APPENDICE AVVISO DI SELEZIONE PER L'ASSEGNAZIONE DI BORSE DI STUDIO DI DOTTORATO DI RICERCA EX DM 630 DEL 24.04.2024 E ALTRI FONDI

Corso di Dottorato	**ANIMAL AND FOOD SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Profilazione di endofiti tramite NGS in piante selvatiche e coltivate
Referente Scientifico	Piergiorgio Stevanato
Email Referente Scientifico	stevanato@unipd.it
Descrizione del progetto	Background The application of 16S and ITS-targeted amplicon sequencing is a promising tool for supporting high-precision phenotyping and breeding of crops. However, our understanding of plant-associated microbial communities remains limited. Aim This project aims to analyze seasonal changes in microbial diversity across different growing sites of wild and cultivated plants using 16S rRNA and ITS sequencing methods. Materials and Methods Bacterial diversity will be assessed using 16S rDNA multi-amplicon sequencing, while ITS-targeted amplicon sequencing will be employed to survey fungal community diversity. The ITS1 and ITS2 regions will be utilized for the analysis. Expected Results To reveal significant differences in endophytic profiles between wild and cultivated plants using NGS. To detect shifts in leaf microbiota composition and varying richness as the season progresses across different sampling times. To identify environmental and genetic factors influencing bacterial and fungal community composition. To provide key insights into the microbial profiling of plants, discussing impacts on precision phenotyping and the breeding of crops.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Eugen Seed Genetics S.r.l.s.

Corso di Dottorato	**ANIMAL AND FOOD SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sostenibilità dei processi di produzione della carne, con particolare riferimento a bovini e suini
Referente Scientifico	Luigi Gallo
Email Referente Scientifico	luigi.gallo@unipd.it
Descrizione del progetto	Meat production is a significant sector for the Italian agrifood system, because of its economic relevance and the size of personnel involved in the meat chains. Moreover, meat is the raw material for several PDO specialties, which are a main feature of Italian agrifood identity. Meat production has also become one of the most discussed topics in the public debates, because of the perceived deficiency of sustainability, particularly for environmental and animal welfare issues. Increasing the sustainability of meat producing systems is therefore a specific requirement, which implies the need of producing and sharing new knowledge and innovation. This research project, developed and managed in partnership with a Veneto primary association of meat producers, aims to train an expert highly qualified in the procedures able to increase the sustainability of the production of pig and beef meat through studies and research activities performed at the University, the association and abroad.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	UNICARVE - ASSOCIAZIONE PRODUTTORI CARNI BOVINE

Corso di Dottorato	**ARTERIAL HYPERTENSION AND VASCULAR BIOLOGY (ARHYVAB)**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Approcci digitali orientati ai metadati per garantire esami di laboratori accurati e diffusi nel territorio per la gestione del rischio cardiovascolare
Referente Scientifico	Andrea Padoan
Email Referente Scientifico	andrea.padoan@unipd.it
Descrizione del progetto	The objective is to improve the standardization of information related to the cycle of testing of clinical laboratory exams (TTP) to harmonize the results provided by different laboratories, for improving the comparability of patients' results within the management of cardiovascular risk. Currently, analytical aspects of the metabolic profile tests (e.g., analytical principle, matrix) can be harmonized/standardized. However, pre/post-analytical information (e.g., sample transportation and centrifugation, measurement units, laboratory reports, etc.) is important, even if it is neither adequately utilized nor encoded. The creation of a standard code referring to the quality of laboratory analyses of pre/post-analytical phases (P2LQC) can facilitate the validity of the test results. Through P2LQC, the entire traceability of a test can be ensured, improving the comparison of results of the same test performed on the same patient but in different laboratories within the regional area.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	QI.LAB.MED S.r.l.

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biochimica e Biotecnologie**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Scoperta, validazione ed ottimizzazione in silico di nuovi teranostici in grado di bloccare l'asse VIP/VPAC
Referente Scientifico	Laura Cendron
Email Referente Scientifico	laura.cendron@unipd.it
Descrizione del progetto	Vasoactive Intestinal Peptide (VIP) and its VPAC receptors are key components of the endocrine and immune systems. Targetting of VIP/VPAC axis is a promising strategy for developing new therapies for chronic inflammation and understand its role in the microbiome ecology. Our project aims to engineer innovative biologics against the VIP/VPAC axis to enhance VIP degradation by hijacking lysosomal degradative pathways. Selected candidates will enable the detection of VIP levels, which could revolutionize the study of pathological conditions. The project will base its success on the synergy between the academic expertise in biochemistry and the bioinformatic resources of the EuBiome company, which employs deep learning and network theory methods to predict interactomes. By combining experimental screening and in silico approaches, we will provide a theranostic solution with enhanced pharmacokinetic properties. Our collaboration can boost the company's expansion into biotech applications.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	EuBiome S.r.l.

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biochimica e Biotecnologie**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Studio funzionale di enzimi lipolitici in microalghe mediante approcci di ingegneria genetica
Referente Scientifico	Tomas Morosinotto
Email Referente Scientifico	tomas.morosinotto@unipd.it
Descrizione del progetto	The proposed project will focus on the functional characterization of a lipolytic acyl hydrolase (LAH) in two stramenopile microalgae models, Phaeodactylum and Nannochloropsis, coupling genome editing, gene overexpression and lipidomic analyses with the aim to elucidate mechanisms of lipid metabolism. Microalgae possess different lipolytic enzymes with various target specificity that permit the mobilization of the polyunsaturated fatty acids (PUFAs) from complex lipids. The LAH enzyme, object of this study, belongs to the group of patatin-like proteins. It has been studied in plants showing preferential activity on galactolipids, primary lipid components of plastid membranes, essential players in membrane homeostasis, and involved in many eco-physiological processes. Our results will enlarge the knowledge about the molecular bases of lipid catabolic processes in microalgae and, in parallel, will allow to identify possible routes to increase the production of lipids for biotechnology.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Stazione zoologica Anton Dohrn

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biologia Cellulare e Fisiologia**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Nanosistemi e Biostimolanti Vegetali per il miglioramento della produttività delle piante
Referente Scientifico	Lorella Navazio
Email Referente Scientifico	lorella.navazio@unipd.it
Descrizione del progetto	Nanotechnology is one of the EC's "Key Enabling Technologies" for sustainable competitiveness and growth. Its real contribution to plant productivity remains uncertain due to a knowledge gap on its effects on plants. Biostimulants, which stimulate plant nutrition and growth at low doses, are widely used but not fully understood. Combining nanotechnology and biostimulants may lead to new products for sustainable agriculture. This project aims to develop, test, and understand the physiological effects of nano-encapsulated, biostimulant and/or biopesticide fertilizers. The research will be conducted in collaboration with UNIPD DAFNAE (Profs. Masi and Carletti) and ILSA S.p.A., where the PhD student will work for at least 6 months. Additionally, the PhD student will spend 6 months abroad. The project will demonstrate the effectiveness of nanoformulated biostimulants and elucidate their effects on plant cell cultures and plants in toto, creating a platform for testing future formulations.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	ILSA S.p.A.

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biologia Cellulare e Fisiologia**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Bersagli di dinamica mitocondriale nelle LMA
Referente Scientifico	Luca Scorrano
Email Referente Scientifico	luca.scorrano@unipd.it
Descrizione del progetto	AML, the second most common leukemia in adults, has a 5-year survival rate of 28%. Changes in mitochondrial dynamics i.e., the processes of mitochondrial fusion, fission ad cristae remodeling governing organelle shape emerged as key in AML genesis and targeted therapy. AML Leukemia Stem Cells (LSCs) that replenish the proliferating myeloblasts and contribute to AML aggressiveness rely on the mitochondrial fission gene FIS1. However, it is unclear how FIS1 sustains LSCs and if and how we can target it to deplete them. The successful candidate will use a unique Fis1 conditional mouse generated in our laboratory and engineered AML cell lines, metabolomics, RNAseq, proteomics to understand whether FIS1 and mitochondrial fission control myelopoiesis and sustains LSCs in AML by licensing a metabolic switch. The candidate will Profile metabolism/mitophagy upon Fis1/Drp1 deletion in myeloid cells and understand molecularly how Fis1/Drp1 deletion induces myeloid differentiation.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Biologia - DiBio su fondi Progetto SCOR_PRIV24_01, responsabile scientifico Prof. Luca Scorrano

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biologia Cellulare e Fisiologia**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Analisi funzionale sistematica delle interfacce tra mitocondri e altri organelli
Referente Scientifico	Luca Scorrano
Email Referente Scientifico	luca.scorrano@unipd.it
Descrizione del progetto	In the cytoplasm, organelle interactions are specified by membrane contact sites (MCS) that define interfacial microdomains responsible for compartmentalization of signaling cascades and metabolic pathways, ultimately impacting on organellar and cellular function. Our knowledge of MCS is scarce. Even for a central organelle such as mitochondria, we are only starting to unravel the proteome and function of the best studied, mitochondria-endoplasmic reticulum (ER) interface. However, mitochondria can engage in contacts with all other organelles and the occurrence, physical composition, biophysical properties, and function of these MCS are largely unknown. The successful candidate will generate genetically encoded probes FRET or SPLIT-FAST-based probes to measure MCS between mitochondria and lysosomes in mammalian cells. The candidate will use these probes to unbiasedly identify modulators of these MCS. By combining this approach with iBAQ proteomics on purified interorganellar MCS the candidate will provide a catalogue of functional components of the mitochondria-lysosome MCS.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Biologia - DiBio su fondi Progetto FIS00001005 dal titolo “A SystematIc fuNctional analysis oF mitOchondrial iNterorganellar InterfAces” dal codice CUP C53C23000420001, responsabile scientifico Prof. Luca Scorrano

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biologia Cellulare e Fisiologia**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Ruolo del metabolismo nell'angiogenesi e nello sviluppo tumorale
Referente Scientifico	Massimo Santoro
Email Referente Scientifico	massimo.santoro@unipd.it
Descrizione del progetto	Endothelial and tumor cells exhibit unique plasticity in terms of redox biology and metabolism. Our lab has contributed in the past years in decoding some of these cellular and molecular mechanisms (Mugoni et al., Cell 2013; Chen et al. Cell Reports, 2017, Facchinello et al., Nature Metabolism, 2022; Arslanbaeva et al., Redox Biology 2022). By using advanced redox and metabolic platforms, and innovative molecular and genetic approaches in cellular and animal models, we aim to shed light on the role of metabolic pathways and antioxidant enzymes in angiogenesis (developmental vs pathological) and cancer disease (melanoma). The ultimate objective is to open the way for the development of innovative therapeutic strategies and complement the existing ones based on genetic and pharmacological manipulation of redox and metabolic state in angiogenic and cancer processes.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Biologia - DiBio su fondi del Progetto MUR "Dipartimenti di eccellenza 2023-2027", D21_ECCELLENZA23_01, CUP: C93C23001650001

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Genetica, Genomica e Bioinformatica**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Miglioramento della Diagnostica delle Infezioni Sessualmente Trasmissibili attraverso approcci di Biologia Sintetica guidati dall'Intelligenza Artificiale
Referente Scientifico	Gabriele Sales
Email Referente Scientifico	gabriele.sales@unipd.it
Descrizione del progetto	BACKGROUND: STIs are a global health concern, causing severe reproductive health problems and cancer risk increase. Major pathogens include both viruses and bacteria. Current STD diagnostics often require specialized equipment, limiting their use in resource-poor areas. Synthetic biology (SB) offers novel solutions, from living biosensors to low-cost cellfree diagnostics. Riboswitches and aptamers can be engineered to bind specific pathogens, triggering detectable signals, despite requiring extensive testing and computational biology design tools. AI-powered genomic language models (gLM) can be used to optimize these SB tools, reducing time and cost of development. AIM: create rapid, cost-effective STD diagnostic tools for low-resource settings leveraging synthetic biology and AI. ROADMAP: -Review AI methodologies for ligand design. -Identify pathogen-specific targets. -Gather data for model training. -Fine-tune transformer-based gLM. -Implement sensors in engineered E.coli or TX-TL platforms.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	AB ANALITICA S.r.l.

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Genetica, Genomica e Bioinformatica**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	RNA circolari coinvolti nei meccanismi di trasformazione e ricaduta nella T-ALL
Referente Scientifico	Stefania Bortoluzzi
Email Referente Scientifico	stefania.bortoluzzi@unipd.it
Descrizione del progetto	La leucemia linfoblastica acuta a cellule T (T-ALL) ha tassi di guarigione insoddisfacenti nei pazienti con resistenza alla terapia o malattia recidivante. È essenziale migliorare la stratificazione dei pazienti e scoprire nuovi meccanismi molecolari che sostengono la linfopoiesi T maligna e la chemoresistenza. Gli RNA circolari (circRNA) sono attori importanti nel cancro che regolano assi oncogenici interagendo con proteine, RNA e DNA. L'espression aberrante dei circRNA nella T-ALL e il ruolo oncogenico di specifici circRNA recentemente svelati incoraggiano ulteriori indagini. Il dottorando sarà coinvolto in studi per meglio caratterizzare la disregolazione del circRNAoma della T-ALL alla diagnosi e anche alla recidiva, definendo circRNA associati a distinte caratteristiche cliniche e genetiche dei pazienti e con rilevanza prognostica, e sarà responsabile di studi sperimentali per la caratterizzazione funzionale dei ruoli dei circRNA nella trasformazione maligna, nella progressione della malattia e nella chemoresistenza, inclusi esperimenti di circRNA loss-of-function mediante silenziamento CRISPR/Cas13 e test sul comportamento cellulare e sulla sensibilità ai farmaci *in vitro* e *in vivo*.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Medicina Molecolare – DMM su fondi AIRC - progetto: AIRC IG Bortoluzzi [BORT_PRIV23_01]

Corso di Dottorato	**BIOSCIENZE**
Curriculum *(eventuale)*	**Biochimica e Biotecnologie**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Approcci basati su modello per l'ingegneria genetica di alghe
Referente Scientifico	Tomas Morosinotto
Email Referente Scientifico	tomas.morosinotto@unipd.it
Descrizione del progetto (max 1.000 caratteri)	At industrial scale microalgae are generally cultivated at high concentrations to maximize biomass productivity. The high density, combined with the high pigment content per cell, causes a large light absorption capacity leading to an inhomogeneous light distribution in the culture with a negative impact on productivity. During industrial cultivation, microalgae are continuously mixed, thus experiencing sudden changes in the exposure to light, causing a stress. The PhD project aims at increase the ability of microalgae to respond to light fluctuations targeting the regulatory mechanism of photosynthesis, increasing their rate of activation / deactivation. This is expected to provide a productivity advantage in the context of a industrial cultivation.
Periodo da svolgere in impresa (facoltativo)	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi di Eccellenza CARIPARO 2023 - Progetto "Model-based Optimisation of MicroAlgae strain selection and industrial production"

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Tecnologie di Intelligenza Artificiale per lo Sviluppo di Software
Referente Scientifico	Alessandro Sperduti
Email Referente Scientifico	alessandro.sperduti@unipd.it
Descrizione del progetto	This Ph.D. research project aims to develop and explore the application of Artificial Intelligence (AI) in enhancing the capabilities of Digital Adoption Platforms (DAPs). The primary focus is on leveraging AI to improve the efficiency, effectiveness, and user experience of these platforms. By integrating advanced machine learning techniques, the research intends to optimize the performance of DAPs, making them more responsive and adaptive to user needs. Additionally, the study will delve into the realm of Human-Computer Interaction (HCI) within the DAP sector. It will analyze how users interact with these platforms and identify opportunities for AI to make these interactions more intuitive and seamless. The integration of AI and HCI aims to provide personalized user experiences that cater to individual preferences and behaviors.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	myMeta S.r.l

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Metodi e Applicazioni dell'Apprendimento Automatico Continuo
Referente Scientifico	Alessandro Sperduti
Email Referente Scientifico	alessandro.sperduti@unipd.it
Descrizione del progetto	This Ph.D. research project aims to study novel methodologies and applications of continual learning for Deep Learning models. The main focus of the project will be on efficiency and effectiveness, with the aim of developing approaches that are sustainable from the point of view of required training data and compute, as well as applicable in all application domains where the environment is continuously changing and/or new functionalities should be gradually and autonomously acquired by the system implementing them. Examples of potential applications will be in the context of Smart Cities, Sustainable Agriculture, Smart Healthcare, and Human-Computer Interaction (HCI). Moreover, the developed methodologies should take into consideration all the dimensions of trustworthy AI, as described in the EU ethics guidelines, and in agreement with the human-centered AI approach outlined in the FBK 2024-2027 Strategic Plan (https://www.fbk.eu/wp-content/uploads/2024/04/PDM_ENG_web.pdf).
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Fondazione Bruno Kessler - FBK

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Robust AI
Referente Scientifico	Mauro Conti
Email Referente Scientifico	mauro.conti@unipd.it
Descrizione del progetto	AI is being widely adopted in several areas, from healthcare to the automotive industry, and from agriculture to the industrial sector. Many of these applications are sensitive both in terms of safety and security. Therefore, it becomes of paramount importance to understand if and how attackers can exploit such systems and to design more robust ones. This project aims to focus on “adversarial machine learning,” both from the attacker’s point of view, to understand ways an adversary can abuse AI solutions to gain an advantage (with attacks such as model stealing, model poisoning, or membership inference), and from the defense’s point of view, to explore novel techniques to make AI solutions more robust against these attacks.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Fondazione Bruno Kessler - FBK

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Intelligenza artificiale per le città intelligenti
Referente Scientifico	Alessandro Sperduti
Email Referente Scientifico	alessandro.sperduti@unipd.it
Descrizione del progetto	The research activity will involve one or more of the following topics: Use of generative AI in the context of citizen access to services; Analytics in the context of city mobility; Analytics in the environmental field; Analytics in the field of real estate.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Comune di Padova con il contributo del Centro Interdipartimentale di Ricerca "Human Inspired Technologies Research Center - HIT"

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Verso una Intelligenza Artificiale Esplicabile e Sicura con Prevenzione dell'Utilizzo Improprio nei LLMs
Referente Scientifico	Roberto Confalonieri
Email Referente Scientifico	roberto.confalonieri@unipd.it
Descrizione del progetto	Verso una Intelligenza Artificiale esplicabile e sicura con prevenzione dell'utilizzo improprio nei LLMs Towards Secure Explainable AI and Misuse Prevention in LLMs Understanding machine learning models, also known as opaque or black-box models, is crucial to ensure the transparency of their decisions. Explicable AI (XAI) has emerged as a research field with practical and ethical benefits in various fields [1]. Despite the significant progress of XAI, significant challenges persist for its adoption and applicability in AI [2]. This project focuses on two main challenges. On the one hand, although XAI provides techniques to explain opaque models, their applicability is limited to classification and regression problems. Furthermore, generative AI, especially Large Language Models (LLMs), has revolutionised human-computer interaction by demonstrating how Deep Neural Networks (DNNs) can understand complex texts, but are opaque and prone to hallucination. Explaining how they generate content is essential to guarantee transparency and improve the training process. On the other hand, current XAI methods show vulnerabilities and security problems [2], with explanations that can be exploited for attacks such as model poisoning, membership attacks and model extraction. Generative models show vulnerabilities in the security of training data [3], leading to an increase in social engineering campaigns. LLMs require huge training sets and continuous updates with user feedback, including potentially sensitive data. Once in production, DNNs and LLMs can be tricked [4], forcing them to reveal sensitive information. This project proposes to examine new explainability approaches for generative AI, aiming to protect the data used in training and explaining opaque models, especially from a privacy perspective. It is proposed to study the application of data protection techniques such as differential privacy or multiparty computation, and to investigate mechanisms to detect and prevent attacks based on explanation and social engineering. Approaches such as output watermarking and detection of characteristic patterns in the outputs of LLMs will be explored to improve the security and transparency of such models. The proposal aims to advance the state of the art in the area of XAI, and protection of private data and protection against misuse of DNNs and LLMs. The results of the proposed research will contribute to increasing trust in AI applications, XAI, and protecting users from privacy violations and social engineering attacks. The objectives of the project are as follows: 1) To create new secure and privacy-preserving XAI methods for generative AI. 2) To detect privacy violations in sensitive data storage processes of DNNs and LLMs. 3) To detect of social engineering activities based on LLMs. 4) To develop an end-to-end methods for secure and privacy-preserving training, inference and explanation.

Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Agenzia per la Cybersicurezza Nazionale – ACN – CUP C96E24000010005

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Profilazione e Gestione a Run-time degli Attacchi a Process-aware Information Systems
Referente Scientifico	Massimiliano De Leoni
Email Referente Scientifico	massimiliano.deleoni@unipd.it
Descrizione del progetto	The steps of automation and digitalization of our society have naturally unfolded through the deployment of on-line information systems and portals that provide support to citizens and enterprises with the participation and management of their organizational processes. It is clearly critical these systems and portals be secure and trustable: this project aims to ensure potential real-time attacks be detected and subsequently managed so as to mitigate their negative effect on systems and processes. The final deliverable is a prototype of a software module to connect to information systems, in order to identify, profile and mitigate the attacks. The project will start from the analysis of the activity logs carried out by users via information systems, so as to extract the patterns of the (il)legitimate users. In doing so, the methodology and algorithms will leverage on Process-Mining techniques, which, among different goals, focus on the analysis and monitoring of business processes.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Agenzia per la Cybersicurezza Nazionale – ACN – CUP C96E24000010005

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Computer Science for Societal Challenges and Innovation**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Resilienza dei Sistemi Collaborativi di Guida Autonoma: Trusted Computing e Garanzie di Privacy
Referente Scientifico	Mauro Conti
Email Referente Scientifico	mauro.conti@unipd.it
Descrizione del progetto	Autonomous driving systems require a collaborative approach in which each vehicle receives data about the vision of a group of other nearby vehicles in order to make informed decisions. This opens the scenario to new threats to vehicle privacy, such as tracking, identification, and profiling of vehicles and their drivers. In this project, we want to redefine the concept of an autonomous and intelligent transport system to make it both resilient and privacy-preserving. In the first phase of the project we will define new online attacks against current cooperative autonomous driving systems. In the second phase, we will develop algorithms for resilience to both state-of-the-art attacks and those defined by us in the first phase. In the third step, we will assess the sensitivity of shared data and define new strategies for minimising the sharing of shared data that can at the same time ensure the fundamental security requirements.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Agenzia per la Cybersicurezza Nazionale – ACN – CUP C96E24000010005

Corso di Dottorato	**BRAIN, MIND AND COMPUTER SCIENCE**
Curriculum *(eventuale)*	**Neuroscience, Technology and Society**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Validazione di una nuova strumentazione bioimpedenziometrica per la valutazione della composizione corporea
Referente Scientifico	Antonio Paoli
Email Referente Scientifico	antonio.paoli@unipd.it
Descrizione del progetto	The project is aimed to validate a new device, developed by Technogym for body composition analysis. This innovative device will use bioimpedance technique to evaluate subjects' body composition in a standing position together with numerous other fitness outcomes. The project will validate the device with DXA (Dual energy Xray absorptiometry) in a general population of both sexes and different ages. Moreover, we will estimate water content and compare it with another bioimpedance device that uses a hand-to-foot technology. The expected results are the validation of this new instrument and the creation of an algorithm specifically studied for this new standing bioimpedance device. This new device will allow to determine health condition in the population (body composition will be integrated with other physical fitness and psychological tests) and, consequentially, to adopt and design healthier personalized lifestyle interventions.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Technogym S.p.A.

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Caratterizzazione dell'attività ormonale di biostimolanti prodotti da ILSA attraverso lo screening sistematico di linee reporter di Arabidopsis
Referente Scientifico	Quaggiotti Silvia
Email Referente Scientifico	silvia.quaggiotti@unipd.it
Descrizione del progetto	Crop productivity and quality are strongly affected by climate change-induced abiotic stresses. Biostimulants represent a promising tool to improve plant tolerance to the environment and to satisfy the need for more sustainable agriculture. However, to standardize their use, a more detailed knowledge of their mechanisms of action is needed. Despite a clear impact on physiological processes as elicitors of plant stress tolerance, their specific biochemical and signaling targets are still almost completely unknown, even though much evidence allowed to hypothesize the existence of a hormonal or hormone-like mode of action. This project is aimed at characterizing the hormonal effects of a few selected ILSA biostimulant compounds by using Arabidopsis reporter lines, expressing specific gene markers for hormonal responses and signaling. This approach will improve our understanding of the mechanisms of action of these compounds and will help standardize their use in agriculture.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	ILSA S.p.A.

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Studio delle specie erbacee invasive dei prati da foraggio in relazione al significato ecologico e fattori implicanti la loro diffusione
Referente Scientifico	Stefano Macolino
Email Referente Scientifico	stefano.macolino@unipd.it
Descrizione del progetto	Permanent meadows, characterized by high biodiversity, play a crucial role in maintaining ecological balance. However, they face significant issues from invasive species. The problem of invasive species is often addressed starting from the most straightforward solution: their elimination. For certain species, the relationship established with climatic and soil factors characterizes their presence and abundance, allowing these species to act as bioindicators. The research project aims to enhance the bioindicator characteristics of invasive species in lowland and mountain meadows of northeastern Italy and understand the correlation with the factors involved in their spread, from climate change to soil changes due to management practices. By expanding knowledge on meadow ecology, the expected outcomes are identifying ecological indicators related to the presence and abundance of invasive species that allow farmers to manage meadows more effectively, reducing their degradation, with a view towards better environmental, economic, and social sustainability on farm management.
Periodo da svolgere in impresa	16
Soggetto finanziatore o cofinanziatore	Biosfera S.r.l. S.t.p.

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Studio delle cause del riscaldo molle e da senescenza delle mele in Trentino Alto Adige
Referente Scientifico	Benedetto Ruperti
Email Referente Scientifico	benedetto.ruperti@unipd.it
Descrizione del progetto	The project aims at understanding soft scald and senescent scald, the two physiological disorders that limit the storability of several apple varieties in the region Trentino Alto Adige, resulting in losses of the fruits and of the energy invested in storage by several regional companies and by Melinda. The causal factors of these storage disorders are not known and strategies that could mitigate or prevent their occurrence should be developed. The project will contribute to fill this gap by monitoring the compositional (mineral, physiological, biochemical and molecular) changes of apples during the fruit growing season and during postharvest storage, by systematically testing controlled atmosphere storage protocols. All these parameters will be related to the occurrence of the disorders and a multifactor model will be developed to predict the predisposition of apples to the disorders and to set up strategies to be used in the field and during postharvest to mitigate or prevent them.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Consorzio Melinda S.c.a.

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Tecnologie di ultima generazione per il miglioramento delle caratteristiche di resilienza delle varietà coltivate
Posti a disposizione	2
Referente Scientifico	Gianni Barcaccia
Email Referente Scientifico	gianni.barcaccia@unipd.it
Descrizione del progetto	Agriculture is called not only to produce food and raw materials in a sustainable way, but also to give a contribution to the environmental quality traits and to mitigate climate change risks. Within this frame, integrated and multifunctional solutions will be developed at different scales for the molecular prediction of resilient traits in crop plants. In particular, at crop level we will exploit Next-Generation Sequencing based technologies, such as DNA genotyping, metabarcoding and RNA-seq, to predict resistance to plant pathogens and tolerance to environmental stresses, to select cultivated varieties (i.e. genotypes) that ensure greater unit yields and better quality characteristics for economically important plant species of the Italian territories, with a specific focus on cereals and vegetables. As far as methods are concerned, multiplex analysis of locus-specific DNA markers will be performed by means of high-throughput workstations for DNA sequencing or haplotyping (SNP markers), DNA genotyping or fingerprinting (SSR markers) with the aim of linking phenotype and genotype through the discovery of loci and genes/alleles for plant traits of agronomic interest, with particular relevance in terms of plant resilience. GWAS and genetic-molecular mapping methods will be exploited to associate specific genetic variations with distinct plant traits by means of genome-wide analysis using Restriction-site Associated DNA sequencing (RAD-seq) or Single Primer Enrichment Technology (SPET) strategies for providing in-depth insights into the genetic architecture of core germplasm collections of cultivated varieties phenotypically well-characterized for their response to biotic/abiotic stresses. Moreover, transcriptomic approaches (RNA-seq) will be used to unveil the molecular basis of the investigated plant traits and to validate candidate genes and QTLs for resilient crop accessions. Research activity will deal with advanced genotyping technologies for the molecular prediction of multiple resilient traits in crop plants. In particular, it aims at the development and implementation of genetic databases and molecular assays for the main horticultural crop species, including tomato salad-types and fresh-cut vegetables (e.g. lettuce, chicory and endive), to assess and predict the agronomic value-added of plant genotypes (i.e., varieties) expressing resilient traits. Moreover, our activity will also take into account the development and application of genome-wide genetic markers useful to predict the value-added of resilient traits by analyzing selected species-specific candidates in core collections of cultivated varieties phenotypically well-characterized.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Agronomia Animali Alimenti Risorse naturali e Ambiente - DAFNAE su fondi PNRR nell'ambito del progetto "National

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	Research Centre for Agriculotural Technologies - Agritech" - CN2-S04, Missione 4, Componente 2, Investimento 1.4, Avviso Centri Nazionali, CUP C93C22002790001

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	L'induzione fiorale nei fruttiferi nell'era dei cambiamenti climatici: il caso studio del melo
Referente Scientifico	Alessandro Botton
Email Referente Scientifico	alessandro.botton@unipd.it
Descrizione del progetto	Ongoing climate change is affecting several aspects of temperate fruit trees cultivation. Apple tree, representing one of the most important fruit productions in Italy, is also challenged along its whole productive cycle in the orchard. Floral initiation, one of the main determinants of apple productivity, is certainly among the most important aspects being affected by climate change and will be the focus of the PhD project. The main endogenous and environmental factors determining a successful or unsuccessful floral induction will be investigated. Particular attention will be devoted to the identification of endogenous predictors (i.e. at the genetic level) of return bloom, their effective adoption within a predictive model, and the identification of possible solutions to improve floral initiation. This study will be carried out in specific apple growing areas, i.e. South-Tyrol, that will be mapped during the project as being currently challenged by these problems.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Sperimentazione Laimburg

Corso di Dottorato	**CROP SCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di enzimi ricombinanti per la depolimerizzazione programmata di items in bioplastica
Referente Scientifico	Lorenzo Favaro
Email Referente Scientifico	lorenzo.favaro@unipd.it
Descrizione del progetto	The PhD project will focus on biotech solutions to develop novel enzymes for the efficient depolymerization of biodegradable items in bioplastics. Novel approaches of molecular biology will be implemented to express selected genes into recombinant yeast and/of fungal strains. Selected enzymes will be then adopted in coating applications for the formulation of new biodegradable items.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Agronomia Animali Alimenti Risorse naturali e Ambiente - DAFNAE su fondi europei nell'ambito del progetto HORIZON-CL6-2024-CircBio-01-5 "MANUFACTURING GUIDING TOOL FOR CIRCULAR AND PROGRAMMED BIODEGRADABLE MATERIALS UNDER OPEN ENVIRONMENT CONDITIONS – MAGICBIOMAT"

Corso di Dottorato	**FUSION SCIENCE AND ENGINEERING**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Implementazione di algoritmi di Apprendimento Automatico per il Miglioramento Sostenibile nella Produzione di Leghe di Alluminio: Un percorso verso Efficienza, Qualità e Responsabilità Ambientale
Referente Scientifico	Manuele Dabalà
Email Referente Scientifico	manuele.dabala@unipd.it
Descrizione del progetto	The project aims to enhance aluminium alloy production in Europe, addressing environmental and technical challenges by enhancing sustainability. Utilizing secondary aluminium, which uses 70% less energy and reduces carbon emissions compared to primary aluminium, is key. Conventional methods for assessing aluminium quality are time-consuming and inefficient. The PhD project proposes an innovative analytical system that rapidly identifies and analyses melt quality using non-equilibrium thermodynamics and machine/deep learning algorithms. This system enables real-time adjustments to melt composition, improving product quality and reducing defects. Implementing Machine and deep learning algorithms will significantly improve aluminium melt quality assessment. Moreover, the project promotes Open Science principles, encouraging collaboration with academic institutions, and industry partners. It aims to share research findings and engage with the scientific community via conferences.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	DUEDI S.r.l.

Corso di Dottorato	**FUSION SCIENCE AND ENGINEERING**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Studi di fisica MHD non lineare e correlazioni con campi 3D in vista di DTT
Referente Scientifico	Lidia Piron
Email Referente Scientifico	lidia.piron@unipd.it
Descrizione del progetto	The proposal aims at developing modeling expertise concerning the non-linear interaction between magnetically confined plasmas and 3D external fields. Present devices often use such fields (usually labelled as Resonant Magnetic Perturbations) for a variety of applications, such as controlling Edge Localized Modes. The work will complement and advance present lines of research dedicated to understanding ELM control physics on present day devices and make projections for DTT. In particular non-linear modeling will be used to study the physics of ELMs mitigation and suppression by RMPs, calculating divertor heat fluxes due to RMPs and consequently optimizing the applied fields. Two of the most well-known tools available to the community will be applied in this project, namely the linear resistive MHD code MARS-F and the non-linear MHD code JOREK. An established collaboration with the Max Planck Institute for Plasma Physics (Garching, DE) will be exploited for training and to plan the foreseen mobility during the PhD period, as well as other collaborations within the EUROfusion framework.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Consorzio RFX

Corso di Dottorato	**FUSION SCIENCE AND ENGINEERING**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Studio della dissipazione di potenza in scenari di plasma ad alta radiazione
Referente Scientifico	Paolo Innocente
Email Referente Scientifico	paolo.innocente@igi.cnr.it
Descrizione del progetto	The aim of the activity is to model the plasma edge and plasma divertor interaction in present high radiative experiments with specific interest in the no ELM or small ELM scenarios which are most relevant for DTT (the Divertor Test Tokamak facility in construction in Italy) and future fusion reactors. This will be done on seeded high-power pulses recently done at JET tokamak and at the WEST experiment that allows long-pulse operation to be handled in an all-tungsten device such as DTT. At the same time, power exhaust modelling of seeded plasma will be carried out on all divertor configurations of the DTT. Edge modelling will be performed with the SOLEDGE3X code which has been validated in the present experiments against experimental data and on future ITER tokamak compared to SOLPS-ITER. The activity will be carried out in close collaboration with the edge group of the CEA laboratory in France which developed the code.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Consorzio RFX

Corso di Dottorato	**FUSION SCIENCE AND ENGINEERING**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Integrazione, caratterizzazione, ottimizzazione della tecnologia Getter Non Evaporabile in grandi sistemi da vuoto per applicazioni relative alla fusione: il caso della sorgente di fascio SPIDER
Referente Scientifico	Emanuele Sartori
Email Referente Scientifico	emanuele.sartori@unipd.it
Descrizione del progetto	In Padova at the Neutral Beam Test Facility, the prototype neutral beam injectors for ITER are being developed. Huge vacuum systems have a key role for the success of these large experiments. In the next years, a very large one-of-a-kind Non-Evaporable Getter pump will be installed in the prototype beam source SPIDER. This research project is integrated in the research activities necessary for its characterization and optimal use. The project includes modelling and experimental tests of: gas flow in molecular regime, gas-getter material interaction, thermal and mechanical aspects of the design, integration and operation of the beam source, also in comparison with other large pumping systems. The PhD project is fully integrated in the effort of the fusion community towards the start of ITER, in a joint collaboration with an innovative Italian company, offering the opportunity to work in exciting international environment as well as in industrial context devoted to research & development.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	SAES Getters S.p.A.

Corso di Dottorato	**GEOSCIENCES**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Mappatura delle risorse idriche da immagini satellitari
Referente Scientifico	Simone Bizzi
Email Referente Scientifico	simone.bizzi@unipd.it
Descrizione del progetto	The project aims to stream the spaceborne mapping of rivers and lakes from national to global scales fusing multiple satellite datasets: Sentinel 2 (S2), Landsat to explore the past decades, and Planet and Iride (yet to come). The projects will develop and test classifiers based on CNN, and will also focus on developing and providing data analysis tools to translate the mapping of freshwater ecosystems into dynamic indicators of rivers geomorphic trajectories, lakes' water availability, drought indices, and e.g., ecosystem status. This PhD will be confounded by SofWater, a company partner in a PNNR funded project with ESA with the aim to provide the first river morphological mapping at national scale in Italy based on S2. The period abroad of the PhD candidate will be with Dott Carbonneau at the Department of Geosciences at Durham University. Dott. Carbonneau is author of the CNN algorithms we are developing on this topic over the last years.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	SoftWater S.r.l.

Corso di Dottorato	**GEOSCIENCES**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Modelli informativi per l'interoperabilità e gli strumenti decisionali
Referente Scientifico	Francesca Da Porto
Email Referente Scientifico	francesca.daporto@unipd.it
Descrizione del progetto	The aim of this PhD project is the development of BIM-based technologies to improve the interoperability of models and automate the processes of analysis and management of building structures with respect to various engineering perspectives (structural, seismic, conservation, energy, etc.). Activities will also focus on advancing informed decision-making tools to support the tasks of identification, prioritization, and management of building inventories through the automation and optimization of data collection, management, and analysis. The work will support digitalization, innovation and competitiveness of enterprises, in agreement with M1C2 and M4C2 of NRRP. ITS offers civil engineering services with a multidisciplinary approach, covering all stages of knowledge, analysis, and design of buildings and infrastructures. ITS will promote the practical application of research outcomes, their dissemination in line with “Open science” principles, and the sustainable development of the construction sector.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	ITS S.r.l.

Corso di Dottorato	**GEOSCIENCES**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Innovazione tecnologica per il miglioramento della sicurezza di edifici in CA
Referente Scientifico	Marco Donà
Email Referente Scientifico	marco.dona.1@unipd.it
Descrizione del progetto	M2C3.2 of NRRP fosters energy efficiency and seismic safety enhancement of the existing built heritage, in the framework of a concurrent updating of European and National standards. This PhD project will tackle intensive modelling and analysis activities, and potentially integrate experimental tests, to define advanced design and verification methods, particularly in the case of a very common built typology, i.e. RC frame buildings with infill masonry walls. The final aim is to provide professionals with easy and effective tools, to meet the new sustainability and safety construction requirements. Consorzio POROTON® Italia is a consortium grouping all the main brick manufacturers in Italy, and directly supervises standardization developments, dealing with innovation in construction systems. It will certainly foster the exploitation of research results in the industrial, regulatory, and scientific fields, supporting technology and scientific transfer according to "Open science" principles, and to increase of competitiveness of the construction sector, in agreement with M4C2 of NRRP.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Consorzio POROTON® Italia

Corso di Dottorato	**HUMAN RIGHTS, SOCIETY, AND MULTI-LEVEL GOVERNANCE**
Curriculum *(eventuale)*	**Inclusion and Psychological growth**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Lo studio del linguaggio applicato all'ambito delle energie rinnovabili: uno studio sulla narrazione della "transizione energetica" nei media e il suo impatto sulle abitudini degli italiani
Referente Scientifico	Gian Piero Turchi
Email Referente Scientifico	gianpiero.turchi@unipd.it
Descrizione del progetto	The energy transition and the sustainable production are central themes of PNRR second Mission (Green Revolution and Ecological Transition) whose aim is to promote a transition toward renewable energy solutions with low/zero environmental impact. In line with this target, this research project aims to study how public opinion about renewable and non-renewable energy is formed. This will allow to combine business innovation, environmental sustainability and social awareness on the topic. The research objective, more specifically, is to study the discursive modalities on which the "energy transition" storytelling is based. The assumptions of Dialogical Science constitute a further innovative element for the project, as a method to describe the use of language and its particular impact on community life. The results will be both used by the company partner involved for innovation purpose and disseminated within the community.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Cafaggi & Mannelli S.r.l.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di criteri rapidi per passaggi di scala e industrializzazione di sintesi chimiche, a partire da date di laboratorio
Referente Scientifico	Paolo Canu
Email Referente Scientifico	paolo.canu@unipd.it
Descrizione del progetto	Production of life-saving drugs and personal medicine calls for a faster route to bring new products and molecules to the patient. In addition to the very long discovery phase of new molecules, or their modification to fulfill compatibility with personal health, the actual, large-scale production of the API requires developing more rapid, more reliable procedures, from laboratory synthesis to the industrial production, both batch or continuous. A science-based, data-driven approach typical of a chemical engineering approach can significantly improve and accelerate the trial-and-error or experience-based procedures typically applied in the scaling-up of processes, from validated laboratory practice to the industrial, commercial scale. More reliable scale-up procedures are also expected to impact the safety of the final products reaching the market. Methods involve integration of data analysis, including artificial intelligence tools, with fundamental laws and conservation principles to reproducibly analyze data collected at small-scale to predict the large-scale behavior. Options to shift from batch processes into continuous manufacturing will also be explored, both experimentally and by modeling.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Lundbeck Pharmaceuticals Italy

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Produzione, utilizzo e potenziale sfruttamento delle microalghe marine nell'economia circolare
Referente Scientifico	Eleonora Sforza
Email Referente Scientifico	eleonora.sforza@unipd.it
Descrizione del progetto	Fresh water microalgae are commonly studied in the biotechnological field, whereas marine phytoplankton is less explored yet it retains a great potential towards carbon fixation and provides valuable bioproducts suitable for industrial exploitation. Within this group, the coccolithophores, calcifying marine microalgae, have the unique ability to fix carbon into two different pools: the organic fraction (cell), and the inorganic exoskeleton (calcium carbonate plates) where the carbon is permanently stored. Although, despite their potential, the optimal conditions to maximize coccolithophore productivity are still poorly studied and only on a limited number of strains. Moreover, the industrial applications of the bioproducts returned from coccolithophore cultivation still need to be clearly assessed, since their possible usages have been mostly hypothesized so far, spanning from zero-impact cement to different nanotechnological applications, within the context of circular economy.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di polimeri biobased con velocità di biodegradazione controllata
Referente Scientifico	Alessandra Lorenzetti
Email Referente Scientifico	alessandra.lorenzetti@unipd.it
Descrizione del progetto	The main objective of the project is to develop biodegradable polymers with a number of different levels of biodegradation rate. At first, several biodegradable polymer blends shall be developed and characterised to find the optimal composition in terms of mechanical and technological properties. Then, strategies to control the biodegradation rate shall be proposed, tested and verified.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi HORIZON-CL6-2024-CircBio-01-5, Acronimo MAGICBIOMAT

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di un approccio integrativo multi-omico per ricerca in campo biomedico
Referente Scientifico	Nicola Elvassore
Email Referente Scientifico	nicola.elvassore@unipd.it
Descrizione del progetto	The PhD project aims to develop integrative approaches for the spatial and temporal analysis of multi-omics data, including RNA sequencing (RNA-seq), Assay for Transposase-Accessible Chromatin using sequencing (ATAC-seq), and proteomics. This project will also focus on analyzing these data at the single-cell level. The primary objective is to advance our understanding of neurodevelopment and neurodevelopmental diseases. By employing these cutting-edge techniques, the research will provide detailed insights into the molecular mechanisms and pathways involved in the development of the nervous system and the onset of neurodevelopmental disorders. The ultimate goal is to uncover potential biomarkers and therapeutic targets that could lead to improved diagnosis and treatment options for these conditions.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi Reproids

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di una piattaforma microfluidica integrata con hydrogel per ospitare e guidare processi biologici durante le prime fasi dello sviluppo embrionale umano
Referente Scientifico	Onelia Gagliano
Email Referente Scientifico	onelia.gagliano@unipd.it
Descrizione del progetto	The reaserch project aims at developing a ground-breaking technology that will enable to model over time and space the early stage of human neural morphogenesis and to recapitulate the very early and inaccessible stages of this human embryonic development. In particular, the project aims at: i) developing a microfluidic platform integrated with Hydrogel, adaptable in time and space to precisely perfuse organoids in specific regions; ii) integrating a 3D tubular-shaped organoid and maintain it in culture; iii) engineering the 3D morphogenesis of the dorsal-ventral patterning of the neural tube during the first weeks of embryonic development.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi OriSha

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Electrical Engineering**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Le determinanti dello sviluppo di una strategia di sostenibilità ambientale nelle PMI: una prospettiva basata sulle risorse
Referente Scientifico	Fabrizio Dughiero
Email Referente Scientifico	fabrizio.dughiero@unipd.it
Descrizione del progetto	Environmental sustainability has become increasingly relevant for companies due to dramatic changes in their operating environment over the past decade. These changes include rising market pressures, stringent European and international regulations, and new standards imposed by leading firms within Global Value Chains. This research aims to identify the determinants influencing the development of environmental sustainability strategies in companies, utilizing the resource-based view (RBV) theory. The focus will be on identifying the competencies and assets within firms that facilitate the creation of formalized sustainability strategies, defined as formal programs with toplevel directives. In particular, the research will focus also on the role of digital skills and digital technologies (e.g. Iot, AI) for environmental sustainability. A mixed-method approach will be employed to achieve the research objectives. The quantitative analysis will utilize national and international datasets on companies to identify patterns and correlations between firm resources and sustainability practices, with annual analysis gates. Qualitative case studies will involve in-depth interviews with selected companies to gain nuanced insights into the internal and external factors influencing their sustainability strategies. Special emphasis will be placed on the professional kitchen equipment industry, particularly in the USA and EU, while also considering horizontal innovation in related industries. This combination will provide a comprehensive understanding of the determinants of environmental sustainability in companies.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	Irinox S.p.A.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Energy Engineering**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di gemelli digitali di compressori per l'industria delle pompe di calore e dei sistemi di refrigerazione
Referente Scientifico	Marco Azzolin
Email Referente Scientifico	marco.azzolin@unipd.it
Descrizione del progetto	The plan “REPowerEU” has the objective of decarbonising the buildings' heating systems. In addition, the refrigeration sector is the fastest-growing use of energy in buildings. To decarbonize these sectors, we can rely on heat pumps and chillers in which the compressor is the main component and its performance directly affects energy consumption. This project aims at developing a hybrid digital twin model of the compressor combining a physical approach and the use of artificial intelligence. The project will focus on: - CFD simulation and experimental study of compressors when working with natural refrigerants - Improving the reliability of the compressor through the use of artificial intelligence to perform predictive maintenance and fault detection The project is aligned with the innovation needs of the PNRR, it will promote the valorization of research results and it will ensure compliance with the principles of the PNRR, in particular decarbonization and environmental sustainability
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Frascold S.p.A.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Energy Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di strategie innovative per aumentare la flessibilità operativa degli impianti idroelettrici e di pompaggio
Referente Scientifico	Giovanna Cavazzini
Email Referente Scientifico	giovanna.cavazzini@unipd.it
Descrizione del progetto	Climate change and clean energy transition are negatively impacting water resources and grid stability. To face this challenge, it is necessary to enhance the flexibility of hydropower plants by extending the operational range and improving the efficiency of hydraulic turbines. With the support of both numerical and experimental data, the PhD student must investigate the current operational limits of hydraulic turbines and must develop innovative strategies to increase the flexibility and resilience of hydraulic turbines, improving their operation at partial and deep partial loads without affecting the plant life. Variable operating conditions, changes in water quality and availability and environmental constraints have to be considered during the development of the innovative strategies. This research addresses the innovation needs of the company, promoting environmental sustainability and effectively supporting the energy transition.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	45 Engineering S.r.l.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Materials Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Studio di trattamenti sostenibili per la rimozione di contaminanti organici da residui metallurgici
Referente Scientifico	Katya Brunelli
Email Referente Scientifico	katya.brunelli@unipd.it
Descrizione del progetto	The project will focus on development of processes to remove the organic contaminants from metallurgical residual, and more in detail, from steel processing residues. Initially, a detailed analysis of the organic contaminants present in the different types of residues coming from steel production will be carried out. The processes that will be taken into consideration will concern the thermal decomposition of organic contaminants through both traditional systems (heating ovens) and innovative treatments (such as the use of microwave or plasma sources). In parallel, decontamination processes will be investigated through the use of chemical reagents to be used in aqueous solutions that allow an effective removal of contaminants from solid steel residues. Furthermore, any other decontamination systems will also be taken into consideration, such as systems based on electrochemistry or systems based on the use of non-aqueous solvents.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Danieli & C. S.p.A.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Materials Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di compositi a matrice ceramica prodotti mediante manifattura additiva per applicazioni ad alta temperatura
Referente Scientifico	Paolo Colombo
Email Referente Scientifico	paolo.colombo@unipd.it
Descrizione del progetto	The activity will concern the manufacture of ceramic matrix composites reinforced with both short and long carbon fibers. The matrix will initially be obtained from preceramic polymers (silicones) and ceramic powders, and then the possibility of developing matrices more resistant to high temperatures will be explored. Particular attention will be given to the development and implementation of a device capable of simultaneously extruding matrix and long fibers. The possibility of developing a printing system using a robotic arm will also be evaluated, to increase the degrees of freedom in the design of the parts to be produced. The design of the components to be printed will be done considering case studies of relevance for high temperature applications. The components will be completely characterized both from a physical (porosity, density, geometry, etc.) and mechanical point of view (compression and bending resistance). Oxidation resistance will also be investigated.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Leonardo S.p.A.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Materials Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Materiali innovativi per frizione
Referente Scientifico	Paolo Colombo
Email Referente Scientifico	paolo.colombo@unipd.it
Descrizione del progetto	The project concerns the use of inorganic binders for brake pads produced by hot pressing of powders. The first objective of the research program will be to develop optimized compositions for tablets which in particular are not subject to "stiction" phenomena. The second objective of the research program will concern the study of industrial processes for the production of binder powder with characteristics suitable for the manufacture of components, with evaluation of the effect of different parameters on the performance of brake pads. The third objective will concern the study of the possibility of using alternative materials to those currently adopted, in particular by-products or residues deriving from other production processes, from a circular economy perspective.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria industriale - DII su fondi contratto ITT Italia S.r.l.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Mechanical Engineering**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Stampi adattivi guidati dall'intelligenza artificiale per operazioni di formatura dei metalli flessibili e sostenibili
Referente Scientifico	Enrico Simonetto
Email Referente Scientifico	enrico.simonetto.1@unipd.it
Descrizione del progetto	Sheet metal forming processes are highly productive but require significant investments in tools and equipment designed for specific components. This limits operational flexibility, leading to time-consuming and expensive setup operations, and reduces process chain resilience to changes in boundary or input conditions. This results in a high number of scrapped parts, reducing both sustainability and economic competitiveness. The project's objective is to develop a cyber-physical approach through the design of smart tools, based on the implementation of innovative and cost-effective magnetorheological actuators combined with measurement sensors. These adaptive dies, supported by artificial intelligence models, will process sensor data to determine necessary corrections to process parameters, optimizing setup operations, improving part quality, reducing scrap rates, and enhancing the sustainability and competitiveness of metal forming processes.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Rheonex S.r.l.

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Mechanical Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Analisi elettro-meccanica di un prototipo di veicolo elettrico multi-motore per lo sviluppo di controlli di dinamica del veicolo
Referente Scientifico	Basilio Lenzo
Email Referente Scientifico	basilio.lenzo@unipd.it
Descrizione del progetto	Within the FISA project VeHiKoMniScience, this PhD path will deal with: the study and management of a full-scale prototype of multi-motor electric vehicle; the analysis of energy management strategies and the general electrical management of the vehicle; supporting the development of advanced vehicle dynamics controls for enhancing vehicle handling, stability and safety, and the experimental validation of such controls.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi MUR (FISA 2022) - progetto VeHiKoMniScience (CUP C93C22009540001)

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Mechanical Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo e applicazione di tecniche di Artificial Intelligence nell'analisi di segnali e immagini dinamiche di piedi ed invasi protesici per il monitoraggio di attività sportive e quotidiane
Referente Scientifico	Nicola Petrone
Email Referente Scientifico	nicola.petrone@unipd.it
Descrizione del progetto	The PhD project will be included in a wide project denominated ProOlympia regarding the behavior of prosthetic components for sport and daily activities, a collaboration between DII-Unipd and INAIL national compensatory authority. In particular, structural behavior of prosthetic components during sport use is fundamental for safety and performance analysis. The candidate will explore the approaches for the development and application of Artificial Intelligence techniques in the analysis of signals and dynamic images of prosthetic feet and sockets in sports and daily activities. In addition to data from wearable sensors, the application of AI technique will regard video images of running events with the aim of estimating the structural behavior of running prosthetic feet in use to Paralympic sprint athletes. Existing tools and new video analysis tools will be explored and implemented after validation against bench mechanical results and track motion capture load/deflection data.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale – DII su fondi ProOlympia finanziato da INAIL

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Mechanical Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Analisi biomeccanica dei determinanti della prestazione sportiva al variare di piedi e allineamenti protesici in atleti elite paralimpici
Referente Scientifico	Nicola Petrone
Email Referente Scientifico	nicola.petrone@unipd.it
Descrizione del progetto	The PhD project will be included in a wide project denominated ProOlympia regarding the behavior of prosthetic components for sport and daily activities, a collaboration between DII-Unipd and INAIL national compensatory authority. In particular, biomechanics of running with prosthetic limbs is a field of investigation giving interesting insight about factors determining the performance and motor control adopted in human locomotion. Prosthetic running gives larger possibilities of modifying and tuning the locomotion system than abled bodied running. The candidate will take advantage of previous experience of the Olympia project and the installation of an instrumented track at Palaindoor Padova: will search the sport performance determinants while varying prosthetic feet shape, categories and alignments during in-vivo tests of elite Paralympic athletes. Data collected will drive and validate dynamic and musculoskeletal models for the investigation of subjective optimal solutions.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale – DII su fondi ProOlympia

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Mechanical Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di sistemi integrati di sensori imbarcabili per la caratterizzazione strutturale e prestazionale di piedi ed invasi protesici per lo sport e la vita quotidiana
Referente Scientifico	Nicola Petrone
Email Referente Scientifico	nicola.petrone@unipd.it
Descrizione del progetto	The PhD project will be included in a wide ongoing project denominated ProOlympia regarding the behavior of prosthetic components for sport and daily activities in collaboration between DII-Unipd and INAIL national compensatory authority. In particular, the knowledge of structural actions loading the prosthetic components during sport use is fundamental for safety design and functional evaluation of running mechanics. The candidate will then explore the approaches for the development of reliable and extensive collection of loading conditions of prosthetic components, in particular feet and sockets. Wearable, lightweight, multicomponent and calibrated sensors technique will be explored and developed for application to top Paralympic sprint athletes, with extension to daily walking activities and even cycling activities. Results will drive innovation towards embedded data loggers for the monitoring of components and the evaluation of safety factors for daily and extreme sport usage.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale – DII su fondi ProOlympia finanziato da INAIL

Corso di Dottorato	**INDUSTRIAL ENGINEERING**
Curriculum *(eventuale)*	**Chemical and Environmental Engineering**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di un modello digitale della crescita di microalghe
Referente Scientifico	Fabrizio Bezzo
Email Referente Scientifico	fabrizio.bezzo@unipd.it
Descrizione del progetto (max 1.000 caratteri)	Intensive microalgae cultivation in industrial systems can be enhanced and optimised by the availability of reliable digital twins of the process. However, even the best mathematical descriptions of microalgae behaviour are lacking an accurate description of the links between process operation and metabolic responses and how the simultaneous action of multiple inputs (temperature, light, nutrients) affect productivity. The PhD project will aim at exploiting experimental data of the biological response of microalgae to dynamic changes in multiple process parameters, and focus on developing a digital twin, i.e. a generic mathematical model capable of simulating microalgae growth in a complex environment where input may continuously change.
Periodo da svolgere in impresa (facoltativo)	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi di Eccellenza CARIPARO 2023 - Progetto “Model-based Optimisation of MicroAlgae strain selection and industrial production”

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Bioingegneria**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sensori indossabili e metodi digitali per il monitoraggio e il trattamento personalizzato nel Parkison's Disease
Referente Scientifico	Mattia Veronese
Email Referente Scientifico	mattia.veronese@unipd.it
Descrizione del progetto	Parkinson's Disease (PD) is a progressive neurodegenerative disorder that primarily affects movement, second only to Alzheimer's Disease for extent, with a rate of increase of 22% worldwide, expecting to double by 2030. It is characterized by the loss of dopamine-producing neurons in the substantia nigra, a region of the brain that plays a crucial role in controlling movement. The exact cause of PD is unknown, but it is believed to involve a combination of genetic and environmental factors. PD main symptoms can be classified in Motor Symptoms (e.g. Tremor or Bradykinesia) and Non-Motor Symptoms (e.g. Sleep disturbances, Cognitive impairment, and Autonomic dysfunction) involving not only senile people but also young generations from 20 years old with a significant impact on the quality of life. In this context, wearable devices and digital technologies offer significant potential for improving the monitoring and treatment of PD. These devices (such as smartwatches and wristbands) typically include sensors that track various physiological parameters and movement patterns, allowing for a detailed analysis of symptom fluctuations throughout the day. Similarly, data from wearable devices can be used to tailor treatment plans to the individual needs of patients. Medication schedules can be optimized based on symptom patterns observed from the wearable data. The aim of this PhD is to develop and validate a new set of digital methods that, by exploiting data from wearable sensors, can be used to monitor PD symptoms (both motor and non-motor) and to tailor personalized medicine. The PhD candidate will take advantage of public databases and private repositories already in place for the research, as well as patented technologies provided by the industry partner. If successful, this PhD will develop technologies with a concrete impact on many PD patients' lives.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	OFFXET S.r.l.

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Reti subacquee per lo studio dei cambiamenti climatici e della biodiversità
Referente Scientifico	Filippo Campagnaro
Email Referente Scientifico	filippo.campagnaro@unipd.it
Descrizione del progetto	The project will focus on the analysis of innovative low-cost underwater acoustic communication systems for civil applications, with special focus on low-cost sensor networks for studying climate change and biodiversity. After understanding all the constraints of the underwater environment, the candidate will design and implement a low-cost underwater network applicable to the aforementioned applications. Different modulation, forward error correction and media access control (MAC) techniques will be analyzed, developed and evaluated both in a simulated environment and in the Venice Lagoon. Given the challenges of the underwater acoustic channel, affected by multipath, Doppler and environmental noise caused by ships, wind and rain, the low bitrate and the high latency imposed by the underwater acoustic medium, the TCP/IP protocol suite is inappropriate for the underwater environment. The candidate will design innovative solutions for new generation underwater acoustic networks.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Subseapulse S.r.l.

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo, implementazione e valutazione di protocolli per reti di comunicazione wireless
Referente Scientifico	Marco Giordani
Email Referente Scientifico	marco.giordani@unipd.it
Descrizione del progetto	The project aims at designing, implementing, and evaluating communication protocols for future wireless networks, focusing for example on 6G, IoT, non-terrestrial network (NTN), and beyond. The study will begin with an in-depth analysis of existing protocols to identify limitations and areas for improvement. Subsequently, novel protocol designs will be developed, exploring and proposing advanced techniques related to channel access, scheduling, routing, and/or transport-layer implementations, tailored to selected wireless scenarios. These protocols will be implemented and rigorously tested via end-to-end full-stack simulations to assess their performance under varying conditions. The evaluation will consider key metrics such as throughput, latency, energy consumption, and reliability. To this aim, among other tools, the candidate researcher will be using the ns-3 network simulator, extending the current code base with new modules to incorporate the proposed protocol solutions. Performance evaluation will have to validate the accuracy and performance of the developed protocols and modules, using both synthetic scenarios and real-world data.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Consorzio Nazionale Interuniversitario per le Telecomunicazioni – CNIT

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'informazione**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Metodi computazioni e approcci di "network science"per la ricostruzione e l'analisi di reti di interazione batterica a partire da dati di sequenziamento di microbiota
Referente Scientifico	Giacomo Baruzzo
Email Referente Scientifico	giacomo.baruzzo@unipd.it
Descrizione del progetto	Recently, much attention has been devoted to study the microbiota and its impact. Among the typical bioinformatics analyses on microbiome sequencing data, most focus on the effects on the analyzed ecosystem (e.g. differentially abundant species). Only few focus on identifying the underlying mechanism and causes, i.e. the bacteria interaction network and the potential dysbiotic state. The knowledge on bacteria networks would enable the mechanistic understanding of the community and how to manipulate it for public health and industrial applications, from fixing human/animal microbiota dysbiosis through fecal transplantation to monitoring food safety towards a global one health view. The goal is the development of open source computational methods to robustly infer bacteria interaction network. Through advanced algorithms and computational modeling, we aim at distinguishing true interaction from random co-occurrence of species, and characterize them using network science approaches.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Eubiome S.r.l.

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Ottimizzazione dei sistemi di azionamento con controllo in loop chiuso dei motori tramite intelligenza artificiale
Referente Scientifico	Angelo Cenedese
Email Referente Scientifico	angelo.cenedese@unipd.it
Descrizione del progetto	The CLooM-AI project aims to develop AI solutions for optimizing brushless motor drive control loops. The goal is to enhance overall system efficiency and simplify the tuning and commissioning of motorized axes. Unlike traditional methods, this project considers varying mechanical configurations, loads, and operational requirements, necessitating adaptable and flexible approaches. The project has two phases: 1. "AI-driven control" (M01-M24) focuses on identifying the best control structure through AI techniques to meet efficiency and usability requirements. 2. "Safe-critical AI" (M13-M36) ensures optimization without compromising machine integrity, developing non-invasive algorithms for safe, customized operation. Innovatively, CLooM-AI introduces a self-adaptive system capable of continuously adjusting to new conditions, outperforming current industry practices and advancing scientific literature. Expected impacts include reduced energy consumption, predictive maintenance, and optimized work schedules, significantly contributing to digital transformation and industrial competitiveness within Industry 4.0. The project is well-aligned with its three-year doctoral timeline, ensuring balanced resource allocation and realistic execution stages, maximizing research effectiveness and coherence throughout the project duration.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	PhD 2024 - Fondazione Cassa di Risparmio di Padova e Rovigo, Intesa Sanpaolo S.p.A., UniSMART cofinanziata con CMZ S.r.l.

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Mappe dinamiche di propagazione per autenticazione a livello fisico di sistemi IoT B5G
Referente Scientifico	Stefano Tomasin
Email Referente Scientifico	stefano.tomasin@unipd.it
Descrizione del progetto	In the context of IoT in B5G networks, sending fake messages is particularly dangerous. The project aims to exploit signals at the physical layer to obtain at the network layer dynamic knowledge (acquired through learning techniques on received signals) of the electromagnetic propagation in the environment (dynamic maps) for spoofing attack detection. Machine learning (ML) techniques will be used to master the complexity of the electromagnetic scenario and possible attacks. Objectives are a) definition of a learning architecture to detect attacks (jammers, fake base stations, colluding devices); b) definition of physical-layer authentication mechanisms in IoT B5G systems; c) analysis of the security of mechanisms and study of possible new attacks and countermeasures. The security analysis includes evaluation of evasion and pollution attacks on ML systems to achieve a robust architecture, and verification on test-beds from Hochschule Darmstadt, Barkhausen Institute, and TIM.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Agenzia per la Cybersicurezza Nazionale – ACN – CUP C96E24000010005

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sistemi ottici per la propagazione di laser di alta potenza nello spazio
Referente Scientifico	Maria-Guglielmina Pelizzo
Email Referente Scientifico	mariaguglielmina.pelizzo@unipd.it
Descrizione del progetto	Simulation of the propagation of laser optical beams from ground to space and design of an optical system for beam manipulation and redirection in orbit. Design and realization of a demonstrator.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Ateneo di Studi e Attività Spaziali “Giuseppe Colombo” - CISAS su fondi del progetto “Space It Up” finanziato da “Bando di finanziamento per le “Attività spaziali" (tematica 15), Prot. CI-2022-DSR-042 del 18 luglio 2022 ASI

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Progetto, ottimizzazione e valutazione di protocolli per reti wireless di prossima generazione
Referente Scientifico	Michele Zorzi
Email Referente Scientifico	michele.zorzi@unipd.it
Descrizione del progetto	The activity of the PhD student will be focused on the design of networking protocol solutions for future communication networks, on their parameter optimization, and on their evaluation using analytical, simulation, and, where possible, experimental tools. Application scenarios of interest and technologies to be investigated include (but are not limited to) millimeter wave, non-terrestrial networks, vehicular networks, artificial intelligence and machine learning, and applications with extremely demanding requirements and challenges in terms of performance, heterogeneity, and adaptability to the environment.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria dell'Informazione - DEI

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Tecniche di comunicazione wireless in ambienti estremi
Referente Scientifico	Michele Zorzi
Email Referente Scientifico	michele.zorzi@unipd.it
Descrizione del progetto	The project will focus on the analysis and optimization of wireless communication techniques for extreme environments (including space, underwater, and specific environments such as harbors, mines, etc). Despite the difference of the communication medium, all these environments have in common the fact that the signal propagation is significantly different than the one observed in terrestrial wireless communication and need to face the challenges of disruptive and delay tolerant wireless networks (DTN). After analyzing the unique characteristics of these unconventional communication media, the candidate will focus on at least one of these challenging wireless channels and design, simulate and optimize routing and channel access protocols specifically tailored for the selected scenarios. The equipment available in the Extreme Lab of the Department of Information Engineering will also allow the candidate to evaluate the studied protocols with some tests realizing a proof of concept of the analyzed idea.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria dell'Informazione - DEI su fondi PNRR - Missione 4: Istruzione e ricerca Componente 2: "Dalla ricerca all'impresa" INVESTIMENTO 1.3: "Creazione di Partenariati estesi alle università, ai centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base", finanziato dall'Unione Europea - NextGenerationEU Progetto "RESearch and innovation on future Telecommunications systems and networks, to make Italy more smART (RESTART)" cod. MUR PE_00000001 (Area tematica: "14.Telecomunicazioni del futuro") CUP C93C22005250001, Spoke 6

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Scienza e Tecnologia dell'Informazione**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Analisi teorica e sperimentale di sistemi fotonici microstrutturati
Referente Scientifico	Luca Palmieri
Email Referente Scientifico	luca.palmieri@unipd.it
Descrizione del progetto	The doctoral program is focused on the theoretical analysis of microstructures photonic systems, including (but not limited to) microstructures optical fibers. The aim of the research activity is to develop theoretical and numerical simplified phenomenological models to describe the propagation in such systems, without resorting to the exact and cumbersome physical model. Besides this theoretical activity, the doctoral candidate is expected also to perform experimental activity to the aim of verifying the reliability of the developed models and of determining the typical values of the model parameters.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria dell'Informazione - DEI

Corso di Dottorato	**INGEGNERIA DELL'INFORMAZIONE**
Curriculum *(eventuale)*	**Bioingegneria**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Controllo avanzato di fotobioreattori utilizzando controllo predittivo di modello robusto e adattivo
Referente Scientifico	Simone Del Favero
Email Referente Scientifico	simone.delfavero@unipd.it
Descrizione del progetto (max 1.000 caratteri)	This project aims at investigating advance control strategies for optimized microalgae cultivation in photobioreactors, by maximising throught a feedback architecture the plant productivity. Algae growth control will be performed by controlling artificial illumination, temperature, nutrients and CO2 flowrates. Adavance multi-input multi-output Model Predictive Control (MPC) techniques will be explored both in linear and non-linear frameworks. Moreover, variaiblity among the plants will be adressed by resorting to robust and sotchastic formualtions of the MPC controller. Variability of the plant over time will be adressed using adaptive MPC formulations, including cutting edge learning-based approaches. The project will also explore the implementation of the develped conteroller on a dedicated hardware plaform and experimental validation.
Periodo da svolgere in impresa (facoltativo)	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Ingegneria Industriale - DII su fondi di Eccellenza CARIPARO 2023 - Progetto "Model-based Optimisation of MicroAlgae strain selection and industrial production"

Corso di Dottorato	**INGEGNERIA ECONOMICO GESTIONALE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di tecnologie AI-Based per la valorizzazione e la gestione del patrimonio culturale italiano
Referente Scientifico	Roberto Panizzolo
Email Referente Scientifico	roberto.panizzolo@unipd.it
Descrizione del progetto	Cultural heritage faces unprecedented challenges such as environmental degradation, overtourism and limited resources, and there is an urgent need for innovative solutions to ensure its long-term sustainability. This research project is a pioneering initiative to harness the transformative potential of Artificial Intelligence (AI) in the field of cultural heritage preservation and management. AI-based technologies such as machine learning, computer vision and natural language processing can enhance the visitor experience, streamline conservation efforts and improve site management. The project will pay particular attention to the development of ad hoc, fine-tuned, open-source Large Language Models (LLMs) using real-world datasets, which play a key role in improving accessibility and public engagement with cultural heritage, ensuring its preservation and value for future generations. Part of the research results will be published as open source in the spirit of Open Science. By improving accessibility for better and more efficient use of public information, the project also aims to equip heritage professionals, local communities and policy makers with the necessary skills and knowledge to harness the potential of AI for sustainable heritage management.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Meeple S.r.l.

Corso di Dottorato	**INGEGNERIA ECONOMICO GESTIONALE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Protocolli openBIM IFC negli ambienti di computazione metrica e nel prezzario regionale opere pubbliche per la valutazione economica dei progetti e lo sviluppo di procedure digitali di verifica dei computi e della contabilità lavori
Referente Scientifico	Carlo Zanchetta
Email Referente Scientifico	carlo.zanchetta@unipd.it
Descrizione del progetto	The use of IFC protocols in digital project management allows the development of metric computation procedures based on shared standards that facilitate the definition of verification procedures on the correct economic evaluation of construction projects. The same standardization process implemented for construction entities must be carried out for cost entities by developing and integrating the regional public works price list. To test these procedures, research on semantic web query languages (SPARQL) will have to be developed, which, in conjunction with formal glossary and classification representation languages such as SKOS (Simple Knowledge Organization System) help computers understand the context and relationships between different pieces of information, enabling them to answer complex questions, make recommendations and validate the semantic content of building information systems.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	888 SOFTWARE PRODUCTS S.r.l.

Corso di Dottorato	**INGEGNERIA MECCATRONICA E DELL'INNOVAZIONE MECCANICA DEL PRODOTTO**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Predizione della Vita a Fatica nelle Strutture Aeronautiche in Materiali Compositi: Approcci Avanzati di Modellazione e Analisi
Referente Scientifico	Marino Quaresimin
Email Referente Scientifico	marino.quaresimin@unipd.it
Descrizione del progetto	The applications of polymeric composite materials in load-bearing primary aerostructures has been continuously increasing in the last years. These structures are typically subjected to in-service loadings which are cyclic by nature and may introduce progressive damage and loss of performances. To maintain the high level of reliability required by an aircraft it is fundamental to include into the design chain tools suitable to describe the fatigue damage evolution, its effects on the material and structure response and eventually the remaining life of the structure. For this aim, promising damage based strategies for the design against fatigue have been presented in the last decade. In the frame of this PhD project, these new approaches will be first evaluated and compared with the traditional empirical methodologies and then validated on the results obtained on experimental campaign on industrial parts. The implementation into industrial design procedures will be also investigated.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Leonardo S.p.A.

Corso di Dottorato	**INGEGNERIA MECCATRONICA E DELL'INNOVAZIONE MECCANICA DEL PRODOTTO**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Progettazione e Gestione di Postazioni di Lavoro Collaborative nell'Era dell'Industria 5.0
Referente Scientifico	Daria Battini
Email Referente Scientifico	daria.battini@unipd.it
Descrizione del progetto	This project explores the design of collaborative and digital workstations, with the goal of developing human-centric and sustainable manufacturing systems. The research will delve into the design of Human Digital Twins to improve worker ergonomics and well-being with real-time assessment from both a physical and cognitive perspective. The workstations will be designed to be reconfigured and adapted to different workers. The human-centric design will prioritize user-friendly interfaces and intuitive interaction mechanisms, such as projected augmented reality. The project will also examine the role of cobots and other assistive device in reducing strain on the operator without compromising precision or efficiency and the development of AI tools to predict the job fitting for different workers. The final aim of this project is to create digital and sustainable workstations that align with Industry 5.0 principles, enhancing productivity, human-robot collaboration and worker well-being.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Bosch Rexroth Oil Control S.p.A.

Corso di Dottorato	**LAND, ENVIRONMENT, RESOURCES AND HEALTH**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Mappatura intelligente dell'agritech: integrazione efficiente dei dati spaziali
Referente Scientifico	Francesco Pirotti
Email Referente Scientifico	francesco.pirotti@unipd.it
Descrizione del progetto	Spatial and non-spatial data are filling the analysis capacity of agencies that manage agritech from the field to the product. Multiple sources range from high-end satellite sensors to ground low-cost sensors imply different measurement temporal rates and spatial density, with varying accuracies and reliability. The candidate will develop skills that are necessary to answer the following research questions: (1) what are the challenges and optimal solutions for the integration of such diverse data in the realm of agritech? (2) what role can be played by artificial intelligence integrated with geospatial analysis tools (i.e. GeoAI)? (3) how to define a workflow for mapping variables of interest for the agritech, with increased reliability and efficiency?
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Rurall S.p.A.

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Progettazione e ottimizzazione di coatings a base di aerogel per rivestimenti flessibili termicamente isolanti per impiego in edilizia sostenibile
Referente Scientifico	Paolo Dolcet
Email Referente Scientifico	paolo.dolcet@unipd.it
Descrizione del progetto	The project aims to develop sustainable, flexible, and thin coating materials using nanoporous aerogels, for improved thermal insulation and energy saving in buildings, aligning with the M2C3 mission of the PNRR. The material design aims at identifying novel and advanced solutions. The aerogel will be produced by sol-gel routes, also using low temperature conditions of solvent removal, i.e. by using supercritical CO2. Aligning with the DNSH principle, leakage of aerogel dust or use of dangerous substances will be prevented. The optimisation phase, supported by Design of Experiment approaches, will minimize time, energy and chemical use while exploring experimental parameters (pH, precursors, solvent removal, etc.). Stability optimization of aerogel powder dispersion in water-based coatings will also be conducted. Prepared aerogels will be tested for thermal conductivity (0.015-0.019 W/mK), water permeability (EN 1931), and fire reaction (EN 13501-1), and then applied as coatings.
Periodo da svolgere in impresa	9
Soggetto finanziatore o cofinanziatore	Silcart S.p.A.

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Foto- ed elettro riduzione catalitica della CO2 attraverso nanomateriali ibridi
Referente Scientifico	Sara Bonacchi
Email Referente Scientifico	sara.bonacchi@unipd.it
Descrizione del progetto	In the pursuit of advancing catalysis, there is a growing interest in leveraging synergies between heterogeneous and homogeneous approaches. The control over the materials by a proper organic coating potentially favors additional catalytic binding sites, thereby boosting the selectivity and performance through a fine-tuning of the intermediates' stability. The use of molecules also widens the strength of this catalytic approach introducing additional electro-photocatalytic activation pathways enable to reduce the overall energetic balance. This Project aims to develop a new generation of hybrid materials - in the form of inks – to be exploited as photo-electrocatalysts to enhance the capture and/or transformation of CO2. The ability of specific classes of compounds such as, diazonium salts and organometallic compounds to physicochemical interact with copper and alloy-based nanostructures will be investigated to provide value-added products, thus ultimately mitigate the climate changes.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Basell Poliolefine Italia S.r.l.

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Catalizzatori di ossido di iridio supportati per elettrolizzatori a membrana a scambio protonico
Referente Scientifico	Christian Durante
Email Referente Scientifico	christian.durante@unipd.it
Descrizione del progetto	To enable large-scale hydrogen generation via PEM electrolysis, the use of scarce iridium-based catalysts for the oxygen evolution reaction (OER) must be significantly reduced. To address this issue, we aim for a facile and scalable synthesis of a highly active MO2 (M = Ti, Ce, Sn, Zr) supported iridium oxide-based catalyst with reduced noble metal content and an Ir-density as low as 0.05–0.08 gIr cm-3. The goal is to obtain a high surface area, corrosion-resistant MO2 catalyst support, homogeneously coated with a 1-2 nm thin layer of IrO2 or interconnected IrO2 nanoparticles of □2 nm. Additionally, we aim to achieve increased crystallinity of the IrO2 phase to significantly enhance the conductivity, along with a significantly increased stability, with minimal Ir dissolution under OER conditions, as the result of the synergistic interaction with the MO2 support. The catalyst characterization, as well as the MEA half-cell and full-cell measurements, will be conducted at DISC Department. Stability tests in a single-stack electrolyzer with catalyst loadings of 0.2-0.3 mg cm-2 will be carried out at the TME Facilities in Zaventem (Brussels).
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Toyota Motor Europe

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo di membrane a scambio ionico ad elevata selettività per applicazioni in dispositivi avanzati di conversione e stoccaggio di energia
Referente Scientifico	Vito Di Noto
Email Referente Scientifico	vito.dinoto@unipd.it
Descrizione del progetto	This project aims at devising new solid electrolytes/separator membranes for application in various types of advanced electrochemical energy conversion and storage devices, with a particular reference to redox flow batteries. The latter could run on either/both aqueous and organic feeds. The PhD student will fabricate the electrolytes/separator membranes, which will typically be based on polymeric matrices. In a second step, the products will undergo a comprehensive program of physicochemical and electrochemical studies. Particular efforts will be dedicated to study the correlation between the synthetic parameters, the physicochemical features and the selectivity of the membranes towards the permeation of the ionic species involved in the operation of the specific device. The results will allow for the screening of the most promising candidates for implementation in lab-scale prototype devices, to be tested for performance and cyclability.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	ENI S.p.A.

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Nuovi Materiali per le Tecnologie Quantistiche
Referente Scientifico	Giovanni Mattei
Email Referente Scientifico	giovanni.mattei@unipd.it
Descrizione del progetto	The development of innovative materials is one of the enabling technologies that is driving the new paradigm shift envisioned by quantum technologies. Topological insulators, superconductors, 2D materials, color centers in diamonds, rare-earths in solids are just few examples of innovative solid state platforms which are expected to be very promising candidates for new classes of solid-state qubits or for novel architectures exploiting the fascinating world of quantum correlations. The PhD candidate will be asked to contribute to the development of advanced materials to be used in a very wide range of applications spanning from quantum communication, computation or sensing.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Fisica e Astronomia "G. Galilei" - DFA su fondi Budget MUR Dipartimenti di Eccellenza 2023-2027 - Progetto "Frontiere Quantistiche" (FQ) - CUP: C93C22009250005

Corso di Dottorato	**MATERIALS SCIENCE AND TECHNOLOGY**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Rivestimenti sol-gel per applicazioni optoelettroniche
Referente Scientifico	Alessandro Martucci
Email Referente Scientifico	alex.martucci@unipd.it
Descrizione del progetto	The research project concerns the development of metal oxide sol-gel coatings based on TiO2, WO3, Al2O3, VO2 and ZnO, for optoelectronic applications. In particular TiO2, Al2O3 and ZnO coatings will deposited on glass tubes for optimizing the performances of plasma antennas for aerospace applications. WO3, ZnO and VO2 coatings will be investigated for developing plasmonic H2 sensors. The coatings will be deposited by dipping, spinning and spraying and both thermal and laser annealing will be investigated for the densification/crystallization of the coatings.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Ateneo di Studi e Attività Spaziali “Giuseppe Colombo” - CISAS su fondi del progetto ASI “LANDAU - pLasma ANtenna aDvanced manUfacturing” e su fondi HORIZON – progetto “Building blOcks for iOdine thruSTer (BOOST)” – GRANT AGREEMENT Project 101135216 — BOOST; Codice Unico di Progetto CUP Master J53C23003080006

Corso di Dottorato	**MEDICINA DELLO SVILUPPO E SCIENZE DELLA PROGRAMMAZIONE SANITARIA**
Curriculum *(eventuale)*	**Emato-oncologia, Genetica, Malattie rare e Medicina predittiva**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Terapie avanzate nel trattamento del tumore ovarico: dala diagnostica molecolare all'ottimizzazione delle "targeted therapies" e della biopsia liquida
Referente Scientifico	Roberto Tozzi
Email Referente Scientifico	roberto.tozzi@unipd.it
Descrizione del progetto	The aim of the project is the advancement of precision medicine in the treatment of ovarian cancer; a fatai neoplasm against which standard therapies have limited efficacy due to late diagnosis and molecular heterogeneity. The project will be structured as follows: - Development of analytical assays based on NGS sequencing with the aim of identifying genomic biomarkers able of improving prognostic capabilities, disease monitoring and drug response. - Improving the appropriate use of therapies used in clinica! setting (like PARPi) by optimizing the determination of HRD. - Developing molecular assays able to predict the response to new "targeted therapies" - Demonstrate the clinica! utility of liquid biopsy in the longitudinal monitoring of ovarian cancer This project falls under the themes of the PNRR, having a positive impact on environmental sustainability (reducing diagnosis time) and on social inclusion (earlier determination of drug resistance leads to a better prognosis).
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	AB Analitica S.r.l.

Corso di Dottorato	**MEDICINA MOLECOLARE**
Curriculum *(eventuale)*	**Biomedicina**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sistemi di nanodelivery naturali di attivi vegetali per combattere le infezioni cutanee antibiotico-resistenti
Referente Scientifico	Paola Brun
Email Referente Scientifico	paola.brun.1@unipd.it
Descrizione del progetto	The surge in antimicrobial resistance nullifies conventional treatments for bacterial and fungal skin and soft tissue infections (SSTI). As the clinical course of SSTI becomes complicated, there is a critical need for innovative approaches. This project plans to design and test natural nanodelivery systems loaded with standardized plant-derived molecules to target antimicrobial-resistant microbes in SSTI. It will i) use biotechnological and cell culture approaches to generate plant extracellular vesicles and a library of green molecules that will be chemically characterized and standardized, ii) test innovative protocols for active encapsulation to extend their half-life, iii) evaluate their antimicrobial efficacy and biological mechanisms, iv) assess long-acting release, v) ensure lack of immunogenicity, vi) monitor resistance occurrence, vii) restore sensitivity to antibiotics. Our approach provides a rational study of an innovative and farseeing multi-purpose drug delivery system.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	ABResearch S.r.l.

Corso di Dottorato	**MEDICINA MOLECOLARE**
Curriculum *(eventuale)*	**Biomedicina**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Miglioramento della Diagnostica delle Infezioni da H. pylori attraverso approcci di Biologia Sintetica
Referente Scientifico	Ignazio Castagliuolo
Email Referente Scientifico	ignazio.castagliuolo@unipd.it
Descrizione del progetto	BACKGROUND: Helicobacter pylori infections pose a global health concern, causing millions of cases annually and leading to conditions like peptic ulcers and gastric cancer due to virulence factors. Current diagnostic methods are effective but can be subjective, require specific equipment, may be costly, and are influenced by metabolic factors. A fast, affordable pre-screening technology is needed, especially in regions with limited resources. Synthetic biology can create innovative diagnostic tools, like biosensors and paper-based solutions. AIM: develop a cost-effective method to detect H. pylori using engineered bacteria with a urea-inducible reporter protein in media mixed with oral fluids (portable device containing genetic extracts or lyophilized bacterial cultures). ROADMAP: -Retrieve biological parts for urea-driven signals in engineered E. coli. -Evaluate system performance through experimental design and optimization. -Scale up using transcription-translation (TX-TL) platforms.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	AB Analitica S.r.l.

Corso di Dottorato	**MEDICINA SPECIALISTICA TRASLAZIONALE "G.B. MORGAGNI"**
Curriculum *(eventuale)*	**Biostatistica ed Epidemiologia Clinica**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Metodi Automatici per Revisioni Sistematiche e Meta-Analisi
Referente Scientifico	Ileana Baldi
Email Referente Scientifico	ileana.baldi@unipd.it
Descrizione del progetto	This research focuses on the application of intelligent algorithms and computational tools that streamline the process of conducting systematic reviews and meta-analyses. By leveraging techniques such as machine learning, natural language processing, and data mining, we aim to address key challenges, including the identification of relevant studies, data extraction, assessment of study quality, and synthesis of evidence across multiple studies. The ultimate goal is to enhance rigor, transparency, and scalability in evidence synthesis across various domains, benefiting decision-makers, researchers, and practitioners. Animal health and food safety present an exceptionally suitable arena for anchoring this research, due to their critical impact on public health and the global food supply chain.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe)

Corso di Dottorato	**MEDICINA SPECIALISTICA TRASLAZIONALE "G.B. MORGAGNI"**
Curriculum *(eventuale)*	**Infermieristica e Scienze della Salute**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Terapia dei Traumi negli Atleti mediante l'uso di campi elettromagnetici (CEM): Efficacia e Applicazioni nei Contesti Agonistici e Amatoriali
Referente Scientifico	Fabrizio Dughiero
Email Referente Scientifico	fabrizio.dughiero@unipd.it
Descrizione del progetto	In recent years, the use of electromagnetic fields (EMFs) has emerged as a promising therapy for treating musculoskeletal injuries. This research project aims to explore the effectiveness of EMFs in the rehabilitation of both professional and amateur athletes by developing innovative methodologies and administration techniques, and analyzing therapeutic outcomes in both athlete populations. The main objectives of the research are: To evaluate the effectiveness of EMFs in reducing pain and accelerating post-trauma recovery. To compare the effects of EMFs between professional and amateur athletes. To examine the biological mechanisms underlying the therapeutic action of EMFs. To identify best practices for the application of EMFs in different sports contexts. After a thorough literature review, the most promising EMF methods for trauma therapy will be assessed. A clinical study will be designed to highlight the effectiveness of various types of EMFs used in trauma therapy through pain measurement scales (VAS), functional and recovery assessments, and biomarkers. The final goal of the research project is to provide a comprehensive understanding of the use of EMFs in trauma therapy for athletes, contributing to improved rehabilitation practices and promoting the well-being of both professional and amateur athletes.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	AMEL Medical Division S.r.l.

Corso di Dottorato	**MEDICINA SPECIALISTICA TRASLAZIONALE "G.B. MORGAGNI"**
Curriculum *(eventuale)*	**Scienze Cardiovascolari**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Il legame tra substrato genetico e reazioni immunitarie nelle cardiomiopatie infiammatorie
Referente Scientifico	Kalliopi Pilichou
Email Referente Scientifico	kalliopi.pilichou@unipd.it
Descrizione del progetto	Inflammatory cardiomyopathies (ICM) comprise a broad group of cardiac disorders characterized by inflammation as primary/secondary cause of impaired function and myocardium remodelling. ICMs evolve in life-threatening arrhythmias and heart failure (HF). Recently, it has been postulated that genetic defects in structural proteins create a vulnerable myocardium prone to myocardial seeding by a pathogen, thus favouring the persistence and progression of myocarditis. On the hand, cardiac inflammation and autoantibodies exist also in most patients with advanced HF, regardless of the pathogenesis i.e. familial dilated cardiomyopathy (DCM) or arrhythmogenic cardiomyopathy (ACM). As such, DCM and ACM affected patients are frequently misdiagnosed as myocarditis (lymphocytic and granulomatous), or vice versa, highlighting the close resemblance of their clinical presentation. We hypothesize that an inflammatory process secondary to a genetic predisposition combined to immune impairment may trigger disease initiation or progression towards myocarditis, ACM or DCM phenotype. To this regard, innovative techniques of genomics and proteomics should be applied on biological samples of patients with biopsy-proven myocarditis, familial DCM and ACM to dissect their genomic and immune profile in order to identify therapeutic targets either new or common between ICM patients. In this setting, the contribution of industry is pivotal to enable the technical support by specialists and access to advanced methodologies and innovative protocols. The infrastracture of Cardiovascular Pathology of Padua is well-known world wide for its achievements in the cardiology, pathology and genetics field. The laboratories and biobanks are certified by ISO9001. PhD Morgagni of Padua is an interdisciplinaty course were educational activities include among others linguistic and IT improvement. Two intersecting working packages will be explored to carry out the project management: WP-1 Genetic and epigenetic profiling of affected patients focusing on those with active inflammatory phase (hot-phase) • Estimate the prevalence of genetic background in ICM hot-phase patients • Assess whether biopsy-proven myocarditis have a genetic component • Define the pattern of microRNA in ICM • Define the pattern of mRNA in ICM • Define the methylation profile in ICM that might influence gene expression among family gene carriers WP-2 Humoral immunologic response assessment and the rescue of inflammatory sequela • Define the potential cellular and humoral predictors (i.e. autoantibodies anti-heart, anti- desmoglein-2, anti-intercalated discs)

	• Generate data on ratios of Treg cells to Th17 cells in patients with ICM • Define HLA genotype profile in ICM and its role for clinical management • Understand how to neutralize immune cell response involved in ICM on zebrafish through candidate molecules and/or immune-depressive therapy The genetic/epigenetic and trascriptomic profile of patients paired with their immune response will shed light on the complex gene networks in ICM patients at risk of heart failure, and the ubiquitous role of the immune system in ICM. Therapeutic targets will be uncovered and new methods of investigation in these patients. The collaboration between university and industry will help the PhD student to develop skills in communication and management of scientific data and resources, acquire and transfer innovative methodologies in the clinical setting and it will give him the opportunity to work in a interdisciplinari environment (cardiology, immunology, genetics, pathology and statistics). Peer-reviewed scientific documents are forseen as well as the development of patents for techniques and drugs promoting, in compliance with intellectual property rights, the valorisation of research results both in the context of the activities of co-financing companies, also with a view to technological transfer, and in the scientific field, through adequate circulation of the results pursued, in any case according to the principles “Open science” and “FAIR Data".
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Diatech Lab Line S.r.l.

Corso di Dottorato	**NEUROSCIENCE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Deficit nelle abilità finanziarie tra i pazienti neurologici: svelare le basi neurofunzionali per migliorare la telereabilitazione
Referente Scientifico	Antonino Vallesi;
Email Referente Scientifico	antonino.vallesi@unipd.it
Descrizione del progetto	The project will investigate the neural underpinnings of financial abilities (FA) in neurological patients, with three main goals: 1. Investigating the correlation between structural neuroimaging data and FA in stroke patients, using advanced analytical techniques like multivariate models, to be compared with conventional methods, such as voxel-lesion symptom mapping. 2. Examining the relationship between FA deficits and functional magnetic resonance imaging (fMRI) in Parkinson's (PD) and mild cognitive impairment (MCI) patients. Dynamic fMRI metrics will be explored as potential biomarkers of decline in FA over time. 3. Evaluating the effectiveness of tele-rehabilitation in improving FA and related cognitive domains, compared to conventional therapy, in stroke or PD/MCI patients. Neuroimaging techniques will be used to assess changes induced by different therapeutic approaches, using dimensionality reduction methods like low-dimensional gradients and functional principal component analysis.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	IRCCS Ospedale San Camillo S.r.l.

Corso di Dottorato	**ONCOLOGIA E IMMUNOLOGIA**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di peptidi macrociclici-farmaco coniugati per la terapia di precisone del carcinoma mammario triplo negativo, un tumore solido raro e aggressivo
Referente Scientifico	Antonio Rosato
Email Referente Scientifico	antonio.rosato@unipd.it
Descrizione del progetto	The overall aim of the project is to leverage follicle-stimulating hormone receptor (FSHR) as a novel tumor-associated antigen to treat solid tumors, among which triple-negative breast cancer (TNBC) and malignant pleural mesothelioma (MPM). We will make use of the cutting-edge directed evolution platform of Arzanya to identify high affinity and selectivity macrocyclic peptides (MPs) against FSHR. Isolated MPs will be chemically synthesized and conjugated to a highly potent cytotoxic payload (deruxtecan, DXd) via a tumor-selective linker, which enables the release of DXd molecules not only on bound tumor cells but also on adjacent tissues through a “bystander effect”, while the peripheral circulation is spared. Selectivity and antiproliferative effect of MP-DXd conjugates will be assessed in vitro using multiple TNBC and MPM tumor cell lines. The therapeutic efficacy and toxic profile of best MP-DXd conjugates will be assessed in vivo using patient-derived xenograft mouse models.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	Arzanya S.r.l.

Corso di Dottorato	**ONCOLOGIA E IMMUNOLOGIA**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di radiofarmaci innovativi per la diagnostica e la terapia di precisione dell'adenocarcinoma duttale del pancreas
Referente Scientifico	Antonio Rosato
Email Referente Scientifico	antonio.rosato@unipd.it
Descrizione del progetto	The goal of this project is to develop novel targeted therapeutic radiopharmaceuticals for the treatment of pancreatic ductal adenocarcinoma (PDAC), a poor prognosis cancer with a 5-year survival rate <10%. To this end, we will make use of the cutting-edge directed evolution platform of Arzanya capable of generating and screening billions of diverse macrocyclic peptides (MPs) against a protein target of interest. We will identify high affinity and selectivity MPs against mesothelin (MSLN), a differentiation antigen overexpressed in PDAC. The isolated MPs will be chemically synthesised, conjugated to different NOTA-derivatives chelators, radiolabelled with 64Cu, and their stability and specificity assessed in vitro using MSLN-positive cells. The diagnostic potential of the 64Cu-MP conjugates will be then assessed in vivo using mouse models bearing MSLN and preclinical PET. Next, best MP-conjugates will be labelled with 67Cu to assess their potential as therapeutic agents.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	Arzanya S.r.l.

Corso di Dottorato	**PHYSICS**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Calcolo quantistico emulato tramite metodi a reti tensoriali
Referente Scientifico	Simone Montangero
Email Referente Scientifico	simone.montangero@unipd.it
Descrizione del progetto	Partial diherential equations (PDEs) are crucial in describing physical phenomena but are challenging to solve, especially in high dimensions. Quantum computing ohers a promising solution, and tensor networks provides an ehicient classical emulation of quantum algorithms. Tensor networks decompose high-dimensional tensors into interconnected lower- dimensional tensors, capturing essential correlations in many-body systems. Matrix Product States (MPS) are key tensor network techniques. These methods approximate quantum states and operators ehiciently, facilitating the emulation process. This approach also exploits mature numerical libraries, bridging classical and quantum computing. In particular, we will use the software Quantum Matcha tea developed at Unipd and installed on Leonardo supercomputer at CINECA. This makes them suitable for quantum simulations and solving PDEs. Quantum algorithms like Quantum Phase Estimation (QPE) and Variational Quantum Eigensolver (VQE) are used to address linear systems and eigenvalue problems common in PDEs. Emulating these algorithms with tensor networks allows researchers to explore their potential without needing quantum hardware. Overall, tensor network emulation of quantum algorithms oPers a practical pathway for understanding how to solve PDEs in a range of mid-scale quantum computers, combining quantum computing's potential with classical simulation efficiency.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Leonardo S.p.A.

Corso di Dottorato	**PHYSICS**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Sviluppo software HPC per emulazione di sistemi di quantum computing
Referente Scientifico	Simone Montangero
Email Referente Scientifico	simone.montangero@unipd.it
Descrizione del progetto	The phd project is devoted to the development and application of the Quantum Matcha Tea library (www.quantumtea.it) for emulation of quantum computers in HPC environment in close collaboration with CINECA and the Quantum Computing and Simulation center of Padova University. Application to quantum machine learning, optimization problems and benchmarking of quantum algorithms will be exploiting also sinergies with EU projects EURYQA and PASQUANS2.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Cineca Consorzio Interuniversitario Spoke 10 - Quantum Computing – nell'ambito del programma di ricerca CN00000013 Centro Nazionale “National Centre for HPC, Big Data and Quantum Computing” - borse di studio finanziate dall’Unione Europea – NextGeneratioEU - Piano Nazionale di Ripresa e Resilienza, Missione 4 - Componente 2 - Investimento 1.4 - CUP D56G22000380006

Corso di Dottorato	**PHYSICS**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Fisica del polimorfismo in liquidi e solidi amorfi
Referente Scientifico	Peihao Sun
Email Referente Scientifico	peihao.sun@unipd.it
Descrizione del progetto	Liquid and amorphous polymorphism, or the existence of more than one form of single-component disordered systems, is an emerging phenomenon with accumulating experimental evidence in recent years, but many unknowns remain to be discovered. The goal of this PhD project is thus to study the physics of polymorphism in liquids and amorphous solids using state-of-the-art experimental techniques, including but not limited to X-ray diffraction, neutron scattering, and flash calorimetry. The systems of interest include liquid tellurium and Te-based alloys, as well as metallic glass-forming liquids. The project will focus on fundamental aspects of the physics involved while experimenting with a variety of instrumentation and sample preparation methods.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Borsa da Dipartimento di Fisica e Astronomia - DFA su fondi progetto STARS Starting Grant “PolyLL”

Corso di Dottorato	**SCIENCES, TECHNOLOGIES AND MEASUREMENTS FOR SPACE**
Curriculum *(eventuale)*	**Mechanical Measurements for Engineering and Space**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Raccolta, archiviazione, elaborazione e diffusione di dati GNSS da stazioni fisse e mobili, finalizzate al miglioramento delle caratteristiche metrologiche delle stazioni stesse e all'analisi del territorio, con particolare riferimento alle regioni del Nord-Est d'Italia
Referente Scientifico	Marco Pertile
Email Referente Scientifico	marco.pertile@unipd.it
Descrizione del progetto	The main activities are: A) Improvement of GNSS data collection and archiving, both from fixed and mobile stations, and for several satellite constellations. B) Optimization of real time analyses of acquired GNSS data using Spider or Geo++ or similar software; the purpose is to evaluate RTK corrections that will be broadcast to users in the North-East Italy regions, in order to improve the reginal GNSS networks; some application fields are cadastral survey, precision farming, control of subsidence, evaluation of landslides and crustal deformation in seismic areas in North-East Italy regions. C) Analysis of the GNSS data using state of the art software Bernese 5.4 following the IGS and EUREF Guideline for precision Data Processing. The European Standards on geospatial referencing will be strictly applied. D) support for the distribution of GNSS data in the context of the European Plate Observing System (EPOS) to promote and enhance the data and products of the regional GNSS networks.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Ricerche Sismologiche dell'Istituto Nazionale di Oceanografia e Geofisica Sperimentale - OGS

Corso di Dottorato	**SCIENCES, TECHNOLOGIES AND MEASUREMENTS FOR SPACE**
Curriculum *(eventuale)*	**Sciences and Technologies for Aeronautics and Satellite Applications**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Tecnologie avanzate per la cattura di CO2 e produzione di bioidrogeno
Referente Scientifico	Francesco Picano
Email Referente Scientifico	francesco.picano@unipd.it
Descrizione del progetto	The project concerns the development of a third generation biorefinery capable of producing food, energy and chemicals from renewable sources and organic substrates such as CO2 or waste, using integrated and sustainable technological and biotechnological processes. The proposed solutions, designed for the terrestrial environment, are even more important for confined environments such as permanent stations on the Moon. In fact, in these stations the regeneration of resources in situ will be essential. The testing of biogenerative systems based on groups of microorganisms belonging to different metabolic groups and their functional integration in a dual "biorefinery" context potentially applicable both in reduced gravity and terrestrial environments is the basis of the project. In particular, the doctoral project will focus on the capacity to absorb carbon dioxide from confined environments and on the production of hydrogen from organic waste and the atmospher.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	VERITAS S.p.A.

Corso di Dottorato	**SCIENCES, TECHNOLOGIES AND MEASUREMENTS FOR SPACE**
Curriculum *(eventuale)*	**Sciences and Technologies for Aeronautics and Satellite Applications**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Progettazione, analisi e valutazione delle prestazioni di configurazioni innovative per il piano focale di telescopi spaziali
Referente Scientifico	Carlo Bettanini Fecia di Cossato
Email Referente Scientifico	carlo.bettanini@unipd.it
Descrizione del progetto	The design of the focal plane assembly is one of the most challenging technical aspects for high resolution imaging systems needed in low-orbiting Earth-observation constellations. The assembly, located at the focal plane position, hosts the support structures for detectors and their associated interfaces; flexi-cables for electrical connection and thermal straps for thermal control are realised as quasi-static mounts with the rest of the instrument. These flexibles cause difficulties in alignment of the detectors with respect to the nominal optical and mechanical reference systems and exhibit sensitivity to temperature gradients. The research project will analyse innovative design configurations for the focal plane assembly to address critical aspects in alignment, repeatability and operational stability in the view of progressively stricter requirements for opto-mechanical positioning tolerances. The thermomechanical optimisation of the assembly will target minimisation of misalignment during operation but also facilitate industrialization of dedicated alignment processes and automatic metrology verification for the demanding metrological requirements during assembly.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	OFFICINA STELLARE S.p.A.

Corso di Dottorato	**SCIENCES, TECHNOLOGIES AND MEASUREMENTS FOR SPACE**
Curriculum *(eventuale)*	**Sciences and Technologies for Aeronautics and Satellite Applications**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Ottiche freeform per strumentazione per nano/cubesat
Referente Scientifico	Giampiero Naletto
Email Referente Scientifico	giampiero.naletto@unipd.it
Descrizione del progetto	This PhD thesis will be devoted to the study and analysis of optical designs for imaging and spectroscopic systems making use of free-form optics. In particular, the possible application of these systems to cubesat/nanosat payloads for remote sensing will be investigated. One of the main tasks will be to obtain diffraction limited performance over the largest possible field of view, minimizing the distortion so to have the best possible image/spectrum quality. Different optical design will be studied, both refractive and reflective, and different dispersion configurations will be analyzed.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Ateneo di Studi e Attività Spaziali “Giuseppe Colombo” - CISAS su fondi del progetto “Space It Up” finanziato da “Bando di finanziamento per le “Attività spaziali" (tematica 15), Prot. CI-2022-DSR-042 del 18 luglio 2022 ASI

Corso di Dottorato	**SCIENCES, TECHNOLOGIES AND MEASUREMENTS FOR SPACE**
Curriculum *(eventuale)*	**Sciences and Technologies for Aeronautics and Satellite Applications**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Modelli fluidodinamici dell'atmosfera marziana
Referente Scientifico	Francesco Picano
Email Referente Scientifico	francesco.picano@unipd.it
Descrizione del progetto	A major problem concerning Mars exploration and a possible colonization is represented by dust storms. These can be strong, wide and long creating severe difficulties for structures and devices. The forecast of their formation and dynamics is a critical problem given the important difference between the Martian and Earth environmental conditions. The main aim of the PhD program concerns the development of a proper dust transport model considering particle lift and deposition in different wind and temperature conditions typical of the Mars atmosphere.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Centro di Ateneo di Studi e Attività Spaziali "Giuseppe Colombo" - CISAS su fondi del progetto "Space It Up" finanziato da "Bando di finanziamento per le "Attività spaziali" (tematica 15), Prot. CI-2022-DSR-042 del 18 luglio 2022 ASI

Corso di Dottorato	**SCIENZE BIOMEDICHE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Miglioramento delle prestazioni di ceppi enologici del lievito S.cerevisiae mediante cisgenesi molecolare
Referente Scientifico	Raffaele Lopreiato
Email Referente Scientifico	raffaele.lopreiato@unipd.it
Descrizione del progetto	The yeast S.cerevisiae is widely used by humans, from biotechnology to the industrial production of fermented beverages as wine. Many oenological yeast strains, isolated from different natural contexts and endowed with peculiar properties, have been so far collected by the partner company. This PhD project aims to improve the fermentative performance of several collection's strains by CRISPR/Cas9-based genetic engineering. Novel cisgenic strains will be generated, suitably modified to either reduce excessive production of undesired compounds as SOz, or to increase the levels of molecules relevant in winemaking as thiols. The project will thus provide a new collection of unique oenological strains, consisting of multiple S.cerevisiae cisgenic variants with enhanced fermentative properties. Although not allowed everywhere (e.g., EU), the use of cisgenic strains in food industry is already possible in other countries (e.g., USA), where the partner company is also active.
Periodo da svolgere in impresa	9
Soggetto finanziatore o cofinanziatore	ITALIANA BIOTECNOLOGIE

Corso di Dottorato	**SCIENZE BIOMEDICHE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di trattamenti farmacologici traslazionali per la regolazione del metabolismo del muscolo scheletrico
Referente Scientifico	Bert Blaauw
Email Referente Scientifico	bert.blaauw@unipd.it
Descrizione del progetto	A large portion of the human body is composed of skeletal muscle. Its activity level strongly affects the energetic needs of the whole organism, especially during exercise. It has recently been identified a new enzymatic state of the skeletal muscle motor protein myosin that evolved with the aim of saving energy during rest, the Super Relaxed State (SRX). The SRX controls muscle energy consumption during muscle inactivity which can happen for several hours a day, and it has been estimated to account for up to 1000 calories/day. In this project we are proposing myosin SRX stability as a new pharmacological target to control resting energy expenditure, with the final goal to develop a treatment for metabolic diseases. We developed a library of SRX modulators that have been characterized by biochemical assays. In this work, we will apply those molecules to living tissues and mice models to explore its pharmacological potential for the treatment of metabolic dysfunction.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	FONDAZIONE RICERCA BIOMEDICA AVANZATA ONLUS

Corso di Dottorato	**SCIENZE BIOMEDICHE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Esplorare l'utilizzo del recettore della transferrina come veicolo per il trasporto selettivo di oligonucleotidi antisenso ai tessuti del muscolo scheletrico
Referente Scientifico	Anna Raffaello
Email Referente Scientifico	anna.raffaello@unipd.it
Descrizione del progetto	Antisense oligonucleotides (ASOs) are promising therapies for neurological and neuromuscular diseases. The project's goal is to leverage transferrin receptor 1 (TfR1) to selectively transport ASOs to skeletal muscle. We will use the cutting-edge directed evolution platform of Arzanya to identify high affinity and selectivity macrocyclic peptides (MPs) against TfR1 that do not interfere with the binding of native transferring ligand. Isolated MPs will be synthesized and selectively conjugated to therapeutic ASO against the negative regulator of the mitochondrial calcium uniporter (MCU), MICU2, to rescue muscle atrophy. We have demonstrated that the MCU complex, mediating calcium entry into mitochondria, controls muscle mass, and targeting its regulator can be a therapeutic strategy to counteract its loss. The therapeutic efficacy and toxic profile of best MP-ASO conjugates will be assessed in vivo in mouse models of atrophy and the reduction of MICU2 mRNA quantified by qRT-PCR.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	Arzanya S.r.l.

Corso di Dottorato	**SCIENZE CLINICHE E SPERIMENTALI**
Curriculum *(eventuale)*	**Scienze ematologiche e geriatriche**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Fisiopatologia del tromboembolismo venoso (VTE) nei pazienti con stato di ipercoagulabilità da trombofilie ereditarie ed acquisite e implicazioni cliniche
Referente Scientifico	Roberta Ramonda
Email Referente Scientifico	roberta.ramonda@unipd.it
Descrizione del progetto	Among acquired conditions, the relationship between cancer and venous thromboembolism (VTE) has been the subject of study over the years, starting since Trousseau's first intuitions in 1965 and still today remains a problem of strong clinical interest. In fact, cancer exposes one to a 4 to 7 times higher risk for VTE, with a variability linked to type of cancer (higher for stomach and pancreatic cancer), stage of cancer (metastatic and locally advanced rather than primary site), ongoing oncological therapy (hormones, immunomodulatory therapy, antiangiogenic drugs), surgery, placement of venous catheters central, the patient's age and other individual risk factors (16,17). To date, VTE represents the second cause of death in cancer patients, with a risk > 60% by first year (16). The clinical manifestation is often subtle and the diagnosis is incidental in almost 50% of cases cases and occurs during imaging performed for cancer staging, evaluation of response to treatment and routine follow-up (18). Anticoagulation treatment also remains a challenge for the associated risk of bleeding, due to potential drug interactions (19), for a high risk of recurrence (20) which often forces patients to interrupt oncological treatment. It is therefore necessary to implement knowledge of the different mechanisms that drive mole thrombosis cancer patients to identify new predictors that improve existing models used for discriminate against high-risk patients (21). The aim of the global study is therefore to implement knowledge on the interrelationship of hereditary and acquired hypercoagulable states in cancer patients, evaluating the risk on the one hand oncological treatment of patients with hereditary thrombophilia, on the other hand to identify new genetic defects of factors or coagulation inhibitors responsible for the thrombotic risk linked to cancer and identify new ones laboratory parameters that can be predictive of thrombotic risk in cancer patients. Finally, it will be evaluated whether hereditary thrombophilia can be included in risk assessment models (RAM) to establish primary thromboprophylaxis in cancer patients. The same oncological risk assessments can also be carried out in subjects with conditions non-hereditary thrombophilic disorders, such as antiphospholipid antibody syndrome. Patients included will undergo a blood sample (if not already available) and will be performed laboratory tests for the analysis of specific hypercoagulability which will include traditional tests coagulation, thromboelastometry using the ROTEM® method, platelet aggregometry on blood whole and on plasma, measurement of circulating extracellular vesicles using the cytometry method a flow with the CytoFLEX® cytometer, thrombin-generation using the CAT® method with addition of thrombomodulin or with the addition of other thrombin inhibitors. Innovative tests will also be carried out such as TFPI tissue factor pathway inhibitor assay and tissue factor assay, gene sequencing of coagulation factors and inhibitors and endothelial

	receptors. The expected results of this study are the following: - Implement knowledge relating to hereditary and cancer-acquired hypercoagulable states - Evaluate the oncological risk of patients with hereditary thrombophilia - Identify new causes of hereditary and acquired thrombophilia in cancer patients develop thrombotic manifestations. - Identify new genetic defects of coagulation factors or inhibitors responsible for the risk thrombosis linked to cancer. - Acquire new knowledge on the pathogenetic mechanisms underlying thrombosis in patients with cancer. - Identify new laboratory parameters that can be predictive of thrombotic risk in cancer patients. - Evaluate whether hereditary thrombophilia can be included in risk assessment models (RAM) to establish primary thromboprophylaxis in cancer patients. The results of this study will be reported in a final integrated statistical and clinical report, compliant with the GCP-ICH guidelines and will be subject to communication and dissemination, regardless of the results obtained. Our Center is committed to contributing to the discussion of results and the drafting of abstracts and manuscripts that will be subject to peer-reviewed publication.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Medicina - DIMED su fondi Pfizer

Corso di Dottorato	**SCIENZE CLINICHE E SPERIMENTALI**
Curriculum *(eventuale)*	**Scienze endocrino-metaboliche e medicina di genere**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Attività antiproliferativa e anti-migratoria dell'estratto di liquirizia e dell'acido glicirretinico su colture di cancro papillare della tiroide
Referente Scientifico	Caterina Mian
Email Referente Scientifico	caterina.mian@unipd.it
Descrizione del progetto	Papillary thyroid cancer (PTC) is the the most common cancer among women. Licorice (Li) contains over 300 active compounds and many of them with anticancer properties. Glycyrrhetinic acid (GA) is a major component of Li. We showed both gene and protein expression and functional activation of mineralocorticoid receptor (MR) in two human PTC cell models, the BCPAP and K1 cell lines. We demonstrated also that GA binds to MR and blocks 11β-hydroxysteroid dehydrogenase type 2 (11βHSD2) exhibiting an in vitro pro-inflammatory activity while administration of Li root extract has an anti-inflammatory and anti-sclerotic action. Given these premises, Li represents an interesting and promising resource for the discovery and the development of new anti-cancer drugs. Our aim is to investigate the potential anti-proliferative effects of Li and GA on PTC cell cultures, paving the way for the development of new anti-cancer drugs for the treatment of PTC.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Katjes Fassin Gmbh + Co.

Corso di Dottorato	**SCIENZE CLINICHE E SPERIMENTALI**
Curriculum *(eventuale)*	**Scienze nefrologiche, dell'esercizio fisico e della nutrizione**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Risposta fisiologica durante l'utilizzo dell'esoscheletro passivo: dal laboratorio al contesto produttivo
Referente Scientifico	Marco Bergamin
Email Referente Scientifico	marco.bergamin@unipd.it
Descrizione del progetto	The PNRR represents a significant opportunity to stimulate innovation and economic growth. The theme of the project concerns the use of exoskeletons, devices that enhance human physical capabilities. This tool fits perfectly in the context of the NRP, helping to achieve several of the PNRR objectives, articulately that of worker safety and health where exoskeletons can improve workstation ergonomics and especially the risk of occupational injuries and illnesses related to biomechanical overload. The aim of the project is to evaluate the physiological response to the use of a passive exoskeleton, first in controlled tasks developed in the laboratory and then in a production setting on workers employed in manual tasks. Specifically, muscle activation, energy expenditure and perceived exertion will be evaluated. The hypothesis is that the use of the exoskeleton will result in a reduction in key physiological variables while performing manual load handling tasks.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	Gymhub S.r.l.

Corso di Dottorato	**SCIENZE CLINICHE E SPERIMENTALI**
Curriculum *(eventuale)*	**Tecnologie emergenti nella formazione e nella ricerca infermieristica e delle professioni sanitarie**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Gestione dei big data e salute: il ruolo delle professioni sanitarie
Referente Scientifico	Roberta Ramonda
Email Referente Scientifico	roberta.ramonda@unipd.it
Descrizione del progetto	The project aims to define methods specific to the multidisciplinary and multi-professional approach for integrated training in health sciences and management, to address complex problems with multidisciplinary approaches and development of skills for working in interprofessional teams, which leads healthcare professions to acquire the research methodology in the phases of study design, data collection, dissemination, and also advanced statistical analysis, big data management by healthcare professions. Definition of research projects in three different areas: 1. Nursing and health professions assistance, with particular regard to the definition and validation of original advanced skills or transmitted through task-shifting processes 2. Organizational-managerial, with particular attention to the definition and testing of multidisciplinary management models in different clinical settings 3. Technological, with the development of tools to improve the effectiveness and efficiency of care, with particular attention to protecting the safety of users and professionals.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Azienda Ospedale-Università Padova

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Materiali, strutture, sistemi complessi e architettura**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Progettazione di nuovi ponti ad arco in muratura: innovare guardando al passato
Referente Scientifico	Paolo Zampieri
Email Referente Scientifico	paolo.zampieri@unipd.it
Descrizione del progetto	Mason arch bridges have been a common type of structure in the past, and are still very common in existing railway and roadway infrastructures. Modern computational power and tools (such as 3D numerical structural models), as well as innovative constructive techniques, may re-vitalize, in lieu of a more sustainable approach to construction, this type of bridge, with the purpose of reaching the goal of zero carbon emission. The aim of the project is the development and implementation of the previously mentioned tools for the optimization design of new masonry arch bridges, as well as the study of innovative materials and production procedures, that allow for the re-cycling and re-use of demolition waste to achieve sustainable bridge construction.
Periodo da svolgere in impresa	15
Soggetto finanziatore o cofinanziatore	Net Engineering S.r.l.

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Materiali, strutture, sistemi complessi e architettura**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Uso innovativo e sostenibile dell'acciaio ad alta resistenza nella costruzione di ponti
Referente Scientifico	Carlo Pellegrino
Email Referente Scientifico	carlo.pellegrino@unipd.it
Descrizione del progetto	The application of high strength steel in bridge construction has the potential to reduce the amount of steel used, and thereby facilitate a more sustainable construction. Fatigue can be a limiting factor in deciding the amount of material, and what steel grade can be used in bridge construction, especially concerning the design of structural details and connections. Improved steel strength allows for greater fatigue resistance of the connections and consequently of the overall bridge; thus enabling the bridge designer to optimize the amount of steel used, the steel cost and the inevitable harmful emissions. The project, after a critical literature review, aims to investigate the fatigue strength of innovative connections and details, studying them through numerical/analytical modelling, as well as, eventually, through experimental testing.
Periodo da svolgere in impresa	15
Soggetto finanziatore o cofinanziatore	Net Engineering S.r.l.

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Materiali, strutture, sistemi complessi e architettura**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	La digitalizzazione nel settore delle costruzioni: definizione di processi e sistemi informativi per la gestione e l'analisi dei dati
Referente Scientifico	Andrea Giordano
Email Referente Scientifico	andrea.giordano@unipd.it
Descrizione del progetto	The implementation of BIM-based processes related to the construction phase of a building process is a research topic stili much explored: in particular, there is a lack of clear guidelines for the management of structured or semi-structured data of an engineering and construction project, their collection and analysis to derive strategie information. This research project therefore aims to define a clear process model taking into consideration the stakeholders, available tools and information requirements, through the use of a metadata system, the use of data analytics, semantic web, interactive data visualization, business intelligence capabilities and possibly artificial intelligence. The research thus contributes to creating new awareness and knowledge of possible methodologies and a process model related to the management of design, economie and security data within a construction company and digitai work environment.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	CARRON CAV. ANGELO S.p.A.

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Rischio, vulnerabilità, ambiente, salute e territorio**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Gestione del rischio di frane su ponti e viadotti: protocolli avanzati per l'indagine e il monitoraggio dello stato di sofferenza delle opere
Referente Scientifico	Lorenzo Brezzi
Email Referente Scientifico	lorenzo.brezzi@unipd.it
Descrizione del progetto	The project addresses managing landslide risks that threaten the stability and safety of bridges and viaducts, aligning with PNRR objectives on infrastructure and sustainable mobility. It seeks to develop advanced protocols for investigating and monitoring structural distress due to landslides, in light of current ministerial guidelines which, despite standardizing procedures, allow significant interpretative freedom for inspectors and concession entities. By considering various types of landslides—from rockfalls to debris flows and slow-moving landslides—the project aims to efficiently manage numerous infrastructures. Integrating digital technologies and innovative approaches, the project will optimize investigation and monitoring processes, enhance efficiency, and reduce landslide risks. Ultimately, the project aims to improve knowledge levels, optimize management and maintenance processes, and promote the sustainability and competitiveness of the national infrastructure system.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	TECNE Gruppo Autostrade per l'Italia S.p.A.

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Rischio, vulnerabilità, ambiente, salute e territorio**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Delimitazione delle aree di salvaguardia attorno a prese da pozzo a scopo idropotabile
Referente Scientifico	Paolo Salandin
Email Referente Scientifico	paolo.salandin@unipd.it
Descrizione del progetto	A wellhead protection area (WHPA) is defined as the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield. The research project aims to define the information necessary to delineate WHPA through the numerical analysis of underground flows considering the heterogeneity of natural formations and the uncertainty in boundary conditions.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Consiglio di Bacino Veneto Orientale

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Rischio, vulnerabilità, ambiente, salute e territorio**
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Intelligenza artificiale per la previsione dello stato del mare in contesti costieri e off-shore
Referente Scientifico	Piero Ruol
Email Referente Scientifico	piero.ruol@unipd.it
Descrizione del progetto	The Institute of Marine Sciences - ISMAR of the National Research Council - CNR, is funding a doctoral fellowship with a restricted topic entitled: 'Artificial intelligence for sea state forecasting in coastal and off-shore contexts'. The scientific interest is the exploration of the opportunities and limitations of the application of artificial intelligence tools for the improvement of sea state forecasting systems. In fact, it is well known that forecasting systems based on the numerical solution of equations describing the physics of sea-wave generation, evolution and dissipation have reached generally high levels of accuracy and reliability, but there are still some areas where performance improvement is sought, for example: simulation of directional wave spectra and derived spectral variables, simulation of complex meteorological sea conditions, parameterisation of the source terms of the equations.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Istituto di Scienze Marine - ISMAR del Consiglio Nazionale delle Ricerche - CNR

Corso di Dottorato	**SCIENZE DELL'INGEGNERIA CIVILE, AMBIENTALE E DELL'ARCHITETTURA**
Curriculum *(eventuale)*	**Rischio, vulnerabilità, ambiente, salute e territorio**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Monitoraggio delle microplastiche nelle acque urbane e messa a punto di filtri per la rimozione
Referente Scientifico	Maria Cristina Lavagnolo
Email Referente Scientifico	mariacristina.lavagnolo@unipd.it
Descrizione del progetto	Si intende sviluppare un prototipo di monitoraggio online, che non preveda l'estrazione del campione d'acqua con la successiva filtrazione e analisi in laboratorio. Il prototipo, sarà in grado di prelevare l'acqua dal sistema (acquedottistico) possibilmente a gravità e condurla all'interno dello strumento di misura. Lo strumento di misura, dotato di una sezione di calma, sarà in grado di effettuare analisi spettroscopico-vibrazionali direttamente sul campione d'acqua, andando a definire quantità e qualità delle particelle eventualmente presenti. Inoltre, una volta testato lo strumento e raccolta un'opportuna quantità di dati, sarà possibile realizzare un modello di deep learning in grado di elaborare i dati. Una parte del dottorato sarà rivolto alla messa a punto di un filtro (brevettabile) per la rimozione delle microplastiche, da utilizzare sia in ambito acquedottistico, se possibile autopulente, la cui efficienza di rimozione venga testata proprio con il prototipo di cui sopra.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Atlas Filtri S.r.l.

Corso di Dottorato	**SCIENZE LINGUISTICHE, FILOLOGICHE E LETTERARIE**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	I frammenti di Aristotele: edizione, traduzione e commento
Posti a disposizione	2
Referente Scientifico	Gertjan Verhasselt
Email Referente Scientifico	gertjan.verhasselt@unipd.it
Descrizione del progetto	The ERC-funded project FragArist aims to make a new critical edition with an English translation of the fragments of Aristotle. This project offers two 3-year positions for Ph.D. candidates to enroll in the doctoral program of Linguistic, Philological and Literary Sciences and write a Ph.D. dissertation preparing a critical edition with an English translation and English commentary of a selection of Aristotelian fragments (ideally about 40 fragments in total or a selection of larger texts). The successful candidates will demonstrate that they meet the following criteria: (1) M.A. in Classics or Ancient Philosophy (or equivalent) (2) Excellent knowledge of Ancient Greek and Latin (3) Fluency in English (C1 or C2) and a good understanding of Italian and French (B2) (4) Good reading comprehension of German (B1 or B2) or commitment to acquire this in the first year (5) An excellent M.A. dissertation (6) Excellent philological skills necessary for editing Ancient Greek and Latin texts.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Scienze Storiche, Geografiche e dell'Antichità - DiSSGeA su fondi progetto ERC-2021-STG “FragArist- The Fragments of Aristotle: A Reconstruction of his Lost Works” GA 101041826, PI prof. Gertjan Verhasselt

Corso di Dottorato	**SCIENZE MATEMATICHE**
Curriculum *(eventuale)*	**Matematica Computazionale**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Tecniche di Ottimizzazione batch e near-real-time per supply chain e produzione sostenibili
Referente Scientifico	Francesco Rinaldi
Email Referente Scientifico	rinaldi@math.unipd.it
Descrizione del progetto	The widespread application of AI techniques and emerging sustainability challenges have led decision support systems to tackle increasingly complex optimization problems. Moreover, in several contexts, re-planning becomes necessary due to events which invalidate the previous decisions: real-time reactions are hence needed. The growing size of the problems and the limited availability of processing time contradict one another: the computing power is indeed insufficient to ensure the resolution of complex problems; therefore, an increasingly efficient and diversified framework of new algorithms is becoming necessary. The project thus focuses on the development and analysis of new exact, heuristic and quantum algorithms that allow us to tackle those challenging problems.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Spindox S.p.A

Corso di Dottorato	**SCIENZE MOLECOLARI**
Curriculum *(eventuale)*	**Scienze Chimiche**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Valorizzazione del contenuto di metalli in fanghi da trattamento acque reflue industriali
Referente Scientifico	Silvia Gross
Email Referente Scientifico	silvia.gross@unipd.it
Descrizione del progetto	This project aims at extraction and valorization processes of metals in industrial wastewater treatment sludge with a high metal content (es. Ni, Cu, Zn, Cr) by using Deep Eutectic Solvents and continuous flow hydrothermal approaches, both complying with the European Union DNSH principle. This waste has to be considered an urban mine relevant for its content in critical and strategic materials. This project has an environmental and circular economy relevance: by valorising these waste materials, important metals for the industry can be put back into circulation, also compliant with the Critical Raw Materials Act, avoiding their dispersion in the environment and consumption of virgin raw materials. The PhD student will be able to take advantage of the company well-equipped R&D laboratories (ICP-MS, fumehoods, ovens, spectrophotometers, pH meter, analytical scale). The results of the research activity, within the limits of intellectual property, will be valorised followingthe principles of "open science".
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	Tintess S.p.A.

Corso di Dottorato	**SCIENZE MOLECOLARI**
Curriculum *(eventuale)*	**Scienze Chimiche**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Polimeri Sostenibili da Ammoniaca
Referente Scientifico	Cristian Pezzato
Email Referente Scientifico	cristian.pezzato@unipd.it
Descrizione del progetto	This project aims at developing new synthetic procedures for the utilization and valorization of ammonia to generate polymeric materials that are (i) (bio)degradable, (ii) recyclable and (iii) originating from bio-sourced raw materials. Bio-derived compounds from renewable feedstocks will be modified with ammonia to yield monomer species that can be readily polymerized by free radical polymerization (FRP), reversible deactivation radical polymerization (RDRP) methods, ring opening metathesis polymerizations (ROMP) and polycondensations. These processes will provide linear polymers that are applicable in the biomedical and agriculture fields, or which can function as starting materials for the synthesis of thermosets as recyclable structural materials.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	CASALE SA

Corso di Dottorato	**SCIENZE MOLECOLARI**
Curriculum *(eventuale)*	**Scienze Chimiche**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di nuove metodologie per la decontaminazione olistica di rifiuti industriali
Referente Scientifico	Cristiano Zonta
Email Referente Scientifico	cristiano.zonta@unipd.it
Descrizione del progetto	This project stems from a long-term collaboration between UniPd and Depuracque Servizi srl. The company is experienced in industrial wastewater treatment and in research and development of novel methodologies for an effective removal of poly-and perfluoroalkyl molecules (PFAS) from contaminated streams. The research aims to: develop novel procedures that lead to separation, concentration and oxidative degradation of PFAS-present in contaminated industrial wastewater, producing original research that will be published in open literature and disseminated to a wide audience during conferences or possibly patented. The proposed research and methodology are in line with PNRR since the effective and sustainable degradation of these molecules still represents an unresolved environmental problem, especially in Veneto region, where it is mainly but not fully contained by landfill disposal or incineration. This research will also innovate Depuracque industrial know-how about PFAS remediation.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	Depuracque Servizi S.r.l.

Corso di Dottorato	**SCIENZE MOLECOLARI**
Curriculum *(eventuale)*	**Scienze Chimiche**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Innovazioni nella spettrometria di massa a ionizzazione chimica e nei sensori a stato solido per il monitoraggio non invasivo ad alta sensibilità dei composti organici volatili per applicazioni agroalimentari ed ambientali
Referente Scientifico	Luca Cappellin
Email Referente Scientifico	luca.cappellin@unipd.it
Descrizione del progetto	The project revolves around three main objectives: i) To develop methods with high specificity and sensitivity for real-time monitoring of volatile compounds, leveraging the latest technological innovations in the field of chemical ionization mass spectrometry. This includes the use of high-resolution time-of-flight analyzers, the implementation of various precursor ions for chemical ionization, and the innovative application of ion mobility mass spectrometry, ii) to support the development and testing of solid-state sensors aimed at monitoring volatile compounds with instrumentation that is more economical and compact compared to advanced but bulky and costly methodologies; iii) to apply the developed methodologies to relevant case studies in the agro-industrial sector, such as the analysis of headspace during food tasting, and in the environmental sector, such as measurements of air quality in both indoor and outdoor environments.
Periodo da svolgere in impresa	18
Soggetto finanziatore o cofinanziatore	3SLAB S.r.l.

Corso di Dottorato	**SCIENZE MOLECOLARI**
Curriculum *(eventuale)*	**Scienze Farmaceutiche**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Applicazione del Machine Learning (ML) per lo sviluppo di modelli predittivi applicati all' ambito preclinico e clinico
Referente Scientifico	Stefano Moro
Email Referente Scientifico	stefano.moro@unipd.it
Descrizione del progetto	The proposed PhD project aims to develop advanced predictive models using ML techniques, specifically targeting preclinical and clinical applications in tight collaboration with the pharma company Sanofi Italia. The project involves the integration of large-scale data, including electronic health records (EHRs), medical imaging, omics data, and patient demographics, to build robust models capable of predicting disease onset, progression, and treatment outcomes. Key objectives include data preprocessing, feature selection, and the application of various ML algorithms such as deep learning, ensemble methods, and reinforcement learning. Rigorous validation using real-world clinical data and collaboration with Sanofi professionals will ensure the models' accuracy and applicability. Ultimately, this research aims to enhance clinical decision-making, improve patient outcomes, and contribute to the advancement of precision medicine.
Periodo da svolgere in impresa	12
Soggetto finanziatore o cofinanziatore	SANOFI S.r.l. Socio Unico

Corso di Dottorato	**SCIENZE STATISTICHE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Big Data per la Mobilità – Integrazione dati e inferenza statistica
Referente Scientifico	Manuela Cattelan
Email Referente Scientifico	manuela.cattelan@unipd.it
Descrizione del progetto	The current technological evolution is accelerating data generation and collection, especially from moving objects or people, which is particularly beneficial for mobility studies. The three main data sources used by Motion Analytica come from Telco, FCD, and GPS from apps. These sources offer significant potential, but they suffer from drawbacks as they are not “independent" of each other and do not provide explicit keys to link individual observations from one source to another. Moreover, each source generates from a sample with specific biases relative to the reference population. This research project aims to: * define methodologies to integrate these sources with each other and with otavailable reference databases (ie Eurostat); * develop methodologies to extrapolate observed estimates to the total population, both by correcting biases introduced by specific sources and by estimating the actual population size; * use the data collected from different sources in order to investigate various issues related to mobility.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Motion Analytica S.r.l.

Corso di Dottorato	**SCIENZE VETERINARIE E SICUREZZA ALIMENTARE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Uno strumento per la valutazione etica delle tecniche di riproduzione assistita negli equidi, nei bovini e nei suini: Valutazione della tutela della biodiversità, del benessere animale e delle implicazioni per la società
Referente Scientifico	Barbara de Mori
Email Referente Scientifico	barbara.demori@unipd.it
Descrizione del progetto	This project aims to develop a practical and ready to use tool for the ethical assessment of assisted reproduction techniques on breeds of equids, bovines and swines based on innovative frameworks, best practices, and literature. The tool will evaluate different ethical aspects, including the ecological impact of breeding techniques on biodiversity and ecosystems; animal welfare; the societal implications, including staff safety, cultural significance, and public acceptance of these biotechnologies; and adherence to high-quality and ethical standards in procedures and research. A crucial portion of the project will be spent in the field, leveraging the assisted reproductive technician expertise of Avantea Labs to build and validate the tool. The objective is to protect biodiversity and encourage the development of sustainable livestock farming practices, in line with the PNNR's goals related to ecological transition and the development of a smart and green agricultural supply chain.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Avantea S.r.l.

Corso di Dottorato	**SCIENZE VETERINARIE E SICUREZZA ALIMENTARE**
Curriculum *(eventuale)*	
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Sviluppo di strumenti innovativi per la gestione della conservazione delle specie protette in contrasto con le attività umane usando le nuove tecnologie: l'esempio della Caretta caretta e del Tursiops truncatus nel Nord Adriatico
Referente Scientifico	Sandro Mazzariol
Email Referente Scientifico	sandro.mazzariol@unipd.it
Descrizione del progetto	Tursiops truncatus and Caretta caretta are included in the Annex II of the Habitat Directive. One of the most relevant areas for their protection is the Northern Adriatic where the Veneto Regional Park Delta del Po has established a marine protected area in 2020. This project is aimed to integrate to marine vertebrates conservation: missing data will be recovered using both new molecular approaches and monitoring data obtained applying artificial intellingence based software elaborating data collected with to drones and automatic cameras. These information will be integrated to additional long data series regarding animals biology and medicine as well as the environment or human activities to develop a predictive model of risk. The results obtained should support the Park in the development of proper monitoring programs and mitigation measures addressing main threats for dolphins and sea turtles conservation and management including an efficient interaction with relevant stakeholders.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Ente Parco Regionale Veneto del Delta del Po'

Corso di Dottorato	**SOCIAL SCIENCES**
Curriculum *(eventuale)*	**Applied Psychology**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	Implementazione della figura degli Esperti per Esperienza nel sistema dei Servizi per le Dipendenze Patologiche dell'Emilia-Romagna: Una Ricerca Esplorativa
Referente Scientifico	Elena Faccio
Email Referente Scientifico	elena.faccio@unipd.it
Descrizione del progetto	The WHO's European Mental Health Action Plan (2013-2030) emphasises the need to generate services that are more inclusive and attentive to the co-construction of care practices. This exploratory study, in the context of the PNRR on Social Equity and Health, analyses the implementation of the figure of the Expert by Experience (EBE) in the system of prevention, treatment and rehabilitation services for pathological ddictions in Emilia Romagna. The EBE, a person with direct experience of addiction and recovery, is increasingly recognised internationally as a crucial figure for improving the quality of services. The research explores the EBE's training, inclusion in recovery processes, in patients' reintegration and advocacy. Involving the whole pathological addiction network system, the study assesses the collaborative dynamics and benefits of EBE integration, reflecting a participatory approach, and providing indications for more effective policies and practices in addiction treatment.
Periodo da svolgere in impresa	10
Soggetto finanziatore o cofinanziatore	Azienda Unità Sanitaria Locale (USL) di Modena

Corso di Dottorato	**SOCIAL SCIENCES**
Curriculum *(eventuale)*	**Applied Psychology**
Tipologia di borsa	Ex DM 630/2024
Titolo del progetto	L'intersezione tra pratiche contemplative, spiritualità e significato: effetti psicosociali su benessere, prosocialità, atteggiamenti pro-ambientali e impatto nei contesti socio-sanitari
Referente Scientifico	Alberto Voci
Email Referente Scientifico	alberto.voci@unipd.it
Descrizione del progetto	The research project aims at investigating the positive effects of the dynamic between contemplative practices, spirituality (self-transcendence and connection with wider dimensions), and presence of/search for meaning. The intersection between these dimensions will be investigated across four studies, in four areas relevant to contemporary society: (1) well-being (psychological well-being, stress reduction); (2) prosociality and social inclusion (empathy, compassion, prejudice reduction, acceptance of diversity); (3) pro-environmental attitudes (connection with nature, pro environmental behaviors; (4) the healthcare context (perceptions and experiences of healthcare professionals, patients, and caregivers). For each of these areas, quantitative research will be carried out, applying validated measurement instruments and analyzing data with multivariate techniques. Results will inform interventions aimed at the development of human capital and of an inclusive and sustainable society.
Periodo da svolgere in impresa	6
Soggetto finanziatore o cofinanziatore	Unione Buddhista Italiana (UBI)

Corso di Dottorato	**STORIA, CRITICA E CONSERVAZIONE DEI BENI CULTURALI**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	I testi teatrali di Lorenzo Da Ponte
Referente Scientifico	Alessandro Borin
Email Referente Scientifico	alessandroborin@steffani.it
Descrizione del progetto	Lorenzo Da Ponte's works included translating texts from French to Italian, reworking old librettos for revivals and providing new works (themselves often adaptations) for Viennese composers. Objectives and Expected results of the doctoral project - To review ("recensio") and collate ("collatio") the corpus of opera librettos by Lorenzo da Ponte. - To create a digital repository of literary sources. - To develop a critical edition of a selection of Lorenzo Da Ponte's librettos with facing hypotexts, indicating in footnotes the variants emerged from the musical sources - To carry out research on da Ponte's works, with a focus on the profound sense of the literary and dramatic traditions within which he was working. Da Ponte took his heritage further back still to the Renaissance. He was intimately familiar with Italian Renaissance poetry. References and quotations in his librettos emphasize the point: Dante, Petrarch, Boccaccio, Ariosto, Sannazaro, Tasso and Guarini all make appearances.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Beni Culturali: archeologia, storia dell'arte, del cinema e della musica - DBC su fondi Piano Nazionale di Ripresa e Resilienza (PNRR) - Missione 4 - Componente 1 "Potenziamento dell'offerta dei servizi all'istruzione: dagli asili nido all'università" - Investimento 3.4 "Didattica e competenze universitarie avanzate", sotto-investimento TS "Partenariati strategici/iniziative per innovare la dimensione internazionale del sistema AFAM", finanziato dall'Unione europea - NextGenerationEU, Project Title: MTNT Music Theatre and New Technologies. Towards a New Paradigm in Opera Studies and Performance

Corso di Dottorato	**STORIA, CRITICA E CONSERVAZIONE DEI BENI CULTURALI**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Opera VR: percorsi interdisciplinari per un approccio didattico Innovativo
Referente Scientifico	Alessandra Montali
Email Referente Scientifico	alessandra.montali@conssp.it
Descrizione del progetto	The research area "Opera VR: Interdisciplinary Paths for an Innovative Educational Approach" focuses on developing the use of virtual reality in teaching opera, linked to the project "MUSIC THEATRE AND NEW TECHNOLOGIES Toward a New Paradigm in Opera Studies and Performance". The goal is to create immersive educational modules for university students, offering a personalized learning experience that allows users to interact with virtual representations of operas and explore appropriate content. The research includes the design of virtual galleries providing access to manuscripts, scores, academic articles, iconography, historical contexts, and multimedia content. This interdisciplinary approach aims to develop a scientific and more engaging understanding of opera through advanced immersive technologies.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Beni Culturali: archeologia, storia dell'arte, del cinema e della musica - DBC su fondi Piano Nazionale di Ripresa e Resilienza (PNRR) - Missione 4 - Componente 1 "Potenziamento dell'offerta dei servizi all'istruzione: dagli asili nido all'università" - Investimento 3.4 "Didattica e competenze universitarie avanzate", sotto-investimento TS "Partenariati strategici/iniziative per innovare la dimensione internazionale del sistema AFAM", finanziato dall'Unione europea - NextGenerationEU, Project Title: MTNT Music Theatre and New Technologies. Towards a New Paradigm in Opera Studies and Performance

Corso di Dottorato	**STORIA, CRITICA E CONSERVAZIONE DEI BENI CULTURALI**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	L'Opera Contemporanea con Sistema Musicale Elettroacustico
Referente Scientifico	Alvise Vidolin
Email Referente Scientifico	vidolina@gmail.com
Descrizione del progetto	The program of the PhD course on The Contemporary Opera with Electroacoustic Music Systems aims: - to address technological obsolescence in electroacoustic music systems; - to research new performance practices related to electroacoustic music; - to investigate the notation of electroacoustic music; - to develop historical and philological approaches to operas that use electroacoustic tools; - to explore the sustainability of electroacoustic and computer music performance practice. Expected Results: - preservation and modernization of electroacoustic music system in relation to the repertoire of the lyric opera; - cooperation with national and international music institutions with same research interest; - promotion of contemporary italian opera; - engagement with global electroacoustic music research initiatives.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Beni Culturali: archeologia, storia dell'arte, del cinema e della musica - DBC su fondi Piano Nazionale di Ripresa e Resilienza (PNRR) - Missione 4 - Componente 1 "Potenziamento dell'offerta dei servizi all'istruzione: dagli asili nido all'università" - Investimento 3.4 "Didattica e competenze universitarie avanzate", sotto-investimento TS "Partenariati strategici/iniziative per innovare la dimensione internazionale del sistema AFAM", finanziato dall'Unione europea - NextGenerationEU, Project Title: MTNT Music Theatre and New Technologies. Towards a New Paradigm in Opera Studies and Performance

Corso di Dottorato	**STORIA, CRITICA E CONSERVAZIONE DEI BENI CULTURALI**
Curriculum *(eventuale)*	
Tipologia di borsa	Borsa da Finanziatori Esterni e da Dipartimenti
Titolo del progetto	Opera italiana del XVII secolo: filologia e transizione digitale
Referente Scientifico	Federico Bardazzi
Email Referente Scientifico	federico.bardazzi@conssp.it
Descrizione del progetto	The doctoral course "Italian Opera in the 17th Century: Philology and Digital Transition" delves into the Italian opera of the 17th century, a pivotal period that witnessed the birth and development of the operatic genre. The program focuses on the philological study of operas, aiming for an accurate understanding of the texts, original scores, and the historical-cultural context in which they were created. Additionally, the course examines modern digitalization techniques and computational methodologies applied to the humanities, enabling students to use advanced digital tools for research and preservation of the operatic heritage. Through this interdisciplinary approach, the doctorate aims to train experts capable of interpreting and enhancing Italian opera through both traditional and innovative lenses.
Periodo da svolgere in impresa	n.a.
Soggetto finanziatore o cofinanziatore	Dipartimento di Beni Culturali: archeologia, storia dell'arte, del cinema e della musica - DBC su fondi Piano Nazionale di Ripresa e Resilienza (PNRR) - Missione 4 - Componente 1 "Potenziamento dell'offerta dei servizi all'istruzione: dagli asili nido all'università" - Investimento 3.4 "Didattica e competenze universitarie avanzate", sotto-investimento TS "Partenariati strategici/iniziative per innovare la dimensione internazionale del sistema AFAM", finanziato dall'Unione europea - NextGenerationEU, Project Title: MTNT Music Theatre and New Technologies. Towards a New Paradigm in Opera Studies and Performance