medico-legal terminology and the assessment of the risk of litigation. Integrations are envisaged with ontologies and knowledge bases in the medical field, and with graph neural network techniques, GNN, as well as transfer learning, generative techniques, etc. The objectives can be multiple, the prediction of the risk of litigation, the assessment of complexity, the assessment of influence of the various factors (type of error and damage, discipline, competence of consultants and lawyers, type of patient, etc.), classification of disputes, production of summaries, prediction of evolution and economic impact, automatic anonymization, etc.</p> <p>The University Hospital of Careggi is a national center and the primary hospital structure for Tuscany. DISIT Lab is one of the most active labs in Tuscany on AI / XAI and NLP issues, it is involved in the CBDAl (Big Data AI Tuscany regional center), CINI Big data node, etc., also in relation to the platforms <a href="https://www.snap4city.org">https://www.snap4city.org</a> and Twitter Vigilance of DISIT, and to the collaboration with various bodies on these issues of AI and NLP.</p>
<p><b>Study/Research periods abroad</b></p>	<p>1 - 3 mesi</p>
<p><b>TITLE OF THE SCHOLARSHIP</b></p>	<p><b>Implementing a novel computational framework for the diagnostic use of future generation sequencing</b></p>
<p><b>RESEARCH TOPIC</b></p>	<p>The advent of second-generation sequencing, and more recently of third generation long read sequencing platforms has completely changed our capability to capture the molecular characteristics underlying diseases at a fine grade. However, the data generated by these technologies requires very complex and standardized computational methods, especially when used for diagnostics and precision medicine applications. The research will focus on developing a software platform that stakeholders of the regional health system can exploit for different types of omics data analysis (genomics, epigenomics and transcriptomics). The platform will provide tools for classification, interpretation, visualization, and reporting as well as AI-based methods for the identification of diagnostic, prognostic, and predictive biomarkers. The system will incorporate state-of-the-art computational methods for the analysis of genomics, epigenomics, transcriptomics.</p>
<p><b>Study/Research periods abroad</b></p>	<p>1 - 3 mesi</p>
<p><b>TITLE OF THE SCHOLARSHIP</b></p>	<p><b>Integration of multimodal imaging for development of automated diagnosis decision support</b></p>
<p><b>RESEARCH TOPIC</b></p>	<p>Medical imaging techniques such as X-rays, CT, and MRI generate large amounts of data that form the basis of radiomics, that allows the extraction of qualitative and quantitative information not directly available from clinical doctors. Recent research aims at creating innovative image and data fusion techniques. The research will focus on the integration of standardized omics and imaging data, and analytic software components to support medical diagnosis. This platform will be based on a sophisticated system design to meet clinicians' requirements and support customization of the analysis pipeline, while at the same time providing an adequate usability in clinical practice. The research will contribute to the development of a software platform that stakeholders of the regional health system can exploit for different types of omics data (genomics, transcriptomics, radiomics) and integrate them in order to create comprehensive models of the pathology of interest. The</p>

	platform will provide tools for classification, interpretation, visualization, and reporting as well as AI-based methods for the identification of diagnostic, prognostic, and predictive biomarkers. The main activities that will be carried out during the research project are: 1. Improve the usability of images generated by different imaging techniques, making it easier the visual analysis of complex data by clinicians. 2. Creation of a prototype of an integrated visualization system for displaying 3D multimodal images, deriving from different methods, both conventional and - omics and decision cues superimposed with the images. 3. Development of novel computational strategies based on AI for exploiting omics data for early diagnosis.		
<b>Study/Research periods abroad</b>	1 - 3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	Videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_8	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Biosignal processing and ad-hoc systems design for psychophysiological evaluation in fragile people</b>		
<b>RESEARCH TOPIC</b>	This research topic is aimed at the 'implementation of advanced methods of multivariate signal analysis and the design of dedicated tools for comprehensive assessment of psychophysiological state in frail subjects. Specifically, the methods and tools should aim at maintaining the state of well-being in healthy subjects or those affected by aging-related diseases. Mathematical characterization of neurophysiological state through analysis of biosignals such as electroencephalogram (EEG), electrocardiogram (ECG), and electrodermal response (EDA) and beyond, and extraction of parameters through the time domain, frequency domain, and through time-varying dynamical systems theory is required. Dedicated model-based artificial intelligence algorithms will be implemented with the goal of predicting and anticipating possible changes in health status.		
<b>Study/Research periods abroad</b>	3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	1 <sup>st</sup> December 2022	09:00 a.m.	Videocall



## INDUSTRIAL ENGINEERING

Director prof. Giovanni Ferrara

<b>PROGRAMME</b>	Centri Nazionali – CN_4	<b>CUP</b>	B13C22001000001
<b>SCHOLARSHIP</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Modeling and optimization of railway components and subsystems for vehicle dynamics, energy optimization and vehicle and infrastructure monitoring</b>		
<b>RESEARCH TOPIC</b>	<p>The candidate will participate in the research activities of the CN4 spoke 4 on sustainable mobility.</p> <p>The research objective will be to develop multiphysics models of railway components, subsystems and systems with the aim of minimizing energy consumption in rail transport by acting on multiple aspects such as, for example, wheel-rail contact, train dynamics and next-generation signaling.</p> <p>The developed models will also be used for the development of innovative techniques for monitoring and maintenance of railway vehicles and infrastructure.</p>		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Methodologies for holistic vehicle design for light and sustainable mobility in urban and peri-urban areas</b>		
<b>RESEARCH TOPIC</b>	<p>Within the framework of CN4 Spoke 5 'Sustainable Mobility', the candidate will have to deal with the design of a vehicle for individual urban transport with low (or very low) environmental impact. After an analysis phase of the scientific and technological state of the art, the candidate will have to contribute to the conception of different construction solutions for innovative 2-, 3- or 4-vehicles, with electric traction possibly with pedal assistance. Among the proposed solutions, one will have to be completed by carrying out the construction drawings and related dimensioning, taking into account the dynamic and active and passive safety requirements. Finally, the PhD student will also have the opportunity to follow the construction phases of the prototype and the related road tests.</p>		
<b>Study/Research periods abroad</b>	6 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	30 <sup>st</sup> November 2022	9:00 a.m.	videocall

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Research and development on modelling cognitive and motor interplay using Biorobotics technologies and neuroscientific approaches</b>		



<b>RESEARCH TOPIC</b>	<p>The PhD program aims to develop novel technologies in the field of robotics and Internet of Things for studying the cognitive and motor interplay in healthy subjects and patients with neurodegenerative diseases. The idea is to investigate how these technologies could be used to improve, objectify, and standardize the current clinical practice that is performed without the use of technology and to identify novel clinical protocols and methods to better study the impact of motor and cognitive decline on humans. In this sense the PhD candidate is requested to develop a comprehensive digitalized intervention for assessment and rehabilitation purposes, ranging from the development of neuropsychological battery encompassing tests to assess subjects' proficiency in several cognitive domains, such as memory, language, attention, visual ability, and executive functions, to the development of intelligent algorithms extracting digital biomarkers for clinical classification purpose on neurodegenerative diseases.</p> <p>The PhD candidate is requested to follow a multimodal approach, using different instruments and devices able to acquire physiological and behavioral data from subjects and to implement artificial intelligence techniques, such as machine learning or deep learning. Similarly, the PhD is requested to development innovative and clinically meaningful kinematic features, starting from a Neuroscientific Framework to better understand the Motor-Cognitive Interface.</p>		
<b>Study/Research periods abroad</b>	3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	30 <sup>st</sup> November 2022	9:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_8	<b>CUP</b>	B83C2200480006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Bio-cooperative approaches in social robotics for neurocognitive assessment and rehabilitation</b>		
<b>RESEARCH TOPIC</b>	<p>The PhD program aims to dramatically enhance kinds of means, both software and hardware, that allow interaction processes and bridge capabilities between users and service/machines. One of the key challenges in Active and Healthy Ageing (AHA) concerns the implementation of interaction with dependable perception capabilities and context awareness, with high acceptability and usability, adaptability, and multi-modal AI-based approaches. This will be pursued by investigating, designing, developing and testing novel “social machines”, namely social robots, apps, VR/AR tools and devices that will be conceived and integrated to interact and communicate with humans by means of social behaviors and rules. Bio-cooperative systems represent the new generation of robotic platforms that promote a bidirectional interaction between the robot and the patient based on multimodal interfaces. Here the idea is to additionally integrate also augmented/mixed reality systems with wearable inertial sensors (for motion capture) and haptic/thermal actuators (for closing the feedback loop). Such a system will be employed through the adoption of innovative bio-cooperative HRI protocols that will take advantage of the combination of motor, cognitive and social aspects.</p>		



	<p>This task will rely on Motor and Cognitive Dual-Task (MCDT) protocols, as well as Social Grasping, for the HRI setting.</p> <p>With such advanced and human-like interacting capabilities, the PhD candidate will aim to demonstrate that machines and devices will be more believable, easier to be adopted and not be abandoned, contributing to support healthy living during daily activities and manage diseases; interestingly, the PhD candidate will demonstrate that “social machines” will be also able to measure and characterize the way humans interact with themselves, generating a number of digital biomarkers of interaction that could be used for early identification and rehabilitation of motor and cognitive decline in frailty and dementia.</p>		
<b>Study/Research periods abroad</b>	3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	30 <sup>st</sup> November 2022	9:00 a.m.	videocall

<b>PROGRAMME</b>	Partnersiati Estesi – PE_11	<b>CUP</b>	B83C22004890007
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Supply chain collaborations for sustainability-oriented and circular design and innovation</b>		
<b>RESEARCH TOPIC</b>	<p>The research will focus on the theme of sustainability-oriented and circular innovation and will aim to understand how innovation projects can be realized through the activation and management of appropriate supply chain relationships throughout the product life cycle, from product design to the use and recycling stages. Enabling factors and barriers to these collaborative practices will be analyzed. The empirical analysis will cover relevant sectors of Italian "Made in Italy" such as the fashion one.</p>		
<b>Study/Research periods abroad</b>	1 - 3 months		
INTERVIEW			
LANGUAGE	DATE	TIME	MODE
Italian/English	30 <sup>st</sup> November 2022	9:00 a.m.	videocall



## INTERNATIONAL DOCTORATE IN CIVIL AND ENVIRONMENTAL ENGINEERING

Director prof. Luca Solari

<b>PROGRAMME</b>	Centri Nazionali – CN_1	<b>CUP</b>	B83C22002830001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development of unsupervised data-driven techniques to discover constitutive laws hidden in large volumes of data</b>		
<b>RESEARCH TOPIC</b>	Data-driven computing is becoming a new paradigm in several scientific fields with a tremendous impact on new technologies. In solid mechanics, the availability of large volumes of data through modern experimental techniques is enabling machine learning methods to open new perspectives in material modeling. In the framework of the research activities of Spoke 7 “Materials & Molecular Sciences” of the National Centre for HPC, Big Data and Quantum Computing, the present PhD project will be focused on the development and implementation of unsupervised data-driven techniques to automatically discover constitutive laws hidden in large volumes of data. Unsupervised approaches require no stress data. Therefore, the methods will have to rely only on full-field displacements and global reaction forces data. The project aims at developing these approaches for materials with complex behavior, such as rate-dependent, shape memory, temperature-responsive, etc.		
<b>Study/Research periods abroad</b>	9 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	28 <sup>th</sup> November 2022	02:30 p.m.	videoconferenza

<b>PROGRAMME</b>	Ecosistemi dell’Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITOLO BORSA</b>	<b>Isogeometric analysis-based models for shape changing structures with applications to patient-tailored stents</b>		
<b>RESEARCH TOPIC</b>	The PhD research activity will be carried out within the project “A new efficient and accurate isogeometric analysis approach to the simulation of shape-changing artery stents—towards patient-tailored 4D printed stents (ISOStent4D)”. The project, carried out in collaboration with DIF and DMSC of UniFI in the framework of the Tuscany Health Ecosystem THE, aims to develop an innovative process to simulate, optimize and print (4D Printing) patient-tailored cardiovascular stents. Recent computational techniques based on isogeometric analysis (IGA) turned out to be, for a given accuracy level, exceptionally faster than existing methodologies based on the standard finite element method in simulating the structural behaviour of such systems. In this context, the objective of the research is to develop an efficient computational model based on isogeometric analysis (IGA) for structural systems with complex geometries able to simulate the shape-changing process required for the personalization of the devices. In		





	particular, the research focus will be placed on modelling thermo-responsive shape memory materials, geometrical nonlinearities, complex geometry reconstruction, and identification of suitable 4D Printing technologies.		
<b>Study/Research periods abroad</b>	9 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	28 <sup>th</sup> November 2022	02:30 p.m.	videoconferenza

<b>PROGRAMME</b>	Partnersiati Estesi – PE_3	<b>CUP</b>	B83C22004820002
<b>SCHOLARSHIP</b>	1		
<b>TITOLO BORSA</b>	<b>Hydrologic and hydraulic risk in the urban environment</b>		
<b>RESEARCH TOPIC</b>	The research activity will be developed in the framework of the PNRR project RETURN on “Environmental, Natural and Anthropogenic Risks”, with reference to the subthemes “Urban and metropolitan settlements” e “Communities’ resilience to risks: social, economic, legal and cultural dimensions”.		
<b>Study/Research periods abroad</b>	9 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
English	28 <sup>th</sup> November 2022	02:30 p.m.	videoconferenza

## AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Director prof. Giacomo Pietramellara

<b>PROGRAMME</b>	Centri Nazionali – CN_2	<b>CUP</b>	B13C22001020007	
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Biotechnological procedures and “green extraction” strategies for the sustainable conversion of by-products, residues and wastes from agroforestry and agrifood sectors into renewable resources to support innovative agriculture and plant protection (Btech&amp;green)</b>			
<b>RESEARCH TOPIC</b>	<p>The sustainable conversion of by-products, residues and waste from agroforestry and agri-food activities into high-value bioactive products is one of the main objectives of circular economy. Biotechnology and "green extraction" strategies are among the most valuable tools and having the highest potential for the realization of this virtuous vision. When adopted in marginal rural areas, this approach turns out to have a much more decisive positive impact than in other social and productive contexts, because it can provide new jobs and it is able to reverse land abandonment. The Btech&amp;green project deals with the development of multidisciplinary biotechnological and "green" procedures for the valorization of by-products and waste, deriving from primary agroforestry and agri-food productions characterizing specific marginal rural areas, through the conversion into high-value bioactive products, that are applicable in the context of sustainable agriculture. In particular, their bioactivity as biostimulants and resistance inducers will be evaluated on different culture systems and using several representative crops as a model, and by a multiscale approach. The eco-toxicological profile of these extracts/molecules from circular economy will also be evaluated, both through official tests and with more articulated investigative approaches, such as those based on “omics” science. In fact, the market for biostimulants, corroborants and resist inducers is still full of poorly supported activities from a scientific point of view, and therefore this fundamental aspect will be also addressed in this project. At last, the Btech&amp;green project includes also activities referred to the constant and periodic dissemination of the results, with the possibility of establishing collaborations not only at the academic level, but also involving the various stakeholders of this highly articulated sector.</p>			
<b>Study/Research periods abroad</b>	6 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	Aula Magna Scuola di Agraria P.le delle Cascine 28 Florence

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

<b>PROGRAMME</b>	Centri Nazionali – CN_5	<b>CUP</b>	B83C22002910001
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<b>SCHOLARSHIP</b>	<b>1</b>			
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Development and implementation of biodiversity genetic indicators</b>			
<b>RESEARCH TOPIC</b>	<p>Biodiversity underlies ecosystem resilience, ecosystem functions, sustainable economies and human well-being. Understanding how biodiversity supports ecosystems subjected to anthropogenic stressors and global environmental change will require new ways of deriving and applying biodiversity data. The Group on Earth Observations - Biodiversity Observation Network (GEO - BON) has developed Essential Biodiversity Variables (EBVs) as key metrics to help aggregate, harmonize and interpret biodiversity data from different sources. EBV mapping and analysis can help assess how aspects of biodiversity are geographically distributed and how they change over time. However, little is known about the feasibility of implementing genetic composition EBVs (genetic EBVs), which are metrics of intraspecific genetic variation. The implementation of genetic indicators for monitoring global and regional genetic diversity with respect to theory, sampling logistics, metadata, archiving, data aggregation, modeling and technological advances is highly topical and primary importance. Furthermore, the Convention on Biological Diversity (CBD) will soon accept a post-2020 global framework for the conservation of the three elements of biodiversity (genetics, species and ecosystem diversity), while ensuring sustainable development and benefit sharing. In previous CBD strategies, targets and indicators for genetic diversity (variation at the DNA level within species, which facilitates species adaptation and ecosystem function) were not developed.</p>			
<b>Study/Research periods abroad</b>	3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	Aula Magna Scuola di Agraria P.le delle Cascine 28 Florence

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

<b>PROGRAMME</b>	Infrastrutture di Ricerca – ITINERIS-ATLAS	<b>CUP</b>	B53C22002150006
<b>SCHOLARSHIP</b>	<b>1</b>		
<b>INSTITUTION</b>	Consiglio Nazionale delle Ricerche - Istituto di Ricerca sugli Ecosistemi Terrestri		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Plant carbon responses to ozone pollution</b>		
<b>RESEARCH TOPIC</b>	<p>Ozone is a widespread and phytotoxic pollutant whose effects on plant growth, especially radial growth and carbon accumulation, are not clear yet. This PhD project aims at investigating ozone impacts on tree radial growth in the field and on plant ecophysiological responses under semi-reductionist conditions. The first objective will be carried out in experimental field sites already equipped with dendrometers and ozone sensors within previous IRET-CNR projects (MOTTLES, MODERN, 4ClimAir). The second objective will be carried out in the IRET-CNR ozone FACE (free</p>		

	<p>air controlled experiment) facility, that allows exposure of plants to ozone in open air so that typical controlled-conditions artifacts, e.g. strong ventilation and low radiation are avoided. This ozone FACE is part of the EC research infrastructure AnaEE (Analysis and Experimentation on Ecosystems) and is part of the ITINERIS project within the Italian National Plan for Recovery and Resilience (PNRR). The experimental results are expected to further our understanding of ozone impacts on carbon sequestration and accumulation in terrestrial ecosystems and to support the achievement of the EC Green Deal objective of carbon neutrality.</p>			
<b>Study/Research periods abroad</b>	3 months			
INTERVIEW				
LANGUAGE	DATE	TIME	MODE	PLACE
Italian	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	Aula Magna Scuola di Agraria P.le delle Cascine 28 Florence

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



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

Director prof. Giuseppe Lotti

<b>PROGRAMME</b>	Partnerships Estesi – PE_3		<b>CUP</b>	B83C22004820002
<b>SCHOLARSHIP</b>	1			
<b>TITLE OF THE SCHOLARSHIP</b>	Mitigation and adaptation strategies and actions for resilient and livable cities			
<b>RESEARCH TOPIC</b>	The research activity will be carried out within the Pe3 Partnership "Environmental, Natural and Anthropogenic Risks - Spoke Ts1 - Urban and metropolitan settlements" and will focus on the study of impacts and management of environmental, natural and anthropogenic risks in urban and metropolitan settlements. The research is aimed at defining urbanistic projects and physical planning practices aimed at assessing different levels of exposure, risk mitigation strategies and settlement adaptation from a resilient, holistic and multi-hazard perspective			
<b>Study/Research periods abroad</b>	1-3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	DIDA Aula sedie colorate (p.4) Santa Teresa Florence

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

<b>PROGRAMME</b>	Partnerships Estesi – PE_11		<b>CUP</b>	B83C22004890007
<b>SCHOLARSHIPS</b>	2			
<b>TITLE OF THE SCHOLARSHIP</b>	Ecodesign strategies in the product system			
<b>RESEARCH TOPIC</b>	The goal of research is to define an Eco-Design strategies: from materials to Product Service Systems – PSS in the sector "Furniture and Interiors, Contracts, Exhibits, Yacht Design" and in the sector "Automation, Mechatronics, Machinery and Mechanical technologies" through: the definition of a portfolio of advanced solutions; a contribution to modeling of design approaches, methodologies, and tools; a Design-driven experimentation; a proof of concept validation			
<b>Study/Research periods abroad</b>	1-3 months			
<b>TITLE OF THE SCHOLARSHIP</b>	Ecodesign strategies in the fashion system			



<b>RESEARCH TOPIC</b>	The goal of research is to define an Eco-Design strategies: from materials to Product Service Systems – PSS in the sector “Fashion, Apparel, Leather, Textile, Footwear, Eyewear, and Accessories” trough: the definition of a portfolio of advanced solutions; a contribution to modeling of design approaches, methodologies, and tools; a Design-driven experimentation; a proof of concept validation.			
<b>Study/Research periods abroad</b>	1-3 months			
<b>INTERVIEW</b>				
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>	<b>PLACE</b>
Italian	1 <sup>st</sup> December 2022	9:00 a.m.	In-person*	DIDA Aula sedie colorate (p.4) Santa Teresa Florence

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## EDUCATION SCIENCES AND PSYCHOLOGY

Director prof. Vanna Boffo

<b>PROGRAMME</b>	Ecosistemi dell'Innovazione – THE Tuscany Healthcare Ecosystem	<b>CUP</b>	B83C22003920001
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Telecare for assessment and empowerment of cognitive functioning in subjects with neurodevelopmental disorders or special educational needs</b>		
<b>RESEARCH TOPIC</b>	<p>In the field of telecare, there is growing interest on the development and testing of new procedures for the assessment and empowerment of cognitive functioning in children and adolescents with neurodevelopmental disorders or special educational needs.</p> <p>A current challenge is to improve existing instruments with psychophysiological indicators of the child's cognitive functioning, learning and emotional activation during the intervention, factors that can contribute to the treatment outcomes. To this aim, it is necessary to integrate telehealth tools with advanced assessments based on artificial intelligence (AI).</p> <p>The PhD will be devoted to the development and testing of new teleassessment and teleintervention procedures that include the main individual parameters of the child's cognitive and emotional functioning, while performing school learning tasks (e.g., attention, emotions, fatigue, and cognitive load), and ecological-environmental indicators (e.g., parental attitude, digital skills), that may contribute to the treatment outcome, in self-adaptive algorithms. A multidisciplinary approach will be required to develop and validate an AI web platform to support telerehabilitation procedures by automatically collecting real-time information on attention, cognitive load, and emotional activation of subjects in the virtual environment. Furthermore, advanced data analysis skills will be required to use the project results for the development of guidelines for the semiotic dimension of teleassessment and teleintervention tools in developmental ages.</p>		
<b>Study/Research periods abroad</b>	1 - 3 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	29 <sup>th</sup> November 2022	10:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_5	<b>CUP</b>	B53C22004010006
<b>SCHOLARSHIP</b>	1		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>“Educational heritage”: people-oriented and community-based approaches for a dynamic safeguard of local assets</b>		
<b>RESEARCH TOPIC</b>	<p>The introduction of the construct of intangible heritage allows us to consider the community as an integral part of the heritage that a place expresses. This has led to a shift towards a people-oriented vision and the overcoming of the so-called expertise-led and object-oriented preservation paradigm with the necessary and consequent need to reconsider in an "unconventional" way the relationship between the public and cultural (and environmental) assets, overcoming the risks of</p>		



	static conservation practices to the advantage of an intrinsic dynamism in the use and transformation of the cultural asset. In this perspective, communities are called upon to reinterpret and re-functionalize public and collective cultural "spaces" from below and at the same time enable collaborative, inclusive and virtuous processes aimed at improving the quality of life and well-being, social inclusion, with particular reference to vulnerable groups (NEETs, immigrants, low-skilled, young people) and with attention to the gender perspective.		
<b>Study/Research periods abroad</b>	6 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian	29 <sup>th</sup> November 2022	10:00 a.m.	videocall

<b>PROGRAMME</b>	Partnership Estesi – PE_8	<b>CUP</b>	B83C22004800006
<b>SCHOLARSHIP</b>	2		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Continuing Work-Related Transitions from labour world: Education, Lifelong Learning and Active Aging</b>		
<b>RESEARCH TOPIC</b>	<p>The training policies of the country of Italy have said little about the problem of active aging, especially as regards the growth of skills for an adult population that will have to prepare for leaving the world of work. There is a real gap between the urgent need to equip the adult population with skills, Life Skills, to face old age and the educational denial that can be inferred from the loss of social cohesion and aggregating and cooperative socio-cultural fabric. The task of the doctoral project will be to focus attention on the analysis of the needs of adults over 60 of working age, study the transition to work at a gender level, concentrate the survey of the competences / abilities possessed by the population to face the challenge of change of life, to support the production of models of social, cultural and health well-being to be developed in the workplace for the purpose of a studied and appropriate prevention. From another point of view, the project will act as a flywheel to build a map of skills / abilities after leaving the world of work that can support the construction of personal services.</p> <ul style="list-style-type: none"> <li>• Mapping skills, also from a gender perspective, to support the transition out of the world of work;</li> <li>• Develop, in terms of research and training, new professional figures capable of supporting the transition out of work;</li> <li>• Building policy models for active aging through support for lifelong learning.</li> </ul>		
<b>Study/Research periods abroad</b>	6 months		
<b>TITLE OF THE SCHOLARSHIP</b>	<b>Care transition for active aging: professionalization processes for sustainable integrated welfare</b>		
<b>RESEARCH TOPIC</b>	<p>Today's society is often described as an "aging society": certainly a "success story" (ILO, 2009) that sees more and more people remain active, extend their career or participate in cultural, social and educational activities. However, an increase is estimated from 19.5 million people in 2016 to 30.5 million in 2050, who will need assistance services in the EU-27 (EC, 2021). A request capable of potentially generating 8 million jobs over the next 10 years. A change that recalls a sort of "care</p>		





	<p>transition” from an approach mainly centered on health aspects to an integrated approach that focuses on well-being and recovers the active role of the subject. Supporting shared decision-making processes, favoring forms of choice and self-management of care processes constitute approaches that profoundly modify relationships and highlight a negotiating dimension that requires practices capable of integrating the educational dimension, to the advantage of self-care skills and the ability to "consume critical "of care services.</p> <p>The research, with the aim of offering evidence that can represent a reference for new welfare policies, starting from the survey and analysis of good practices, develops around some questions: Which integrated models of services, sustainable and <i>constructionable</i>, can be prefigured, between institutional welfare and socio-educational welfare, to respond quickly to the scenarios of the demographic megatrend? what professionalization paths could be supported and developed? What impact could widespread educational / training actions have by acting in term of prevention at level of family and individual self-care education?</p>		
<b>Study/Research periods abroad</b>	6 months		
<b>INTERVIEW</b>			
<b>LANGUAGE</b>	<b>DATE</b>	<b>TIME</b>	<b>MODE</b>
Italian/English	29 <sup>th</sup> November 2022	10:00 a.m.	videocall