PhD in Materials Science and Technology

Research Title: Nanostructured and functional materials for detection of chemicals/biomolecules in water

SESSION: SUMMER 2019

Funded by	Centro Interdipartimentale CleanWaterCenter (CWC)

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Contact	https://maps-polito.com/wp/rapid-project/overview-rapid-project/

Context of the research activity	Technological progress has brought advancements and improvements in average life conditions but also an ever growing pollution. In this context, water is an extremely valuable resource and our lives depend on it. Pollution of water reserve is a major concern in today's policies and in particular, drinking water which can contain contaminants of all species (erbicides, fungicides, drugs). Monitoring water quality is of paramount importance and a prompt response against a peak in pollution contamination is a key factor to prevent insurgence of health risks in the population. To this aim, photonics nanomaterials can be used to develop sensors based on e.g. Surface enhanced Raman Scattering, that are able to identify contaminants at very low concentration and with a very low cost per analysis. Sensors based on such technology could be integrated in a portable system to allow water quality control in remote areas, e.g. Africa, Amazonia, and a quick response to acute water pollution events.

Objectives	The candidate will work on the development of nanostructured materials and surfaces for sensing and detection of chemicals/biomolecules in water. The research will comprise three main topics that the

	candidate should master: - Wet chemistry/nanolithography techniques for fabrication of nanomaterials and their characterization - Design, fabrication and demonstration of sensors for chemicals/biomolecules and measurements of their performance e.g. (limit of detection, selectivity) - Be involved in possible internal/external collaboration for testing in significative environments

Skills and competencies for the development of the activity	The candidate should be very motivated, able to work autonomously and in a team. We look for a candidate interested in all the aspects of the research, from the more fundamental ones to the more applied like the fabrication and demonstration of sensors. Having previous experience on the subjects is a plus but is not mandatory.