Università
Ca'Foscari
Venezia

**Dipartimento di
Scienze Molecolari
e Nanosistemi**

**Dottorato in
science and
technology of Bio
and Nanomaterials**

A Lightbulb, a Magnet, a Thermometer: Multifunctional (nano)Materials from Design to Application

September 20, 2024, ore 10.30 am
Aula Delta 2A, Scientific Campus, Mestre (Venice)
link **https://zoom.us/j/81815791185** Passcode: seminar1

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Luminescence and magnetism are phenomena that have fascinated human beings since time immemorial. From the warm light of the Sun to the terrestrial magnetic field, we as a species have found ways to harness these natural physical phenomena and profit from them. On a (much!) smaller scale, throughout my career I have been striving to do something similar, manipulating the optical and/or magnetic properties of (nano)materials for different applications. During this talk, I will provide a bird-eye view of my work during the past seven years, which can be summarized in broad strokes with three mundane objects: a lightbulb, a magnet, and a thermometer. The lightbulb represents the luminescence of lanthanide-doped nanoparticles, semiconductor nanocrystal, and coordination compounds The magnet hints at the magnetic properties of lanthanide-based singlemolecule magnets (SMMs) and iron oxide nanoparticles. The thermometer alludes at my involvement in luminescence thermometry, whereby the photons emitted by a luminescent nanoparticle (i.e., a nanothermometer) are analyzed to obtain a thermal readout. Above all, the results I will present will touch upon the development of synthetic strategies to control the structure-property relationship in nanomaterials, the preparation of optical materials tailored for bioimaging, biosensing, and theranostic applications, and – more recently – the implementation of machine learning algorithms to enhance the performance of luminescence sensing approaches