

Potential PhD-research projects

- Design and synthesis of new drug candidates based on natural products for the treatment of protein misfolding pathologies, such as neurodegenerative diseases.
 - Sustainable production of nanostructured biomaterials for applications in the field of environmental protection and valorization of natural resources.
 - Omic- approaches for the identification of targets and molecular mechanisms in biological processes.
 - Insight of Chalcogens, with a special focus on Selenium, to create novel molecules with unique biological properties.
 - Molecular mechanisms governing the multidrug resistance (MDR) and searching for novel contrasting strategies.
 - Selective hydrodefluorination of polyfluorinated and perfluorinated alkanes, alkenes and arenes Using Surface Organometallic Chemistry (SOMC) Approaches
 - Development of a multiresidual method to evaluate the environmental and nutritional chemical exposure
 - New organic semiconductors for photovoltaic applications.
 - Biosurfactant/biopolymer nanostructured formulations: from the eco-sustainable and bio-compatible design to the structural, dynamic and functional characterization.
 - Design and characterization of lead halide perovskites for next generation solar cells.
 - Hydrogen storage and transportation through coupling of hydrogenation-dehydrogenation reactions of unsaturated organic substrates.
 - Designed and engineered metalloenzymes for biocatalysis and sustainable technologies.
 - Computational design of peptides for diagnostic and therapeutic applications.
 - Extraction and characterization of bioactive compounds from agri-food industry wastes.
 - Natural and bioinspired biopolymers for applications in food and biomedical sectors.
 - Valorization of polyphenol based materials from agri-food wastes by sustainable methodologies.
 - Development and formulation of intelligent materials for the controlled release of active molecules.
 - Rational design of heterogeneous functional materials for energy conversion.
 - Development of high throughput methodologies for the analysis of proteins post-translational modifications in complex matrices.
 - Study of dynamical and structural complexity of macromolecular systems: from gels to block copolymers, from rubbers to composites.
 - Structural studies of the interactions of metallodrugs with biological macromolecules.
 - Design, structure and properties of novel biodegradable and recyclable polymers from renewable sources: chemical approach towards the circular economy of polymers.
 - Innovative approach for the preparation of functional polyolefins: from functional elastomers to polar polyolefins
 - Design and characterization of heterophasic systems based on olefin copolymers and terpolymers: the solution to the conflict between mechanical strength and resilience.
 - Astropolymers: innovative materials for robotic and human exploration of extraterrestrial habitats
 - Bioactive secondary metabolites as potential phyto and/or chemotherapeutics drugs from microbial cultures and plants
 - Isolation and characterization of natural bioactives for the development of ecosustainable ecopesticides
 - Search of natural bioactives for cosmetic and nutraceutic industry.
 - Innovative approaches in carbohydrate synthesis.
 - Glycan based molecular cross-talk: structure, function, properties and molecular level dissection of glycans in their interaction with proteins
 - The chemical diversity of microbial glycans
 - Structure/properties correlations of propylene-ethylene copolymers from phthalate-free catalyst.
- eligible for the DM630/24 PNRR scholarships (industrial cofunding)

- New oxidizing systems for cleansing use eligible for the DM630/24 PNRR scholarships (industrial cofunding)
- Implementation of new molecular catalysts for the synthesis of high performance elastomers eligible for the DM630/24 PNRR scholarships (industrial cofunding)
- Quantitative Structure-Activity Relations in molecular C1-symmetric olefin polymerization catalysts (funded by DSC , DPI project)
- Topological Performance Polyolefins (funded by DSC , DPI project)
- Structure and dynamics of electrochemical interfaces for next-generation energy storage devices (Funded by ENEA)