

# Introduction to Bionanotechnology

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## Overview

Bionanotechnology is a field of research with very broad scope and objectives. It comprises several biomedical domains including nanomedicine. The use of nanotechnologies to the benefit of human health is explored since few decades. Few types of nanoparticles and nanomaterials have reached the product market. However, the development of new advanced multifunctional systems is continuing growing, thanks also to the discovery of new nanomaterials endowed of therapeutic, diagnostic and imaging properties. Indeed, the field of theranostics is the most explored and promising in the current days. IN this context, the course aims to illustrate examples of nanoparticles and nanomaterials for bionanotechnology applications.

This course is organized in a single module. The topics will focus on organic functionalization, characterization and bio-applications of different classes of nanoparticles and nanomaterials: 1) organic nanoparticles (i.e. peptides and dendrimers); and 2) inorganic nanoparticles (i.e. carbon nanotubes, graphene and 2D materials). The objectives are multiple: 1) identify the main differences between organic and inorganic nanoparticles; 2) associate the different nanoparticles to their properties and applications; 3) recognize the advantages and disadvantages of each class of nanoparticle in term of biomedical applications; 4) propose appropriate chemical functionalizations based on the type of nanoparticles; and 5) design a multifunctional nanoparticle or nanomaterial for a specific therapeutic and/or diagnostic application.

Course participants will learn these topics through lectures and distributed materials (i.e. papers). Also case studies and assignments will be shared to stimulate research motivation of participants.

<b>Modules</b>	<b>Introduction to Bionanotechnology: May 4 - May 8, 2017</b> <b>Number of participants for the course will be limited to fifty.</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"><li>▪ you are a chemist or research scientist interested in designing new drug delivery and imaging multifunctional systems.</li><li>▪ you are material scientist interested on biomedical applications on new nanomaterials.</li><li>▪ you are a biologist or a life science scientist interested on the interfacing new nanomaterials and nanoparticles with living systems.</li><li>▪ you are a student or faculty from academic institution interested in learning how to do research on bionanotechnology and nanomedicine.</li></ul>
<b>Fees</b>	The participation fees for taking the course is as follows: <b>Participants from abroad : US \$500</b> <b>Industry/ Research Organizations: 30000</b> <b>Academic Institutions: 10000</b> The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

## The Faculty



**Dr. . Alberto Bianco** received his PhD in 1995 from the University of Padova (Italy). As a visiting scientist, he worked at the University of Lausanne during 1992, at the University of Tübingen in 1996–1997 (as an Alexander von Humboldt fellow) and at the University of Padova in 1997–1998. He is currently First Class Research Director at the CNRS in Strasbourg (France). His research interests focus on the design of multifunctional carbon-based nanomaterials (carbon nanotubes, graphene and adamantane) and other 2D materials (hBN, transition metal dichalcogenides) for therapeutic, diagnostic and imaging applications. He is also interested in the impact of this type of materials on health. He is author and co-author of over 230 papers. He is Associate Editor of *Nanotechnology Reviews* and in the Advisory Board of *Nanomedicine (Lond.)* and the *Journal of Peptide Science*. In 2011 he has been appointed as Editor of *Carbon*.



**Prof. Sandeep Verma** is presently Professor and Head of the Department of Chemistry, IIT Kanpur. His research interests include peptide/protein assemblies for disease modeling, surface chemistry of metal complexes and bioimaging. He has published more than 160 papers in international journals and guided 18 students for their PhD. He is a recipient of *Shanti Swarup Bhatnagar Prize* in Chemical Sciences and an elected *Fellow* of the Indian National Science Academy, Indian Academy of Sciences, National Academy of Sciences, India. He is also an Associate Editor of *Journal of Chemical Sciences* (Springer) and serves on the Editorial Advisory Boards of *Chemical Communications* (RSC, UK), *Cell Chemical Biology* (Cell Press) and *Journal of Peptide Science* (Wiley).

## Course Co-ordinator

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