

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. [Eligible for the DM117/23 PNRR scholarships \(industrial cofunding\)](#).
- Structural and immunological characterization of polysaccharide antigens against bacterial infections [Eligible for the DM117/23 PNRR scholarships \(industrial cofunding\)](#).
- Design, synthesis and characterization of novel heterophasic polypropylene based materials for high-performance applications in a circular economy [eligible for the DM117/23 PNRR scholarships \(industrial cofunding\)](#).
- Development of materials for fuel cells based on polymer electrolyte [\(funded by ENEA\)](#).
- Deciphering and exploiting the chemistry of immunomodulatory glycoconjugates provided by gut microbiota [\(funded by DSC, GSK project\)](#).
- Biophysical approaches for characterization of Shigella O-antigen specific monoclonal antibodies [\(funded by DSC, ERC grant\)](#).
- Development of nucleic acids-based and nucleic acids-targeting compounds for therapeutic uses [\(eligible for PNRR funding CN3 scholarships\)](#).
- Development of RNA based drugs containing nanosystems [\(eligible for PNRR funding CN3 scholarships\)](#).
- Development of a CO₂ capture process on-board ships [\(eligible for PNRR funding CN4 scholarships\)](#).
- Development of a sustainable hydrothermal liquefaction process for the conversion of wastes to bio-fuels, with by-products recovery [\(eligible for PNRR funding PE2 scholarships\)](#).