

<b>Title of the doctoral program</b>
Bioengineering and Medical-Surgical sciences
<b>Title of the research activity</b>
Superparamagnetic iron oxide nanoparticles and their surface modifications for cancer targeted therapy
<b>Short description of the research activity</b>
<p>This activity concerns the synthesis and characterization of inorganic magnetic nanoparticles showing a central core of nanosized magnetite crystals, embedded into a silica shell or other protective layers. They can be obtained by colloidal synthesis and the external surface can be successfully used to graft antineoplastic molecules, targeting ligands or eventually decorated with ultra-small gold nanoparticles with plasmonic effect (magneto-optic nanoparticles). These particles can be proposed for different targeting strategies:</p> <ul style="list-style-type: none"> <li>• Passive carriers: the delivery of the chemotherapeutic agent to the desired site (tumour) and the release of the drug from its carrier (magnetic particles) can be ensured by simply implanting the particles onto the tumour site (passive carriers)</li> <li>• Magnetic drug targeting: the delivery of the chemotherapeutic agent to the desired site is ensured by driving the particles to a given target site by injection and concentration with the aid of magnetic field (magnetic drug targeting)</li> <li>• Immunological drug targeting: this means the functionalization with a targeting ligand that can deliver the drug-loaded nanoparticle to the tumour cells, upon specific recognition</li> <li>• Gene therapy assisted by the superparamagnetic nanovectors</li> </ul> <p>This activity is funded by AIRC project - "Development of engineered magnetic nanoparticles for cancer therapy" 2012, and S. Paolo Project "CSP-Torino-Piemonte - Development of engineered magnetic nanoparticles for targeted therapies (LV-MNPs)" 2012, both coordinated by Università del Piemonte Orientale (UNIPMN), and will be carried out in collaboration with UNIPMN and foreign research Institutes.</p>
<b>Scientific responsible (name, surname, role, email)</b>
<p>Enrica Verné Associate Professor of Materials Science and Technology at POLITO</p> <p>Institute of Materials Physics and Engineering Applied Science and Technology Department</p> <p><a href="mailto:enrica.verne@polito.it">enrica.verne@polito.it</a></p>
<b>Number of vacancies for XXXI cycle (3 years program)</b>
1
<b>Specific requirements (experiences, skills)</b>
The candidate should possess a background on materials science, chemistry, biomaterials
<b>Website of the research group (if any)</b>
<a href="http://www.composites.polito.it">www.composites.polito.it</a>