

Scuola di Dottorato in Scienze e Tecnologie Chimiche e Farmaceutiche
Università di Trieste

Progetto Scientifico

**Ph. D. School in
Chemical and Pharmaceutical Sciences and Technologies
University of Trieste (Italy)**

Scientific Project

The School comprises 5 broad Research Areas:

- Chemical Sciences,
- Pharmaceutical Sciences,
- Sciences and Technologies of Chemical Engineering,
- Food and Natural Products,
- Analytical-Environmental Sciences.

For each Area, the School provides the Ph D students with an interdisciplinary training that requires the acquisition of concepts, expertise, research methods and experimental techniques. In more detail:

To the Ph. D. students in the **Areas of Food and Natural Products, and Analytical-Environmental Sciences** the School will give the opportunity to:

- improve their knowledge on foods, food supplements, herbal drugs and their derivatives, acquire expertise on food quality and safety control and learn chemical and biological techniques for the study of foods and herbal drugs, also according to EU regulations;
- learn research techniques and experimental design methods for the control, improvement and certification of food quality and for improving the efficacy and safety of food supplements, herbal drugs, and phytotherapeutic agents;
- acquire an in-depth knowledge of environmentally relevant analytical techniques and of advanced methodologies for the correct treatment of the experimental data, develop models for the space and time distribution of chemical species in ecosystems, as well as in urban and industrial settings;
- acquire expertise on environmental pollutants and toxins of natural origin, in particular in marine ecosystems;
- learn analytical techniques based on physical models and on structure-activity relationships for determining the exposure-related toxicity of chemical species.

The Ph. D. students in the **Area of Chemical Sciences** will:

- develop a cultural background, acquire advanced expertise and research competence in one or more fields among theoretical and computational chemistry, molecular spectroscopy, inorganic and bio-inorganic chemistry, homogeneous and heterogeneous catalysis, bio-crystallography, supramolecular chemistry, organic and bio-organic chemistry, nano-sciences and nano-technologies;
- learn how to perform advanced research in an up-to-date chemistry laboratory, acquiring a sound knowledge in modern research techniques and instrumentations;
- learn how to plan, develop, manage and bring to conclusion a research project on a chemistry topic, both from the point of view of the scientific interest and of the potential applications.

To the students in the **Area of Pharmaceutical Sciences** the School will provide specific competence for:

- the design of new drugs, their synthesis through both traditional and innovative methodologies, their structural and physical-chemical characterization, and the determination of their technological properties;
- the investigation of the molecular properties that affect the pharmacokinetic and pharmacodynamic behaviour of pharmacologically active compounds;
- the investigation of structure-activity relationships in biologically active molecules;
- the design and development of controlled-release pharmaceutical preparations for oral administration.

The students in the **Area of Sciences and Technologies of Chemical Engineering** will:

- improve their knowledge on the processes involving exchange of matter, heat, and momentum from the molecular level to the micro-, meso-, and macroscopic scale;
- develop the techniques of molecular simulation for systems that are of industrial or bio-medical interest;
- acquire a sound knowledge in the design and modeling of complex systems for the controlled release of pharmaceutically active compounds;
- learn the methodologies for the development and simulation of the processes of purification and remediation from pollutants.

The Departments have all the facilities necessary for carrying out the research projects proposed by the School.