

**FINALIZED “TOPIC-
BOUND GRANTS”.**

3 SCHOLARSHIPS within the framework of the “**POLO DEI MATERIALI COMPOSITI**”, for research activities relating to environmental sustainability, design, modelling and chemical development of products in the composite materials sector

For additional information postlaurea@unicam.it

3 SCHOLARSHIPS within the REDI CONSORTIUM (Reducing risks of natural Disasters)			
	Research topics	Area of Research and PhD Curriculum	Contact person
1	Assessment of the resilience of historic centres in the event of natural catastrophic events. Use of HPC (High Performance Computing) systems. Primary supervisor: UNICAM Secondary supervisors: GSSI, INGV, INFN	Computer Science and Mathematics	andrea.dallasta@unicam.it
2	Urban and territorial planning for risk reduction based on BBB principles (Building Back Better). Primary supervisor: UNICAM Secondary supervisor: GSSI	Architecture, Design, Planning - Sustainable Urban Planning and Inland Areas Development Strategies	massimo.sargolini@unicam.it
3	Calculation of shaking and damage scenarios. Primary supervisor: UNICAM Secondary supervisor: INGV	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	emanuele.tondi@unicam.it

1 SCHOLARSHIP FOR THE AWARD OF A DOCTORAL DEGREE IN CO-TUTORSHIP BETWEEN UNICAM and the UNIVERSITY of ANTWERPEN			
	Research field	Area of Research and PhD Curriculum	Contact person
	Physics of matter	Physics, Earth and Materials Sciences - Physics	andrea.perali@unicam.it

1 SCHOLARSHIP FOR THE AWARD OF A DOCTORAL DEGREE IN CO-TUTORSHIP BETWEEN UNICAM and the JILING AGRICULTURAL UNIVERSITY (CHINA)		
	Area of Research	
	Life and Health Sciences	For additional information postlaurea@unicam.it

ADDITIONAL POSITIONS

Up to a maximum of 5 SCHOLARSHIPS reserved for Chinese citizens graduated from the Liaocheng University, under the AGREEMENT SIGNED BETWEEN UNICAM AND LIAOCHENG UNIVERSITY (CHINA)
Research topics
Priority will be given to applications in the disciplines of Physics, Chemistry, Mathematics, Biology and Veterinary Medicine

For additional information postlaurea@unicam.it

Up to a maximum of 6 SCHOLARSHIPS reserved for Chinese citizens graduated from the Zhengzhou University within the framework of the AGREEMENT SIGNED BETWEEN UNICAM AND ZHENGZHOU UNIVERSITY (CHINA)
Research topics
Priority will be given to applications in the disciplines of Food Sciences, Chemistry, Biology and Design

For additional information postlaurea@unicam.it

Up to a maximum of 6 SCHOLARSHIPS reserved for Chinese citizens under the AGREEMENT SIGNED BETWEEN UNICAM AND SUZHOU CHIEN SHIUNG INSTITUTE OF TECHNOLOGY (CHINA)
Research topics
Priority will be given to applications in the disciplines of Chemistry, Biosciences, Pharmaceutical Sciences, Architecture and Computer Sciences

For additional information postlaurea@unicam.it

2 SCHOLARSHIPS under the agreement signed between the University of Camerino and the University of Applied Sciences and Arts, North-western Switzerland, FHNW, School of Business.

	Research topics	Area of Research	Contact person
1	Business Information Systems: Querying and Navigation in Enterprise Model Repositories	Computer Science and Mathematics	knut.hinkelmann@fhnw.ch
2	Business Information Systems: A Tool-based Methodology to assess and develop Digital Leadership	Computer Science and Mathematics	knut.hinkelmann@fhnw.ch

RESEARCH TOPICS LIST: ARCHITECTURE, DESIGN, PLANNING			
	Research topics description	Area of Research and PhD Curriculum	For additional information
1A	Teorie e progetto dell'architettura contemporanea	Architecture, Design, Planning - Architecture, Theories and Design	postlaurea@unicam.it
2A	Storia e valorizzazione del patrimonio architettonico	Architecture, Design, Planning - Architecture, Theories and Design	postlaurea@unicam.it
3A	Rappresentazione grafica e multimediale dell'architettura	Architecture, Design, Planning - Architecture, Theories and Design	postlaurea@unicam.it
4A	Design di oggetti, sistemi e ambienti innovativi ed intelligenti	Architecture, Design, Planning - Innovation Design	postlaurea@unicam.it
5A	Design per la sostenibilità ambientale e per l'innovazione di processo e di prodotto	Architecture, Design, Planning - Innovation Design	postlaurea@unicam.it
6A	Design della comunicazione, nuove tecnologie e patrimonio culturale	Architecture, Design, Planning - Innovation Design	postlaurea@unicam.it
7A	Sviluppo sostenibile del territorio, contenimento del consumo di suolo e strategie di adattamento al <i>climate change</i>	Architecture, Design, Planning - Sustainable Urban Planning and Inland Areas Development Strategies	postlaurea@unicam.it
8A	Gestione del rischio e superamento delle situazioni di crisi	Architecture, Design, Planning - Sustainable Urban Planning and Inland Areas Development Strategies	postlaurea@unicam.it
9A	Politiche per l'innovazione, valorizzazione territoriale e sviluppo delle aree interne	Architecture, Design, Planning - Sustainable Urban Planning and Inland Areas Development Strategies	postlaurea@unicam.it
10A	Attivazione di processi di rigenerazione urbana	Architecture, Design, Planning - Sustainable Urban Planning and Inland Areas Development Strategies	postlaurea@unicam.it

RESEARCH TOPICS LIST: CHEMICAL AND PHARMACEUTICAL SCIENCES AND BIOTECHNOLOGY			
	Research topics description	Area of Research and PhD Curriculum	For additional information
1 CH	<p>Research Topic in Physical Chemistry. The research activity in physical chemistry will be focused on sustainable materials and technologies for Lithium-ion and Sodium-ion batteries, through the following activities: (i) synthesis of sustainable active materials to reduce dependence on critical raw materials; (ii) development of green formulations and processing of electrodes; (iii) physico-chemical characterizations of chemical, structural, morphological and electrochemical properties; (iv) development of innovative recycling processes.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	francesco.nobili@unicam.it
2 CH	<p>Research Topic in Inorganic Chemistry. Synthesis and characterization of molecular and supramolecular compounds based on 11th group metals for optoelectronics and/or biological applications. The preparation of smart materials in the field of bioinorganic and material science will be the focus of this study, with a particular regard in the design of new entities potentially skilled of remarkable photoemissive, molecular recognition, self-assembly properties. The molecular approach will be experienced to design extended supramolecular entities with homo- and hetero-nuclear frames to enhance the emissive yield. On the bioinorganic application side, ligands will be functionalized to reduce systemic toxicity and to achieve a better binding efficiency on biological molecular targets. Another goal is the development of innovative anticancer strategies by exploiting the promising features of 11th group metal-based compounds via design and synthesis of new ligands, including bi-functional chelators to be conjugated with selected bioactive molecules, and of their metal complexes.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	rossana.galassi@unicam.it ; maura.pellei@unicam.it
3 CH	<p>Research topic in organic chemistry. Graduate students in organic chemistry have opportunities in the group of Marcantoni-Cimarelli-Gabrielli to design and study new catalysts and catalytic processes with applications for pharmaceutical, natural product and industrial chemical synthesis. The scientific interest, therefore, during the PhD Course aims to develop innovative, efficient, and environmentally responsible methods for the production of small molecules utilized at the interface of biology and materials. The studies concern the application of Lewis acid activators in organic reactions, and a significant portion of the work is devoted in finding methods for preparing new carbon-carbon, nitrogen-carbon and oxygen-carbon bonds under mild conditions and to provide the opportunity to prepare functionalized molecules. Given that the relationship between biological activity and stereochemical structure, in these last years, the utility of these new organic reactions is currently being investigated in the discovery and development of new synthetic methodologies and their applications to synthesis of architecturally complex natural products or model compounds having pharmacological importance, both in terms of knowledge and therapeutic attitudes, able to act selectively on a specific pharmacological target. The synthesis of small organic molecules as useful organic agents in the preparation of polymers with well-defined compositions, architectures, and functionalities will be studied with the main aim of developing new synthetic processes, especially catalytic processes, which can reduce by-products, wastes, and emission, and they can be defined as sustainable. Practical scientific principles in solving real organic synthesis problems will allow improve own skills in analytical techniques such as Infrared, Mass Spectrometry, and Nuclear Magnetic Resonance Spectroscopy.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	enrico.marcantoni@unicam.it ; cristina.cimarelli@unicam.it ; serena.gabrielli@unicam.it

4 CH	<p>Research topic in Analytical Chemistry . Synthesis and characterization of mixed-Hexacyanometallates. Thanks to their peculiar characteristics they can be used in many chemical applications. For example, in environmental chemistry for a selective recovery of pollutants, in electrochemistry as electrode materials for aqueous batteries, as protective films</p> <p>Applications of geopolymer in the treatment of industrial waste waters.</p> <p>Applications of the analytical techniques to the cultural heritage investigation.</p> <p>Studies on the biogenic volatile organic compounds in the forest context related to the “forest therapy” .</p> <p>All the results of the above topics are elaborated with chemometric techniques.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	mario.berrettoni@unicam.it ; silvia.zamponi@unicam.it ; paolo.conti@unicam.it
1 PS	<p>The main goal of this PhD program is to involve PhD students in stimulating research activities in the fields of drug design, rationale synthesis, in vitro and in vivo pharmacological studies, drugs and cosmetics formulation and delivery, food quality and safety, food supplements and nutraceuticals, analytical and biological studies on plant extracts.</p> <p>During the three years PhD Course the students will have personal mentors who educate them to follow research topics, with the goal to allow the students to become able to formulate a scientific problem independently, propose hypotheses and procedures leading to its solving on an experimental or theoretical level in the above different fields.</p> <p>The general concept behind all the research activities listed above is related to human health and well-being.</p> <p>Research activities will be related to: computer assisted drug design and optimization; synthesis of potential drugs with different synthetic approaches and instrumental characterization; isolated macromolecules, cell tissues and animal pharmacological studies; novel strategies for drug delivery systems; new formulations, mainly based on natural ingredients, for cosmetics; in deep qualitative quantitative analytical studies of foods; development of functional food and food supplements, mainly based on nutraceuticals; analytical studies and biological properties of essential oils and solvent extracts from plants.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	sauro.vittori@unicam.it
2 PS	<p>CIRCULAR ECONOMY IN FOOD TOURISM How to apply circular economy principles to sustainable food tourism development. Food tourism is the exploration of food as the purpose of tourism. It is now considered a vital component of the tourism experience. Dining out is common among tourists and "food is believed to rank alongside climate, accommodation, and scenery" in importance to tourists. Culinary tourism became prominent at the beginning of this century. The World Food Travel Association estimates that food and beverage expenses account for 15 to 35% of all tourism spending, depending on the affordability of the destination. The WFTA lists possible food tourism benefits as including more visitors, more sales, more media attention, increased tax revenue, and greater community pride. The Project aims to foster innovative solutions for sustainable food tourism development and management of tourism enterprises, through transnational cooperation and knowledge transfer, in particular toward SMEs focused on local supply chains and developing industrial symbiosis to develop circular business models. An important part of the project will focus on the development of - new products, services, skills and new business models, especially working on industrial symbiosis/communities of practice, and - more circular and sustainable supply chains at local level, with particular attention on Food Waste Recovering and reuse, and Plastic-free solutions, also rethinking packaging</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	sauro.vittori@unicam.it

3 PS	<p>Scale-up and optimization of isolation procedures of phytocannabinoids from hemp by-products. The increase of cultivation of industrial hemp (<i>Cannabis sativa</i> L.) all over the world offers new opportunities for the industry to manufacture innovative products from this multipurpose crop. The availability of hemp biomass produced during manufacturing and processing of fibre and seeds represents a valuable resource to exploit and valorize on an industrial level. The main goal of this project is to develop and scale-up sustainable extraction and isolation procedures of cannabidiol (CBD) and minor non-psychoactive phytocannabinoids (e.g., CBG, CBC, THCV) from hemp by-products. procedures of phytocannabinoids from hemp by-products</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	filippo.maggi@unicam.it
4 PS	<p>Targeting the extracellular NADome (eNADome) in inflammation Intracellular Nicotinamide Adenine Dinucleotide (NAD) and its related metabolites (NADome) are important endogenous components that play crucial roles in cellular metabolism, inflammation, oxidative stress, cancer, neurodegeneration, and aging in mammals. While the intracellular NADome (iNADome) has received considerable attention and drugs targeting it are being developed in the field of cancer and inflammation, the extracellular NADome (eNADome) has been partly neglected and is not fully understood, although it can be a valuable source of plausible targets for several disorders, including inflammatory bowel diseases (IBD). In this context, the eNADome is an exciting new field of research and strongly urge further investigation. Additionally, the enzyme nicotinic acid phosphoribosyl transferase (NAPRT) has been recently found extracellularly, and its levels are significantly increased in inflammatory states. Based on these findings, the main goal of the project is to develop new small chemical entities acting as potential NAPRT inhibitors.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	loredana.cappellacci@unicam.it , riccardo.petrelli@unicam.it
5 PS	<p>Development of formulation of biomolecules and biosimilars exploiting innovative systems of delivery. The candidate will develop innovative formulations such as nanoparticles, hydrogels, complexes to protect and deliver biomolecules and biosimilars to specific body compartments, in a fashionable design [Industrial Doctorate in collaboration with Recusol srl] Financially supported by “Programma Operativo Regionale del Fondo Europeo di Sviluppo Regionale POR MARCHE FESR 2014/2020 – Asse 1 – OS 2 – Azione 2.1 – Sostegno allo sviluppo di una piattaforma di ricerca collaborativa negli ambiti della specializzazione intelligente. Area tematica: medicina personalizzata, farmaci e nuovi approcci terapeutici”.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	piera.dimartino@unicam.it
6 PS	<p>Research Topics in Neuroscience Few PhD positions are available in the field of neuroscience. Selected applicants will have the opportunity to work in the following research topics: 1) The functions of sleep in health and disease; 2) The neurobiology and psychopathology of substance use and eating disorders ; 3) Neuromorphological and neurobiological correlates in animal model of nervous system disorders The doctoral candidate will receive training in the techniques most commonly used in basic neuroscience, including brain activity recording, imaging, electrophysiology, proteomics, behavioural testing, molecular biology, histology and data analysis. Pharmacological, chemogenetic and optogenetic approaches will be also experienced. Candidates with different training backgrounds in life sciences, physics, mathematics will be considered for these positions.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences OR Life and Health Sciences - Molecular Biology and cellular Biotechnology	<p>Contact persons for topic 1) michele.bellesi@unicam.it; luisa.devivo@unicam.it; Contact person for topic 2) roberto.ciccocioppo@unicam.it; carlo.cifani@unicam.it; Contact person for topic 3) khosrow.tayebati@unicam.it</p>

7 PS	<p>Effect of Brewing Variables on the Flavour Chemistry and Sensory Quality of Espresso. Coffee is one of the most consumed beverages worldwide. It is prepared in a number of ways, but the most common forms in Southern Europe, Central America, and other areas is espresso coffee (EC), prepared from roasted and ground coffee beans. Factors related to coffee itself, such as the variety and blend of coffee beans, the degree of roasting and the grinding process affect coffee composition and quality. Moreover, another typology of factors that strongly impact on the chemical, physical and sensorial characteristics of coffee is the brewing process and, in particular, EC machine parameters such extraction temperature and pressure, together with an array of less studied extraction accessories (e.g. filter baskets, distributor and tamping), that should be used and tuned in a specific way, in order to extract a good EC. In spite of its worldwide popularity, the conditions for optimal espresso preparation have not yet been defined in detail and there is still a lack of standardization in the weight and grinding of roasted ground coffee used, the beverage volume, and the extraction conditions, all parameters likely to influence the EC quality. To assess the impact of variations of key extraction parameters on the chemical, physical, and sensory properties of EC, specific experiments will be carried out. From a flavour chemistry point of view, both volatile and non-volatile fractions will be fully characterized. Bioactive compounds (caffeine, chlorogenic acids and others) and physical-chemical characteristics (pH, total solids, lipids and protein) will be measured in such a way to understand how the variations of key extraction parameters influenced EC. The sensory properties and quality of the ECs will be measured by a descriptive analysis panel and a panel of espresso experts, respectively.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	sauro.vittori@unicam.it
8 PS	<p>Study and analysis of food contaminants by High Pressure Liquid Chromatography (HPLC) and Gas Chromatography (GC) techniques</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	gianni.sagrati@unicam.it
9 PS	<p>Study of food and plants as source of ingredients and bioactives for nutraceutical preparations</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	gianni.sagrati@unicam.it
10 PS	<p>Preparation, characterisation and testing of different biomaterials. The task will be to prepare and test different nanoparticle technology formats for imaging, accommodating payloads, and specific targeting of pain-associated cells or molecules in DRG. We aim to control the particle size and drug content by taking four independent processing parameters and two characteristics of the material into account. The interdependencies between processing, material parameters, and the subsequent nanoparticle characteristics will be optimised to allow efficient production of drug-loaded polymer nanoparticles. This level of understanding should rapidly assist the project to have protocols for the production of optimal PLGA nanoparticles in place.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	gianfilippo.palmieri@unicam.it
11 PS	<p>Neuroregeneration and Neurotransplantation. The task is to develop genetic modification technology and tools (transgenic mice, knock-out mice, and replication-defective viral vectors) with the long-term goal to promote functional neuroregeneration of injured spinal cord tracts. Protocols will be developed where in vivo gene transfer technology is employed to modulate the response of neurons and glia cells to injury to provide new insights into the molecular and cellular mechanisms that promote and/or inhibit neuroregeneration.</p>	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical, Nutraceutical and Food Sciences	carlo.cifani@unicam.it

RESEARCH TOPICS LIST: COMPUTER SCIENCE AND MATHEMATICS			
	Research topics with co-funded fellowships	Area of Research and PhD Curriculum	For additional information
1 CS	Artificial Intelligence and Intelligent Systems • Collective and adaptive systems	Computer Science and Mathematics	michele.loreti@unicam.it
2 CS	Computing and Mathematics • Algebraic and logical aspects of quantum computing	Computer Science and Mathematics	sonia.linnocente@unicam.it
3 CS	Intelligent Civil Engineering • Historical construction: monitoring and reliability model updating	Computer Science and Mathematics	andrea.dallasta@unicam.it
4 CS	Intelligent Healthcare Protection • Telemedicine and Teleservices (<i>3 fellowships</i>)	Computer Science and Mathematics	francesco.amenta@unicam.it
5 CS	Machine learning and econometrics • Machine learning for energy (<i>2 fellowships</i>) • Machine learning for business analytics	Computer Science and Mathematics	carlo.lucheroni@unicam.it
6 CS	Software and Information System Engineering • Open Data and co-creation of public services by governments and companies • Open Data, Enhancing supporting Ecosystem with Algorithm and Artificial Intelligence	Computer Science and Mathematics	andrea.polini@unicam.it
Other Research topics			
7 CS	Artificial Intelligence Methods • Explainable AI methodologies based on Knowledge Representation and Reasoning	Computer Science and Mathematics	francesco.santini@unipg.it
8 CS	Bioinformatics • Structural analysis of RNA and proteins	Computer Science and Mathematics	luca.tesei@unicam.it
9 CS	Cybersecurity • Design of resilient systems, Intrusion detection systems, Honey pots analysis	Computer Science and Mathematics	francesco.tiezzi@unicam.it
10 CS	Data Science and Machine Learning • Topology driven modelling with applications to biological systems	Computer Science and Mathematics	emanuela.merelli@unicam.it
11 CS	Formal and Applied Ontology • Representation of relational and temporal information	Computer Science and Mathematics	francesco.orilia@unimc.it
12 CS	Methodological Aspects of Science Education • Interdisciplinary use of logic in science education	Computer Science and Mathematics	carlo.lucheroni@unicam.it ; francesco.orilia@unimc.it

13 CS	Optimization and Machine Learning • Support Vector Machines and optimization Methods in Machine Learning	Computer Science and Mathematics	renato.deleone@unicam.it
14 CS	Process Management • Collaborative and Distributed Business Process Enactment including Blockchain	Computer Science and Mathematics	barbara.re@unicam.it
15 CS	Investment Valuation in Software and Data	Computer Science and Mathematics	andrea.polini@unicam.it ; grid.thoma@unicam.it
16 CS	Software Systems Design and Formal languages	Computer Science and Mathematics	flavio.corradini@unicam.it

RESEARCH TOPICS LIST: LEGAL AND SOCIAL SCIENCES			
	Research topics description	Area of Research and PhD Curriculum	For additional information
1 LS	<p>Constitutional Rules and Civil Law Relationships. The main aim of this research is to make private relationships functional to the values that mould the whole multi-level legal system. The Italian Constitutional legal framework introduces a new kind of legality which is direct to respect also European and International Principles. The research covers all areas of Civil Law such as contracts, torts, property, rights of persons and Family law, Alternative Disputes Resolutions. The research will be developed through an analysis of European and International case-law. The central issue of the research is to demonstrate that the free development of the human person is superior to any concurrent economic interest. A very special interest will be in research focused on the fundamental rights (e.g. integrity of the person, respect for private and family life, Protection of personal data) in the Market Place and on the role of the enterprises, no-profit organizations, professionals to achieve the new goals proposed by the 2030 Agenda for Sustainable Development.</p>	Legal and Social Sciences - Civil Law and Constitutional Legality	lucia.ruggeri@unicam.it
2 LS	<p>The tax concessions of local authorities in the European Union perspective of the prohibition of state aid. The aim of the research, granted by IFEL – Fondazione Anci, is to investigate the tax concessions provided for local authorities in the European Union perspective of the prohibition of State aid. In particular, the goal of the research is to analyze the compatibility of the facilities provided for in the field of local taxes with the prohibition of State aid pursuant to Article 107 of the Treaty on the functioning of the European Union. In this regard, the relevance of the provisions of articles 53-64 of legislative decree 34/2020 must be emphasized, which, in the assumption of the emergency situation, determined by the epidemic from Covid-19, temporarily derogated from the aforementioned prohibition allowing the " adoption of tax breaks otherwise in contrast with this prohibition". It is therefore intended to examine the relationship between the interventions of local authorities on the subject of tax concessions, already largely falling within the autonomy of revenue management of these bodies, recognized by national legislation, and the legislation on State aid directed to businesses, given that such concessions can be considered in contrast with European Union regulatory framework. The main outcome expected by the research is an in-depth analysis regarding the impact of EU "Temporary Framework for State aid measures to support the economy in the current COVID-19 outbreak" on citizens and companies with specific regard to the new role of local authorities in the following phase of reprise and resilience. A further result of the research will also be to analyze how the tax concessions granted by local authorities to businesses and citizens are consistent with the guidelines of the Next Generation EU, in compliance with the rules on the prohibition of State aid.</p>	Legal and Social Sciences - Civil Law and Constitutional Legality	lucia.ruggeri@unicam.it

3 LS	<p>Validation of biomolecular methods to detect the presence of viral nucleic acids in post-mortem forensic biological samples. The autopsy allows to ascertain the real cause of death of a subject and represents one of the most important medical legal activities with clear judicial reflections in criminal and civil</p> <p>The autopsy allows to ascertain the real cause of death of a subject and represents one of the most important medical legal activities with clear judicial reflections in criminal and civil fields.</p> <p>Forensic autopsy is a potential source of infectious risk for health professionals (from the technicians in the sectorial room, to the forensic doctors, to the personnel in laboratory analysis, to the trainees) which in various ways meet the body and the biological samples taken from it.</p> <p>The proposed research project is to develop and validate the biomolecular methods on post-mortem forensic biological samples. In this research pivotal are biomolecular methods such as Real Time - Polymerase Chain Reaction (qPCR), Reverse Transcriptase - Polymerase Chain Reaction (RT-PCR) and qualitative and quantitative and immunochromatographic antigenic tests, already widely validated and available to detect the presence of viral nucleic acids in living biological samples.</p> <p>The main research outcome is to individuate the real risk of contagion for legal professionals, coroners etc., and the real need to maintain a high level of personal protection (DPI) for these procedures.</p>	Legal and Social Sciences - Civil Law and Constitutional Legality	ascanio.sirignano@unicam.it
4 LS	<p>Legal and medico-legal reflections about individual protective devices: approval, licensing and marketing. The emergency due to COVID-19 pressed Italian government to enact a wide range of urgent measures, even derogating from widely established general principles, while the urge to save the greatest possible number of both human lives and jobs, drove many enterprises to convert their production in order to make up for the individual protective devices' global lack.</p> <p>In this field has promptly been deemed as essential the implementation of appropriate measures to speed up the healthcare purchasing procedures, by introducing derogatory and wholly exceptional schemes. Even the European Commission put forward a proposal for deferring the implementation of Reg. 2017\745\UE, that deeply reforms the medical devices market, for a year after its planned enactment for 26 May 2020.</p> <p>In this research will be studied the exemptions provided by the law (the so called "Cura Italia" decree) for the duration of the emergency and then the ordinary regulation procedure that companies should enforce to continue their production.</p>	Legal and Social Sciences - Civil Law and Constitutional Legality	giovanna.ricci@unicam.it
5 LS	Health and Food	Legal and Social Sciences - Fundamental Rights in the Global Society	postlaurea@unicam.it
6 LS	Fundamental Rights	Legal and Social Sciences - Fundamental Rights in the Global Society	postlaurea@unicam.it
7 LS	<p>The Right to an inclusive and innovative Education for the Future of depressed areas. This PhD track will explore cases (both Italian and international) of E-Learning to permit inclusive Education activities in depressed or disaster areas. This program aims at combining a local perspective with state of the art international research on Educational and Training activities (e.g. ET 20 Framework). Children's fundamental rights will dialogue with the Right to Remain in One's Place of Origin: the Digital Teaching could be an opportunity for all children who live in depressed areas hit by disasters. (THE TOPIC WILL BE ACTIVATED ONLY IN CASE OF COFINANCING]</p>	Legal and Social Sciences - Civil Law and Constitutional Legality	lucia.ruggeri@unicam.it

RESEARCH TOPICS LIST: LIFE AND HEALTH SCIENCES

	Research topics description	Area of Research and PhD Curriculum	For additional information
1 LH	The function of sleep in health and disease. The doctoral candidate will receive training in the techniques most commonly used in basic neuroscience and sleep research, including brain activity recording, imaging, electrophysiology, behavioural testing, molecular biology, histology and data analysis. Candidates with different training backgrounds in life sciences, physics, mathematics will be considered for this position.	Life and Health Sciences - Molecular Biology and cellular Biotechnology	michele.bellesi@unicam.it ; luisa.devivo@unicam.it
2 LH	Neuromorphological Correlates of Nervous System Disorders	Life and Health Sciences - Molecular Biology and cellular Biotechnology	khosrow.tayebati@unicam.it
3 LH	Biomaterials from Antarctic bacteria: synthesis, analysis and characterization of the involved enzymes. The topic of this PhD project is to study the ability of Antarctic bacteria to synthesize biomaterials from pure raw materials and waste products. The produced materials will be analysed and chemically characterized. Furthermore, putative enzymes involved in the synthesis pathways will be identified for their biochemical characterization.	Life and Health Sciences - Molecular Biology and cellular Biotechnology	sandra.pucciarelli@unicam.it
4 LH	Nutri-epigenomics and intergenerational inheritance. Early life represents a window of epigenetic plasticity during which occurs the programming of adult health. This research aims to characterize epigenetic biomarkers in parents and in their offspring, and to identify nutrigenomics strategies able to promote the development of a healthy epigenome	Life and Health Sciences - Molecular Biology and cellular Biotechnology	rosita.gabbianelli@unicam.it
5 LH	Nutrigenomics and control of inflammation. Nutrigenomic impact of food components on gene expression and epigenetic modifications will be used to control low grade inflammation. The aim of this project is to screen bioactive compounds able to modulate inflammation in human cell lines, animal models and/or ex vivo human cells. Gene expression and epigenetic modulations (DNA methylation and histone modifications) will be analysed to identify how bioactive food components can modulate inflammatory responses.	Life and Health Sciences - Nutrition, Food and Health	rosita.gabbianelli@unicam.it
6 LH	Innovative approaches for diagnosis and treatment of animal and human pathologies.	Life and Health Sciences - One Health	angela.palumbo@unicam.it
7 LH	Plant functional diversity and community structure. Adopt field experimental system on forest understorey, across management gradient and oldgrowth references. In-site sampling and measurements of plant assemblies, and the relations with stand descriptors. Aimed to fine scale modeling of ecological trajectories to inform conservation practices	Life and Health Sciences - One Health	roberto.canullo@unicam.it
8 LH	Studies on microbial symbiosis in mosquitoes and potential applications for the control of vector borne diseases	Life and Health Sciences - One Health	guido.favia@unicam.it

9 LH	Development of new molecular entities against human pathologies and application of in vitro/in vivo investigation strategies for mechanism of action identification of biologically active compounds	Life and Health Sciences - One Health	guido.favia@unicam.it
10 LH	Genetic characterization of the microbial community forming the activated sludge in wastewater treatment plants. Currently, the activated sludge process is the most widely used technology for the wastewater treatment where a high number of bacterial species plays an essential role in removing pollutants and particularly, in ammonia degradation. In recent years the ammonia levels in the environment has been increasing in a alarming level due to many anthropogenic sources as livestock farms, NH ₃ -fertilizer applications, landfill sites, industrial and civil activities. In fact, ammonia in wastewater is a growing concern due to its detrimental impact on aquatic ecosystems causing eutrophication and damages to the balance of the flora and fauna in aquatic bodies. Thus, isolation, identification and genetic characterization of microorganisms, responsible for ammonia removal, are fundamental steps to alter the composition of the native bacterial population in the attempt to produce a so-called "Super Activated Sludge". This high-efficiency sludge would reduce the time required for ammonia degradation thereby improving the overall wastewater treatment process. The candidate will learn the most useful Microbiology and Molecular Genetics techniques (DNA manipulation, PCR, Next Generation Sequencing of 16S DNA and whole genome sequencing).	Life and Health Sciences - One Health	maurizio.falconi@unicam.it
11 LH	Eukaryotic microorganisms as models for the response to environmental changes. We use eukaryotic microorganisms as models for studying the cell response to environmental changes in temperature, salinity, and pollutants concentration. The approach is molecular, looking at changes in phenotype and genotype. By differential expression analysis (RNAseq), we identify marker genes and biological processes affected by environmental stresses (see as example the publication by Piersanti et al. Environ Pollut, 2021, 269: 116955)	Life and Health Sciences - Molecular Biology and cellular Biotechnology	cristina.miceli@unicam.it
12 LH	Understanding the microbial interactions in the gut. The human body is associated with many microorganisms, and both prokaryotes and micro-eukaryotes are harbored in the human gut and their functions and interactions contribute to human health. We study the plasticity of the human gut microbiome when exposed to changes of external environment and diet by 16S rDNA analysis (see as example the publication by Chen et al. 2021, Parasites Vectors, 14: 62) and metagenomics	Life and Health Sciences - Molecular Biology and cellular Biotechnology	cristina.miceli@unicam.it

RESEARCH TOPICS LIST: PHYSICS, EARTH AND MATERIALS SCIENCES			
	Research topics description	Area of Research and PhD Curriculum	For additional information
1P	Condensed Matter Physics <ul style="list-style-type: none"> • Many-body theory of ultracold matter • Superconductivity at the nanoscale: theory, simulations, and experiments • Theory of electron-hole superfluidity in graphene devices • BCS-BEC crossover in multicomponent superfluids and superconductors 	Physics, Earth and Materials Sciences - Physics	postlaurea@unicam.it
2P	Experimental Physics <ul style="list-style-type: none"> • Matter under extreme conditions • Physics of surfaces, interfaces and nanosized systems • Physics, Astrophysics and Cosmology with Gravitational Waves • Soft matter, glasses, liquids and liquid solutions • Synchrotron Radiation and advanced radiation sources 	Physics, Earth and Materials Sciences - Physics	postlaurea@unicam.it
3P	Physics Education	Physics, Earth and Materials Sciences - Physics	postlaurea@unicam.it
4P	Theoretical and Computational Physics <ul style="list-style-type: none"> • Active Matter, Brownian motion, bacterial motion • Computer simulations for molecular modelling and spectroscopy • Soft matter, clustering, non equilibrium physics, transport properties 	Physics, Earth and Materials Sciences - Physics	postlaurea@unicam.it
5P	Tectono-stratigraphic evolution of the jurassic Umbria-Marche succession. The aim of this research project is to analyse the Jurassic paleotectonic setting of the Umbria-Marche area, with particular respect to the rifting stage(s), the rift-to-drift transition and the sedimentary evolution during the early stage of passive continental margin development. The subsequent Cretaceous to Paleogene continental margin evolution will also be considered, together with the role of inherited structures in the Neogene development of the Umbria-Marche sector of the Apennines fold and thrust belt. Suitable candidates may be considered as preferably having a good background in one or more of the following fields: carbonate sedimentology / Mesozoic basin stratigraphy / basin analysis / geological mapping of sedimentary rocks / structural analysis in sedimentary rocks.	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	stefano.mazzoli@unicam.it
6P	Applied Near Surface Geophysics. The candidate will apply integrated techniques of surveying (ground penetrating radar, magnetometry, electric resistivity, and aerial photogrammetry) to different fields of investigation, including archaeological geophysics, hydrogeology, and structural geology. A strong background in geophysics and general geology is required. Students with an MS degree in Geology, Engineering or Physics are welcome.	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	antonio.schettino@unicam.it ; pietropaolo.pierantoni@unicam.it
7P	Remote sensing for quantitative hydrogeomorphological analysis at the basin scale and the study of complex geological processes	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	marco.materazzi@unicam.it

8P	Qualitative-quantitative characterization and numerical modeling of recent porous aquifers: examples from Apennine fluvial plains	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	marco.materazzi@unicam.it
9P	<p>Geological-stratigraphic mapping and facies analysis of clastic sedimentary successions exposed in the eastern sector of Sheet 326 Ascoli Piceno (southern Marche). This field-based PhD project aims to examine the structural and stratigraphic evolution of the poorly studied Pliocene and Pleistocene deepwater sediments exposed in eastern central Italy portion of the Peri-Adriatic foredeep and integrates several disciplines, such as sedimentary geology, geological mapping and structural geology. The project is strongly focused on fieldwork, requiring detailed geological mapping of the basin structures and sedimentology. Once the broad relationships between structure and strata are established from mapping the student will examine the sediments in more detail.</p> <p>Duties</p> <ul style="list-style-type: none"> • Collect, process and interpret field data. • Mapping surficial deposits and geologic structures, measuring sections in sedimentary rocks • Sedimentological description and reconstruction of deep-water architectural elements • Scientific collaboration in applied projects and in geological mapping. <p>Requirements</p> <ul style="list-style-type: none"> • Master in Geology, possibly with majors in geological mapping of clastic systems, facies analysis or structural geology. • Good background in Apennine geology and sedimentary geology. • A broad clastic sedimentology background, including field work experience. • Experience in geological mapping, facies analysis and Geographic Information Systems (GIS). • Ability to work in autonomy and to respect the schedules. • Willingness to work out-of-office over long times for field work and flexibility to reach the scope of the project. • Ability in the use of unmanned aerial vehicles (UAV) and experience with working with innovative digital outcrop modelling software focusing on advanced visualization of photorealistic textured models and meshes. 	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	claudio.dicelma@unicam.it
10P	<p>Ground shaking scenarios through the use of empirical methods. [Ph.D position without scholarship at Sede INGV di Unicom https://istituto.ingv.it/it/sede-unicam.html] The aim of the research will be the calibration of empirical methods for the generation of ground shaking scenarios in Italy. The candidate will acquire skills in the field of geostatistics applied to seismological data, to evaluate the distribution and the spatial correlation of the residuals between observed and predicted ground motion parameters. Predictions will be made using one or more ground motion prediction equations. The results of the geostatistical analyses will be used for the generation of shaking scenarios at bedrock, whereas the site effects will be included through proxies of soil amplification (e.g. average shear wave velocity in the uppermost 30 m, $V_{s,30}$), calibrated on available shear wave velocity profiles, collected for seismic microzonation purposes.</p>	Physics, Earth and Materials Sciences - Physical and chemical Processes in Earth Systems	emanuele.tondi@unicam.it ; lucia.luzi@unimib.it
11P	<p>Manufacturing and processing materials</p> <ul style="list-style-type: none"> • Materials for energy harvesting and storage • Materials science and circular economy • Materials for theranostics • Metals, alloys and superconductors 	Physics, Earth and Materials Sciences - Materials Sciences	postlaurea@unicam.it

12P	<p>Advanced material characterization</p> <ul style="list-style-type: none"> • Fine-analysis of materials for cultural heritage • Application of synchrotron radiation techniques to advanced materials • Transport, electron and structural properties of superconductors • Materials under extreme conditions 	Physics, Earth and Materials Sciences - Materials Sciences	postlaurea@unicam.it
13P	<p>Composites and hybrid materials</p> <ul style="list-style-type: none"> • Biomaterials and biocompatible materials • Nanomaterials • Oxides and composites for electrodes and devices 	Physics, Earth and Materials Sciences - Materials Sciences	postlaurea@unicam.it