

New PhD programme in Science and Technology of Bio and Nanomaterials



The PhD programme in Science and Technology of Bio and Nanomaterials will start from September 2018 in partnership with the Department of Molecular Science and Nanosystems (DSMN) and The National Cancer Institute (Centro di Riferimento Oncologico, **CRO**) in Aviano (PN).

The Students will have the opportunity to develop their own research projects in the scientific structures of CRO and of DSMN.

Laboratories at DSMN are provided with chemical hoods to conduct synthesis of organic and inorganic materials and modern analytical equipment. Departmental laboratories are also available for the use of advanced analytical instruments such as transmission and scanning electron microscopes (TEM and SEM), multinuclear NMR spectrometers, atomic force microscopes. New laboratories for molecular and cellular biology research include outstanding platforms for molecular and cellular biology studies such as: cell culture hoods, CO₂ incubator, real-time PCR, Fluorescence Microscope, flow cytometry cell analyser, fluorescence-activated cell sorting (FACS) system, Gel Doc imaging instrument and documentation system, Digital Dispenser for multiple reactions, Plate reader for absorbance, fluorescence and luminescence.

The scientific area library (BAS) and Ca' Foscari Digital Library permit the access to the network of the most widely used databases and scientific journals.

Laboratories in CRO are equipped to train graduate students in advanced experimental studies in the various fields of chemistry, biology, and molecular and transversal medicine. Every single CRO laboratory is provided with basic and advanced equipment, organized in core facilities, such as the latest DNA sequencer, imaging and flow cytometry. The Scientific Library is specialized in oncology and related biomedical sciences.

The programme is taught entirely in **English**. Students need to have an English language proficiency of at least **B2 level**.

Yearly the call for applications is published during the spring.

Info for application: dottorato.nanobio@unive.it

Educational Aims

The aim of this PhD programme is to acquire an in-depth knowledge in these fields:

- To develop the ability to collaborate and compete with specialists coming from different disciplines.
- To use specialized literature and reviews characterized by a multidisciplinary content.
- To use specialized knowledge in an interdisciplinary context when this is characterized by a strong applicative value.
- To learn how to communicate the research results to different target audiences, to manage the intellectual property rights and to exploit their possible industrial development.
- To manage interdisciplinary projects, together with experts from various disciplines, with the aim to develop materials and techniques in the frame of chemico-physico-biological analyses useful for the development of bio-nanotechnologies applied to nano-medicine.

Research Themes

- Theranostics: synthesis of organic (polymeric and / or micelles) or inorganic (mesoporous) nanostructures suitable for drug delivery and as contrast medium for optical and/or magnetic imaging; study of the interaction of these nanostructures with the biological environment and their efficacy for in vivo and in vitro targeting.
- Development of advanced ceramic materials for medical applications (prostheses or prosthesis coatings); study of their interaction with biological systems, of degradation processes and the formation of biofilms.
- Simulation and numerical design of nanostructures obtained via self-assembly of anisotropic objects, or via folding of DNA and proteins.
- Development of electrochemical biosensors for the determination of contaminating ions in water and in foods and / or small molecules (e.g. drugs) in plasma. Study of the interphases between inorganic, organic and biological systems using Scanning Electrochemical Microscopy (SECM) and AFM with high spatial resolution.
- Development, production and application of targeted therapies in human diseases.
- Development of innovative in vitro evaluation systems of the interaction among nanosystems, tissues and organs to limit the use of in vivo tests (Organoids).
- Evaluation of the impact produced by new technologies; management of technology transfer from laboratory to industry.