ISTITUTO DI CHIMICA DEI COMPOSTI ORGANOMETALLICI

Consiglio Nazionale delle Ricerche

Martedì 16 Novembre 2021
alle ore 14:30

presso AULA Toraldo di Francia dell'Edificio F
Area della Ricerca CNR di Firenze
Via Madonna del Piano 10, Sesto Fiorentino

il Prof. Ishan Barman
Department of Mechanical Engineering
Johns Hopkins University
Baltimora (USA)

terrà il seguente seminario:

"Molecular analysis and cellular phenotyping at the intersection of Raman spectroscopy and advanced nanomaterials"

Si invitano tutti gli interessati a partecipare.

Dr.ssa Maria Caporali
Ricercatrice ICCOM

Dr. Francesco Vizza
Direttore ICCOM

Short Abstract:

This talk will focus on engineering surface-enhanced Raman scattering (SERS) probes for ultrasensitive detection of specific molecular species. The high sensitivity and broad applicability of these SERS nanoprobes, in conjunction with their inert composition, render them a promising agent for precise delineation of microscopic tumors that are impossible to visualize with currently available imaging technologies. Plasmonic nanoparticles are also used in flexible skin-like biosensing platforms, which are capable of conformally wrapping a soft or irregularly shaped object, to enable 3D label-free acquisition of spatially resolved molecular signatures from live cells. A second module of this talk will focus on the results from our ongoing collaboration with CNR that seeks to leverage silver-coated disordered silicon nanowires to provide highly sensitive label-free Raman detection through molecular trapping and plasmonic hotspot formation. I will also discuss how such platforms can inspire the development of a mechanical phenotyping assay that provides information on the patient's risk of metastasis by measuring the metastatic potentials of their cancerous cells.

Biographic sketch:

Ishan Barman is Associate Professor in the Department of Mechanical Engineering at Johns Hopkins University with joint appointments in the Departments of Oncology, and Radiology and Radiological Science.

He is also a senior investigator of the NIH P41 Laser Biomedical Research Center, a multi-institutional biophotonics center between Johns Hopkins, MIT and Harvard University. He graduated from the Indian Institute of Technology (IIT), Kharagpur, before moving to MIT for his Ph.D., where he investigated transcutaneous blood analyte detection using vibrational spectroscopy. His laboratory's research is focused on the development of cutting-edge and transformative biophotonics technologies with the goal of disease detection at early, manageable stages, monitoring therapeutic effects and treatment outcomes, and guiding interventions. His work has been resulted in >105 journal publications including in Proceedings of National Academy of Sciences, Nature Materials, Cancer Research, Nano Letters, Angewandte Chemie Intl Ed, Chemical Science and Small, and has also been prominently featured in leading scientific (Technology Review, Physics Today, Physics World, C&E News) and popular media (Wall St. Journal, CNN Newsroom with Ali Velshi) outlets. Dr. Barman's awards for his research contributions include the NIH Director's New Innovator Award, Emerging Leader in Molecular Spectroscopy Award, EAS Young Investigator Award, Maryland Outstanding Young Engineer Award, American Society for Lasers in Surgery and Medicine (ASLMS) Dr. Horace Furumoto Innovations Young Investigator Award, and the Tomas Hirschfeld Award by the Federation of Analytical Chemistry and Spectroscopy Societies.