ANNEX 1
LIST OF RESEARCH FIELDS AND TOPICS

PhD Programme	Curriculum (where applicable)	Code for research field	RESEARCH FIELD	Code for topic	TOPIC
Architecture, Design, Planning	Architecture, Theories And Design	ARCH1	Rethinking architectural and territorial heritage: critical investigations and design experiments between material structures and abandoned places	ARCH 1.1	PALINSESTI DELL'ABITARE: Public Housing in the Marche Region: Historical Investigations and Design Scenarios
Architecture, Design, Planning	Architecture, Theories And Design	ARCH1	Rethinking architectural and territorial heritage: critical investigations and design experiments between material structures and abandoned places	ARCH 1.2	The Wastescape as a Performative Infrastructure
Architecture, Design, Planning	Innovation design	ARCH2	Design research for circular and digital innovation of products and processes, and for heritage communication	ARCH 2.1	ADD_Aggregate-Driven Design: Digital Workflows for Circular Concrete and Discrete Construction Systems
Architecture, Design, Planning	Innovation design	ARCH2	Design research for circular and digital innovation of products and processes, and for heritage communication	ARCH 2.2	Digital Infrastructures for Emerging Research Paradigms in Design
Architecture, Design, Planning	Sustainable planning, cultural heritage, built environment	ARCH3	Territorial and landscape regeneration of Inland Areas: Integrated planning for landscape, heritage and climate resilience in fragile territories	ARCH 3.1	Water and territorial resilience: the role of Land Reclamation Consortia in sustainable planning. The Marche Region case study
Architecture, Design, Planning	Sustainable planning, cultural heritage, built environment	ARCH3	Territorial and landscape regeneration of Inland Areas: Integrated planning for landscape, heritage and climate resilience in fragile territories	ARCH 3.2	Resilience and sustainability of Inland Areas in Italy and Japan: urban regeneration, densification, and strategies for territorial cohesion
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM1	Organic Chemistry And Material Science	CHEM 1.1	High-Performance Refinishing System with Functionalized Additives for an Eco-Responsible Future
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM1	Organic Chemistry And Material Science	CHEM 1.2	Studying the role of organic synthesis in facilitating to a bio-based economy
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM1	Organic Chemistry And Material Science	CHEM 1.3	Synthesis and characterization of small molecules through unconventional technologies
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM2	Analytical Chemistry	CHEM 2.1	Characterization of electrode materials and interfaces in batteries and post-mortem analysis
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM2	Analytical Chemistry	CHEM 2.2	Interfacial phenomena and surface chemistry in electrochemical systems for energy storage
Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM3	Physical Chemistry	CHEM 3.1	Synthesis and characterization of advanced materials for post-Lithium electrochemical energy storage and conversion

Chemical and Pharmaceutical Sciences and Biotechnology	Chemical sciences	CHEM4	Inorganic Chemistry	CHEM 4.1	Breaking the Forever Chemicals: MOFs for PFAS Removal and Destruction"
Chemical and Pharmaceutical Sciences and Biotechnology	Pharmaceutical, Nutraceutical and Food Sciences	CHEM5	Drug Delivery	CHEM 5.1	Development of Metal Organic Framework (MOF) based platforms for Targeted Therapeutic Delivery
Chemical and Pharmaceutical Sciences and Biotechnology	Pharmaceutical, Nutraceutical and Food Sciences	CHEM7	Food Chemistry	CHEM 7.1	Study of the composition, formulation and biological activity of food supplements
Computer Science and Mathematics	\	CSMATH2	Process Management and Mining	CSMATH 2.1	Novel Methodologies for multi-dimensional Process Improvement
Computer Science and Mathematics	\	CSMATH3	Machine Learning and Artificial Intelligence	CSMATH 3.1	Hypergraph Theory for Causality-Based Machine Intelligence
Computer Science and Mathematics	\	CSMATH8	Computational Biology and Bioinformatics	CSMATH 8.1	Languages and Tools for a Unified Framework of Specification and Verification of Sequences
Computer Science and Mathematics	\	CSMATH10	Cybersecurity	CSMATH 10.1	Secure by Design: Formal Foundations for Cryptographic Attribute-Based Communication in Distributed Systems
Legal and social sciences	Fundamental rights in the global society	LEGAL1	Fundamental Rights in a Global Perspective	LEGAL 1.1	Fundamental rights between national legal systems and the European legal space: multilevel protection, dialogue between courts, and transformations of contemporary constitutionalism
Legal and social sciences	civil law	LEGAL2	Person and Markets in the Sustainable Transition Era	LEGAL 2.1	Ethical finance contracts
Legal and social sciences	civil law	LEGAL2	Person and Markets in the Sustainable Transition Era	LEGAL 2.2	Environmental sustainability and impact on real and obligatory rights between private individuals
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.1	Comprehensive Bacteriological Validation and Mechanistic Investigation of an Innovative Antimicrobial Technical Liquid for Surface and Environmental Disinfection
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.2	From gut barrier to brain: effects of ageing and nutritional extremes on the HCRT circuit in *Nothobranchius furzeri*
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.3	Characterization of the Fecal Microbiota in New World Camelids and Its Implications for Animal Health, Nutrition, and Welfare.
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.4	Innovative Approaches to Veterinary Transfusion Medicine within the One Health Framework
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.5	Veterinary Neoplasms as a Translational Model for Human Medicine: Diagnostic and Prognostic Role of Biomarkers
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.6	Pharmacological modulation of the bone-muscle axis with stanozolol in orthopedic dogs: a prospective, randomized study on fracture consolidation, TPLO osteotomy healing, and muscle trophism recovery from a One Health perspective.
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.7	Precision veterinary orthopedic surgery using virtual planning and 3D printing for the treatment of appendicular deformities and spontaneous fractures in dogs: a prospective biomechanical,

					clinical, and translational study from a One Health perspective.
Life and Health Sciences	One Health	LIFE1	Veterinary Science and Animal Health in the One Health Approach	LIFE 1.8	Sustainable aquaculture and opportunities for integrated actions
Life and Health Sciences	One Health	LIFE2	Biodiversity and Ecosystem Management	LIFE 2.1	Temporal dynamics of plant diversity in forests: assessing conservation status across environmental gradients
Life and Health Sciences	One Health	LIFE2	Biodiversity and Ecosystem Management	LIFE 2.2	The role of functional variation in species' vulnerability to environmental change and ecosystem multifunctionality in forests
Life and Health Sciences	Nutrition, food and health	LIFE3	Healthy food	LIFE 3.1	Innovative Coffee-Based Beverages Solutions for Healthy and Sustainable Nutrition
Life and Health Sciences	Molecular Biology and Cellular Biotechnology	LIFE4	Molecular Frontiers in Biomedical Research	LIFE 4.1	Molecular Characterization of CFTR Gene Variants and Their Clinical Impact on Personalized Therapeutic Management of Cystic Fibrosis Patients in Albania
Life and Health Sciences	Molecular Biology and Cellular Biotechnology	LIFE4	Molecular Frontiers in Biomedical Research	LIFE 4.2	Ultrasound-guided hyaluronic acid rhinofiller: development and validation of a safety and optimal-outcome protocol
Physics, Earth and Materials sciences	Physics	PEMS2	Experimental Physics and ultrasensitive methods for force measurements	PEMS 2.1	Development of Seismic and Magnetic Sensor Networks and Seismic Early-Warning Systems
Physics, Earth and Materials sciences	Physics	PEMS3	Astronomy and Astrophysics, Theoretical cosmology	PEMS 3.1	Aspects of stellar physics and connections with multiwavelength probes of dark energy and dark matter
Physics, Earth and Materials sciences	Physics	PEMS4	Quantum Matter	PEMS 4.1	Quantum coherent phenomena and magnetic phases in electron-hole bilayer systems.
Physics, Earth and Materials sciences	Materials sciences	PEMS5	Nanomaterials for energy and information technology applications	PEMS 5.1	Coatings to Mitigate Range Loss in THOR HPM System
Physics, Earth and Materials sciences	Physical and Chemical Processes in Earth Systems	PEMS8	Environmental Management and Engineering	PEMS 8.1	Vulnerability models for mutli-risk analysis

DESCRIPTION OF TOPICS

PhD Programme: ARCHITECTURE, DESIGN, PLANNING

CURRICULUM: ARCHITECTURE, THEORIES AND DESIGN

RESEARCH FIELD ARCH 1: Rethinking architectural and territorial heritage: critical investigations and design experiments between material structures and abandoned places

Scholarship code: ARCH1.1

Research Topic and project:
PALINSESTI DELL'ABITARE: Public Housing in the Marche Region: Historical Investigations and Design Scenarios
Public housing in Italy is characterized by persistent tensions between the right to housing and the selectivity of interventions, design quality and physical deterioration, welfare-oriented approaches and market-driven policies. Within this framework, the research investigates the development of public housing in the Marche Region, focusing on the relationship between national housing policies and their local implementation. Particular attention is devoted to the province and city of Ascoli Piceno, where public housing projects developed from the second half of the twentieth century to the present will be examined through archival research, photographic surveys, mapping, and critical analysis of selected case studies. The study aims to reconstruct the original projects and their authorship, analyse the evolution of private and collective living spaces, and assess the relationships established between residential developments and their urban context. Based on the recognition of the architectural and urban value of this built heritage, the research will develop strategies for the regeneration of public housing estates, exploring the role of public and open spaces as catalysts for social, architectural, and environmental renewal.

Supervisor: Prof. Luigi Coccia

Scholarship co-funded by *ERAP Marche*

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
    - 40 ECTS in research activity (with a yearly evaluation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills

    - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
    - 40 ECTS in research activity (with a yearly evaluation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills
    - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
    - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in architectural and urban design, with particular reference to residential environments, public housing, and urban regeneration. Competence in the critical reading of architectural and urban form, the representation of the built environment, and design-driven research approaches will be positively evaluated.

Scholarship code: ARCH1.2

Research Topic and project:
Il Wastescape come Infrastruttura Performativa
The Wastescape as a Performative Infrastructure
This research investigates the role of wastescapes as strategic resources for urban and territorial regeneration in response to land scarcity and climate change. Focusing on soils and water bodies affected by degradation, contamination, or marginalisation, the project explores how these landscape-environmental matrices can contribute to more sustainable and resilient forms of development. The research is based on the concept of "Critical Dismantling", an integrated approach that seeks to overcome the traditional separation between environmental remediation and spatial planning. Through the mapping of wastescapes according to their urban metabolism, the analysis of international case studies, and the examination of regulatory frameworks, the project aims to identify opportunities, constraints, and transferable strategies for regeneration. Particular attention is devoted to the development of operational tools, spatial frameworks, and design guidelines capable of integrating blue and green infrastructures within regeneration processes. The research promotes a shift from object-based interventions towards process-based approaches, in which soil and water are understood as active infrastructures supporting ecosystem services and urban resilience. The expected outcome is a set of replicable methodologies and pilot applications to support research institutions and public authorities in the regeneration and governance of wastescapes.

Supervisor: Prof. Luigi Coccia

Scholarship co-funded by *CZstudio Associati S.T.P. a r.l.*

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno

Duration: **3 years**
Provisional starting date: 1st November 2026

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  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in architectural, urban, and landscape design, particularly in relation to regeneration processes and the transformation of contemporary territories. Sensitivity towards ecological and environmental issues, together with the ability to interpret complex spatial conditions through design, will be positively evaluated.

PhD Programme: ARCHITECTURE, DESIGN, PLANNING

CURRICULUM: INNOVATION DESIGN

RESEARCH FIELD ARCH 2: Design research for circular and digital innovation of products and processes, and for heritage communication

Scholarship code: ARCH2.1

Research Topic and project:
ADD_Aggregate-Driven Design: Digital Workflows for Circular Concrete and Discrete Construction Systems
Concrete is the most widely used construction material worldwide, yet its production is responsible for significant environmental impacts and generates major challenges at the end of the building lifecycle, as construction and demolition waste is still largely downcycled. Within the transition towards a circular built environment, this research investigates the relationship between cement-based composites, digital design, and additive manufacturing, considering material properties as active parameters in the design process. Particular attention is devoted to the role of mineral aggregates from recycled and local sources, whose variability influences material behavior, fabrication processes, and construction solutions. While 3D concrete printing has demonstrated considerable potential in reducing environmental impacts and enabling the use of recycled resources, existing applications remain largely focused on fabrication processes rather than on integrated and scalable construction systems. The research aims to define the relationships between material composition, printing parameters, component design, and building systems, with specific reference to local supply chains in the Marche Region. Through an iterative workflow integrating design, production, and assembly, the project will develop design protocols and full-scale prototypes based on principles of circularity, traceability, replicability, and scalability. Operating across the interconnected scales of material, component, and construction system, the research contributes to advancing knowledge on digital materiality, circular construction, and the integration of materials, data, and fabrication processes within sustainable building systems.

Supervisor: Prof. Roberto Ruggiero

Scholarship co-funded by *Centauroos* and *Impresa edile Mancini Alfredo*

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
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  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

- 2 Year:
    - 40 ECTS in research activity (with a yearly evaluation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills
    - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
    - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in construction systems, digital design and fabrication, sustainable building technologies, and circular economy approaches in the built environment. Experience in computational design, additive manufacturing, prototyping, digital workflows, or performance-based design methodologies will be positively evaluated.

Scholarship code: ARCH2.2

Research Topic and project:
Digital Infrastructures for Emerging Research Paradigms in Design
This research investigates the role of advanced digital infrastructures and research laboratories in reshaping design processes and the organizational models of university-based research. As data platforms, simulation environments, and digital fabrication systems become increasingly embedded within higher education institutions, they act not only as technical support systems but also as active agents in knowledge production, influencing design methodologies, research workflows, and relationships between academia, industry, and society. The research is grounded in the case of the QUaBIT Laboratory and the network of Advanced Digital Environments (ADA), conceived as an ecosystem linking data management, simulation, and digital fabrication. Particular attention is devoted to ADA Digital Fabrication, the digital manufacturing, robotics, and prototyping laboratory of the School of Architecture and Design of the University of Camerino, which will serve as the main experimental environment for the research. The central hypothesis is that advanced digital infrastructures do not merely improve the efficiency of design processes but fundamentally transform the ways knowledge is produced, validated, and transferred. Through theoretical investigation, comparative analysis of national and international case studies, and experimental activities developed within ADA Digital Fabrication, the research will examine the epistemic, operational, and institutional dimensions of digital infrastructures. The expected outcome is the development of theoretical and operational models capable of supporting the integration of research, production, education, and third mission activities, contributing to new organizational paradigms for design research and innovation within universities.

Supervisor: Mr. Davide Paciotti

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno.

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in design research and in the role of digital technologies in shaping contemporary design processes. Curiosity, critical thinking, and a propensity to experiment with digital tools and environments will be positively evaluated, together with familiarity with digital design, modelling, visualization, fabrication, or related workflows.

PhD Programme: ARCHITECTURE, DESIGN, PLANNING

CURRICULUM: SUSTAINABLE PLANNING, CULTURAL HERITAGE, BUILT ENVIRONMENT

RESEARCH FIELD ARCH 3: Territorial and landscape regeneration of Inland Areas: Integrated planning for landscape, heritage and climate resilience in fragile territories

Scholarship code: ARCH3.1

Research Topic and project:
Water and territorial resilience: the role of Land Reclamation Consortia in sustainable planning. The Marche Region case study
This research addresses the challenges of sustainable water and land management in the context of climate change, focusing on the role of Land Reclamation Consortia in improving the efficiency, resilience, and governance of irrigation and hydraulic systems. The main objective is to develop a scientifically robust and operational methodology for the preparation of Classification and Cost Allocation Plans, ensuring transparency, consistency, and fairness in the assessment of benefits and the distribution of consortium charges. To this end, the research will examine the activities of Land Reclamation Consortia, relevant regulatory frameworks, and existing planning instruments, with particular reference to the reclamation districts of the Marche Region. Through the integration of Geographic Information Systems (GIS), territorial databases, and spatial modelling techniques, the study will identify and classify reclamation infrastructures and assess the irrigation, hydraulic, hydrogeological, and environmental benefits generated by consortium activities through dedicated technical indicators. The proposed methodology will be tested and refined through the Marche Region case study, with the aim of developing an integrated and transferable framework applicable to different territorial contexts. The expected outcomes include improved governance practices, enhanced decision-support tools, and innovative approaches for climate-resilient water management and sustainable spatial planning.

Supervisor: Prof. Massimo Sargolini

Scholarship co-funded by *Consorzio Bonifica Marche*

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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- 2 Year:
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    - 10 ECTS in mandatory SAS Activities to acquire transferable skills
    - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
    - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in spatial planning and territorial governance, with particular reference to water management, environmental resilience, and climate adaptation strategies. Experience in territorial analysis, planning tools, and the use of geospatial data to support decision-making processes will be positively evaluated.

Scholarship code: ARCH3.2

Research Topic and project:
Resilience and sustainability of Inland Areas in Italy and Japan: urban regeneration, densification, and strategies for territorial cohesion
Building on the existing collaboration between Toyo University, the REDI consortium, and UNICAM-SAAD, this research investigates the resilience and sustainability of inland areas in Italy and Japan, focusing on strategies for urban regeneration and territorial cohesion. Particular attention is devoted to the historic towns of Central Italy, whose dense and compact urban fabric is examined in relation to contemporary challenges of safety, sustainability, and climate resilience. The research explores the relationships between inland and coastal areas, considering their functional, ecological, perceptual, and cultural interdependencies, and will interact with the activities of the Marche Region Landscape Observatory. The project aims to develop innovative strategies and planning tools for the regeneration of small and medium-sized towns, enhancing their connections with surrounding semi-natural environments while increasing resilience to multihazard conditions. It also addresses adaptation strategies for coastal areas exposed to erosion and flooding, promoting integrated approaches capable of reducing both exposure and vulnerability. Through the analysis of international experiences, European policy frameworks, and selected case studies in Italy and Japan, the research will develop a strategic framework for strengthening the resilience, sustainability, and long-term development of inland areas, supporting decision-making processes and regional planning at multiple scales.

Supervisor: Prof. Massimo Sargolini

Scholarship co-funded by *Consorzio REDI* *https://www.redi-research.eu/it/homepage/*

Leader of the PhD Programme: Prof. Roberto Ruggiero
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, School of Architecture and Design in Ascoli Piceno

Duration: **3 years**
Provisional starting date: 1st November 2026

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Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates should demonstrate a strong interest in spatial and urban planning, with particular reference to the regeneration of inland areas, territorial cohesion, and resilience-oriented planning. Familiarity with strategic planning approaches, multiscale territorial analysis, and policies addressing sustainable local and regional development will be positively evaluated.

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: CHEMICAL SCIENCES

RESEARCH FIELD CHEM 1: Organic Chemistry and Material Science

Scholarship code: CHEM 1.1

Research Topic and project:
High-Performance Refinishing System with Functionalized Additives for an Eco-Responsible Future
The project focuses on developing an advanced refining system for innovative high-performance materials, particularly microfiber (virgin and recycled), polyester, polyamide, cotton, linen, and viscose. It aims to enhance the physical-mechanical properties of these fibres by characterising their chemical and physical properties, including resistance, absorption, and wear behaviour. A quality control protocol will monitor properties like tensile strength and abrasion resistance. Functionalized self-crosslinking films, such as polycarbodiimides and hybrid copolymers, will be used to improve performance. Application techniques will include spraying and lamination. The experimentation phase will involve direct application on samples, with comparative tests for effectiveness and statistical analysis to assess improvements. This initiative emphasises sustainability and the integration of research across universities and industry, aligning with the Sustainable Development Goals (SDGs) while promoting "Made in Italy" products.

Supervisor: Prof.ssa Serena Gabrielli

Scholarship co-funded by *TRIO srl*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

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- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Scholarship code: CHEM 1.2

Research Topic and project:
Studying the role of organic synthesis in facilitating to a bio-based economy
Organic chemistry has played and continues to play an important role in the great challenge of making biomass useful as a new raw material for the synthesis of biologically and pharmaceutically active small molecules and innovative high-performance materials. During the course the PhD will be able to use how organic synthesis and molecular characterization often work in synergy to design, create and identify new functional molecules. Equally important, the PhD candidate will have the opportunity to establish a network of interdisciplinary collaborations between organic chemists, biologists, and pharmacologists. This because the eco-sustainable synthetic methodologies developed in the laboratory will be helpful in identifying a correlation between structure and efficiency of the transformation system. Furthermore, it will have the opportunity to use the instrumentation available at the MARLIC (Marche Applied Research Laboratory for Innovative Composites) Laboratory in Camerino.

Supervisor: Prof. Enrico Marcantoni
Co-supervisor: Prof.ssa Serena Gabrielli

Scholarship co-funded under ITALiS project: *"Progr. Di finanziamento: PNRR M2C1 I3.4 "Fondo rotativo contratti di Filiera (FCF) per il sostegno dei contratti di filiera per i settori agroalimentare, pesca e acquacoltura, silvicoltura, floricoltura e vivaismo" - progetto: Programma di filiera "Innovazioni tecnologiche per ALlevamenti Sostenibili – CUP B19I21000520001"*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

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  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Scholarship code: CHEM 1.3

Research Topic and project:
Synthesis and characterization of small molecules through unconventional technologies
The project aims to contribute to the development of novel synthetic protocols with a low environmental impact, focusing on the reduction of waste generation, conservation of natural resources, and the promotion of a better quality of life and environmental sustainability. Specifically, the research will leverage unconventional technologies such as flow chemistry (including photo-flow processes), microwave-assisted synthesis, the use of supported solid reagents, and the implementation of one-pot procedures. The doctoral candidate will develop new protocols for the synthesis and derivatization of biological active and pharmacologically relevant heterocyclic systems, as well as for the preparation of "small molecules" that serve as key intermediates in the construction.

Supervisor: Prof. Alessandro Palmieri

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: CHEMICAL SCIENCES

RESEARCH FIELD CHEM 2: Analytical Chemistry

Scholarship code: CHEM 2.1

Research Topic and project:
Characterization of electrode materials and interfaces in batteries and post-mortem analysis
By examining structural, chemical, and electrochemical properties, characterisation of electrode materials and interfaces helps reveal battery performance, stability, and degradation mechanisms. Complementing this approach, post-mortem analysis investigates aged or failed cells after operation, offering insights into failure modes, material transformations, and interfacial evolution to guide improved battery design and longevity.

Supervisor: Prof. Marco Giorgetti

Scholarship co-funded by *FERRARI S.p.A.*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: E-cells lab, in Bologna, and University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Scholarship code: CHEM 2.2

Research Topic and project:
Interfacial phenomena and surface chemistry in electrochemical systems for energy storage
Interfacial phenomena and surface chemistry play a crucial role in electrochemical energy storage systems, such as batteries, affecting efficiency, stability, and device lifetime. The candidate will investigate these aspects and propose potential improvements with appropriate electrochemical, spectroscopic, and analytical techniques.

Supervisor: Prof. Marco Giorgetti

Scholarship funded by *VERSALIS S.p.A.*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: CHEMICAL SCIENCES

RESEARCH FIELD CHEM 3: Physical Chemistry

Scholarship code: CHEM 3.1

Research Topic and project:
Synthesis and characterization of advanced materials for post-Lithium electrochemical energy storage and conversion.
The project develops biomass-derived carbons for post-Li electrochemical energy storage (Na-ion and Zn–air batteries) and conversion (reversible PEM cells). Waste biomass will be converted into carbonaceous materials serving as SIB anodes and catalyst supports for ORR/OER reactions in alkaline and acidic media. Activities include materials synthesis and characterization by SEM/EDX, XRD, Raman spectroscopy, and electrochemical testing through voltammetry and galvanostatic cycles. Reaction kinetics will be investigated by electrochemical impedance spectroscopy, RDE, and RRDE methods. The objectives are to produce sustainable materials, assess their electrochemical performance, and clarify redox-process kinetics. The expected impact is to improve the sustainability, circularity, and cost-effectiveness of key technologies for renewable-energy integration. By valorizing waste biomass and replacing less sustainable materials with abundant alternatives, the project supports SDGs 7, 12, 13.

Supervisor: Prof. Francesco Nobili

Scholarship co-funded under the Agreement *"Convenzione di ricerca ENEA/UNICAM PTR 2025-2027 (Progetto Integrato Tecnologie di accumulo elettrochimico e termico) – CUP I53C24003300001"*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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  - 40 ECTS in research activity (with a yearly evaluation)
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  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

- 3 Year:
    - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
    - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: CHEMICAL SCIENCES

RESEARCH FIELD CHEM 4: Inorganic Chemistry

Scholarship code: CHEM 4.1

Research Topic and project:
Breaking the Forever Chemicals: MOFs for PFAS Removal and Destruction
Per- and polyfluoroalkyl substances (PFAS) are persistent environmental contaminants that pose significant risks to human health and ecosystems. Conventional water treatment methods often fail to effectively remove especially short-chain PFAS. Metal–organic frameworks (MOFs), with their high surface area and tunable chemistry, offer a promising alternative for selective adsorption and potential degradation of PFAS.
This project explores the design, synthesis, and optimization of MOF-based materials for efficient PFAS removal from water. Key aspects include understanding adsorption mechanisms, enhancing material stability, and evaluating performance in realistic conditions. The outcomes aim to advance next-generation water purification technologies. Conventional water treatment technologies, including activated carbon adsorption, ion exchange resins, and membrane filtration, often show limited efficiency, especially for short-chain PFAS. These molecules are more mobile, less hydrophobic, and more difficult to capture, requiring advanced materials with higher selectivity and adsorption capacity.

Supervisor: Prof. Claudio Pettinari

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: PHARMACEUTICAL, NUTRACEUTICAL AND FOOD SCIENCES

RESEARCH FIELD CHEM 5: Drug Delivery

Scholarship code: CHEM 5.1

Research Topic and project:
Development of Metal Organic Framework (MOF) based platforms for Targeted Therapeutic Delivery
The project aims to develop innovative drug delivery systems based on Metal–Organic Frameworks (MOFs), highly porous and tunable materials with strong biomedical potential. The goal is to design biocompatible MOF platforms capable of encapsulating, protecting, and releasing therapeutic agents in a controlled and targeted manner. Particular attention will be given to stimuli-responsive MOFs triggered by pH, temperature, or enzymatic activity, enabling site-specific drug release while reducing systemic toxicity. The project may contribute to next-generation nanocarriers for precision medicine, cancer therapy, antimicrobial treatments, and personalized medicine.

Supervisor: Prof.ssa Roberta Censi
Co-supervisors: Prof. Claudio Pettinari, Dott.ssa Cristina Casadidio

Scholarship co-funded by *Manifaktura*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY

CURRICULUM: PHARMACEUTICAL, NUTRACEUTICAL AND FOOD SCIENCES

RESEARCH FIELD CHEM 7: Food Delivery

Scholarship code: CHEM 7.1

Research Topic and project:
Study of the composition, formulation and biological activity of dietary supplements
The PhD program is being developed in collaboration with Nutras srl, a company that markets nutraceuticals and therefore primarily studies bioactive compounds present in foods and plants that display beneficial health effects. The research topic is multidisciplinary and crosses several disciplines. Initially, selected nutraceuticals/food supplements will be studied from a chemical-nutritional perspective using instrumental analytical techniques such as high-performance liquid chromatography (HPLC) and gas chromatography (GC) coupled with various detectors such as DAD, FLD, and mass spectrometers. Moreover, the pharmaceutical formulation will be specifically designed and optimized, and various targeted biological assays will be conducted on these products to understand their health effects. The research project will be carried out in constant contact with the company, with which the PhD student and supervisor will be in constant communication to define all research project strategies.

Supervisor: Prof. Giovanni Caprioli
Co-supervisor: Prof. Gianni Sagratini

Scholarship co-funded by *Nutraceutical Solutions*

Leader of the PhD Programme: Prof. Claudio Pettinari
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: COMPUTER SCIENCE AND MATHEMATICS

RESEARCH FIELD CSMATH2: Process Management and Mining

Scholarship code: CSMATH 2.1

Research Topic and project:
Novel Methodologies for multi-dimensional Process Improvement
This PhD project aims to investigate novel methodologies for Environment-Aware Process improvement through the integration of Artificial Intelligence techniques. The research will focus on the development of process-oriented approaches capable of transforming heterogeneous data into interpretable representations of process behavior and related environment, supporting the observation, explanation, prediction, and continuous improvement of organization operations. Particular attention will be devoted to the development of adaptive and intelligent process capable of supporting data-driven decision making in dynamic environments. Expected outcomes include novel methodologies, software prototypes, that will be validated in real case studies.

Supervisor: Prof.ssa Barbara Re

Leader of the PhD Programme: Prof.ssa Emanuela Merelli
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Science and Technology

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: COMPUTER SCIENCE AND MATHEMATICS

RESEARCH FIELD CSMATH3: Machine Learning and Artificial Intelligence

Scholarship code: CSMATH 3.1

Research Topic and project:
Hypergraph Theory for Causality-Based Machine Intelligence
This research investigates Hypergraph Theory and its application to modelling machine intelligence grounded in Causal Inference. Hypergraphs provide a powerful mathematical framework for representing complex agent behaviours and structured causal relationships. By encoding observations over causal models, the research aims to develop an abstract computational framework for the formalisation of task theory. Such a framework enables agents to decompose, transfer, and recombine tasks across domains, supporting systematic generalisation, counterfactual reasoning, and zero-shot adaptation.

The proposed approach seeks to unify task representation, learning, and execution under a common causal abstraction layer, offering a novel perspective on reinforcement learning as a component of a scalable theory of general machine intelligence. Building on the expertise of BioShape Lab, the framework will be validated in the biomedical domain, with applications to Precision Medicine and the development of advanced AI-driven decision-support tools.

Supervisor: Prof.ssa Emanuela Merelli

(work in progress) In relation to this scholarship, it may be possible to activate a joint supervision agreement with the Reykjvik University

Leader of the PhD Programme: Prof.ssa Emanuela Merelli
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Science and Technology

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: COMPUTER SCIENCE AND MATHEMATICS

RESEARCH FIELD CSMATH8: Computational Biology and Bioinformatics

Scholarship code: CSMATH 8.1

Research Topic and project:
Languages and Tools for a Unified Framework of Specification and Verification of Sequences
Many activities and phenomena can be represented as sequences of elements describing either spatial structures, such as biological polymers, or temporal evolutions, such as system executions and event logs. In many cases, sequence elements correspond to intervals connected by temporal or spatial relations (e.g., precedence, overlap, or molecular interactions). This project aims to develop novel formal languages and computational tools for the specification, verification, and pattern discovery of properties in such structured sequences. Unlike many existing approaches, which rely on ad hoc algorithms or probabilistic methods, the project investigates logical formalisms as a rigorous and domain-independent framework for representing and analyzing structural patterns.
The research will focus on extending temporal and modal logics, together with automated verification techniques such as model checking, to support a unified treatment of temporal and spatial relations in sequences. The resulting methods will be applicable across different domains, from software and system analysis to computational biology. In particular, the ability to formally characterize interaction patterns in RNA, DNA, and proteins may provide new insights into biological function and contribute to research on disease mechanisms and therapeutic targets.

Supervisor: Prof. Luca Tesei

Leader of the PhD Programme: Prof.ssa Emanuela Merelli
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Science and Technology

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
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  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: COMPUTER SCIENCE AND MATHEMATICS

RESEARCH FIELD CSMATH10: Cybersecurity

Scholarship code: CSMATH 10.1

Research Topic and project:
Secure by Design: Formal Foundations for Cryptographic Attribute-Based Communication in Distributed Systems
Modern distributed systems — spanning IoT, cyber-physical systems, and collective adaptive environments — require both flexible, dynamic interaction models and strong security guarantees. Existing formal models address these needs in isolation: expressive coordination models lack security, while cryptographic frameworks lack the flexibility to capture attribute-driven interaction. This PhD project bridges that gap.
Building on attribute-based communication (AbC) — a paradigm where components select interaction partners dynamically via conditions on runtime properties — the project develops a formally verified security theory for this class of systems. The core challenge is integrating cryptographic protection into a rich coordination model while preserving formal tractability. This involves: designing type systems that statically enforce security policies; developing behavioural equivalence theories capturing adversarial observability; and formally proving confidentiality, authentication, non-repudiation, and non-interference. Key results will be mechanised in proof assistants, providing machine-checked correctness guarantees.
The impact is twofold: scientifically, it advances secure distributed computation theory with reusable formal techniques across formal methods, programming language theory, and cryptographic protocol analysis; practically, it grounds the development of verified middleware for attribute-driven applications with built-in security, targeting high-stakes domains such as industrial IoT, healthcare, and smart cities.

Supervisor: Prof. Michele Loreti

Leader of the PhD Programme: Prof.ssa Emanuela Merelli
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Science and Technology

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: LEGAL AND SOCIAL SCIENCES

CURRICULUM: Fundamental rights in the global society

RESEARCH FIELD LEGAL 1: Fundamental rights in a global perspective

Scholarship code: LEGAL 1.1

Research Topic and project:
Fundamental rights between national legal systems and the European legal space: multilevel protection, dialogue between courts, and transformations of contemporary constitutionalism
The project aims to investigate the evolution of fundamental rights in the European legal space through an interdisciplinary historical and comparative perspective, connecting the Italian experience with the processes of European integration and the progressive consolidation of multilevel rights protection.
The project's research hypothesis is that fundamental rights today constitute the primary locus of redefinition of the classic categories of contemporary public law: sovereignty, constitution, democracy, separation of powers, and relations between legal systems.
The interaction between national constitutions, the European Convention on Human Rights, the Charter of Fundamental Rights of the European Union, and the case law of the Italian Constitutional Court, the Court of Justice of the European Union, and the European Court of Human Rights has progressively generated a polycentric system of rights protection, characterized by dynamics of cooperation, interpretative tension, and jurisprudential dialogue.
The research will analyze these transformations from a comparative perspective, focusing on some paradigmatic rights—human dignity, equality, religious freedom, freedom of expression, the right to health, social rights, personal data protection, and digital rights—with particular attention to the challenges generated by artificial intelligence and algorithmic governance.

Supervisor: Prof. ssa Carlotta Latini

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: Prof. Paolo Bianchi
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Law

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: LEGAL AND SOCIAL SCIENCES

CURRICULUM: Civil Law and Constitutional Legality

RESEARCH FIELD LEGAL 2: Person and Markets in the Sustainable Transition Era

Scholarship code: LEGAL 2.1

Research Topic and project:
Ethical finance contracts
The opportunity to update the legal analysis of the phenomenon in question arises from a combination of three factors: first and foremost, Article 111-bis of the Consolidated Banking Act, revitalised by the recent implementing Ministerial Decree of 4 October 2022, published in the Official Gazette on 21 January 2023, which specifies its scope of application; secondly, the promulgation of Pope Leo XIV's Motu Proprio 'Coniuncta Cura' and the Morningstar IOR Eurozone Catholic Principles and Morningstar IOR Global Catholic equity investment benchmarks; lastly, the launch of a trading platform for Shariah-compliant securities, sponsored by the Government of Saudi Arabia but now open to all Muslims worldwide, whether individuals or pension funds, with a consequent impact on the composition of the equity and bond portfolios of pension funds in the 57 member Countries of the Organisation of Islamic Cooperation.

Supervisor: Prof. Stefano Testa Bappenheim

Scholarship co-funded by *Studio Legale Vannicelli Cinquemani Celletti & Molossini*

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: Prof. Paolo Bianchi
Curriculum Programme: Civil Law and Constitutional Legality (Info: lucia.ruggeri@unicam.it)
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Law

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

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The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: A mandatory period is to be spent at *Studio Legale Vannicelli Cinquemani Celletti & Molossini*

Scholarship code: LEGAL 2.2

Research Topic and project:
Environmental sustainability and impact on real and obligatory rights between private individuals
The proposed research focuses on the study of real rights and contractual obligations as shaped by the Italian-EU principle of environmental sustainability. Real rights – from this methodological perspective – will need to be re-examined by highlighting the role of private autonomy in the development of atypical real rights (overcoming the dogma of numerus clausus) that are functional in implementing environmental sustainability (eg.: the expansion of green areas, sustainable mobility, etc.). On the other hand, contractual obligations will also be studied with regard to the green function which characterizes them and the consequences in terms of the applicable regulation (consider, for example, green mortgages and leases).
All of this according to a methodology that aims at overcoming the traditional divide between real rights and creditor's rights and that assumes title/possession (as the exercise of the real situation) and the cause of the contract as measures of legality and of the constitutional legitimacy of the studied private law relationship and as instruments for the re-functionalization of the whole Private Law. The research carried out by the selected doctoral student will proceed within this methodological framework in order to verify the consistency and the consequences of the proposed objectives.

Supervisor: Prof. Francesco Longobucco
Co-Supervisor: Lucia Ruggeri

Scholarship co-funded by *Nuove tecnologie elettro-telefoniche s.p.a. (N.T.ET. S.P.A.)*

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: Prof. Paolo Bianchi
Curriculum Programme: Civil Law and Constitutional Legality (Info: lucia.ruggeri@unicam.it)
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: University of Camerino, in Camerino – School of Law

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: A mandatory period is to be spent at UNIROMA3 and Nuove tecnologie elettro-telefoniche s.p.a. (N.T.ET. S.P.A.)

PhD Programme: LIFE AND HEALTH SCIENCES

CURRICULUM: One Health

RESEARCH FIELD LIFE 1: Veterinary Science and Animal Health in the One Health Approach

Scholarship code: LIFE 1.1

Research Topic and project:
Comprehensive Bacteriological Validation and Mechanistic Investigation of an Innovative Antimicrobial Technical Liquid for Surface and Environmental Disinfection
This project aims to perform a comprehensive bacteriological validation and mechanistic investigation of an innovative antimicrobial technical liquid for surface and environmental disinfection. The primary objective is to assess its efficacy against a broad range of pathogenic microorganisms, including antibiotic-resistant strains relevant to veterinary and human health (e.g. ESKAPE pathogens, MRSA, ESBL-producing E. coli, Pseudomonas aeruginosa, Salmonella spp., Clostridioides difficile). Suspension and surface tests according to EN standards will be carried out, along with biofilm studies. The second phase includes mechanistic investigations using scanning electron microscopy (SEM), mass spectrometry, and biochemical assays to identify the molecular target and inactivation kinetics. The expected impact is twofold: to provide a sustainable disinfectant solution (lower toxicity, higher biodegradability) and to reduce environmental transmission of pathogens under a One Health perspective. Results may support adoption in veterinary clinical settings, livestock farms, research facilities, and public health.

Supervisor: Prof. Vincenzo Cuteri
Co- Supervisor: Prof. Anna-Rita Attili

Scholarship co-funded by: Think Green Technologies R&D srl

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and in Matelica

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master Degree in Animal Biotechnology (LM-9 Medical, Veterinary and Pharmaceutical Biotechnology) must be owned.

Scholarship code: LIFE 1.2

Research Topic and project:
From gut barrier to brain: effects of ageing and nutritional extremes on the HCRT circuit in Nothobranchius furzeri
The intestinal barrier acts as an interface between the body and the external environment, protecting against pathogens, toxins and undigested food particles while allowing nutrient absorption. Its integrity depends on the coordinated action of the epithelium, tight junctions, mucus layer, microbiota and mucosal immune system. Beyond gut health, intestinal barrier plays a key role in systemic homeostasis and in the gut-brain axis, a bidirectional communication system linking gut and central nervous system through neural, endocrine, immune and metabolic pathways. Within this context, the orexinergic system is of particular interest. Orexins are hypothalamic neuropeptides involved in food intake, arousal, sleep-wake regulation, motivation and energy balance. Recent evidence suggests orexinergic system involvement in gastrointestinal motility, secretion, inflammation and permeability. Moreover, intestinal metabolites may influence central HCRT/orexin neurons. In this context, emerging vertebrate models offer an important opportunity to study, in an integrated manner, the relationship between the intestinal barrier and central control of energy homeostasis. The aim of this study is to assess whether alterations in the integrity of the intestinal barrier, induced by ageing or nutritional stress, modulate the activity of the central HCRT/orexin circuit in *Nothobranchius furzeri*.

Supervisor: Prof. De Felice Elena
Co- Supervisor: Prof. Scocco Paola

Scholarship co-funded by University of Naples “Federico II”

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino – School of Biosciences and Veterinary Medicine and Università degli Studi di Napoli “Federico II”

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Scholarship code: LIFE 1.3

Research Topic and project:
Characterization of the Fecal Microbiota in New World Camelids and Its Implications for Animal Health, Nutrition, and Welfare.
The fecal microbiota is crucial for the health, metabolism, and immunity of animals. Recently, research has focused on these microbiota in livestock, including non-conventional species like New World camelids—mainly alpacas and llamas—whose digestive systems differ from ruminants. Unlike ruminants with four stomach chambers, these "pseudoruminants" have three, leading to distinct fermentation processes. This project aims to analyze the fecal microbiota of alpacas and llamas across Italy, considering factors like age, sex, diet, and husbandry, to identify microbes involved in degrading highly fibrous plant material into short-chain fatty acids. Understanding this microbiota can help prevent dysbiosis, which animals are prone to after dietary or stressful events, and reduce health issues such as acidosis or ulcers. Identifying efficient cellulose-degrading microbes could improve feed formulations and fleece quality. Additionally, a healthy gut microbiome is linked to increased resistance to parasites, potentially reducing anthelmintic use and antibiotic resistance. Future strategies may include using prebiotics and probiotics to enhance digestion and immunity. Overall, studying the microbiota in New World camelids offers valuable insights for sustainable livestock management, animal welfare, and scientific knowledge, supporting the growth of this emerging sector.

Supervisor: Prof. Rossi Giacomo
Co-supervisor: Prof.ssa Gavazza Alessandra

Scholarship co-funded by Nobile VET srl

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and Matelica

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

Scholarship code: LIFE 1.4

Research Topic and project:
Innovative Approaches to Veterinary Transfusion Medicine within the One Health Framework
This project explores veterinary transfusion medicine as a strategic field within the One Health framework, which recognizes the close connection between animal, human, and environmental health. The study aims to improve transfusion safety and efficacy through the characterization of blood groups in dogs and cats, the assessment of donor health status using hematological, biochemical, and coagulation parameters, and the investigation of recipient immune responses. Particular attention will be given to the detection of blood-borne pathogens using advanced molecular diagnostic techniques, in accordance with recent national guidelines on veterinary transfusion medicine. Since several transfusion-transmissible parasites are zoonotic agents, monitoring their presence in companion animals may also contribute to public health surveillance. By integrating veterinary and human health perspectives, the project seeks to generate knowledge that supports both animal welfare and the prevention of infectious diseases within a translational One Health approach.
Supervisor: Prof. Gavazza Alessandra

Scholarship co-funded by Pharmalab srl

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and Matelica and Emoteca Veterinaria Adriatica, San Marino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

Scholarship code: LIFE 1.5

Research Topic and project:
Veterinary Neoplasms as a Translational Model for Human Medicine: Diagnostic and Prognostic Role of Biomarkers
Veterinary neoplasms represent an important translational model for human oncology due to the biological, genetic, and clinical similarities between spontaneous tumors in companion animals and humans. This PhD project aims to investigate the diagnostic and prognostic value of hematological, histopathological, molecular, and omics biomarkers in veterinary cancers. Particular attention will be given to tumors such as lymphoma, mast cell tumors, and osteosarcoma. The study will assess biomarkers including CRP, LDH, ALP, leukocyte ratios, and sialic acid, as well as molecular markers such as non-coding RNAs and genetic mutations. Their expression will be correlated with clinicopathological features, survival, and therapeutic response. Comparative analyses between animal and human tumors will be performed to identify translational similarities. A specific research focus may involve evaluating sialic acid levels as indicators of tumor aggressiveness and metastatic potential. The project seeks to identify biomarker panels for early diagnosis and improved prognostic stratification. By adopting a One Health perspective, the research aims to benefit both veterinary and human medicine. Ultimately, the integration of veterinary and human oncology may enhance our understanding of tumor biology and support the development of more precise and personalized diagnostic and therapeutic strategies.

Supervisor: Prof. Gavazza Alessandra
Co-supervisor: Prof. Rossi Giacomo

Scholarship co-funded by Clinica Veterinaria Gaudenzi Srl

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and Matelica

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

Scholarship code: LIFE 1.6

Research Topic and project:
Pharmacological modulation of the bone-muscle axis with stanozolol in orthopedic dogs: a prospective, randomized study on fracture consolidation, TPLO osteotomy healing, and muscle trophism recovery from a One Health perspective.
This PhD project, developed within a One Health framework, aims to evaluate the potential benefits of stanozolol as an adjunctive therapy in canine orthopedic surgery. The study will focus on three interconnected outcomes: fracture healing, osteotomy healing following Tibial Plateau Leveling Osteotomy (TPLO), and recovery of muscle mass during the postoperative period. Recognizing that successful orthopedic outcomes depend not only on mechanical stability but also on the biological response of bone and muscle tissues, the dog represents a highly relevant spontaneous translational model.A prospective, randomized, double-blind, placebo-controlled trial will be conducted, including a primary cohort of TPLO patients and a parallel cohort of dogs undergoing surgical treatment for long-bone fractures. The main objectives are to determine whether stanozolol enhances radiographic bone healing, reduces time to clinical and radiographic union, preserves and restores muscle trophism, improves functional recovery, and demonstrates an acceptable safety profile.Outcome measures will include serial radiographic evaluations, ultrasonographic assessment of muscle thickness, thigh circumference, muscle condition score, force-plate gait analysis, orthopedic examinations, owner-reported pain scores, and laboratory monitoring. The project is expected to provide evidence-based guidance on the use of stanozolol in veterinary orthopedics, improve understanding of the bone–muscle axis during recovery, and generate translational knowledge relevant to regenerative and musculoskeletal medicine in both veterinary and human health contexts.
Supervisor: Prof. Palumbo Piccionello Angela

Scholarship co-funded by ACME srl

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and Matelica

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

Scholarship code: LIFE 1.7

Research Topic and project:
Precision veterinary orthopedic surgery using virtual planning and 3D printing for the treatment of appendicular deformities and spontaneous fractures in dogs: a prospective biomechanical, clinical, and translational study from a One Health perspective.
This PhD project aims to develop and validate a precision veterinary orthopedic surgery platform based on computed tomography (CT), three-dimensional virtual planning, and 3D printing for the treatment of canine limb deformities and spontaneous fractures, particularly pathological fractures and highly complex reconstructive cases. Although 3D printing is increasingly used in veterinary surgery, standardized workflows and prospective clinical evidence remain limited. The project will establish an integrated and reproducible workflow encompassing CT-based anatomical segmentation, virtual surgical planning, computer-aided design (CAD), production of patient-specific anatomical models and surgical guides, and quantitative postoperative assessment. Specific objectives include standardizing each technical step, validating the geometric and functional accuracy of 3D-printed guides, and prospectively evaluating their clinical application in dogs with naturally occurring limb deformities and complex fractures. Outcome measures will include correction accuracy, surgical and anesthetic times, fluoroscopy use, complication rates, and functional recovery. The project will also assess quality assurance, traceability, and sustainability indicators to support future clinical implementation. Expected outcomes include improved surgical precision, reduced intraoperative variability, and more personalized treatment strategies. Within a One Health framework, the canine patient serves as a valuable translational model, generating knowledge applicable to human corrective osteotomies, complex trauma surgery, and comparative orthopedic oncology. Ultimately, the project seeks to create a shared methodological platform linking veterinary medicine, bioengineering, and human orthopedics, fostering innovation and future multicenter collaborations.

Supervisor: Prof. Palumbo Piccionello Angela

Scholarship co-funded by Gregorio VII Policlinico vet.

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino, Ospedale Veterinario Gregorio VII in Rome and Università Politecnica delle Marche, in Ancona.

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills
- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

Scholarship code: LIFE 1.8

Research Topic and project:
Sustainable Aquaculture and opportunities for integrated actions
Integrated aquaculture is considered the new trend of the most innovative and sustainable farming systems showing the best technique available of rearing aquatic organisms belonging to different positions along the trophic levels. In the literature and in legislation has been extensively recognized the environmental benefits of this method, mainly for the capability to reduce the ecological footprint of intensive aquaculture systems and concrete addressing the Sustainable Development Goals no. 14 (SGD's 14). This approach is aimed at reducing the use of antibiotics. However, a lesser attention is recorded in the assessments of its role in enhancing zootechnical performance, animal welfare of the species involved and sustainability of the farm. The integrated approach will exploit the presence of extractive organisms (echinoderms and sponges) both to improve the animal welfare of farmed fish and to characterize these invertebrates within the ecosystem. The fish species will be studied to test sustainable, balanced, and innovative feeds enriched with essential oils, capable of strengthening their immune systems, evaluating their intestinal health and livestock performance compared to conventional farming. Based on this scenario, a PhD position could deep the knowledge of integrated models for the sustainable management of marine aquaculture. Beyond its environmental advantages, the study can positively influence the productivity, growth, survival, feed efficiency and Animal Health and Welfare (AH&W), offering significant benefits in terms of Environmental, Societal and Governance (ESG) parameters and One Health.

Supervisor: Prof.ssa Roncarati Alessandra

Scholarship co-funded by PNRR M2 C1 I3.4 Fondo Rotativo Contratti di Filiera (FCF) - Next generation EU" - progetto "AVATIM- ALLEVAMENTO VIRTUOSO IN ACQUACOLTURA MULTITROFICA INTEGRATA MARINA"- CUP B15C22028020001

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino and San Benedetto del Tronto

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills
- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: at least 3 months

Additional criteria specific for the topic: Master degree in Veterinary Medicine must be owned.

PhD Programme: LIFE AND HEALTH SCIENCES

CURRICULUM: One Health

RESEARCH FIELD LIFE 2: Biodiversity and Ecosystem Management

Scholarship code: LIFE 2.1

Research Topic and project:

Temporal dynamics of plant diversity in forests: assessing conservation status across environmental gradients

Biodiversity loss and global environmental change are profoundly reshaping forest plant communities. Understanding the temporal dynamics of plant diversity is therefore crucial to assess ecosystem conservation status and the effectiveness of protected areas (PAs), which are key conservation tools. However, large-scale studies based on comparable temporal data remain scarce. This project aims to investigate changes in plant diversity in Italian forests over the past decades, focusing on forest habitat along latitudinal and environmental gradients, both inside and outside Pas by resurveying historical vegetation plots. Fieldwork will include collecting data on species composition, richness, and abundance, together with environmental variables (e.g., altitude, slope, aspect) and soil data. The objectives are to: (1) quantify temporal changes in taxonomic diversity and community composition; (2) assess the effectiveness of PAs in mitigating biodiversity loss over time; (3) evaluate the role of environmental gradients in shaping community trajectories. The project will address the lack of large-scale temporal studies in natural forests, improving our understanding of plant community responses to global change. From an applied perspective, the results will support conservation planning by identifying priority areas and species, enhancing the management of protected areas, and contributing to national and European biodiversity policies under ongoing climate change.

Supervisor: Dott. Alessandro Bricca

Scholarship co-funded under “Bando FIS3 - progetto PACE "Evaluating the role of Protected Areas in Conserving biodiversity and Ecosystem multifunctionality under global change - CUP J53C25002350001"

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

2 Year:

- 40 ECTS in research activity (with a yearly evaluation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills
- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Scholarship code: LIFE 2.2

Research Topic and project:

The role of functional variation in species' vulnerability to environmental change and ecosystem multifunctionality in forests

Understanding how biodiversity supports ecosystem functioning and species resilience to environmental change is a major challenge in modern ecology. Plant trait variability is key determinants of how plant communities respond to environmental stressors and sustain multiple ecosystem functions. This project aims to investigate the role of plant functional variation in shaping species' vulnerability to environmental change and ecosystem multifunctionality in forest ecosystems. The PhD candidate will conduct field campaigns to collect vegetation data and measure key functional traits of dominant species. These will include plant size traits, leaf traits (e.g., specific leaf area, dry matter content), stem traits, and especially root traits (e.g., specific root length, tissue density), which are crucial to understand how species influence ecological processes such as nutrient cycling and carbon storage. Multiple individuals per species will be sampled to account for intraspecific trait variability. Environmental variables and soil samples will also be collected to assess ecosystem functions. The objectives are to: (1) evaluate how functional trait variation influences species vulnerability along environmental gradients; (2) quantify the contribution of functional diversity and ITV to plant community assembly; (3) assess the role of plant traits, particularly belowground traits, in driving ecosystem multifunctionality. The project will advance functional ecology by linking plant traits to ecosystem functioning in natural systems. From an applied perspective, it will identify key functional components of biodiversity that are most vulnerable or most relevant for ecosystem service provision.

Supervisor: Dott. Alessandro Bricca

Scholarship co-funded under "Bando FIS3 - progetto PACE "Evaluating the role of Protected Areas in Conserving biodiversity and Ecosystem multifunctionality under global change - CUP J53C25002350001"

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills
- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: LIFE AND HEALTH SCIENCES

CURRICULUM: Nutrition, Food and Health

RESEARCH FIELD LIFE 3: Healthy food

Scholarship code: LIFE 3.1

Research Topic and project:
Innovative Coffee-Based Beverages Solutions for Healthy and Sustainable Nutrition
The project aims to develop innovative coffee-based beverages that meet growing consumer demand for quality, sustainability, and enhanced nutrition. It focuses on both dairy and plant-based formulations as healthier and more sustainable alternatives. The first objective is to evaluate the nutritional, physicochemical, and sensory properties of beverages prepared using a novel steam-free emulsification technology. This technology heats beverages to their optimal sweetness point, creating a stable and silky foam without dilution. The second objective is to develop plant-based coffee beverages enriched with biomolecules and prebiotics. These formulations will be designed to improve flavor, modulate caffeine content, and provide health benefits. The project will examine interactions between coffee compounds and functional ingredients to enhance their bioavailability and physiological effects. Expected outcomes include new knowledge on coffee–milk and coffee–plant interactions, as well as the impact of innovative processing technologies. The project will support the development of sustainable, high-value functional beverages with improved nutritional profiles and greater consumer appeal.

Supervisors: Prof.ssa Silvia Vincenzetti, Prof.ssa Valeria Polzonetti

Scholarship co-funded by Simonelli Group

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

- 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: LIFE AND HEALTH SCIENCES

CURRICULUM: Molecular Biology and Cellular Biotechnology

RESEARCH FIELD LIFE 4: Molecular Frontiers in Biomedical Research

Position without scholarship: LIFE 4.1

Research Topic and project:
Molecular Characterization of CFTR Gene Variants and Their Clinical Impact on Personalized Therapeutic Management of Cystic Fibrosis Patients in Albania
Cystic fibrosis (CF) is a severe genetic disorder requiring lifelong management. While new CFTR modulator therapies offer personalized treatment, the molecular spectrum of CFTR variants in Albania remains incompletely characterized. This study aims to perform a comprehensive molecular characterization of Albanian CF patients to define the national mutation profile, identify rare variants, and establish clinical genotype-phenotype correlations for targeted therapies. The project will include patients with confirmed or suspected CF. Molecular analysis will begin with the SNaPshot method to screen for known frequent mutations, followed by Next Generation Sequencing (NGS) for negative or partially characterized cases to detect rare variants. Genetic data will then be correlated with clinical severity and therapy eligibility. Ultimately, the project expects to optimize Albania's diagnostic workflow, strengthen genomic medicine, and enhance precision medicine for better patient management.

Supervisor: Prof.ssa Rosita Gabbianelli
Co-Supervisor: Prof. Anila Babameto-Laku

Position funded by LEKLI SHPK

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino, Italy and the Medical Genetics Lab, University Hospital Center “Mother Teresa”, Tirana, Albania

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

3 Year:

- 50 ECTS in research activity (writing and defend the Doctoral dissertation)
- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Position without scholarship: LIFE 4.2

Research Topic and project:
Ultrasound-guided hyaluronic acid rhinofiller: development and validation of a safety and optimal-outcome protocol
Non-surgical rhinoplasty with hyaluronic acid (HA) filler offers immediate, reversible correction of dorsal irregularities, under-projection, and selected postoperative contour defects. However, the nose is a high-risk aesthetic unit because of terminal arterial anatomy and potential anastomoses with the ophthalmic circulation. Intravascular injection may cause skin ischemia, necrosis, or, rarely, visual loss and stroke . Current rhinofiller literature remains heterogeneous regarding filler rheology, permitted planes, needle versus cannula, utility of aspiration, and rescue algorithms. High-frequency Doppler ultrasound has emerged as a practical tool for mapping dorsal nasal and lateral nasal vessels, confirming tissue planes, and guiding hyaluronidase when vascular compromise is suspected. Yet ultrasound is not uniformly integrated into reproducible protocols. This PhD project will therefore develop and validate a safety-first, anatomy-based HA rhinofiller protocol that combines ultrasound vascular mapping, standardized injection sequencing, conservative volumetry, and a formal complication-management pathway. Scientifically, the project will replace the ambiguous idea of perfection with an Optimal Result Composite (ORC) that integrates safety, patient satisfaction, expert aesthetic assessment, and predefined 3D morphometric targets.

Supervisor: Dott. Giulio Nittari
Co-supervisor: Prof. Nabissi Massimo

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Attilio Fabbretti
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

PhD Programme: Physics, Earth and Materials sciences

CURRICULUM: Physics

RESEARCH FIELD PEMS 2: Experimental Physics and ultrasensitive methods for force measurements

Scholarship code: PEMS 2.1

Research Topic and project:
Development of Seismic and Magnetic Sensor Networks and Seismic Early-Warning Systems
Sensor networks — including seismic, magnetic, acoustic, climatic, and environmental systems — are essential tools for characterizing and optimizing sites intended for gravitational-wave detectors, as well as for improving our understanding of seismic and environmental phenomena. The research group of the Physics Section at the **University of Camerino**, coordinated by **Prof. Flavio Travasso**, has long been active in this field within the international **Virgo** and **Einstein Telescope (ET)** collaborations.
A central part of the PhD project will take place at **CAOS (Center for Gravitational-Wave Applications and Seismology)**, a joint **University of Perugia–INFN** facility dedicated to research in gravitational-wave science and seismology. Here, the PhD candidate will work on **DAS (Distributed Acoustic Sensing)** techniques and contribute to the development of a **torsion-pendulum system inspired by TOBA**, designed for seismic early warning through the measurement of gravitational-gradient signals.
Another crucial component of the PhD will take place in **Sardinia**, at the candidate site for the Einstein Telescope and the underground observatory of **Sos Enattos**. The candidate will have access to one of the densest and most integrated monitoring networks in Italy. Working in Sardinia provides a **"privileged vantage point" on Italy's geodynamic activity**, thanks to the extraordinary quietness of the site, which enables the detection of weak and stable signals that cannot be observed elsewhere.
The PhD programme will therefore integrate activities across three complementary sites:

- **Camerino**: data analysis and modelling
- **CAOS (Perugia)**: advanced experimentation, DAS, and torsion-pendulum development
- **Sardinia (Sos Enattos)**: installation, optimization and use of sensor networks

These activities directly support the objectives of the **REDI project**, in particular:

- **WP 2**, focused on risk models and community resilience
- **WP 3**, dedicated to the role of cultural heritage and its classification to support reconstruction processes

Through this work, the PhD candidate will acquire an interdisciplinary background combining physics, seismology, advanced monitoring technologies, and applications for territorial resilience and cultural-heritage protection.

Supervisor: Prof. Flavio Travasso

Scholarship co-funded by *Consorzio REDI* https://www.redi-research.eu/it/homepage/

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Roberto Gunnella
Language of the Phd Programme: Italian/English
Operative sites of the Phd Student: Camerino, CAOS (Perugia), Sardinia (Sos Enattos)

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180

The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Candidates with prior experience in gravitational-wave science, seismic or environmental monitoring or data analysis of geophysical signals are particularly encouraged to apply. Laboratory experience in physics or engineering (e.g., optical systems, DAS, torsion pendulums) is also desirable. Interest in interdisciplinary research — linking physics, seismology, risk-reduction models, community resilience, and cultural-heritage protection (REDI WP-2 and WP-3) — will be considered an asset.

PhD Programme: Physics, Earth and Materials sciences

CURRICULUM: Physics

RESEARCH FIELD PEMS 3: Astronomy and Astrophysics, Theoretical cosmology

Scholarship code: PEMS 3.1

Research Topic and project:
Aspects of stellar physics and connections with multiwavelength probes of dark energy and dark matter
This PhD project uses stellar physics, in a broad sense, as a probe of cosmological evolution. Different aspects of stellar physics, including supernovae, gamma ray bursts, nuclear astrophysics, accretion, stellar evolution and black holes, will be addressed both phenomenologically and theoretically, with the aim of exploring their cosmological applications. The main purpose is to investigate the interplay between astrophysics and cosmology, with particular emphasis on reducing the theoretical uncertainties affecting astrophysical probes used as standard candles. This will allow one to improve the constraints on cosmic expansion and on the nature of dark energy.

Supervisor: Prof. Orlando Luongo

Scholarship co-funded by *INAF – Osservatorio Astronomico d'Abruzzo*

The candidate will select a well-defined phenomenological topic at the Osservatorio Astronomico d'Abruzzo, in close connection with theoretical cosmology and dark energy to pursue at Unicam. Once the topic has been chosen, the candidate is expected to work exclusively on the project for the entire duration of the scholarship.

Leader of the PhD Programme: prof. Roberto Gunnella
Language of the Phd Programme: Italian/English
Operative sites of the Phd Student: University of Camerino, Camerino (MC), Italy and Osservatorio Astronomico d'Abruzzo

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)

- 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

The selection will give particular weight to candidates with a solid preparation in astrophysics and theoretical and observational cosmology.
The Phd program lies on the interplay between the two fields and, therefore, it will have emphasis on cosmic expansion, dark energy, cosmological parameter estimation and the use of astrophysical observables as probes of the large scale evolution of the Universe. A background in statistical methods, Bayesian inference, likelihood analysis, numerical modelling or cosmological data interpretation will be considered especially relevant.
Expertise in stellar physics, supernovae, gamma ray bursts, accretion, nucleosynthesis, compact objects or black hole astrophysics will be evaluated primarily in relation to its cosmological impact.
Priority will be given to candidates whose scientific profile is oriented toward the cosmological exploitation of astrophysical phenomena, rather than toward purely astrophysical modelling. The ideal profile combines familiarity with selected aspects of stellar astrophysics with a broader competence in cosmology.
Aspects of stellar physics and connections with multiwavelength probes of dark energy and dark matter

PhD Programme: Physics, Earth and Materials sciences

CURRICULUM: Physics

RESEARCH FIELD PEMS 4: Quantum Matter

Scholarship code: PEMS 4.1

Research Topic and project:
Quantum coherent phenomena and magnetic phases in electron-hole bilayer systems
This project aims to investigate at a theoretical and computational level quantum coherent phenomena and magnetically ordered phases in exciton bilayer systems by mapping the system onto an Ising-like model. The numerical approach adopted will be based on Quantum Monte Carlo (QMC) techniques to characterize the possible ordered ground states. The resulting magnetic phase behavior will be compared with the normal-liquid, supersolid, and superfluid regimes of condensed excitons, made by bound electron-hole pairs formed across the two layers, previously studied in our group using path-integral and second-quantization approaches. The project will thereby provides a unified perspective on competing many-body quantum phases in bilayer excitonic systems, formulating theoretical predictions of physical quantities and phenomena that can be tested in future experiments on these highly tunable quantum platforms.
Main objectives of the projects are:
1) Modelling the electron-hole excitonic systems of interest, specifying the geometry of the heterostructure, the electronic energy spectrum, dielectric materials, conducting layers, methods to tune carrier concentrations and controlling Coulomb attractive and repulsive interactions.
2) Implementation of the Quantum Monte Carlo simulations for the considered bilayer system.
3) Study of ground state energies and configurations to find conditions for emergent magnetically ordered phases in the exciton bilayer systems.
4) Phase diagram and phase transitions of the exciton bilayer systems as a function of system geometry and densities, to compare the stability of the quantum phases: supersolid, superfluid, metallic, magnetic orders.
5) Prediction and numerical evaluation of quantities and phenomena that can be tested in experiments.

Supervisor: Prof. Andrea Perali
Supervisors in Antwerp: Prof. David Neilson and Prof. Jacques Tempere.

Scholarship carried out in collaboration with University of Antwerp, Belgium
(work in progress) In relation to this scholarship, it may be possible to activate a joint supervision agreement with the University of Antwerp.

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Roberto Gunnella
Language of the Phd Programme: Italian/English
Operative sites of the Phd Student: Università di Camerino, in Camerino, Italy and University of Antwerp in Belgium.

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180

The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad:
The successful candidate will work for at least 18 months in Camerino and (provisional, in case the joint supervision agreement is actually activated) up to 18 months in Antwerp. The periods of stay in the two sites, even nonconsecutive, will be agreed with the supervisors.

Additional criteria specific for the topic:

Background knowledge of Condensed Matter Theory, computational and many-body theory methods to study magnetic, superconducting and superfluid phenomena in different solid state and ultracold atom systems.

PhD Programme: Physics, Earth and Materials sciences

CURRICULUM: Materials Sciences

RESEARCH FIELD PEMS 5: Nanomaterials for energy and information technology applications

Scholarship code: PEMS 5.1

Research Topic and project:
Coatings to Mitigate Range Loss in THOR HPM System
Mitigation of the field emission in high power microwave laser device via advanced metamaterial coatings of the magnetron head of the source. The advanced metastructure system with the predesigned electronic structure is invented in UNICAM and will be patented shortly.

Supervisor: Dott. Seved Javad Rezvani

Exclusive participation to the project for the entire duration of the scholarship is foreseen.

Leader of the PhD Programme: prof. Roberto Gunnella
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Additional criteria specific for the topic:

Background in the deposition and characterization of materials as well as solid state physics.

PhD Programme: Physics, Earth and Materials sciences

CURRICULUM: Physical and Chemical Processes in Earth Systems

RESEARCH FIELD PEMS 8: Environmental Management and Engineering

Scholarship code: PEMS 8.1

Research Topic and project:
Vulnerability models for mutli-risk analysis
Earthquakes often act as catalysts for a range of triggered or concurring hazards, intensifying their overall impact. Earthquake-related phenomena can occur simultaneously, resulting in complex multi-hazard situations that significantly increase risk for communities and infrastructures This highlights the need for a multi-hazard risk contingency planning to manage seismic crises in a broader multi-hazard risk perspective.
Research aims at providing vulnerability models that can be efficiently used to study the physical response of buildings and infrastructures within a multi-risk framework, Different models will be considered for the analysis of the problem at different scales, in order to make it possible detailed predictions for the response of single constructions, as well as risk maps at regional level. The problem will be approached including uncertainties affecting hazard and system response.
Multi-hazard risk assessment and management is fundamental at the national level to provide a robust framework for long-term risk reduction actions, including the development of building codes or emergency planning.

Supervisor: Prof. Andrea Dall'Asta

Scholarship co-funded by *Consorzio REDI* *https://www.redi-research.eu/it/homepage/*

Leader of the PhD Programme: prof. Roberto Gunnella
Language of the Phd Programme: Italian/English
Operative site of the Phd Student: Università di Camerino, in Camerino

Duration: **3 years**
Provisional starting date: 1st November 2026

ECTS credits (within 3 years): 180
The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses ; 3 ECTS for participation in seminars and events

  3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Planned Period of research mobility abroad: 6 months

Further potential positions available in the framework of International mobility agreements with People's Republic of China

(Phd Programs for each topic will be identified later)

Positions codes: "LIAOCHENG" (see Call text)

Type of positions: supernumerary – international mobility Phd Position – without UNICAM scholarship

Up to a maximum of 5 scholarships reserved for Chinese citizens graduated from the Liaocheng University under the agreement signed between the University of Camerino and the Liaocheng University (China), for carrying out research preferably in the field of Physics, Chemistry, Mathematics, Biology, and Veterinary Medicine. The candidate must indicate the course and the curriculum of interest in the application form. In the hypothetical research project, the candidate must specify the agreement with the Chinese university.

Positions codes: "ZHENGZHOU-A" (see call text)

Type of positions: supernumerary – international mobility Phd Position – without UNICAM scholarship

Up to a maximum of 6 positions are reserved for Chinese citizens graduated from the Zhengzhou University of Light Industry under the agreement signed between the University of Camerino and the Zhengzhou University of Light Industry (China), for carrying out research preferably in the field of Food Sciences, Chemistry, Biology and Design. The candidate must indicate the course and the curriculum of interest in the application form. In the hypothetical research project, the candidate must specify the agreement with the Chinese university.

Positions codes: "ZHENGZHOU-B" (see call text)

Type of positions: supernumerary – international mobility Phd Position -– without UNICAM scholarship

Up to a maximum of 5 scholarships are reserved for Chinese citizens graduated from the Zhengzhou University of Light Industry under the agreement signed for the issue of double degrees between the University of Camerino and the Zhengzhou University of Light Industry (China), for carrying out research preferably in the field of Food Science and Engineering, Chemical Engineering and Technology, Light Industry Technology and Engineering, Software Engineering, Computer Science and Technology, Art Design, Resources and Environment, Biology and Medicine, Business Administration. The candidate must indicate the course and the curriculum of interest in the application form. In the hypothetical research project, the candidate must specify the agreement with the Chinese university.

Positions codes: JILIN

Type of positions: supernumerary – international mobility Phd Position

No. 1 co-funded scholarship reserved for Chinese citizens under the co-tutorship agreement between the University of Camerino and Jilin Agricultural University (China). The candidate must indicate the course and the curriculum of interest in the application form. In the hypothetical research project, the candidate must specify the agreement with the Chinese university.

For all the topics related to ***Further potential positions available in the framework of International mobility agreements with People's Republic of China*** the following rules apply:

Duration: **3 years**

Provisional starting date: **1st November 2026**.

ECTS credits (within 3 years): 180

The Doctoral program consists of 180 ECTS credits, distributed in the following way, in order to contribute to a better recognition of your title at a European and global level

- 1 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses; 3 ECTS for participation in seminars and events
- 2 Year:
  - 40 ECTS in research activity (with a yearly evaluation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills
  - 10 ECTS in curricular related activities: 7 ECTS for participation in thematic option courses; 3 ECTS for participation in seminars and events
- 3 Year:
  - 50 ECTS in research activity (writing and defend the Doctoral dissertation)
  - 10 ECTS in mandatory SAS Activities to acquire transferable skills

The Curricular related activities (seminars and courses in specific topics of interest) are organized by the Scientific Board of the Doctoral course.

Special requirements, additional to "standard" ones:

Further aspects related to these topics must comply with the Agreements the positions are based on.