SCHOLARSHIP FUNDED THROUGH THE PARTNERSHIP AGREEMENT BETWEEN ANTWERPEN AND CAMERINO

	Research topic description	Area of Research and PhD Curriculum	Supervisor
1	**Quantum Coherent Phenomena in Superconducting Nano-Stripes.** When superconductors are confined at the nanoscale, new phenomena emerge: oscillations and enhancement of the critical temperature as a function of the size and quantum phase slips detectable in the resistivity and in the current-voltage characteristics. With magnetic fields, nanoscale superconductors present novel vortex phenomena with potential for applications. This theoretical project will be carried out in collaboration with Prof. M. Milosevic, University of Antwerp (BE), within our joint doctorate. The realization of the devices will be done in INRiM-Turin. The Ph.D. student will be exposed to different methodologies and will learn state of the art techniques to investigate quantum phenomena at the nanoscale	Science and Technology - Theoretical and experimental Physics	Andrea Perali, Milorad Milosevic

SCHOLARSHIP CO-FUNDED by JILIN AGRICULTURAL UNIVERSITY

	Research topic description	Area of Research and PhD Curriculum	Supervisor
1	**Analysis and modulation of the gut microbiome by different diets and by prebiotic elements.** The short term objective will be a comparison of the gut microbiome in young healthy individuals exposed to two diets (chinese food vs mediterranean diet) in alternative periods of their life. The long term objective will be the identification of possible prebiotic elements in the diets and the assay of these elements in mouse models	Life and Health Sciences - Molecular Biology and Cellular Biotechnology	Cristina Miceli

ONE POSITION reserved for carrying on researches on BUSINESS INFORMATION SYSTEMS in the context of the AGREEMENT between UNIVERSITY OF CAMERINO and UNIVERSITY OF APPLIED SCIENCES AND ARTS, Nortwestern Switzerland, FHNW School of Business

	Research topic description	Area of Research and PhD Curriculum	Supervisor
1	**Challenges and Opportunites of Digitalization for Business**	Science and Technology - Computer Science	Knut Hinkelmann

RESEARCH TOPICS LIST

	Research topic description	Area of Research and PhD Curriculum	Supervisor
1	**Synthesis and characterization of new materials with potential application in the field of the optoelectronics, bioinorganics based on coinage metals/azolate/phosphanes coordination chemistry.** The project will deal with the synthesis of coordination compounds with coinage metals and azole or phosphane ligands leading to the formation of compounds with peculiar properties in the field of molecular recognition, of the sensing, of the optoelectronic properties, of catalysis, also in the field of bioinorganics. The design of new products will be experienced to exalt or modify the properties already expressed in the previous stages of study. The compounds will then be tested in other research groups which collaborations are currently under course.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Rossana Galassi
2	**Active Materials for Metal-Ion Batteries.** Sustainable electrochemical storage solutions, such as Li-ion and Na-ion batteries, represents a key technology enabling a reliable and efficient storage of renewable energy sources. In this context, synthesis and physicochemical and electrochemical characterization of nanocomposite materials and electrodes for Li and Na electrochemical storage will be carried out, mainly targeting performance, durability and interfacial stability for stationary, mobile and automotive applications, in a research team which collaborates with several national and international partners	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Francesco Nobili
3	**Heterocycles and Organic Chemistry: the Importance of Innovative synthesis.** Heterocycles are among the most significant structural components of pharmaceuticals, and in the database of FDA approved drugs it is possible to find that almost 70% of unique small molecule drugs are polysubstituted heterocycles. The challenge for the organic chemistry is the development of new eco-sustainable synthetic methods to obtain polysubstituted heterocycles, especially the formation of cyclic core of different heteroatoms. During the PhD course the research project concern the study of new procedures for the formation of new carbon-heteroatom bonds in order to obtain acyclic precursors which, through selective cyclization reactions allow to provide bulk quantities of a wide variety of polyfunctionalized heterocycles with interesting biological activities. Practical scientific principles in solving real organic synthesis problems, and improving own skills in analytical techniques such as Infrared, Mass Spectrometry and Nuclear Magnetic Resonance Spectroscopy are developed.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Enrico Marcantoni
4	**Design and syntheses of copper complexes as versatile agents for an innovative multi-purpose approach in targeted anticancer therapy.** Copper compounds are an emerging class of metal-based drugs alternative to Pt(II) complexes due to their antitumor properties endowed with low toxicity towards non-cancer cells. [Cu(P)4]+-type and [Cu(L)(P)]0/+-type complexes, where P is a phosphane and L is a scorpionate ligand, have already shown high anticancer efficacy. According to such evidence, we aim to further exploit the potential of Cu-based anticancer compounds via the design and synthesis of new copper complexes comprising other classes of P- and L-type ligands, including bi-functional chelators.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Maura Pellei
5	**Study of the chemical-physical and morphological properties of innovative polymeric materials.** The objective of the research is to study the chemical-physical characteristics and morphological properties of innovative polymeric materials for the footwear industry by spectroscopic and structural methods, in order to identify correlations between the final performance of the products obtained and the chemical-physical properties of the raw materials and of the final products.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Carlo Santini

6	**The neurobiological basis of compulsive consumption of food: research of new therapeutic approaches.** The episodes of binge eating, characterized by intake of abnormal quantities of palatable food in a short period of time, are specific of individuals diagnosed with binge eating disorder, bulimia nervosa and anorexia nervosa binge/purge. Binge eating of highly caloric food is also a common behavior among obese subjects. The understanding of neurochemical mechanisms, of specific neuronal circuits and of structural and functional alterations of neurons and glia in the pathways that regulate the compulsive intake of food is of fundamental importance for the development of new pharmacological therapies.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Carlo Cifani
7	**Targeting the extracellular NADome in inflammation.** The project stems from the observation that a number of molecules involved in NAD metabolism (enzymes, precursors and NAD itself; referred as NADome) are paradoxically also found extracellularly. Importantly, this is paralleled by the observation that nicotinamide phosphoribosyl transferase (NAMPT), as well as other NADome members, are significantly elevated in acute and chronic inflammatory states. The project has therefore been built to gain further knowledge on the extracellular NADome and to apply this to the development of new therapeutic strategies in inflammatory bowel disease, a clinical condition in which many patients still cannot find a suitable pharmacological answer to their symptoms.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Riccardo Petrelli
8	**Advanced Drug Delivery and Targeting of Drugs.** Biodegradable and biocompatible polymers are synthesize and characterized to be formulated as hydrogels, nano-hydrogels, nanoparticles, for advanced drug delivery and targeting. In vitro drug dissolution is performed and after selection of the best candidates formulation in vivo tests are performed.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Piera Di Martino
9	**Metabolic reprogramming in cancer cells.** Reprogramming of cellular metabolism is a pivotal driver in controlling cell growth. One-carbon metabolism (1C-metabolism) fuels nucleotides biosynthesis and provides substrates for ATP and NADPH generation, changing in response to physio-pathological conditions. The mechanisms controlling 1C-metabolism in normal and transformed epithelial cells are still largely unknown. This project aims to develop novel methodologies to produce mitochondria-targeted therapeutics (MTTs), and to design and synthesize novel nicotinic (nAChR), muscarinic (mAChR) and adenosine (AR) receptor ligands in order to shed light on the role of the these receptors in the metabolic pathways implicated in lung cancer growth and progression.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Loredana Cappellacci, Fabio Del Bello
10	**Constitutional Norms and Civil Law Relationships.** The main aim of this research is to re-read the civil code and statutes in the light of the Italian Constitution and to make private relationships functional to the values that mould the whole legal system. The Republican Constitution 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, family law, rights of Succession and analyses domestic, European and International test cases or doctrines. 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 human rights in the Market Place.	Legal and Social Sciences - Civil Law and Constitutional Legality	Lucia Ruggeri
11	**Freedom of Contract and Alternative Disputes Resolution.** The aim of this research is to analyse how the freedom of contract is useful to resolve a civil dispute. The UE implemented several kinds of Alternative Disputes Resolutions (ADR) in every field of Civil Law. Nowadays professionals and consumers are free to select an ADR technique and this freedom will be studied in the light of domestic, European and International rules. A specific issue of this research is to study terms and conditions used in ADR or On Line Disputes procedures.	Legal and Social Sciences - Civil Law and Constitutional Legality	Rocco Favale

12	**Systematic and taxonomic studies on the vascular flore of the Central Apennines.** Selection of some critical group of vascular plants (Anthyllis vulneraria gr., Centaurea sp. pl., Senecio doronicum gr., Veronica gr. austriaca, Clinopodium sp. pl., Taraxacum sect. Palustria, Lathyrus pannonicus gr., ecc), study of relevant literature, field research, morphological analyses, taxonomic conclusions.	Life and Health Sciences - Ecosystem and Biodiversity management	Fabio Conti
13	**New functional foods and nutraceuticals for healthy ageing.** Design of probiotic functional foods and nutraceuticals for elderly people and study of their role in healthy ageing. Elderly subjects will be enrolled to be part of a human trial, during which a number of different kinds of new probiotic functional foods and nutraceuticals will be supplied. The beneficial effects on elderly health will be monitored studying several physiological and nutritional parameters also correlated to intestinal microbiota modulation.	Life and Health Sciences - Molecular Biology and Cellular Biotechnology	Stefania Silvi
14	**Artificial intelligence solutions for supporting medical care in remote areas.** The possibility to provide adequate medical assistance in case of diseases or accidents in remote areas underserved from a medical point of view is a problem. ICT has allowed a relevant support in this area allowing people to contact health professionals to obtain their advice via telecommunication systems. The request for medical support to a specialized center requires specific skills and training that, at best, are quite rudimentary. To improve teleconsulting skills it is therefore necessary to make available systems that facilitate the formulation of telemedicine requests correctly also by people who have not received adequate and specific health education. Development of these systems from either an informatics and a health point of view will be the topic of these fellowships.	Life and Health Sciences - One Health	Francesco Amenta
15	**Advanced technological solutions of occupational medicine and health protection of seafarers.** Safety on board ships is a major issue with significant implications for maritime safety. The purpose of this project is to develop an approach for making at a distance: Periodic surveys of the health status of workers with evaluation of their suitability for the specific duties on board; Dematerialize health documentation to make these data available if need arises; To realize video surveillance of work environments; To plan remote control of workers risk assessment; The system, thanks to the improvement of existing products/services, will help to improve the quality of medical care at remote sites. It can also be used for health prevention and surveillance offering a global service of medical prevention and treatment activities.	Life and Health Sciences - One Health	Francesco Amenta
16	**Diagnostic techniques applied to veterinary gastroenterology.** Gastrointestinal (GI) disease is a major cause of morbidity in pet animals worldwide. Diarrhea, GI pain, vomitus, malabsorption, may result from infection with a variety of microbial pathogens, viruses, or parasites, that alter intestinal microbiota, GI permeability, and fecal proteasome. Our PhD proposal project will focus on the diagnostic algorithm in canine gastroenterology, from clinical evaluation, through instrumental exams, followed by multiplex molecular panels related to the inflammasome, microbiome and proteasome modifications. The goal is to highlight issues related to test performance, result interpretation, and cost-effectiveness of these new molecular diagnostic tools.	Life and Health Sciences - One Health	Giacomo Rossi, Matteo Cerquetella
17	**Non-transfusional platelet-rich plasma for the treatment of human and canine osteoarthritis: in vitro characterization and clinical efficacy.** The aim of the research project is to determine the efficacy of topical application of autologous non-transfusional platelet-rich plasma (PRP) for tissue repair in human and canine osteoarthritis. A characterization of PRP will also be made, to increase knowledge about mechanism of action, production techniques, clinical effects and therapeutic indications. A multidisciplinary scientific approach will run.	Life and Health Sciences - One Health	Adolfo Maria Tambella

18	**Machine Learning of Spatio-Temporal Systems: from Neurosciences to Finance.** Time series data which include 'spatial' degrees of freedom, either coming from sites scattered in geographical space or in more abstract spaces, are difficult to model and forecast. Such series are found in research fields apparently very far from each other, like Neurosciences (EEG and dynamic MRI brain scans) and Finance (zonal electricity prices and yield or commodity forward curves). From a mathematical point of view, a very exciting, modern and unifying approach to these complex modelling problems is that of deterministic and probabilistic machine learning, especially deep learning. Thus, during this project, spatio-temporal data analysis problems originated from Neuroscience and Finance will be mathematically compared and investigated by means of advanced machine learning techniques in a strongly interdisciplinary approach, with the goal of grasping and exploiting possible synergies and hints coming from working with both these apparently dissimilar research communities at the same time.	Science and Technology - Mathematics	Carlo Lucheroni
19	**Relativistic quantum entanglement.** The project will investigate entanglement of a quantum field in curved spacetime using a particle detector model. By considering the entanglement between two comoving detectors interacting with a field, it would be possible to detect the entanglement of the field by swapping it to detectors. Its characterization should provide information about the transition to classical of quantum fluctuations generated during the inflationary era. [Fully funded by China Scholarship Council]	Science and Technology - Theoretical and experimental Physics	Stefano Mancini
20	**Electron Spectroscopy with Radioactive beams.** Spectroscopy with electrons from nuclear processes provides direct access to the nuclear structure. An interesting example is the relation between the penetration of atomic electrons in the nucleus and the electric monopole transitions of the nucleus itself. We propose to develop an advanced apparatus to investigate monopole transitions of excited states in nuclei produced at the SPES radioactive beam facility of the INFN Legnaro Laboratories. SPES is a project aimed to both basic research in nuclear physics and interdisciplinary applications, e.g., the production of radionuclides of medical interest. This project will be financially supported by INFN (Istituto Nazionale di Fisica Nucleare).	Science and Technology - Theoretical and experimental Physics	Fabio Marchesoni
21	**Risk assessment of new and existing buildings with seismic isolation systems.** The topic concerns methods and tools for the seismic risk assessment of buildings with base isolation systems. Research program involves risk evaluation at different levels (demand, damage, loss assessment) and investigations concerning both new and existing buildings. The research program may be focused on analytical formulations of the problems, numerical methods and computational issues, applicative results and design methods. The knowledge of the structural mechanics fundamentals is required. We are seeking a highly motivated candidate, experience in in vitro electrophysiology although not required is highly appreciated.	Architecture, Design, Urban Planning - Sustainable Urban Planning	Graziano Leoni
22	**Construction risk assessment and structural design.** The topic concerns methods and tools for the structural design of constructions, with a special attention to the behaviour under extreme events involving dynamic actions, e.g. earthquakes, hurricanes and so on. Investigations may be focused on analytical formulations of the problems, numerical methods and computational issues, applicative results and design methods. The knowledge of the structural mechanics fundamentals is required.	Architecture, Design, Urban Planning - Sustainable Urban Planning	Graziano Leoni
23	**Theories and Culture of Architecture and the City**	Architecture, Design, Urban Planning - Architecture. Theories and Design	

24	**Tourism and Landscape Architecture**	Architecture, Design, Urban Planning - Architecture. Theories and Design	
25	**Temporariness as a permanent feature of the contemporary city**	Architecture, Design, Urban Planning - Architecture. Theories and Design	
26	**Design of Innovative and Smart Objects, Systems and Environments**	Architecture, Design, Urban Planning - Innovation Design	
27	**Design for Environmental Sustainability and Process and Product Innovation**	Architecture, Design, Urban Planning - Innovation Design	
28	**Design of Communication, New technologies and Cultural Heritage**	Architecture, Design, Urban Planning - Innovation Design	
29	**The collaboration between strategic guidance and urban tactics in planning process**	Architecture, Design, Urban Planning - Sustainable Urban Planning	
30	**Protection, security and energy efficiency of cultural heritage in public administration** (Co-funded ENEA)	Architecture, Desing, Urban Planning	
31	**Il palazzo ducale dei Varano a Camerino: storia costruttiva, materiali, vulnerabilità sismica**	Architecture, Desing, Urban Planning	
32	**Machine learning techniques for Internet of things.** The research project aim at designing and investigating novel techniques of machine learning in the field of IoT and in particular the use of clustering algorithms for sensors data with particular reference to emerging fields of application such as Smart Agriculture, Industry 4.0, Smart Energy. New advanced and predictive analysis algorithms are expected while current data analysis are based on data reduction according to pre-established models often implemented as map-reduce jobs whose application in IoT scenarios is not always successfull.	Science and Technology - Computer Science	Andrea Polini
33	**Modelling of fault interactions, implications for predicting the evolution of seismic sequences.** The time-space evolution of seismic sequences can be function of the degree of interaction and connection among the individual fault segments, and of the presence of high pore pressure volumes along fault zones. The present project proposes the implementation of an innovative, integrated and multidisciplinary geological and geophysical approach aimed at predicting nucleation locations for large rupture in evolving seismic sequences at short- and long-term time scale. According to the aforementioned aims, which deal with the time-dependent and deterministic seismic hazard evaluation of the active fault systems, a realistic description of the properties of both propagation medium and fault zones is required.	Science and Technology - Physical and chemical Processes in Earth Systems	Emanuele Tondi, Claudio Di Celma
34	**Sedimentological and stratigraphic characterisation of sedimentary rocks and their relationship with failure modes and fracture distribution.** Reservoir quality is usually very variable due to the high degree of heterogeneities, most of which are below conventional seismic resolution but may have a major impact on fluid behaviour during production. This PhD project aims to explore the relationships existing between compositional, depositional, and diagenetical rock features and the physical-mechanical properties of the sedimentary rocks and, as a consequence, the different failure modes and fracture distributions in sedimentary rocks.	Science and Technology - Physical and chemical Processes in Earth Systems	Emanuele Tondi, Claudio Di Celma
35	**Synthesis and characterization of new transition metal complexes with polytopic nitrogen- and oxygen-donor ligands, and exploration of their catalytic activity in oxidation and oxygenation processes of organic substrates. Synthesis and characterization of Porous Coordination Polymers (PCPs) and MOFs and investigation of their absorption and catalytic ability toward small molecules. Design and synthesis of new inorganic and organometallic complexes with innovative biological properties.**	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Claudio Pettinari, Fabio Marchetti, Riccardo Pettinari and Corrado Di Nicola

36	**Development of methods for food quality assessment.** The project aims to provide new methods for the assessment of food quality by means of identification and quantification of new chemical markers, after development of appropriate analytical methods for their analysis. Gas chromatography coupled to mass spectrometry (GC-MS) and to flame ionization detection (GC-FID), high performance liquid chromatography coupled to mass spectrometer detectors (HPLC-MS), fluorimetric detector (HPLC-FLD) or diode array detector (HPLC-DAD) will be exploited to this purpose. Several techniques will be applied for the sample preparation, like solid-phase microextraction (SPME), solid-phase extraction (SPE) or liquid-liquid extraction.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Dennis Fiorini
37	**Tools for collaboration and integration between municipalities**	Legal and Social Sciences - Fundamental Rights in the Global Society	
38	**Protection of fundamental rights between national and international courts**	Legal and Social Sciences - Fundamental Rights in the Global Society	
39	**Topological field theory of Data.** The project will investigate topological field theory of data exploiting formal languages. By considering the manifold hidden relations (patterns) that exist among data, as correlations depending on the semantics generated by the mining context, it would be possible to construct an automaton as a recognizer of the data language. Its categorisation should provide new insides of the learning processes such as those of the immune system, the brain and the RNA-based evolution.	Science and Technology - Computer Science	Emanuela Merelli
40	The project will focus on the **investigation of neurobiological mechanisms responsible for development of drug abuse combining approaches from various disciplines, including behavioral pharmacology, molecular biology and electrophysiology.** Chemiogenetic and optogenetic approaches will have to be used to explore neuronal reorganization following exposure to drugs of abuse. In addition, the candidate will explore, at preclinical level, new mechanisms for development of innovative pharmacotherapeutic approaches to substance use disorder.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Roberto Ciccocioppo
41	**Chronic pain is a debilitating difficult to treat with currently available medications.** Often opioid agonists are employed, but their use is associated with serious negative consequences like development of drug addiction. We are seeking applicants interested to investigate the link between chronic neuropathic pain and development of psychiatric conditions including deterioration of cognitive performances, depression and development of substance use disorder. To exploit these investigations in rodents several approaches from various disciplines (i.e., behavioral pharmacology, molecular biology, electrophysiology) will have to be combined. Chemiogenetics and optogenetics will also be used to explore neuronal reorganization in response to chronic pain or exposure to opioid agonists. In addition, the candidate will explore, at preclinical level, new mechanisms for the development of innovative pharmacotherapeutics to chronic neuropathic pain.	Chemical and Pharmaceutical Sciences and Biotechnology - Pharmaceutical Sciences	Roberto Ciccocioppo
42	**Distributed cloud programming.** The research project main purpose is to conceive novel approaches for the design and analysis of IoT systems. The case studies will mainly involve smart building automation and industry 4.0. The objective is to allow the specification of complex behaviours (at the cloud level) that take into account data coming from distributed sensors. While behaviours may be specified at the cloud level theirs implementation will be decentralised as much as possible away from centralized nodes towards the network extremes (the edge) by leveraging on device resources. In this way devices do not need to be connected to the network (or data center) continuously. Behaviour specification should enable quantitative and quality analyses.	Science and Technology - Computer Science	Leonardo Mostarda, Rosario Culmone

43	**Formal verification of smart contracts.** The research project main purpose is to conceive novel approaches for verifying smart contracts. The project will focus on quantitative properties as well as to qualitative ones. These will include but not limited to security properties and liveness ones. The approach will be initially evaluated on Ethereum and solidity and further extended to other technologies.	Science and Technology - Computer Science	Leonardo Mostarda, Diletta Romana Cacciagrano
44	**Risks rediction through geoenvironmental monitoring: models in seismic area.** Monitoring of identified situations and criticalities over time from structural, morphological and hydrogeological point of view. The project aims to carry out in-situ detailed surveys and set up a series of monitoring stations, which is fundamental for understanding the morpho-evolutionary trends in the landscape and for planning surveillance activities accordingly. Outcome and final products will be the evolutionary models of structures and landscape in natural and anthropized areas, as well as a database on a digital platform available for institutions and administrations.	Science and Technology - Physical and chemical Processes in Earth Systems	Maria Chiara Invernizzi, Gilberto Pambianchi, Marco Materazzi
45	**Geoarchaeological studies and landscape evolution since the Bronze Age along the Adriatic side of central Italy.** In central-southern Marche, relevant archaeological testimonies, ranging from the Iron Age till the Middle Age, are present. The detail of geomorphologic research is focused on these sites, distributed in different and representative morphological situations located between the Apennines and the Adriatic Sea. Only some small sites are well preserved, and therefore enjoyable; many other, even though recognizable, were abandoned and spoiled by time, by men and, often, by natural catastrophes (earthquakes and floods). The research using geomorphological and geo-archaeological methods (aerial photograps, remote sensing, geophysical surveys, paleopedology and stratigraphy…) aims at reconstructing: a) landscape before the establishment of the archaeological site (past geomorphic evolution); b) landscape during and after the establishment of the site (recent geomorphologic evolution); c) present landscape (active geomorphic evolution); The results will allow to have a representative framework of the geomorphological heritage which will be an unique cultural heritage together with archaeological finds also in line with the recommendations of the European Landscape Convention.	Science and Technology - Physical and chemical Processes in Earth Systems	Gilberto Pambianchi
46	**New synthetic methodologies for the preparation of heterocyclic systems with biological activity.** The growing number of biologically active compounds featured by the indole nucleus and other nitrogen containing heterocycles makes the study of their preparation and synthetic transformations particularly interesting and indispensable. The proposed research plan is aimed to provide new synthetic pathways for the preparation and functionalization of heterocyclic systems. Particularly, the reactivity of sulfonyl indoles and other azole derivatives amenable of generating indolenine intermediates, will be studied. These unprecedented procedures would complement the classical Friedel-Crafts reaction in introducing a wide array of functional groups into the heterocyclic ring.	Chemical and Pharmaceutical Sciences and Biotechnology - Chemical Sciences	Marino Petrini
47	**Study of microbiota-host interactions in mosquitoes disease vectors.** These studies aim at decoding the relationships between the mosquitoes and their bacterial microbiota with the aim of identifying specific symbiotic bacteria that contribute to some specific traits of the mosquito's biology (eg impact on the vectorial capacity, role in nutrition, involvement in immunological processes) or that can be used in the development of innovative control methods (eg paratransgenesis).	Life and Health Sciences - Molecular Biology and Cellular Biotechnology	Guido Favia

48	**Le fonti giuridiche.** Obiettivo del progetto è la diffusione della conoscenza e la valorizzazione del notevole patrimonio librario giuridico presente nell'Ateneo di Camerino che comprende libri giuridici di grande valore. Si effettuerà un'analisi delle fonti della ricerca giuridica, una loro esegesi critica, affrontando problematiche quali la loro comprensione e il loro impiego in una prospettiva funzionale alla formazione del giurista attuale	Legal and Social Sciences - Fundamental Rights in the Global Society	Carlotta Latini
49	**Application of artificial intelligence to e-learning process.** The main purpose of the research project is to conceive novel approaches for the design and analysis of Artificial Intellingence (AI) systems for powering and improving e-learning processes. The project will focus on the application of AI techniques in the e-learning environment, using machine learning to provide adapted responses to the learners' needs. The data analysis obtained with big data patterns from the on-line learning environments are fundamental, as a starting point, to develop systems and algorithms for the personalization of e-learning paths on the basis of the student's features, using AI and machine learning models and techniques. We also aim to the adaptation of communication with the students guiding them to an appropriate path, in order to create motivation for them and improving in a considerable way learning outcomes.	Science and Technology - Computer Science	Andrea Perali, Leonardo Mostarda
	to be continued		