

Venerdì 26/02/2021  
alle ore 11.30

la **Dr.ssa BEATRICE CAMPANELLA**  
CNR-ICCOM  
Pisa

terrà il seguente seminario:

"The light at the end of the tunnel: how we can exploit analytical spectroscopy to solve environmental and cultural heritage issues (and many others)"

Il seminario sarà tenuto in modalità telematica, tramite accesso alla piattaforma GoToMeeting o equivalente.

Si invitano tutti gli interessati a partecipare.

Dr. Francesco Vizza  
Direttore ICCOM

## Short Abstract:

Spectroscopic techniques have long been useful in basic studies of general chemistry. With the massive technological progress of the last years, and the awareness of environmental and cultural heritage protection, such methods have acquired a much wider usage in the instrumental chemical analysis of a variety of samples (soil, sediment, wastewater but also paintings or graffiti). The advantages of spectroscopic analytical techniques nowadays include sensitivity, safety, non-invasiveness and/or remote access, miniaturization, inexpensive running costs, and rapid, automated sample turnover. Major breakthroughs in analysis have come from hyphenated techniques comprising component separation interfaced with spectroscopic detection. Often, however, different laboratories obtain different results by failing to follow the same sampling and pretreatment protocols, and for to many researchers without the prerequisite background, the spectrometer is not too far from a black box that gives a result. This is a dangerous scenario, and it is essential that the user is aware not only of the basic theory and advantages but also the limitations of the particular technique in question.

The purpose of my work is to provide a new contribution to the field of the environmental and cultural heritage analytical chemistry, developing methods for fast, accurate and low-cost quantification of metals, inorganic anions and synthetic molecules in diverse matrices. The presented strategies are all based on the use of spectroscopic methods for the direct determination of the analyte, while in some cases a pre-derivatization step is required. Some compounds taken into account gained popularity in the last decades due to their well-known serious and toxic effects on living organisms (e.g., mercury, arsenic, cyanide, and thallium) or for their extensive use in the artistic field (e.g. daylight fluorescent pigments), while others are usually considered essential or not relevant for human health (e.g., selenium and thiocyanate). The presence of these compounds in various environmental compartments is a matter of great concern for governments, as some of them are still used in huge amount by the industry and agriculture. Thus, their determination in the environment helps to assure national food safety and support the development of water, soil and crop-specific remedies for contaminated sites. From the artistic point of view, the contemporary paint materials contain synthetic pigments susceptible to degradation under the influence of environmental parameters as light irradiation, temperature and amount of pollutants, posing challenges only recently faced by conservators. The characterization of these compounds is a key parameter for long-term preservation of our artistic heritage.

## Biographic sketch:

Beatrice Campanella completed her MSc (2013) and PhD (2016) studies in Chemistry at University of Pisa. During her PhD, in collaboration with the Institute of Chemistry of Organometallic Compounds of the Italian National Research Council (ICCOM-CNR), she developed analytical strategies for the characterization and quantification of inorganic contaminants, mainly working on different methods for the photochemical vapor generation of organo-compounds of mercury, selenium and arsenic. She spent a period at the National Research Council of Canada (NRC) in Ottawa, and she is still collaborating with the Metrological Group on the development of primary analytical methods based on isotope dilution gas-chromatography mass-spectrometry for the characterization of Certified Reference Materials. After her PhD, she moved to the Applied Laser Spectroscopy group of ICCOM-CNR as post-doctoral fellow, where she spent three years studying plasmonic nanostructures applied to nanoparticle enhanced laser induced breakdown spectroscopy (NELIBS) and surface enhanced Raman (SERS). In June 2018 she was awarded with the Ambrogio Mazzucotelli prize, conferred by the Italian Chemical Society for the results in the field of analytical spectroscopy.

Since November 2019 she is permanent researcher at ICCOM-CNR in Pisa, where her work is mainly devoted to the development and optimization of analytical methods, procedures and instrumentation for chemical analysis and application to environmental and biological matrices and to materials of interest in the cultural heritage field. Beatrice Campanella (H-index=14) is co-author of more than 60 papers in international peer-reviewed journals, and she presented her work at several national and international conferences.