

## **Mesoporous silica nanoparticles: functionalization, characterization and applications for cancer sensing, therapy and imaging**

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Mesoporous silica nanoparticles (MSNs) represent a versatile nanoplatform for constructing multifunctionalized particles for a variety of applications. This lecture will introduce the methodologies for synthesis, functionalization and characterization of MSNs. Furthermore, procedures and characterization methodologies for loading the mesopores of MSN with cargo molecules (dyes, drugs, imaging agents) and their entrapment inside the mesopores by the presence of pore-blocking agents (quantum dots, coordination compounds, large molecules and biomolecules) will be described. Designing nanosystems for stimuli-responsive (in response analyte biomolecules, exposure to light or change of pH) through employment of stimuli-responsive linkers between the pore-capping moieties and the MSN will be also discussed. Finally, the examples of recent research achievements in the field of pore-loaded MSNs for sensing and stimuli-responsive treatment and imaging of cancer will be described.

### **CV:**

Dr. Nikola Knežević is a Full Research Professor at the Center for Sensing Technologies, BioSense Institute. He graduated with PhD in Chemistry in 2009 at Iowa State University, USA; under the supervision of late Prof. Victor Shang-Yi Lin. He obtained further research experience as a Postdoctoral fellow at University of Houston (research in multistep organic synthesis), Universidad Complutense de Madrid (research in nanomaterials science), Institute Charles Gerhardt Montpellier (research in nanomaterials science), FP7 – ERA Chairs Postdoctoral researcher at Vinča Nuclear Institute and as Pole Chimie Balard Visiting professor at the University of Montpellier. Nikola's record includes over 40 peer-reviewed publications in highly ranked international journals with over 1600 citations and H index 21. Nikola is the project coordinator of one H2020 project (NANOFACTS GA 952259), three Serbian national projects (PRECAST – 6060755, Proof of concept – 5566, Transfer of Technology-1135) and two bilateral research projects (with France and Germany). His research interests include synthesis of functional bioresponsive nanomaterials and their applications in health protection and construction of biosensors.