











APPENDIX CALL FOR APPLICATIONS FOR ADDITIONAL PHD SCHOLARSHIPS ON INNOVATION TOPICS (ACTION IV.4)

Research Topics

Thematic area	B - Health, Nutrition, Quality of life
National Strategy of	
Intelligent	
Specialization	
2014-20	
National Posoarch	1 Health
Brogrom DND 2021	
PIOGIAIII PNR 2021-	
2027	
Project title	New drug development for the treatment of Sarcopenia
Supervisor	Marco Sandri
PhD Programme	BIOMEDICAL SCIENCES
Curriculum (if	
foreseen)	
Project description	Human life expectancy has extended in modem societies, aver 20% of Europeans will be 65/over by the 2025. Unfortunately, healthy life has not increased in line with lifespan. Aging sarcopenia, the pathological decrease of muscle mass during life, is a disease that cause the frailty syndrome, a condition 'of vulnerability to develop comorbidities and precocious mortality. Actually, there are not drugs available to treat sarcopenia and frailty syndrome. This project will use an in-silico platform screening (Rejuvenate's property) to identify and validate new drugs that will be placed on the market for treating sarcopenia and ameliorating quality of life in elderly people. The insilico identified molecules will test in preclinical trials to show efficacy and safety and to generate a robust rationale for moving to clinical! trials on aging and sarcopenia. This project will provide an important synergistic action between industry and university far targeting human age-related diseases.
Mandatory	6 months
traineeship	

Thematic area National Strategy of Intelligent Specialization 2014-20	A - Smart and sustainable industry, energy and environment
National Research Program PNR 2021- 2027	4. Digital, Industry, aerospace
Project title	MODO 4.0 – MODelling and Optimization in Industry 4.0: development of machine learning approaches
Supervisor	Pierantonio Facco
PhD Programme	INDUSTRIAL ENGINEERING
Curriculum (if foreseen)	Chemical and environmental engineerinmg
Project description	 This project deals with the development of digital twins to support sustainable fine-chemicals process management and scale-up through Machine Learning (ML) approaches for Industry 4.0. It is divided in 5 work packages (WP; Table 1) to develop: WP1: multivariate machine learning techniques to allow process understanding from process data fusion; WP2: innovative data-based monitoring systems to identify/diagnose process anomalies for early fault detection and process troubleshooting; WP3: hybrid digital twins (integrating ML to process knowledge) to aid the process, product and technology development and scale transfer. WP4: virtual sensors to predict the quality of intermediates and final product quality. WP5: methodologies of latent-variables model inversion to propose the formulation of products to obtain a desired product quality from data on historical formulations and pilot scale experiments.
Mandatory	6 months
traineeship	

Thematic area National Strategy of Intelligent Specialization 2014-20	A - Smart and sustainable industry, energy and environment
National Research Program PNR 2021- 2027	5. Climate, energy, sustainable mobility
Project title	Company Law and Sustainability. Legal Barriers and Opportunities
Supervisor	Claudia Sandei
PhD Programme	INTERNATIONAL LAW AND PRIVATE AND LABOUR LAW
Curriculum (if foreseen)	
Project description	Companies' role is pivotal in meeting the objectives of the EU Green Deal and designing a sustainable future, as they sit at the junction of consumers, investors, workers, etc. However, the incentives, measurement and accountability mechanisms which frame their governance have traditionally been defined with regards to financial performance only. Therefore, not surprisingly, the European Green Deal (p. 19) sets out that "sustainability should be further embedded into the corporate governance framework" (directors' duties and remuneration criteria; disclosure and accountability requirements; etc.). At a national level, the SNSI (p. 114) also emphasizes the role of company law, while stressing the need to reform business structure (start-up a vocazione sociale; b-corp) and facilitate social investment through corporate crowdinvesting platforms. Accordingly, the project aims to investigate what a robust governance framework for companies would look like under a sustainability paradigm and what function company law and companies directors shall have in this. Doing so, the project provides detailed recommendations to support enterprises to identify governance gaps in their own companies and find practical solutions that will benefit their business and premete its sustainable growth.
Mandatory	6 months
traineeship	

Thematic area National Strategy of Intelligent Specialization 2014-20	D - Tourism, Cultural heritage and Creativity industry
National Research Program PNR 2021- 2027	2. Humanistic culture, creativity, social transformations, inclusion society
Project title	Public Al Models for Text Recognition and Classical Philology: the Case of Livy's 16th - Century Editions
Supervisor	Gianluigi Baldo
PhD Programme	LINGUISTIC, PHILOLOGICAL AND LITERARY SCIENCES
Curriculum (if foreseen)	
Project description	The project aims at developing a public model far the text recognition and automatic transcription of early modem books in Latin; the corpus will be represented by the 16th-century editions of Livy's Ab urbe condita libri. The project, which will benefit from the expertise of Padua's Interdepartmental Research Centre "Studi Liviani" and the relationship with institutions such as the Marciana Library and the Biblissima Portai, will fruitfully integrate with the activities of DiSSGeA's Mobilab, and will be carried out in partnership with Read- Coop SCE, a society that develops models of digitisation, Al- powered text recognition, and automatic transcription of texts through the platform "Transkribus". The model developed by the researcher will be made publicly applicable to other corpora, while the data collected will be used to realise an open- access, digitai repository of the textual variants of the AUC's early printed tradition, a long-since desideratum in the field of Livian studies.
Mandatory traineeship	6 months

Thematic area National Strategy of	D - Tourism, Cultural heritage and Creativity industry
Intelligent	
Specialization	
2014-20	
National Research	2. Humanistic culture, creativity, social transformations, inclusion
Program PNR 2021-	society
2027 Project title	Digital adition of Tassa's Lasturas
Supervisor	Franco Tomasi
Supervisor	
Curriculum (if	LINGUISTIC, FTILOLOGICAL AND LITERART SCIENCES
forescen	
Droject description	This project aims to produce a critical and commented digital edition
	of the series of lectures - belonging to the work Prose diverse (1875) - that Torquato Tasso devoted to the poetry of his time (namely six lectures on the lyric works of Pigna, Della Casa and Tasso). The reason to develop this project is twofold. First, no critical edition of these texts exists; and second, no exegetical work has been carried so far to cast light on this part of Tasso's production which is extremely valuable to assess the author's oeuvre. The digital edition of Tasso's lectures will be published open access - according to the XML-TEI norms - both on a web platform devoted to Tasso and on the webpage of the BIT&S book series · The edition will be available in print too. The researcher working on this project will also participate to the creation of the database on Tasso's works, co-designed by Padua University, Sapienza University in Rome, and the Centre for Studi Tassiani in Bergamo.
Mandatory traineeship	6 months

Thematic area National Strategy of Intelligent Specialization 2014-20	D - Tourism, Cultural heritage and Creativity industry
National Research Program PNR 2021- 2027	2. Humanistic culture, creativity, social transformations, inclusion society
Project title	Towards the dematerialization and exploitation of the documentary assets of the ASV (Archive of Veneto Writers)
Supervisor	Attilio Motta
PhD Programme	LINGUISTIC, PHILOLOGICAL AND LITERARY SCIENCES
Curriculum (if	
foreseen)	
Project description	The PhD project is aimed at exploiting the Collections relating to some 20th Venetian century writers, located at the Department of Linguistic and Literary Studies of Padua University. The main purpose is to foster synergetic cooperation by building bridges between researchers and enterprises dealing with the digitalization of documentary assets. The PhD student will spend six months in Paris at the ITEM (/nstitut des Textes and Manuscrits Modernes), a research unit at CNRS/ENS, where s/he will be provided with training in digital scholarly editing; six months will be spent at the DISMA s.a.s., a leading company in the field of dematerialization of cultura! heritage, where s/he will become acquainted with material aspects of the digitalization process. The acquired knowledge, added to the training activities provided by the beneficiary, will boost a research project aimed at producing a model for and an example of a digital scholarly edition of part of the ASV Collections.
Mandatory	6 months
traineeship	

Thematic area National Strategy of Intelligent Specialization 2014-20 National Research Program PNR 2021- 2027	 A - Smart and sustainable industry, energy and environment 4. Digital, industry, aerospace
Project title	Driving the transition of manufacturing firms towards customized, integrated solutions through smart product-service systems
Supervisor	Lara Agostini
PhD Programme	MANAGEMENT ENGINEERING AND REAL ESTATE ECONOMICS
Curriculum (if foreseen)	
Project description	Digitalization and servitization, despite born independently, are both customer-centric strategies aiming to gain competitive advantage by offering solutions tailored on customer needs. Recently, their potential of mutual strengthening has been recognized, since, if combined, they allow firms ensuring value capture through the development of smart product-service systems. This scenario represents a radical transformation of manufacturing firms: shifting from a product- to a service-centred perspective is far from easy since it is likely to change their business models (BMs). In particular, many incumbents are lacking the methods and capabilities for managing the transition towards these new BMs. To address this challenge that reflects a huge opportunity, this project aims, through an in-depth literature review and company field research, to develop a roadmap and guidelines to support firms through this transition, embracing the human, organizational, technological and strategic areas.
Mandatory traineeship	6 months

Thematic area National Strategy of Intelligent Specialization 2014-20	C - Digital Agenda, Smart Communities, Intelligent Mobility Systems
National Research Program PNR 2021- 2027	4. Digital, industry, aerospace
Project title	Advanced rare earth-free motor drives for energy-efficient pumps in urban applications
Supervisor	Mauro Zigliotto
PhD Programme	MECHATRONICS AND PRODUCT INNOVATION ENGINEERING
Curriculum (if foreseen)	
Project description	In a recent past, building energy consumption in EU was 37% of final energy, larger than that documented for industrial sectors (28%) and that of transportation (32%). There remain effective chances to lessen the energy use of buildings. Increasingly in very large buildings, a computerized central station monitors and controls services such as heating, air conditioning and water supply. Electronically controlled pumps can be readily integrated into such building automation systems, increasing convenience and saving energy. The Research project will focus on Capacitorless and Sensorless Control of Synchronous Reluctance Motors for pumps application. During the three years of PhD, the student will analyse the scientific and industrial state of the art and study new techniques that lead to the elimination of both bulky electrolytic capacitors and delicate position sensors in electric pumps.
Mandatory traineeship	6 months

Thematic area	B - Health, Nutrition, Quality of life
National Strategy of	
Intelligent	
Specialization	
2014-20	
National Research	1. Health
Program PNR 2021-	
2027	
Project title	Control of dynamical switches in the brain by minimally invasive
	neuromodulation devices
Supervisor	Stefano Vassanelli
PhD Programme	NEUROSCIENCE
Curriculum (if	
foreseen)	
Project description	Neuromodulation is attracting growing interest as a therapy of neurological diseases including Parkinson's, stroke and epilepsy. Novel and minimally invasive brain-computer interfaces are promising towards controlling brain states and facilitate recovery, but successful therapy will crucially depend on understanding and predicting where and how to stimulate. Instead of attempting a simultaneous control of multiple brain regions, which is nowadays technically very challenging, the strategy is to identify and stimulate one or a few key structures with the capability to drive favorable switches between brain states. The PhD project aims at building an efficient computational platform for real-time simulation of electrical stimulation of the brain by minimally invasive implantable devices. The model will be validated in an experimental animal model of stroke and assessed for therapeutic efficacy, taking also advantage of a novel AI-based implant technology for closed-loop neuromodulation.
Mandatory	o months
traineeship	

Thematic area	D - Tourism, Cultural heritage and Creativity industry
National Strategy of	
Intelligent	
Specialization	
2014-20	
National Research	2 Humanistic culture creativity social transformations inclusion
Program PNR 2021-	society
2027	
Project title	Lost in transition? For whom and why digital learning resources are
	beneficial
Supervisor	Lucia Mason
PhD Programme	PSYCHOLOGICAL SCIENCES
Curriculum (if	
foreseen)	
Project description	Educational systems are undergoing a massive digital transformation.
	Unfortunately,
	this transition is rarely driven by evidence-based instructional design
	grounded on
	scientific research, which indicates how learning is a complex
	Interweaving of
	cognitive, motivational, and socio-emotional processes. All they
	school motivation success and wellbeing
	We know very little about the processes and outcomes of learning.
	through digital
	resources, in particular regarding those that are designed to remove
	barriers to
	learning and/or targeted to vulnerable students. Effectiveness
	crucial strategy to test the value-added of learning based on digital
	materials and
	media that may be used as the traditional ones. or innovatively for
	their unparalleled
	affordances. Relying on a multi-method approach, the project includes
	multiple
	studies to reveal whether and to what extent, for whom, and why
	benefits of
	digitalization emerge in secondary school.
Mandatory	6 months
traineeship	

Thematic area	B - Health, Nutrition, Quality of life
National Strategy of	
Intelligent	
Specialization	
2014-20	
National Research	1. Health
Program PNR 2021-	
2027	
Project title	Artificial intelligence for closed-loop neurorehabilitation of visuospatial
	functions in stroke patients
Supervisor	Marco Zorzi
PhD Programme	PSYCHOLOGICAL SCIENCES
Curriculum (if	
foreseen)	
Project description	Eye movements are the key to visual exploration, which is
	fundamental for most
	activities of daily living. Eye movement disorders may affect over 70%
	of stroke
	survivors (Pollock et al., 2011, for a Cochrane review), but very lew
	investigated protocols for their treatment. This project will exploit
	machine learning
	coupled with an eye-tracking device to develop a gaze-based
	biofeedback system for
	training eye movements. Visual exploration will be tracked in real time and deviation
	from an ideal observer model will provide a "cost function" to be minimed during
	training. The system will force the correction of eye movements
	abnormalities using
	real-time feedback, thereby reducting the gap with normal visual
	exploration dynamica. This percendized appreach will be tested in a pilot
	rehabilitation study and
	its possible extension to a home-based setting will also be explored
	The research
	approach will be strongly interdisciplinary, combining knowledge from
	cognitive
	neuroscience and artificial intelligence.
Mandatory	8 months
traineeship	

Thematic area National Strategy of Intelligent	C - Digital Agenda, Smart Communities, Intelligent Mobility Systems
2014-20	
National Research	4. Digital, industry, aerospace
2027	
Project title	SOS – SOcial media Sampling
Supervisor	Maria Letizia Tanturri
PhD Programme	STATISTICAL SCIENCES
Curriculum (if	
foreseen)	
Project description	Social Media Mining represents the last frontier of the data analysis. Indeed, social media potentially provide an easy and inexpensive way to collect large amounts of data containing feelings, opinions, behaviours (and so on) of the people. However, such collections do not rely on probability samples. Social media samples are not representative of the whole population, because "online" individuals usually have different characteristics and attitudes than "offline" people. This leads to problems of selection bias. However, given the rapidly declining of response rates and increasing costs of probability samples, nonprobability samples (NPS) are becoming an interesting alternative. With the help of a firm specialised in surveys' administration and data collection, this project aims at: i) developing new solutions to improve the representativeness of NPS selected from social media; ii) defining suitable weighting measures to correct for the systematic differences in probability sampling.
Mandatory	6 months
traineeship	