

# Summer Course in Nanoscience and Nanotechnology

## III “Julio Palacios” International Symposium

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### ABSTRACT

## Nanotechnology for a safe and sustainable use of water resources

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According the EU Water Framework Directive (2000/60/EC) establishing a framework for Community action in the field of water policy, 48 microbiological and chemical parameters should be regularly monitored in order to ensure water safety. Among them, 33 chemicals priority substances, from which 13 are considered priority hazardous substances due to their persistence, bioaccumulation and toxicity (PBTs). The complexity of the water supply and sanitation systems makes unaffordable to establish a regular monitoring plans for all those parameters in each of the sensitive spots of the network. The use of portable and networks of sensors for those contaminants will allow the sustainable monitoring of the water safety in real time at each relevant point.

An increasing number of studies have documented the presence of pesticides, pharmaceuticals, poly- and perfluoroalkyl substances and other organic pollutants in rivers, groundwater or reclaimed wastewater. Some of these organic pollutants and pathogens are highly persistent to conventional wastewater treatment, and their removal by existing advanced treatment options requires large amounts of chemicals and/or energy-intensive processes. On the other hand, the appearance of biofilms is a major issue in the maintenance of most part of infrastructures and devices in contact with water, generating big economic losses to the water companies and related stakeholders.

We will discuss how nanotechnology, as one of the 6 key enabling technologies identified by European Commission, can help to tackle some of these issues by, among others; developing nanotech-based sensors for water quality monitoring; designing and fabricating nanomaterials for water contaminants' selective capture or degradation and tailoring the surfaces in contact with water in order to avoid biofilm formation.