Summary

Antropologia Culturale e Sociale / Cultural and Social Anthropology 119R	
Progetto di ricerca Research project	**ITA:** "La dimensione socio-culturale della transizione digitale" **(PROG.1**) **ENG:** "The socio-cultural dimension of the digital transition" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	2
Abstract	**ITA**: Il progetto mira a indagare etnograficamente l'impatto che la transizione digitale ha sulle traiettorie di vita di gruppi specifici. L'analisi antropologica dovrà riguardare tematiche quali l'identità individuale e collettiva, le disuguaglianze e i legami sociali. Il progetto considera sia ricerche che verranno condotte in Italia sia all'estero, privilegiando queste ultime. Tutti i candidati e le candidate partecipano all'attribuzione di queste borse. **ENG:** The project aims to ethnographically investigate the impact that the digital transition has on the life trajectories of specific groups. The anthropological analysis will have to cover topics such as individual and collective identity, inequalities and social ties. The project considers both research to be conducted in Italy and abroad, favouring the latter. All candidates participate in the awarding of these scholarships.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Economia Statistica e Data Science / Economics, Statistics and Data Science 112R Statistica/ Statistics	
Progetto di ricerca Research project	**ENG:** "Advanced Statistical Methods for Complex Data Analysis" **(PROG.1**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Università degli Studi di Bergamo
Borse/Scholarships	1
Abstract	**ENG:** Statistics enables us to understand a changing world, anticipate trends, and make informed decisions. In an increasingly data-driven context, this project aims to train researchers with the theoretical knowledge and practical skills necessary to work in the field of statistics. The research focuses on advanced methods for analyzing complex data, including high-dimensional, functional, and network data, as well as challenges arising from spatial-temporal dependencies. Emphasis will be placed on scalable approaches for large datasets, clustering models, and Bayesian techniques, ensuring interpretability and applicability across various domains.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Economia Statistica e Data Science / Economics, Statistics and Data Science 112R Statistica/ Statistics	
Progetto di ricerca Research project	**ENG:** "Statistical and Computational Methods for Complex Data" **(PROG.2**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Università Cattolica del Sacro Cuore
Borse/Scholarships	1
Abstract	**ENG:** The research activity will focus on the development of modern statistical and computational methodologies for the analysis of structured multivariate datasets. The approaches developed will be motivated by problems arising from empirical research, both in natural sciences and in socio-economic fields, particularly addressing the challenges of high-dimensional models and complex dependence structures. The goal is to develop advanced methodologies based on both frequentist and Bayesian approaches. The main areas of research include, but are not limited to: • Network data analysis: models for the analysis of dependence structures between variables or network-linked observations. • Clustering and dimensionality reduction: heuristic and probabilistic methods for the identification of homogeneous groups in high-dimensional data. • Causal inference from observational studies: methodologies for establishing causal relations between variables in the presence of observational data. • Experimental design: methods for designing and conducting controlled experiments to collect data that provide conclusive statistical evidence.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Educazione nella Società Contemporanea / Education in the Contemporary Society 120R	
Progetto di ricerca Research project	**ENG:** "Intangible and tangible cultural heritage as spaces for social transformation" **(PROG.1**)
Tipo/Type	Borse di Ateneo / University Scholarships
Borse/Scholarships	1
Abstract	**ENG:** The project aims to study and analyze the importance and the role that cultural heritage, both intangible and tangible, can provide in processes of cultural, educational and social innovation. The path should include the creation of close collaboration with museums, archives, foundations, cultural, educational and school places with a focus on enhancing the participation of the communities involved. Supported by a solide knowledge of critical theory, the project will study and focus on the processes of co-design and co-production. The focus area will be on the field of cultural transformation, with the aim of enhancing cultural heritage, reducing educational poverty, supporting social justice practices, and building collective knowledge.
Tutor	*da definirsi/to be defined*
Abroad period	Expected length of stay abroad: 3 months
Specific rules	*no specific rules*

Educazione nella Società Contemporanea / Education in the Contemporary Society 120R	
Progetto di ricerca Research project	**ITA:** "Cambiamenti e potenzialità socio-educative connessi alla transizione digitale" **(PROG.2**) **ENG:** "Changes and socio-educational opportunities related to the digital transition" **(PROG.2**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	2
Abstract	**ITA**: In un momento storico in cui la pervasività delle nuove tecnologie digitali sta trasformando l'esperienza quotidiana dei singoli e delle collettività, appare necessario indagare le combinazioni variabili di limiti e opportunità che si generano all'interno dei contesti educativi. In questo scenario, i progetti di ricerca potranno riguardare tematiche emergenti nelle seguenti aree: contrasto alle disuguaglianze educative e formative; formazione di identità individuali e collettive inedite; rafforzamento dei legami sociali/reti solidali. **ENG:** In an era where the pervasive influence of new digital technologies is reshaping the daily experiences of individuals and communities, it becomes imperative to explore the diverse interplay of constraints and possibilities within educational environments. In this scenario, research projects could delve into emerging issues in the following areas: tackling inequalities in education and training; shaping new individual and collective identities; and strengthening social cohesion and solidarity networks.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca **Research project**	**ITA:** "Nuovi approcci per capire componenti e interazioni fondamentali della natura" **(PROG.1**) **ENG:** "New approaches to understanding fundamental components and interactions of nature" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Il candidato svolgerà la propria attività su uno dei temi di ricerca del progetto Dipartimenti di Eccellenza 2023-2027, che includono lo sviluppo di strumenti di rivelazione o di analisi innovativi per la rivelazione di nuove sorgenti di onde gravitazionali, test indiretti del settore oscuro con nuove sonde astrofisiche e ricerche dirette di materia oscura particellare. **ENG:** The candidate will work on one of the research topics of the project Department of Excellence 2023-2027, which include the development of innovative detectors or analysis tools for the detection of new gravitational wave sources, indirect tests of the dark-sector with new astrophysical probes and direct searches particle dark matter.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca **Research project**	**ITA:** "Una nuova luce sulle componenti oscure dell'universo: test sulla natura di materia oscura con nuove tecnologie e tecniche" **(PROG.2**) **ENG:** "A new light on the dark components of the universe: testing dark matter with new technologies and techniques" **(PROG.2**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Nell'ambito del progetto Dipartimenti di Eccellenza 2023-2027, il candidato o la candidata si occuperà di test astrofisici della natura della materia oscura attraverso lo sviluppo di simulazioni cosmologiche e/o l'analisi di dati osservativi. **ENG:** Within the framework of the project Departments of Excellence 2023-2027, the candidate will be involved in astrophysical tests related to the nature of dark matter through the development of cosmological simulations and/or the analysis of observational data.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca Research project	**ITA:** “Una nuova luce sulle componenti oscure dell'universo: test sulla natura della gravità con nuove tecnologie e tecniche” **(PROG.3**) **ENG:** “A new light on the dark components of the universe: testing gravity with new technology and techniques” **(PROG.3**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Nell'ambito del progetto Dipartimenti di Eccellenza 2023-2027, il candidato o la candidata si occuperà dello sviluppo di nuovi strumenti di rivelazione o di analisi per la ricerca di onde gravitazionali, anche in intervalli di frequenza non coperti dagli attuali interferometri terrestri. **ENG:** As part of the 'Departments of Excellence 2023-2027' project, the candidate will work on the development of new detection or analysis instruments to search for gravitational waves, including in frequency ranges not covered by current ground-based interferometers.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca Research project	**ITA:** "Sviluppo di strumentazione innovativa per calibratori volanti artificiali per polarimetria di CMB" **(PROG.4**) **ENG:** "Development of novel instrumentation for flying artificial calibrators for CMB polarimeters" **(PROG.4**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Il candidato lavorerà sul disegno, la realizzazione, i test, la messa in opera di per hardware e software innovativi per calibratori volanti su drone e pallone in vista dei più avanzati polarimetri per CMB. È richiesta una preparazione su progettazione, realizzazione, assemblaggio e test di sorgenti artificiali per telescopi radio/microonde. **ENG:** The candidate will work on the design, realization, test, deployment and data reduction of novel hardware and software for flying, drone-borne or balloon-borne, artificial calibrators within view of the most advanced CMB polarimeters. A background on design, realization, assembly and test of artificial mm-wave sources for radio/microwave telescopes is required.
Tutor	*da definirsi (proponente prof. Federico Nati)*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca **Research project**	**ITA:** "Sviluppo di rivelatori criogenici con Piombo archeologico per l'esperimento RES-NOVA" **(PROG.5**) **ENG:** "Development of cryogenic detectors with Archaeological Pb for the RES-NOVA Experiment" **(PROG.5**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Il lavoro proposto si concentra sulla sviluppo di rivelatori criogenici prodotti con materiali ultra-puri e lo sviluppo di un modello di fondo per l'esperimento RES-NOVA. L'obiettivo è mettere in funzinoe rivelatori criogenici realizzati con piombo archeologico aventi soglie energetiche sulla scala dei keV e fondi nella regione di interesse necessari alla rivelazione di neutrini di origine astrofisica. La ricerca mira a ottimizzare la sensibilità e la precisione dell'esperimento nell'identificazione di segnali di neutrini, affrontando contemporaneamente le sfide legate ai fondi sperimentali. **ENG:** The proposed work focuses on the development of cryogenic detectors made from ultra-pure materials and the creation of a background model for the RES-NOVA experiment. The goal is to operate cryogenic detectors produced with archaeological Pb, featuring energy thresholds on the keV scale and background levels in the region of interest necessary for the detection of astrophysical neutrinos. The research aims to optimize the sensitivity and precision of the experiment in identifying neutrino signals while simultaneously addressing challenges related to experimental backgrounds.
Tutor	*da definirsi (proponente prof. Luca Pattavina)*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca Research project	**ITA:** "Sviluppo di nuovi strumenti per l'analisi e l'inferenza da dati di pulsar timing arrays (PTAs)" **(PROG.6**) **ENG:** "Developing novel tools for pulsar timing array (PTA) data analysis and inference" **(PROG.6**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: L'obiettivo della borsa di studio è lo sviluppo di nuovi algoritmi di analisi dei dati PTA per un'identificazione rapida e accurata di segnali realistici nei dati. In particolare, questi includeranno più binarie eccentriche di buchi neri supermassicci risolvibili e rumore non gaussiano-non stazionario. Il candidato familiarizzerà con gli strumenti di analisi PTA standard e si baserà su di essi per sviluppare nuove tecniche sotto la supervisione di ricercatori post-dottorato esperti all'interno del gruppo. **ENG:** The goal of the fellowship is the development of novel PTA data analysis algorithms for fast and accurate recovery of realistic signals in PTA data. Most notably, these will include multiple resolvable eccentric supermassive black hole binaries and non gaussian-non stationary noise. The candidate will familiarize with standard PTA analysis tools and build from them under the supervision of expert post-doctoral researchers within the group.
Tutor	*da definirsi (proponente Alberto Sesana)*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca **Research project**	**ITA:** "Inferenza e astrofisica multimessaggera con pulsar timing arrays (PTAs)" **(PROG.7**) **ENG:** "Astrophysical inference and multimessenger astrophysics with pulsar timing arrays (PTAs)" **(PROG.7**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: L'obiettivo della borsa di studio è sviluppare nuove tecniche di inferenza per caratterizzare la popolazione cosmica di binare di buchi neri supermassicci (SMBHB) da segnali osservati nei dati PTA, e combinare osservazioni gravitazionali ed elettromagnetiche per comprendere l'astrofisica di questi oggetti. Il candidato lavorerà con simulazioni realistiche di dati PTA e popolazioni sintetiche di galassie e SMBHB ricavate dal codice semianalitico L Galaxies, sotto la supervisione di ricercatori post-dottorato esperti all'interno del gruppo. **ENG:** The goal of the fellowship is the development of novel inference pipelines to characterize the cosmic population of supermassive black hole binaries (SMBHBs) from observed signals in PTA data, and the combination of gravitational and electromagnetic observations to constrain the astrophysics of these sources. The candidate will work with realistic simulations of PTA data and synthetic galaxy and SMBHB populations from the semianalytic code L Galaxies, under the supervision of expert post-doctoral researchers within the group.
Tutor	*da definirsi (proponente prof. Alberto Sesana)*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca Research project	**ENG:** "Development of a superconducting quantum sensing platform for improving fundamental physics measurements" **(PROG.8**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	co-finanziata da Fondazione Bruno Kessler e dal Dipartimento di Fisica "G. Occhialini"
Borse/Scholarships	1
Abstract	**ENG:** The advancement of superconducting quantum technologies opens new frontiers in precision measurements, enabling the detection of extremely weak signals beyond classical limits. The Microwave Squeezing with Superconducting (meta)materials (MiSS) project focuses on the development of a superconducting quantum sensing platform designed to enhance fundamental physics measurements by using innovative material. A key aspect of this research will be the implementation of quantum squeezing techniques to reduce quantum noise and improve the sensitivity of detection schemes. One of the primary applications of this platform will be the search for light dark matter candidates, where ultra-sensitive readout systems are required to detect weak interactions that would otherwise be obscured by noise. To achieve this, the project will leverage Traveling Wave Parametric Amplifiers (TWPAs) based on superconducting materials, which provide near-quantum-limited amplification over broad frequency ranges, significantly improving signal-to-noise ratios. Additionally, the platform will incorporate RFSoC (Radio Frequency System-on-Chip) boards, enabling flexible and high-speed digital signal processing for real-time acquisition and analysis of quantum signals. By integrating superconducting circuits, quantum squeezing protocols, TWPA amplifiers, and advanced digital electronics, this research aims to push the boundaries of quantum-enhanced sensing and contribute to the exploration of fundamental physics beyond the current state of the art.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Fisica e Astronomia / Physics and Astronomy 113R	
Progetto di ricerca Research project	**ENG:** "Development of nonlinear superconducting circuits for quantum sensing applications" **(PROG.9**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione Bruno Kessler
Borse/Scholarships	1
Abstract	**ENG:** Superconducting devices represent one of the most advanced and promising platforms for quantum sensing, as they exploit macroscopic quantum effects to achieve unparalleled sensitivity in measurements. In particular, circuits based on Josephson junctions play a crucial role in enabling the detection of extremely weak signals, making them highly suitable for a wide range of quantum sensing applications in both applied and fundamental physics as well as metrology. The project focuses on the development of superconducting quantum circuits tailored for quantum sensing applications, integrating existing circuit components, such as Al/AlOx/Al Josephson junctions, and introducing innovative circuits layout. By leveraging state-of-the-art fabrication techniques and advanced modelling, the project aims to design and implement novel superconducting architectures that push the boundaries of measurements in the microwave domain, targeting sensitivity and accuracy beyond the state-of-the-art. The research activities will encompass multiple stages, starting with the design and simulations of superconducting circuits to optimise their layout and performance. This is followed by the microfabrication of the devices in the cleanroom facilities, for which dedicated microfabrication processes will be tested. Finally, the fabricated devices will undergo cryogenic characterisation measurements at mK temperatures, with a dedicated cryogenic set-up installed in a dilution refrigerator and an optimised read-out scheme. This project aims to advance the field of quantum sensing and contribute to the development of next-generation superconducting devices with high-impact applications in fundamental physics and precision measurement.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Identificazione dei bersagli metabolici nelle leucemie acute." **(PROG.1**) **ENG:** "Targeting the dysregulated metabolic program in acute leukemias" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: I programmi metabolici sono fondamentali sia per il funzionamento dell'ematopoiesi normale che nei processi patologici. Tuttavia, la natura complessa delle vie metaboliche ha complicato l'identificazione precisa dei bersagli per una terapia efficace e sicura. Abbiamo ipotizzato che le dipendenze che le cellule di Leucemia Mieloide Acuta (LAM) sviluppano nei confronti di specifici nutrienti come il glucosio, possano essere riprogrammate esponendole a fonti alternative di nutrienti. Questo progetto mira a comprendere come la LAM possa utilizzare vie metaboliche alternative nel midollo osseo, che spesso risulta deprivato dalla maggior parte dei nutrientio essenziali per l'ematopoiesi normale. Ipotizziamo che la riprogrammazione metabolica in condizioni di mancanza di glucosio e l'esposizione a zuccheri alternativi (ad esempio, Fruttosio o Mannosio) influenzino profondamente il rimodellamento della cromatina guidato da R-2HG. In questo contesto, il candidato acquisirà competenze nella generazione di modelli mutanti IDH, nello svolgimento di saggi metabolici utilizzando Seahorse e nella quantificazione dei metaboliti, nella progettazione e conduzione di screening CRISPR e farmacologici per identificare le dipendenze metaboliche delle cellule leucemiche in diverse condizioni nutritive. L'analisi sarà completata con analisi trascrittomiche ed epigenetiche per identificare se la disponibilità di zucchero influisce sull'epigenoma. In generale, questo progetto ha il potenziale di illuminare strategie terapeutiche più efficaci basate su approcci metabolici ed epigenetici per il sottogruppo di pazienti con mutazione IDH1-2. **ENG:** Metabolic programs are fundamentals for normal and pathological physiology. However, the complex and intertwined nature of metabolic pathways has complicated the precise identification of targets for effective and safe cancer therapy over many decades of research. We hypothesize that the nutritional dependencies of AML cells with mutant metabolic pathways (e.g., mutIDH1-2) can be reprogrammed by exposing such cells to an alternative source of nutrients rather than glucose, which is often limiting in the leukemic bone marrow microenvironment. This project aims at understanding how AML can rely on alternative metabolic pathways. We hypothesize that metabolic reprogramming upon glucose-deprivation and alternative sugar exposure (eg. Fructose or Mannose) profoundly impacts on chromatin remodeling and on the transcriptional output driven by R-2HG. Within this context, the candidate will acquire expertise in generating IDH mutant models, conducting metabolic assays using Seahorse and quantifying metabolites, designing and conducting CRISPR and drug screening to identify metabolic dependencies and synthetic lethality of leukemic cells in different nutrient conditions. The analysis will be complemented with transcriptomic and epigenetic analysis to identify if sugar availability impacts on epigenome.

	Overall, this project has the potential to illuminate more effective metabolic and epigenetic-based therapeutic strategies for IDH mutant subgroup of patients.
Tutor	Prof.ssa Angela Savino
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ENG:** "Generation of 2D and 3D cellular models to elucidate pathological phenotypes associated with a single large delection of mtDNA" **(PROG.2**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione IRCCS Istituto Neurologico "Carlo Besta"
Borse/Scholarships	1
Abstract	**ENG:** Mitochondrial diseases form a heterogeneous group of disorders, some of which are caused by a clonal expansion of mitochondrial DNA (mtDNA) with macrodeletion. The clinical manifestation of these disorders occurs when the percentage of mutant mtDNA compared to healthy mtDNA exceeds a critical threshold, a condition known as heteroplasmy. Pearson syndromes and Kearns-Sayre syndrome are heteroplasmy and multisystemic diseases characterised by neurological impairment and cardiac manifestations. To overcome the lack of suitable animal models for the study of mitochondrial diseases, induced pluripotent stem cells (hiPSCs) reprogrammed from patient fibroblasts are valuable preclinical models as they retain the specific genetic characteristics of the patients themselves. During the reprogramming process, clones with different percentages of mutated mtDNA heteroplasmy are obtained so that the percentage of mtDNA deletion can be correlated with the observed phenotypes. Some clones may also lose the mutation, which can be used as an isogenic control to distinguish the contribution of nuclear DNA from mtDNA in disease development or adaptive responses. The aim of the project is to generate 2D and 3D cell models (cardiomyocytes, neurons and brain organoids) from hiPSCs of patients with mtDNA macrodeletion to investigate the underlying pathological mechanisms and to test innovative therapeutic strategies such as gene therapy and experimental pharmacological approaches.
Tutor	UNIMIB: Prof.ssa Valeria Tiranti Supervisor aziendale: Dott.ssaCamille Peron
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Cellule CAR-T con un doppio bersaglio: le cellule tumorali e il microambiente immunitario nel glioblastoma" **(PROG.3**) **ENG:** "Dual CAR-T Cells Targeting Tumor cells and Immune Microenvironment in Glioblastoma" **(PROG.3**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione IRCCS Istituto Neurologico "Carlo Besta"
Borse/Scholarships	1
Abstract	**ITA**: Un CAR progettato per bersagliare B7-H3, una proteina di membrana sovraespressa in oltre il 70% dei glioblastomi ma assente nei tessuti sani, ha mostrato un significativo potenziale nel migliorare la sopravvivenza in modelli preclinici di glioblastoma. Tuttavia, nonostante questi risultati promettenti, le cellule CAR-T si trovano ad affrontare diverse sfide. Uno degli ostacoli principali è il microambiente tumorale/immunitario (TIME), che nel caso del glioblastoma gioca un ruolo cruciale nell'indurre resistenza all'immunoterapia. Per approfondire l'influenza di specifici sottogruppi mieloidi sulla disfunzione delle cellule T, abbiamo condotto un sequenziamento RNA a singola cellula. I nostri risultati hanno rivelato che i macrofagi e la microglia associati al tumore sono i sottotipi più rappresentativi, mentre i monociti contribuiscono in modo significativo all'induzione di una disfunzione irreversibile delle cellule T. Queste cellule immunosoppressive esprimono sulla loro superficie marcatori specifici, che intendiamo utilizzare come potenziali bersagli per le cellule CAR-T. In base a queste osservazioni, svilupperemo un costrutto definito "dual CAR" che miri sia alle cellule tumorali B7-H3+ sia ai monociti. Le cellule CAR-T, pertanto, saranno in grado di eliminare efficacemente le cellule tumorali e, nel contempo, svolgere la loro attività effettrice senza subire un differenziamento terminale prematuro. L'efficacia delle CAR-T sarà valutata in modelli 3D o in sezioni organotipiche, ottenute da materiale chirurgico, che garantiranno la preservazione dell'integrità del microambiente tumorale. **ENG:** A CAR designed to target B7-H3, a membrane protein overexpressed in over 70% of glioblastomas but absent in healthy tissues, has shown significant potential in improving survival in preclinical models of glioblastoma. However, despite these promising results, CAR-T cells face several challenges. One of the main obstacles is the tumor and immune microenvironment (TIME), which plays a crucial role in inducing resistance to immunotherapy in the case of glioblastoma. We conducted single-cell RNA sequencing to further investigate the influence of specific myeloid subgroups on T cell dysfunction. Our results revealed that tumor-associated

	macrophages and microglia are the most representative subtypes, while monocytes significantly contribute to the induction of irreversible T cell dysfunction. These immunosuppressive cells express specific surface markers, which we intend to use as potential targets for CAR-T cells. Based on these observations, we will develop a construct defined as "dual CAR" that targets both B7-H3+ tumor cells and monocytes. Therefore, CAR-T cells will be"dual CAR" construct that targets able to effectively eliminate tumor cells while simultaneously maintaining their effector activity without undergoing premature terminal differentiation. The efficacy of CAR-T cells will be evaluated in 3D models or in organotypic sections obtained from surgical material, which will ensure the preservation of the tumor microenvironment's integrity.
Tutor	UNIMIB e Supervisor aziendale: Prof.ssa Serena Pellegatta
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Utilizzo di sistemi di machine learning per identificare patterns associati a scarsa risposta alle terapie per la malattia da trapianto verso l'ospite" **(PROG.4**) **ENG:** "Exploiting machine learning to identify patterns associated with drug-resistant graft versus host disease" **(PROG.4**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione M. Tettamanti M. De Marchi - ONLUS
Borse/Scholarships	1
Abstract	**ITA**: La malattia da trapianto verso l'ospite, o GvHD (acuta o cronica) è una delle più frequenti complicanze dopo trapianto allogenico di cellule staminali (TCSE) che colpisce il 30-50% dei pazienti. La gestione clinica è spesso molto complessa e la risposta alle terapie subottimale, cosa che richiede un trattamento immunosoppressivo prolungato, che incrementa il rischio infettivo o di recidiva di malattia. Pertanto, è necessario trovare approcci innovativi per cambiare la gestione clinica della GvHD. Il nostro gruppo ha recentemente sviluppato un'applicazione (GvHDtrackR) che consente di raccogliere i dati sulla GvHD, integrando la stadiazione con le terapie, e di registrarli in un database (Sindoni et al., 2025). Il candidato si occuperà di utilizzare l'applicazione per raccogliere i dati in maniera prospettica su GvHD acuta e cronica dei pazienti sottoposti a TCSE presso l'IRCCS San Gerardo dei Tintori. I dati raccolti saranno integrati con i dati ottenuti mediante citofluorimetria di immunoricostituzione e saranno analizzati dal candidato utilizzando approcci di machine learning per identificare patterns associati a scarsa risposta alle terapie. L'obiettivo finale del progetto è di identificare precocemente i pazienti a rischio di scarsa risposta per poter sviluppare approcci personalizzati e ottimizzati che consentano di migliorare la prognosi di questi pazienti. **ENG:** Graft versus host disease (GvHD, either acute or chronic) is a troublesome complication after allogeneic hematopoietic stem cell transplantation (HSCT) which affects 30-50% of patients. Clinical management is complex and response to therapy is often suboptimal and requires prolonged immunosuppressive treatment, which increases the risk of infections or disease relapse. Therefore, innovative approaches to change the management of GvHD are warranted. In our group, we recently developed a tool for clinical data collection of GvHD, GvHDtrackR (Sindoni et al., 2025). This tool allows to collect clinical data, such as grading, but also therapies administered to the patients and store data in a longitudinal database. The candidate will be in charge of a prospective collection of data exploiting GvHDtrackR application, on acute and chronic GvHD from pediatric patients undergoing HSCT at IRCCS San Gerardo dei Tintori. Collected data will be integrated with flow cytometric immune reconstitution data and will be analyzed by the candidate exploiting machine learning tools to identify specific patterns associated to poor response to therapies. The final aim of the

	study is to identify patients at risk for poor response at the onset of GvHD in order to develop a personalized and optimized therapeutic approach for this group of patients with poor prognosis.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Riarrangiamenti PAX5 nella leucemia linfoblastica acuta pediatrica: dalle vie di segnale, al targeting farmacologico e al metabolismo" **(PROG.5**) **ENG:** "PAX5 rearrangements in pediatric acute lymphoblastic leukemia: from signaling to targeting and metabolism" **(PROG.5**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione M. Tettamanti M. De Marchi - ONLUS
Borse/Scholarships	1
Abstract	**ITA**: La leucemia linfoblastica acuta da precursori delle cellule B (BCP-ALL) è il tumore più comune nei bambini, con un tasso di guarigione superiore all'80%. Tuttavia, solo il 20-45% dei pazienti raggiunge la remissione dopo una recidiva, che rimane una delle principali cause di mortalità. Nell'ampio sottogruppo di pazienti con BCP-ALL, il 30% dei casi è caratterizzato da alterazioni del gene PAX5, che codifica per un fattore di trascrizione correlato alle cellule B. PAX5 è spesso bersaglio di traslocazioni, che portano alla formazione di geni di fusione che danno origine a proteine aberranti. Pertanto, capire come sostengono la leucemia nelle cellule B aiuterebbe a trovare nuovi bersagli molecolari per aumentare l'efficacia della terapia e ridurre la tossicità del trattamento in presenza di tali fusioni. Lo scopo del piano di ricerca è l'approfondimento e lo studio delle vie di segnalazione e metaboliche in presenza di riarrangiamenti di PAX5, e quindi lo sviluppo di una strategia target preclinica per il loro trattamento nella leucemia linfoblastica acuta pediatrica precursore delle cellule B con nuove e specifiche molecole/farmaci. Evidenzieremo inoltre le vie di segnalazione deregolamentate a valle delle fusioni PAX5, sia a livello di RNA che di proteine, indagando anche il profilo metabolico dovuto alle fusioni genetiche. Questo studio ha un potenziale impatto elevato sulla conoscenza dei meccanismi della leucemia pediatrica, poiché lo sviluppo di una strategia target preclinica darebbe accesso a nuove terapie per colpire i casi riarrangiati di PAX5 a basso rischio. **ENG:** -Cell Precursor Acute Lymphoblastic Leukemia (BCP-ALL) is the most common cancer in children, with a cure rate exceeding 80%. However, only 20-45% of patients achieve remission following relapse, which relapse remains a leading cause of mortality. Among the large subset of B-others BCP-ALL patients, 30% of cases is characterized by alterations of PAX5 gene, which encodes for a B-cell related transcription factor. PAX5 is frequently target of translocations, leading to the formation of fusion genes resulting in aberrant proteins. Therefore, understanding how they sustain leukemia in B-cells would help to find novel

	molecular targets to increase the efficacy of therapy and reduce the treatment toxicity in presence of those fusions. The aim of the research plan is the deepening and study of the signaling and metabolic pathways in the presence of PAX5 rearrangements, and then the development of a preclinical target strategy for their treatment in pediatric B-cell precursor acute lymphoblastic leukemia with novel and specific molecules/drugs. We will moreover highlight the deregulated signaling pathways downstream PAX5 fusions, both at RNA and protein levels, also investigating the metabolic profile due to the genetic fusions. This study has a potential high impact on knowledge on pediatric leukemia mechanisms, as the development of a preclinical target strategy would give access to novel therapies to target the poor risk PAX5-rearranged cases.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Potenziare la terapia con cellule CAR-T per superare gli ostacoli generati dalla nicchia midollare della leucemia mieloide acuta pediatrica (LMA" **(PROG.6**) **ENG:** "Potentiate armored chimeric antigen receptor (CAR)-T cells to circumvent pediatric acute myeloid leukemia (AML) niche barriers." **(PROG.6**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione M. Tettamanti M. De Marchi - ONLUS
Borse/Scholarships	1
Abstract	**ITA**: La terapia a base di cellule CAR-T nell'ambito della leucemia mieloide acuta (LMA) deve affrontare molti limiti, tra cui la mancanza di antigeni esclusivi per questa forma di leucemia, l'eterogeneità della stessa e il ruolo protettivo del microambiente alterato del midollo osseo (BM). La nicchia midollare così trasformata ostacola l'infiltrazione, la persistenza e l'espansione delle CAR-T all'interno di questo compartimento. L'obiettivo principale di questa proposta è migliorare la terapia CAR-T combinando strategie ingegneristiche avanzate per aggirare la nicchia ostile. Il nostro approccio mira ad "armare" le cellule CAR-T attraverso una combinazione di interventi: ingegneria dei recettori delle chemochine per promuovere l'homing al midollo osseo delle cellule T e introduzione di citochine che aumentino le proprietà effettrici delle cellule T. Per valutare queste strategie, utilizzeremo alcuni modelli di organoide osteo-midollare, replicando la complessità del midollo osseo umano, fornendo una piattaforma realistica per testare come queste CAR-T armate possano superare i limiti della nicchia leucemica, con l'obiettivo di sviluppare un trattamento strategico per i pazienti pediatrici affetti da LMA. **ENG:** Chimeric Antigen Receptor (CAR)-T therapy for Acute Myeloid Leukemia (AML) faces many hurdles, including the lack of AML-restricted antigens, leukemia heterogeneity, and the leukemia-protective role of the altered bone marrow (BM) microenvironment. The transformed BM niche hinders CAR-T infiltration, persistence, and expansion within this compartment. The main goal of this proposal is to enhance CAR-T by combining advanced engineering strategies to circumvent the hostile niche. Our approach aims to "arm" CAR-T cells through a combination of interventions: engineering chemokine receptors to promote T-cell BM homing and introducing cytokines boosting T-cell fitness. To evaluate these strategies, we will use organoid models, replicating the complexity of the human BM, providing a realistic platform to test how these armored CAR-T can circumvent AML niche, with the goal of developing a strategic treatment for pediatric AML patients.
Tutor	*da definirsi/to be defined*

Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Analisi funzionale del ruolo di varianti dei geni delle coesine nella predisposizione genetica alla leukemia acuta linfoblastica pediatrica" **(PROG.7**) **ENG:** "Functional dissection of the role of cohesin genes variants in the genetic predisposition to pediatric acute lymphoblastic leukemia" **(PROG.7**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione M. Tettamanti M. De Marchi - ONLUS
Borse/Scholarships	1
Abstract	**ITA**: La leucemia linfoblastica acuta (LLA) è il tumore pediatrico più frequente. Ad oggi, dobbiamo ancora comprendere le cause della LLA e iniziare a pensare a come prevenirla. Sappiamo che eventi genetici predisponenti sono responsabili almeno di una parte dei casi. L'obiettivo principale del progetto è l'identificazione di varianti in geni associati alla predisposizione alla LLA, per comprenderne la rilevanza clinica. Un'attenzione particolare sarà rivolta alle varianti dei geni della famiglia delle Coesine, per le quali il gruppo ha già prodotto dati preliminari che ne suggeriscono il coinvolgimento nelle fasi iniziali della malattia. Al candidato sarà richiesto di studiare il loro ruolo nella predisposizione alla LLA in contesto nazionali e internazionali, ampliando i modelli funzionali della patogenesi, valutandone il rischio effettivo e le possibili modifiche terapeutiche. **ENG:** Acute lymphoblastic leukemia (ALL) is the most frequent childhood cancer. Nowadays, we still need to understand what causes ALL, and start thinking on how to prevent it. We know that predisposing genetic events account at least for a proportion of cases. The overall aim of the project focus on the identification of variants in genes associated to ALL predisposition, to make variants actionable. A specific focus will be on the Cohesin gene variants, for which the group has produced preliminary data on their involvement in the early phases of the disease. The candidate will be asked to study their role in ALL predisposition in national and International contexts, extend functional modelling of pathogenesis, exploring actual risk and possible modification of therapies.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Medicina Traslazionale e Molecolare – DIMET / Translational and Molecular Medicine – DIMET 121R	
Progetto di ricerca Research project	**ITA:** "Profilazione tramite Next Generation Sequencing e Valutazione della Malattia Minima Residua nei Linfomi a Cellule T" **(PROG.8**) **ENG:** "Next Generation Sequencing Profiling and Minimal Residual Disease Assessment in T-Cell Lymphomas" **(PROG.8**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Fondazione M. Tettamanti M. De Marchi - ONLUS
Borse/Scholarships	1
Abstract	**ITA**: linfomi a cellule T (TCL) rimangono difficili da diagnosticare e gestire nell'era moderna. L'avvento del sequenziamento di nuova generazione (NGS) ha permesso il profilo genetico di varie neoplasie, inclusi i linfomi, e l'analisi genomica è ora riconosciuta come uno strumento aggiuntivo prezioso nelle linee guida cliniche. Nel linfoma diffuso a grandi cellule B, la valutazione seriale delle alterazioni genomiche ricorrenti e della clonalità del recettore delle cellule T o B mediante DNA tumorale circolante (ctDNA) dal plasma è emersa come un metodo promettente per valutare la risposta al trattamento e monitorare lo stato di remissione durante il follow-up. Sebbene l'analisi del ctDNA per il monitoraggio della malattia minima residua (MRD) sia stata esplorata anche nei linfomi T periferici (PTCL), i dati disponibili sono ancora limitati e non conclusivi. In questo studio, analizzeremo biopsie tissutali e ctDNA di una coorte di pazienti con TCL arruolati in uno studio prospettico. Utilizzando un pannello NGS personalizzato per le neoplasie a cellule T, un pannello di metilazione e la droplet digital PCR, valuteremo la fattibilità e il valore clinico di: (1) il profilo genomico su tessuto e ctDNA integrato con una valutazione della metilazione, (2) il monitoraggio della MRD e (3) l'analisi genomica completa per la valutazione prognostica ed il potenziale impatto sulle scelte terapeutiche. **ENG:** T-cell lymphomas (TCL) remain challenging to diagnose and manage in the modern era. The advent of next-generation sequencing (NGS) has enabled gene profiling across various malignancies, including lymphomas, and genomic analysis is now recognized as a valuable adjunctive tool in clinical guidelines. In diffuse large B-cell lymphoma, serial assessment of recurrent genomic alterations and T- or B-cell receptor clonality using circulating tumor DNA (ctDNA) from plasma has emerged as a promising method for evaluating treatment response and monitoring remission status during follow-up. While ctDNA-based minimal residual disease (MRD) assessment has also been explored in peripheral T-cell lymphoma (PTCL), available data remain limited and inconclusive. In this study, we aim to analyze tissue biopsies and ctDNA from a cohort of TCL patients enrolled in a prospective study. Using a custom NGS panel for T-cell malignancies, a

	methylation panel, and droplet digital PCR, we will investigate the feasibility and clinical value of: (1) tissue- and ctDNA-based profiling integrated with a methylation score, (2) MRD monitoring, and (3) comprehensive genomic analysis for prognostic assessment and therapeutic decision-making.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Nursing and Midwifery 133R	
Progetto di ricerca Research project	**ENG:** "Pediatric palliative care nursing: children and family needs during the care path and models of care" **(PROG.1**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Fondazione IRCSS San Gerardo dei Tintori
Borse/Scholarships	1
Abstract	**ENG:** The PhD fellowship, in synergy with the projects and institutional characteristics of the IRCCS San Gerardo dei Tintori Foundation (FSGT), aims to develop new knowledge, methodologies, and tools for nursing care in the field of pediatric palliative care. In particular, the multidisciplinary research project could focus on one or more of the following areas of interest: • Review of the state of the art in the scientific literature on pediatric palliative care nursing; • The quantitative and qualitative description and understanding of the care needs of children/adolescents, parents, and families in the bio-physiological, psychosocial, cultural, and spiritual dimensions within the context of pediatric palliative care; • The identification of key outcomes, concepts, variables of interest, and quality indicators for healthcare and nursing care in the pediatric palliative care pathway; • The development of care models, methods, tools, and interventions aimed at improving the end-of-life pathway and alleviating the suffering of the child/adolescent, parents, and family. The project involves access to and management of pediatric patients and their families through a care approach that integrates services and care settings into a unified system. This care approach model is structured in three settings (hospital, home, residential), where the pediatric pain therapy and palliative care team operates, constantly interacting with the discharging services, territorial services, family pediatricians, physicians, hospital wards, social services, etc. A distinctive feature of the patients referred to the pediatric palliative care (CPPed) is the presence of complex needs, requiring a high level of multidisciplinary coordination, as well as frequent transitions from one care setting to another. Given the frequent movement between different settings within the network, a strong connection between them is necessary, primarily ensured by the presence of a single care

	team, coordinated by a Case Manager and a Clinical Lead person of the pediatric pain therapy and palliative care team who is assisting the patient. Thus, the same care team is responsible to continuously provide care (or consultation) for the patient, regardless of the setting (hospital, home, residential) in which the child is assisted during the different stages of life, illness, and care. To ensure continuity of care 24/7 and the sustainability of the organizational model, integration between the pediatric pain therapy and palliative care network (TDeCPPed) and local palliative care networks is planned, based on a shared care plan (PAI) and supervision by the pediatric team. These activities will improve the operational pathway, identifying the activities to monitor and assess what has been hypothesized and implemented in the different stages, ultimately facilitating the process of continuous improvement of the activities.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Nursing and Midwifery 133R	
Progetto di ricerca Research project	**ENG:** "Strategies methods and tools for promoting treatment adherence and lifestyles in the continuum of care for the elderly population with chronic diseases and polypharmacy" **(PROG.2**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Università degli Studi di Milano
Borse/Scholarships	1
Abstract	**ENG:** Background Changes in the health service and patients' expectations of safe and reliable health care and medication adherence, which are not always satisfied, will inevitably impact nursing education. It is reasonable for patients to expect that care should be delivered by nurse specialists who are fully trained and experienced. A program of new nursing advanced competencies and skills is needed. A Nurse Practitioner Role is an advanced practice nurse who works within their scope of practice, incorporating clinical settings, research, education, and leadership to provide comprehensive healthcare assessments, plan care, implement therapeutic interventions, and evaluate outcomes to support safe practice and professional growth. Information about current Nurse Practitioner prescribing trends and medication adherence informs future Nurse Practitioner education programs and gives unique insight for future health system and service planning, including considering introducing nurse practitioners into their services. Nursing education and competencies for Nurse practitioners in Italy have not yet been discussed. A competency-based curriculum is needed to develop a common understanding of the knowledge, skills, and experiences nurse practitioner graduates require for education and practice. Medication adherence is the greatest opportunity to improve outcomes related to chronic disease. Adherence rates of 80% or greater, or taking medication as prescribed at least 80% of the time, can positively impact health outcomes. The current international Nurse practitioner (NP) prescribing models could also be applied in Italy to assess whether and to what extent they can achieve better adherence to drug treatments. Such models include autonomous prescribing, prescribing under supervision and prescribing under a structured arrangement. Nursing prescriptions are medicines and treatments for older adults with complex medical conditions in countries where nurse practitioners have prescriptive authority or privileges. The NP could achieve more favourable adherence results than the general practitioner in taking care of the person and dedicating more time to the comprehension of the treatment. Aims To gain insight into attitudes and beliefs into the views of Italian registered nurses (RNs), nurse specialists (with a master's in Advanced Nursing Practice or LM in Italy) and physicians on the improvement of NP education and practice and the consequences of nurse prescribing ; To draft a Competency-based curriculum for nurse practitioner graduates; To apply prescribing models gradually following current regulations and evaluate informed medication adherence among older adults with complex conditions compared to the informed medication adherence achieved by general practitioners.

Tutor	UNIMIB: Prof. Davide Ausili; Prof.ssa Stefania Dimauro, Supervisor aziendale: Prof.ssa Maura Lusignani; Dott. Stefano Terzoni
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Psicologia, Linguistica e Neuroscienze Cognitive / Psychology, Linguistics and Cognitive Neuroscience 127R Mente, Cervello e Comportamento/ Mind, Brain, and Behavior	
Progetto di ricerca Research project	**ITA:** "L'acquisizione di nuovi significati attraverso l'apprendimento di nuove parole" **(PROG.1**) **ENG:** "The acquisition of new meanings through novel word learning" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Impariamo nuove parole quasi ogni giorno: da adulti, un nuovo elemento viene introdotto nel nostro vocabolario a giorni alterni. Con le nuove parole impariamo anche nuovi concetti e idee - nella maggior parte dei casi le nuove parole non sono infatti semplicemente etichette aggiuntive da applicare a oggetti familiari, connotano significati sconosciuti per la persona che le incontra. Tuttavia, quando sperimentiamo, da adulti, una parola non familiare, tipicamente il suo referente non è immediatamente disponibile nello stesso contesto. Come può il linguaggio, da solo, costituire uno strumento così affidabile per l'acquisizione di nuovi significati? Cosa sfruttiamo per indurre nuovi significati sulla base di una sequenza di suoni o elementi grafici non familiare? Il progetto affronta queste domande usando la modellistica computazionale (e in particolare la semantica distribuzionale) per studiare l'elaborazione semantica di nuove parole. Agli studenti di dottorato verrà chiesto di sviluppare un progetto volto a perfezionare modelli computazionali esistenti, in grado di stimare l'attivazione semantica prodotta da parole non familiari, e/o testare le previsioni di tali modelli utilizzando metodi della psicologia sperimentale e delle neuroscienze cognitive. Il progetto affronterà questioni legate agli attuali dibattiti nelle scienze cognitive, compreso l'impatto dell'apprendimento statistico, il ruolo dell'arbitrarietà rispetto alla sistematicità, la relazione tra linguaggio e pensiero e la caratterizzazione cognitiva del significato. **ENG:** We learn new words almost on a daily basis: as adults, a new element is introduced in our vocabulary every other day. With new words, we also learn about new objects and ideas - in most cases new words are not simply additional labels to be applied to familiar objects: they connote meanings that are unknown to the speaker of a language. However, when we experience, as adults, an unfamiliar word, typically its referent is not immediately available in the same context. How then can language, by itself, constitute such a reliable instrument for the acquisition of novel meanings? What do we exploit to induce new meanings on the basis of an unfamiliar sequence of sounds or graphical elements? The project addresses these questions by building on computational modelling (and in particular distributional semantics) to investigate the semantic processing of novel words. The PhD students will be asked to develop a project aimed at refining existing computational

	models, able to estimate the semantic activation produced by unfamiliar words, and/or test the predictions of such models using methods from experimental psychology and cognitive neuroscience. The project will tackle questions related to current debates in cognitive science, including the impact of statistical learning, the role of arbitrariness vis-à-vis systematicity, the relationship between language and thought, and the cognitive characterization of meaning.
Tutor	Prof. Marco Marelli
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Psicologia, Linguistica e Neuroscienze Cognitive / Psychology, Linguistics and Cognitive Neuroscience 127R Mente, Cervello e Comportamento/ Mind, Brain, and Behavior	
Progetto di ricerca Research project	**ITA:** "Le nuove tecnologie (realtà virtuale e aumentata, dispositivi mobili e indossabili) applicate allo studio della mente umana e del miglioramento delle interfacce uomo-macchina - A" **(PROG.2**) **ENG:** "New technologies (virtual and augmented reality, mobile and wearable devices) applied to the study of the human mind and the improvement of human-machine interfaces - A" **(PROG.2**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Il/la candidato/a dovrà svolgere attività di ricerca nel contesto del progetto dei dipartimenti di eccellenza (http://de2023.psico.unimib.it). In particolare, l'attività sarà svolta tramite le competenze e attrezzature dei centri MibTec (www.mibtec.it) e BicApp (www.bicapp.it). Il/la Candidato/a dovrà quindi indagare diversi aspetti del comportamento umano e dei processi psicologici all'interno di ambienti che simulino contesti di vita reale, comprendenti lavoro, gioco, emergenza, e salute, ma siano modificabili in modo controllato. L'attività di ricerca potrà inoltre riguardare lo studio del comportamento umano e dei processi psicologici nella vita reale attraverso dispositivi wearable e portable. Tale attività di ricerca potrà inoltre indagare dal punto di vista scientifico gli human factors legati all'interazione uomo-macchina. La posizione è aperta a diverse competenze nel campo dell'informatica, dell'interaction design, dell'ingegneria e delle discipline psicologiche. Il progetto si svilupperà nell'ambito della Psicologia cognitiva, della Linguistica, delle Neuroscienze cognitive e nelle aree disciplinari del Curriculum Mente, Cervello e Comportamento. **ENG:** The candidate will be required to conduct research activities within the framework of the Departments of Excellence project (http://de2023.psico.unimib.it). Specifically, the research will be carried out using the expertise and equipment available at the MibTec (www.mibtec.it) and BicApp (www.bicapp.it) centers. The candidate will investigate various aspects of human behavior and psychological processes within environments that simulate real-life contexts—including work, play, emergency, and health—while allowing for controlled manipulations. Additionally, the research may involve studying human behavior and psychological processes in real-life settings using wearable and portable devices.

	This research activity may also explore, from a scientific perspective, human factors related to human-machine interaction. The position is open to candidates with expertise in fields such as computer science, interaction design, engineering, and psychology. The project will be developed within the domains of Cognitive Psychology, Linguistics, Cognitive Neuroscience, and the disciplinary areas of the Mind, Brain, and Behavior track.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Psicologia, Linguistica e Neuroscienze Cognitive / Psychology, Linguistics and Cognitive Neuroscience 127R Psicologia Sociale, Cognitiva e Clinica/ Social, Cognitive, and Clinical Psychology	
Progetto di ricerca Research project	**ITA:** "Le nuove tecnologie (realtà virtuale e aumentata, dispositivi mobili e indossabili) applicate allo studio della mente umana e del miglioramento delle interfacce uomo-macchina - B" **(PROG.3**) **ENG:** "New technologies (virtual and augmented reality, mobile and wearable devices) applied to the study of the human mind and the improvement of human-machine interfaces – B" **(PROG.3**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Il/la candidato/a dovrà svolgere attività di ricerca nel contesto del progetto dei dipartimenti di eccellenza (http://de2023.psico.unimib.it). In particolare, l'attività sarà svolta tramite le competenze e attrezzature dei centri MibTec (www.mibtec.it) e BicApp (www.bicapp.it). Il/la Candidato/a dovrà quindi indagare diversi aspetti del comportamento umano e dei processi psicologici all'interno di ambienti che simulino contesti di vita reale, comprendenti lavoro, gioco, emergenza, e salute, ma siano modificabili in modo controllato. L'attività di ricerca potrà inoltre riguardare lo studio del comportamento umano e dei processi psicologici nella vita reale attraverso dispositivi wearable e portable. Tale attività di ricerca potrà inoltre indagare dal punto di vista scientifico gli human factors legati all'interazione uomo-macchina. La posizione è aperta a diverse competenze nel campo dell'informatica, dell'interaction design, dell'ingegneria e delle discipline psicologiche. Il progetto si svilupperà nell'ambito della Psicologia sociale, cognitiva, clinica, del lavoro e delle organizzazioni e nelle aree disciplinari del Curriculum Psicologia sociale, cognitiva e clinica. **ENG:** The candidate will be required to conduct research activities within the framework of the Departments of Excellence project (http://de2023.psico.unimib.it). Specifically, the research will be carried out using the expertise and equipment available at the MibTec (www.mibtec.it) and BicApp (www.bicapp.it) centers. The candidate will investigate various aspects of human behavior and psychological processes within environments that simulate real-life contexts—including work, play, emergency, and health—while allowing for controlled manipulations. Additionally, the research may involve studying human behavior and psychological processes in real-life settings using wearable and portable devices.

	This research activity may also explore, from a scientific perspective, human factors related to human-machine interaction. The position is open to candidates with expertise in fields such as computer science, interaction design, engineering, and psychology. The project will be developed within the domains of Social, Cognitive, Clinical, and Work and Organizational Psychology, and the disciplinary areas of the Social, Cognitive, and Clinical Psychology track.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Psicologia, Linguistica e Neuroscienze Cognitive / Psychology, Linguistics and Cognitive Neuroscience 127R Psicologia Sociale, Cognitiva e Clinica/ Social, Cognitive, and Clinical Psychology	
Progetto di ricerca Research project	**ITA:** "YOUTHreach: Colmare le lacune nel supporto alla salute mentale. Una strategia europea integrata" **(PROG.4**) **ENG:** "YOUTHreach: Bridging Gaps in Mental Health Support. A Comprehensive European Strategy" **(PROG.4**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Provincia Lombardo Veneta Ordine Ospedaliero San Giovanni di Dio Fatebenefratelli – IRCCS Centro San Giovanni di Dio Fatebenefratelli
Borse/Scholarships	1
Abstract	**ITA**: La salute mentale dei giovani in Europa sta affrontando una crisi, con un aumento significativo dei disturbi mentali e un accesso limitato ai servizi di supporto adeguati. YOUTHreach è un innovativo progetto finanziato dall'UE, progettato per colmare queste lacune attraverso una ricerca comparativa su tre interventi chiave: centri di supporto accessibili ai giovani, un'app di auto-aiuto per smartphone e una piattaforma online ibrida che combina supporto tra pari e da professionisti. Il progetto riunisce 14 partner accademici e clinici di sette paesi europei, insieme a collaboratori dall'Australia, per valutare l'efficacia, l'efficienza economica e la sostenibilità di questi interventi in diversi sistemi sanitari e sociali. Utilizzando una metodologia incentrata sui giovani, in cui i giovani stessi agiscono come co-ricercatori, YOUTHreach condurrà studi su larga scala con 1.780 partecipanti, generando solide evidenze empiriche per orientare le politiche sanitarie e migliorare le pratiche. Gli obiettivi principali includono lo sviluppo di un quadro comparativo per la valutazione degli interventi sulla salute mentale giovanile, la creazione di strumenti digitali per il monitoraggio della salute mentale e la formulazione di raccomandazioni politiche per la loro attuazione a livello nazionale ed europeo. Il progetto produrrà dati e strumenti open-access per ricercatori, economisti della salute e policy-makers, garantendo un impatto a lungo termine sulla ricerca e l'innovazione nel campo della salute mentale giovanile. Grazie al suo approccio interdisciplinare e transnazionale, YOUTHreach mira a trasformare il supporto alla salute mentale dei giovani, migliorando l'accesso alle cure e promuovendo il benessere delle future generazioni in tutta Europa. **ENG:** Youth mental health in Europe is facing a crisis, with a significant rise in mental health disorders and limited access to appropriate support services. YOUTHreach is an innovative

	EU-funded project designed to address these gaps through comparative research on three key interventions: youth-friendly walk-in support centers, a smartphone-based self-help app, and a hybrid online platform combining peer and professional support. The project brings together 14 academic and clinical partners from seven European countries, along with collaborators from Australia, to evaluate the effectiveness, cost-efficiency, and sustainability of these interventions across diverse healthcare and social systems. Using a youth-centered methodology, where young people act as co-researchers, YOUTHreach will conduct large-scale studies with 1.780 participants, generating robust evidence to inform health policies and best practices. Key objectives include developing a comparative framework for evaluating youth mental health interventions, creating digital tools for mental health monitoring, and formulating policy recommendations for national and European implementation. The project will produce open-access data and tools for researchers, health economists, and policymakers, ensuring a lasting impact on youth mental health research and innovation. With its interdisciplinary and transnational approach, YOUTHreach aims to transform youth mental health support, improving access to care and fostering well-being for future generations across Europe.
Tutor	UNIMIB: Prof.ssa Alessandra Santona, Prof.ssa Laura Parolin Supervisor aziendale: Dott. Giovanni de Girolamo
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Public Health Epidemiology, Statistics and Economics 129R	
Progetto di ricerca **Research project**	**ENG:** "Development and empirical application of models to estimate dynamics of healthcare demand, use and cost, with focus on innovative drugs, medical technologies and devices" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	2
Abstract	**ENG:** The topic of developing and empirically applying models to estimate the dynamics of healthcare demand, use, and costs is crucial for optimizing resources in the healthcare sector. With the advancement of medical technologies, innovative drugs, and devices, it is essential to develop models that predict the economic impact and effectiveness of these innovations. Such models can help understand how the introduction of new therapies affects the demand for care, long-term costs, and system efficiency. Empirical research in this field allows for the analysis of real data to validate predictions, improve healthcare policies, and ensure sustainable access to innovative treatments. A model-based dynamic approach also enables monitoring the evolution of healthcare needs and adjusting resources accordingly. The PhD positions will mainly focus on drugs and devices.
Tutor	Prof. Lorenzo Giovanni Mantovani
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Public Health Epidemiology, Statistics and Economics 129R	
Progetto di ricerca **Research project**	**ENG:** "Biomarkers and therapies in cholestatic liver diseases" **(PROG.2**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** Cholestatic liver diseases, including primary biliary cholangitis and primary sclerosing cholangitis, represent significant unmet clinical needs due to the lack of early diagnostic tools and effective treatments. A major limitation to therapeutic development is the poor understanding of their pathopysiological mechanisms. This PhD project will employ cutting-edge techniques in molecular biology, bioinformatics, and translational research to investigate the underlying pathophysiology of these diseases and uncover potential biomarkers for early detection and prognosis. The ideal candidate will have a strong background in clinical hepatology and liver transplant, and an interest in applying innovative methodologies to improve our understanding of cholestatic liver diseases. The candidate will work within a dynamic, interdisciplinary team, applying advanced techniques in molecular biology, immunology, genomics, and bioinformatics to investigate disease mechanisms and uncover biomarkers that can be translated into clinical practice. At the Niguarda Liver Centre, the candidate will have access to cutting-edge technologies, a collaborative research environment, and opportunities to engage with leading experts in hepatology. This project offers the potential to make significant contributions to the field, with the ultimate goal of improving early diagnosis and treatment outcomes for patients suffering from cholestatic liver diseases.
Tutor	Prof. Marco Carbone
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienza e Nanotecnologia dei Materiali / Materials Science and Nanotechnology 116R	
Progetto di ricerca Research project	**ENG:** "Cross-link distribution in elastomeric nanocomposites" **(PROG.1**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Corimav (Consorzio UNIMIB - Pirelli)
Borse/Scholarships	1
Abstract	**ENG:** The main processes to produce rubber nanocomposites with high mechanical properties for applications such as tyres are the addition of reinforcing fillers and the rubber vulcanization to cross-link polymer chains forming a three-dimensional network. The control over the polymer network formation is still an open issue, depending on the components of the composites and on the diffusion and distribution of the curing agents during compounding and curing phases. The project focuses on the study of the curing mechanism and cross-link structure and distribution in the vulcanization process of rubber nanocomposites and their dependence on the microstructure of the elastomer, the inorganic filler particles and the curing agents. The aim of the study is to find the relationship between the crosslink structure formation, the filler particle network and the resulting mechanical behaviour and resistance of the nanocomposite material for better governing the vulcanization process and tailoring the properties of the final material. Different rubber composites materials will be prepared and vulcanized changing rubber polymer, curing agents and silica filler particles with specific surface compatibilization. The compositional, morphological and structural characterization of the vulcanization process will be performed by using spectroscopic, diffraction and microscopic technique. The mechanical behaviour of the materials will be assessed by dynamical-mechanical measurements and resistance tests. The research activity will involve a 6 months period spent abroad and a strong interaction with the company laboratories.
Tutor	UNIMIB: Prof. Roberto Scotti Supervisor aziendale: Dott. Ivan Mangili (Pirelli Tyre)
Abroad period	The research activity will involve a 6 months period spent abroad
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Scienza e Nanotecnologia dei Materiali / Materials Science and Nanotechnology 116R	
Progetto di ricerca Research project	**ENG:** "Study of New Approaches to the Molecular Stabilization of the Performance of Racing Tyres" **(PROG.2**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Corimav Consorzio UNIMIB - Pirelli)
Borse/Scholarships	1
Abstract	**ENG:** Racing tyres operate under conditions of extreme mechanical stress and elevated temperatures, which lead to a decay of mechanical properties in current materials. The primary objective of this research project is to develop molecular strategies that enhance the compound modulus as the temperature increases. The implementation of such strategies in model racing compounds is expected to stabilize their dynamic modulus in a broad temperature range. The research activity will encompass organic synthesis to generate new materials, compounding activities to create new compounds based on these materials, and comprehensive chemical, physical and mechanical characterization of the materials and their corresponding compounds, including the cured model racing compounds that represent the intended application. The research activity will involve a 6 months period spent abroad and a strong interaction with the company laboratories.
Tutor	UNIMIB: Prof. Mauro Sassi, Prof.ssa Barbara Di Credico Supervisor aziendale: Dott. Mauro Monti (Pirelli Tyre)
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Geologiche/ Geological Sciences	
Progetto di ricerca Research project	**ENG:** "Study of the evolution of the climate in the past" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** See call for interests on the web pages: https://www.disat.unimib.it/it/didattica/dottorato-scienze-chimiche-geologiche-e-ambientali/linee-ricerca https://www.disat.unimib.it/en/study/phd-chemical-geological-and-environmental-sciences/research-lines
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Geologiche/ Geological Sciences	
Progetto di ricerca Research project	**ENG:** "Monitoring of the effects of ongoing climate warming and mitigation strategies and techniques" **(PROG.2**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** see call for interests on the web pages: https://www.disat.unimib.it/it/didattica/dottorato-scienze-chimiche-geologiche-e-ambientali/linee-ricerca https://www.disat.unimib.it/en/study/phd-chemical-geological-and-environmental-sciences/research-lines
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Geologiche/ Geological Sciences	
Progetto di ricerca Research project	**ENG:** "Assessing CO2 Emissions from Neo-Tethyan Magmatic Arcs through Melt Inclusion and Hg Te Analyses on Iranian Rocks: Implications for Cenozoic Climate Evolution" **(PROG.3**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** At timescales of millions to tens of millions of years, the geological carbon cycle modulates the storage of carbon into rocks and the release of carbon into the ocean and atmosphere, thereby linking the evolution of climate and life to plate tectonics. This call gathers projects framed within the fully funded 2024-ERC-CoG grant MATRICs aimed at constraining the extent to which the closure of the Neo-Tethyan ocean and subsequent India-Asia and Arabia-Asia collision are entailed with Cenozoic climate trends. Analytical methods include, but are not limited to, studies of Melt Inclusions within target magmatic products (e.g., Raman spectroscopy and/or SIMS), analyses of mercury (Hg) and Tellurium (Te) anomalies within target sedimentary sequences and geochronology (e.g., LA-ICPMS U-Pb zircon and Ar-Ar dating) on available and newly sampled rocks. The measurements will provide rigorous and novel quantifications of the causal relationships between Cenozoic Neo-Tethyan geodynamics and climate changes. Expected work allocation: ~15% field sampling, ~60% analytical work, 25% papers writing. The project is co-supervised by Rosario Esposito, and will be held in collaboration with external partners (e.g., J. Koornneef, University of Amsterdam, VU; P. Bouilhol, CRPG-Nancy, University of Lorraine; S. Castelltort, University of Geneva; P. Ballato, University of Roma TRE; J. Dai, University of Beijing; F. Farina, University of Milano), who will provide access to the sampling field terrains and analytical facilities in external Institutes during the (6-12 months) expected periods abroad.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Geologiche/ Geological Sciences	
Progetto di ricerca Research project	**ENG:** "Neo-Tethyan Magmatic CO2 Emissions and Climatic Effects: Insights from Melt Inclusions and Hg-Te Analysis on rocks from Ladakh (India)" **(PROG.4**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** At timescales of millions to tens of millions of years, the geological carbon cycle modulates the storage of carbon into rocks and the release of carbon into the ocean and atmosphere, thereby linking the evolution of climate and life to plate tectonics. This call gathers projects framed within the fully funded 2024-ERC-CoG grant MATRICs aimed at constraining the extent to which the closure of the Neo-Tethyan ocean and subsequent India-Asia and Arabia-Asia collision are entailed with the Cenozoic climate trends. Analytical methods include, but are not limited to, studies of Melt Inclusions within target magmatic products (e.g., Raman spectroscopy and/or SIMS), analyses of mercury (Hg) and Tellurium (Te) anomalies within target sedimentary sequences and geochronology (e.g., LA-ICPMS U-Pb zircon and Ar-Ar dating) on available and newly sampled rocks. The measurements will provide rigorous and novel quantifications of the causal relationships between Cenozoic Neo-Tethyan geodynamics and climate changes. Expected work allocation: ~15% field sampling, ~60% analytical work, 25% papers writing. The project, co-supervised by Rosario Esposito, will be held in collaboration with external partners (e.g., J. Koornneef, University of Amsterdam, VU; P. Bouilhol, CRPG-Nancy, University of Lorraine; S. Castelltort, University of Geneva; F. Farina, University of Milano), who will provide access to the sampling field terrains and analytical facilities in external Institutes during the (6-12 months) expected periods abroad.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Geologiche/ Geological Sciences	
Progetto di ricerca Research project	**ENG:** "The Role of Neo-Tethyan CO2 Emissions in Driving Cenozoic Climate Changes: Insights from Melt Inclusions and Hg-Te Analyses on Tibetan Rock Samples" **(PROG.5**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** At timescales of millions to tens of millions of years, the geological carbon cycle modulates the storage of carbon into rocks and the release of carbon into the ocean and atmosphere, thereby linking the evolution of climate and life to plate tectonics. This call gathers projects framed within the fully funded 2024-ERC-CoG grant MATRICs aimed at constraining the extent to which the closure of the Neo-Tethyan ocean and subsequent India-Asia and Arabia-Asia collision are entailed with the Cenozoic climate trends. Analytical methods include, but are not limited to, studies of Melt Inclusions within target magmatic products (e.g., Raman spectroscopy and/or SIMS), analyses of mercury (Hg) and Tellurium (Te) anomalies within target sedimentary sequences and geochronology (e.g., LA-ICPMS U-Pb zircon and Ar-Ar dating) on available and newly sampled rocks. The measurements will provide rigorous and novel quantifications of the causal relationships between Cenozoic Neo-Tethyan geodynamics and climate changes. Expected work allocation: ~15% field sampling, ~60% analytical work, 25% papers writing. Ther project, co-supervised by Rosario Esposito, will be held in collaboration with external partners (e.g., J. Koornneef, University of Amsterdam, VU; P. Bouilhol, CRPG-Nancy, University of Lorraine; S. Castelltort, University of Geneva; J. Dai, University of Beijing; F. Farina, University of Milano), who will provide access to the sampling field terrains and analytical facilities in external Institutes during the (6-12 months) expected periods abroad.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Ambientali / Environmental Sciences	
Progetto di ricerca Research project	**ENG:** "Development of cal/val tools and algorithms for fluorescence retrieval in the context of the FLEX space mission" **(PROG.6**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ENG:** The research activities are part of the FLuorescence EXplorer (FLEX) mission promoted by the European Space Agency (ESA) to generate global maps of vegetation fluorescence that can reflect photosynthetic activity and plant health and stress. In turn, this is not only important for a better understanding of the global carbon cycle, but also for agricultural management and food security. The innovative instrument aboard FLEX will not directly measure photosynthesis but will provide all the essential variables needed to enable its estimation from space to address several scientific and societal challenges. The mission was selected as the eighth Earth Explorer in ESA's Living Planet Programme in 2015. FLEX will fly in tandem with the Copernicus Sentinel-3 mission, working in combination with the OLCI and SLSTR instruments. FLEX is expected to be launched in 2026, with a three-and-a-half-year design lifetime. The planned activities have a twofold objective. The first objective involves the definition of the validation procedures for the mission's data products, while the second research topic focuses on the development and improvement of algorithms for estimating fluorescence, both from satellite data and from airborne hyperspectral sensors. The validation component is related to the development of an indirect validation method based on radiative transfer model simulations. In this context, the fluorescence will be simulated at selected sites using radiative transfer models parametrized with high resolution plant trait maps (derived for example from other satellite missions and ground-measured vegetation parameters). This would open to the use of well-characterised sites in terms of vegetation properties where fluorescence measurements are instead not available. The improved retrieval algorithm will include the modelling of the canopy anisotropy and the inclusion of the adjacency effect, and it will be also optimised for airborne instruments. Both aspects aim at providing improved fluorescence retrieval that could be better exploited for the further scientific interpretation of the physiological status of the canopy. For example, toward an improved retrieval of the fluorescence quantum yield and all downstream exploitation of fluorescence products.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Chimiche, Geologiche ed Ambientali / Chemical, Geological and Enviromental Sciences 124R Scienze Chimiche/ Chemical Sciences	
Progetto di ricerca Research project	**ENG:** "Green Chemistry applied to industrial processes for the preparation of APIs for diagnostics and intermediates thereof" **(PROG.7**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Bracco Imaging S.p.A.
Borse/Scholarships	1
Abstract	**ENG:** The Chemical Industry is on the forefront of the green chemistry revolution, ever increasing efforts in the direction of making production processes less energy intensive, more efficient, progressively less reliant on the use of toxic reagents and solvents and essentially waste free. Bracco Imaging is a world leader in the production of active principles for diagnostics (X-Ray and MRI) and is committed on the optimization of existing production processes as well as on the development of new, intrinsically safe and sustainable. Within the various activities devoted to the development of sustainable products and processes, Bracco is investigating various approaches to carry out chemical transformations in benign media (mostly water) and/or in the absence of a medium (mechanochemistry). This research will be focused on the development of surfactant and other additives specifically designed to carry out several organic transformations of interest for the production of contrast agents in water as the solvent. The research will also aim at the development of alternative catalysts based on non platinum group metals that could be used in a wide range of catalytic reactions of interest in the field.
Tutor	UNIMIB: Prof. Luca Beverina Supervisor aziendale: Dr. Luciano Lattuada
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship

Scienze Marine, Tecnologie e Gestione / Marine Sciences, Technology and Management (MTM) 128R	
Progetto di ricerca Research project	**ITA:** "Mappatura dei paesaggi sottomarini e dei processi attivi per svelare gli impatti climatici su più scale spazio-temporali" **(PROG.1**) **ENG:** "Mapping Underwater Landscapes and active processes to Unveil Climate Impacts Across multiple Spatio-Temporal Scales" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	1
Abstract	**ITA**: Questo progetto di dottorato mira a studiare i processi morfodinamici su piccola scala della barriera corallina di Magoodhoo alle Maldive utilizzando una combinazione di metodi avanzati di raccolta dati geospaziali. Integrando batimetria multifascio, dati satellitari, retrodiffusione, immagini di droni, campioni di sedimenti e l'uso del sistema Distributed Acoustic Sensing (DAS), il progetto cerca di studiare se il sistema DAS può rivelare modelli su piccola scala di processi oceanografici e sedimentari che influenzano l'evoluzione del sistema della barriera corallina e dei suoi ambienti sedimentari associati. Indagini ripetute condotte ogni due anni consentiranno di rilevare cambiamenti su piccola scala nella geomorfologia sottomarina, che possono essere interpretati per comprendere meglio come questi processi si evolvono nel tempo. L'uso innovativo del sistema DAS, insieme ai tradizionali set di dati geospaziali, fornirà nuove intuizioni sulle dinamiche oceanografiche e sedimentarie a scale spaziali senza precedenti e sarà testato durante i primi due anni del progetto. Questa ricerca avrà implicazioni significative per la pianificazione dello spazio marino e le pratiche di gestione sostenibile, specialmente in questa regione climaticamente sensibile che è stata colpita dalle recenti attività di bonifica del territorio. Il progetto trae vantaggio dall'infrastruttura di ricerca fornita dal MaRHE Center, che facilita l'organizzazione di workshop strutturati e la raccolta di dati di alta qualità. Il candidato al dottorato avrà l'opportunità di trascorrere un periodo di 6 mesi all'estero per acquisire esperienza nell'uso del sistema DAS e analizzare il set di dati geospaziali marini. **ENG:** This PhD project aims to investigate the fine-scale morphodynamic processes of the Magoodhoo reef in the Maldives using a combination of advanced geospatial data collection methods. By integrating multibeam bathymetry, satellite data, backscattering, drone imagery, sediment samples, and the use of the Distributed Acoustic Sensing (DAS) system, the project seeks to investigate whether the DAS system can reveal fine-scale patterns of oceanographic and sedimentary processes that influence the evolution of the reef system and its associated sedimentary environments. Repeated surveys conducted bi-annually over two years will enable the detection of fine-scale changes in submarine geomorphology, which can be interpreted to better understand how these processes are evolving over time. The innovative use of the DAS system, alongside traditional geospatial datasets, will provide new insights into oceanographic and sedimentary dynamics at unprecedented spatial scales and will be tested during the first two years of the project. This research will have significant implications for marine spatial planning and sustainable management practices, especially in this climatically sensitive region that has been impacted by recent land reclamation activities.

	The project benefits from the research infrastructure provided by the MaRHE Center, which facilitates the organization of structured workshops and high-quality data collection. The PhD candidate will have the opportunity to spent a 6 months period abroad to gain experience on the use of the DAS system and to analyze marine geospatial dataset.
Tutor	Prof.ssa Alessandra Savini
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Marine, Tecnologie e Gestione / Marine Sciences, Technology and Management (MTM) 128R	
Progetto di ricerca Research project	**ENG:** "Marine-Derived Biomaterials: Applications in Precision Agriculture and BiodegradableFood Packaging" **(PROG.2**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Fondazione Istituto Italiano di Tecnologia
Borse/Scholarships	1
Abstract	**ENG:** Bioplastics, renewable and biodegradable materials derived from biological sources, offer a sustainable alternative to conventional plastics for various applications including agriculture and food packaging. Although bioplastics produced from land-based biomass, agricultural waste, and microorganisms are well established, marine biomass is less explored. This project aims to create new bioplastics and bioplastic composites starting from marine biomass. The research will focus on recovering the compounds of interest, i.e. biopolymers or active biomolecules, from the marine biomass and on formulating prototypes through compounding with other biobased polymers, or through effective industrially applicable processing for delivering the final product. The final aim is to develop biodegradable components with specific functionalities for active and smart food packaging or for precision agriculture components. The developed marine based biocomposites will be deployed for: Food packaging products to prolong shelf life and to indicate the food spoilage; Soil to address nutrient deficiencies, moisture imbalances, or the presence of pathogens; Plants to address oxidative stress and pathogens. The research will be conducted at the Smart Materials Group of the Italian Institute of Technology (IIT) Genova.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Marine, Tecnologie e Gestione / Marine Sciences, Technology and Management (MTM) 128R	
Progetto di ricerca Research project	**ENG:** "Interactions Between Microplastics, Nanoplastics, and Marine Biota: Implications forOceanic Health" **(PROG.3**)
Tipo/Type	Borse finanziate da enti/aziende convenzionati / Scholarships funded by partner organizations/companies
Azienda o ente finanziatore / Funding Body	Fondazione Istituto Italiano di Tecnologia
Borse/Scholarships	1
Abstract	**ENG:** Micro and nanoplastics are released to the water bodies by diverse products and processes or by the degradation of plastic litter, and their physical-chemical characteristics are expected to substantially differ from the corresponding bulk counterparts. To date, knowledge on the effects that these pollutants may pursue on marine biota is still scarce. This PhD activity will point to the fabrication of micro and nanoplastics, with characteristics similar to the ones found in real environmental samples by adopting top-down approaches starting from specific synthetic and natural bulk polymeric components and following innovative fabrication methods combined with mechanical fragmentation. Their implications on marine biota will be studied by exposing to specific in vitro and in vivo models such as cell lines and organoids, zebrafish embryos, bacteria, planaria and corals. Special attention will be focused on comparative studies using conventional synthetic plastic and innovative bioplastic particles. This work will be conducted at the Italian Institute of Technology (IIT) Genova. Collaborations with the Translational Pharmacology Facility of IIT for some in vivo aquatic models, and with MaRHE (Marine Research and High Education) Center Facility inside the Aquarium of Genoa are envisaged.
Tutor	*da definirsi/to be defined*
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Scienze Marine, Tecnologie e Gestione / Marine Sciences, Technology and Management (MTM) 128R	
Progetto di ricerca Research project	**ENG:** "Optimization of Offshore Surveys for Submarine Cables: Innovative Approaches to Geohazard Assessment" **(PROG.4**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Poliservizi Engineering s.r.l.
Borse/Scholarships	1
Abstract	**ENG:** The installation of submarine cables is a critical infrastructure process that requires a comprehensive understanding of marine geomorphology and geohazard risks. However, geohazard assessments are often limited, lacking standardized procedures and failing to account for short-term seabed evolution in response to cable deployment. This project aims to enhance offshore survey methodologies by integrating advanced geohazard analysis techniques and improving data acquisition and interpretation. By leveraging new insights into seabed dynamics, the research will provide guidelines for a more effective and sustainable approach to submarine cable placement. The ultimate goal is to minimize environmental impact, reduce operational risks, and ensure the long-term resilience of these essential underwater networks.
Tutor	UNIMIB: Prof.ssa Alessandra Savini Supervisor aziendale: Dr. Lorenzo Barone
Abroad period	*no specific rules*
Specific rules	*no specific rules*

Tecnologie Convergenti per i Sistemi Biomolecolari (TeCSBi) / Converging Technologies for Biomolecular Systems (TeCSBi) 117R	
Progetto di ricerca Research project	**ENG:** "BUTTERFLY - "Mainstreaming pollinator stewardship in view of cascading ecological, societal and economic impacts of pollinator decline"" **(PROG.1**)
Tipo/Type	Borse finanziate dal Dipartimento / Scholarships funded by the Department
Borse/Scholarships	2
Abstract	**ENG:** Two alternative research topics (one per PhD position) will be investigated in the Project BUTTERFLY: **a) Pollinator decline in a changing world: characterizing the pollination ecosystem services and the solutions for habitat enhancement.** Human activity alters natural systems at different levels, as a consequence, these changes dramatically impact the ecosystem services provided to humans by biodiversity. Among these, pollination by animals constitutes an element of global importance, in terms of food security and maintaining primary ecological processes. The ongoing decline in pollinator populations could have a potentially drastic effect on human nutrition and health. This research line aims to significantly enhance society's capacity to appraise, foresee, and respond to the threats posed by cascading impacts of pollinator decline, for co-creating proactive pollinator restoration solutions. The PhD candidate will focus on: (1) collect, integrate, and manage ecological and spatial information on a wide range of known and lesser known pollinators, with specific reference to the Italian mainland and island territories. (2) characterize the services provided by pollinators in urban and periurban agricultural fields and community allotments to advance our understanding on the implications of pollinator decline to co-create and test pollinator restoration options that increase resilience. (3) investigate the role of urban park habitat enhancement on pollinator diversity and pollination ecosystem service. The candidate will closely interact with a network of entities within a Living Lab in the Metropolitan area of Milan, as breeding place for multi-actor co-creation of knowledge and sustainable solutions, paving the way to pollinator stewardship in all sectors. The main impact will be the triggering of significant positive changes in biodiversity, and the application of agroecological and pollinator-friendly farming and community practices by providing tools and guidelines for actionable pollinator knowledge, decision support and science-policy interaction. **b) Pollinator stewardship & the butterfly effect.** Pollination is vital for plant communities, and its decline can negatively affect biodiversity and human societies. Targeted restoration efforts, with species-specific conservation measures are key to mitigate pollinator loss. Local actions must align with broader conservation strategies across national and European levels. To do this the PhD candidate will identify key pollinators with significant social, economic, or cultural impacts ,and identify their plant and habitat needs. This knowledge will allow the candidate to align local

	stakeholder needs—like crop production—with specific pollinators and their habitat needs. This is project deliverable 1 (D1), determining the focal pollinators for different stakeholders needs. To enable local and targeted landscape modifications the PhD candidate will use scalable joint species distribution models of these plant and pollinators species, a deliverable of the European Horizon project Butterfly. Linking the information of D1 with these distribution models will allow her/him to develop a spatial tool (D2) which identifies the localities of missing plant species. A final deliverable will allow the end-user to interact with such a tool and input landscape information to design measures to attract the focal pollinators and their services at a local scale (D3). The expected impact is to synchronize EU conservation efforts by valuing natural and semi-natural landscapes for their ability to support the focal pollinator species. This is supplementary to methods that look for supply-demand mismatches, inherently focussing to improve landscape less suitable to support large numbers of pollinators. The focus directs management efforts towards conserving high quality habitats areas and designs habitat corridors to enhance connectivity.
Tutor	Dr. Paolo Biella
Abroad period	massimo 12 mesi (18 se in cotutela)
Specific rules	*no specific rules*

Tecnologie Convergenti per i Sistemi Biomolecolari (TeCSBi) / Converging Technologies for Biomolecular Systems (TeCSBi) 117R	
Progetto di ricerca Research project	**ENG:** "Development and optimization of functional nanomaterials for physical modulation of cell aging processesDevelopment and optimization of functional nanomaterials for physical modulation of cell aging processes" **(PROG.2**)
Tipo/Type	Borse finanziate da enti esterni / Scholarships funded by external organizations
Azienda o ente finanziatore / Funding Body	Difa Cooper Spa
Borse/Scholarships	1
Abstract	**ENG:** Aging is a complex biological process influenced by genetic, environmental, and biochemical factors. Emerging evidence suggests that nanomaterials, in combination with physical stimuli, such as optical, electrical, magnetic, and mechanical cues, can modulate cellular aging pathways. Understanding the interplay between these factors and in vitro aging models is crucial for developing innovative strategies to slow down or counteract age-related cellular decline. This project aims to investigate the functional interactions between nanomaterials and aging cell models under different physical stimuli. The study will be carried out in three phases: (i) Optimization of bio-hybrid interfaces by integrating nanoparticles, bioactive molecules, or nanostructured thin films with in vitro aging models, alongside biocompatibility and stability assessments. (ii) Analysis of cellular responses to physical stimuli and nanomaterial exposure, focusing on their impact on aging-related mechanisms and the identification of key biological pathways involved. (iii) Validation of the approach and evaluation of large-scale applications through the development of composite systems that integrate nanomaterials with existing commercial products. The project is highly multidisciplinary, bridging fundamental research with applied science. In collaboration with Cantabria Labs, it will also address process standardization, prototype development, and preliminary market feasibility. By unveiling novel interactions between nanomaterials, physical stimuli, and aging mechanisms, this project could lead to breakthrough strategies for mitigating cellular aging. The findings may pave the way for innovative anti-aging technologies in regenerative medicine, dermatology, and biomaterials. Furthermore, the potential industrial translation of these findings, supported by Cantabria Labs, could facilitate the commercialization of next-generation bio-hybrid products, bridging scientific innovation with real-world applications.

Tutor	UNIMIB: Prof. Francesco Lodola Supervisor aziendale: Dott.ssa Solange Caimi per Cantabria Labs Difa Cooper, Dott.ssa Maria Rosa Antognazza (IIT)
Abroad period	*no specific rules*
Specific rules	Intellectual property clauses agreed with the Company apply to this scholarship