Krakow School of Interdisciplinary PhD Studies <KISD>
invites PhD students and members of the research Staff
to attend the series of lectures given by

Prof. Sudipta Seal

University Distinguished Professor, Trustee Chair and UCF Pegasus

University of Central Florida (UCF)

A. Engineering ceria as nanozyme: Implication in pandemic mitigation

COVID-19 has shaped up to be one of the defining challenges of our lives. Among the primary modes of spread is surface to surface contamination. Under these circumstances, the shortcomings of traditional chemical agent-based disinfectants got more pronounced. A lack of regenerative properties and the short duration activity of traditional disinfectants impacted the efforts to contain the spread. Here we report the design of nanoceria (a ceramic material) as nanozymes for antiviral agent and tested on various virus and pathogens. We have also used AI/ML for new materials design to combat infectious disease.

B. Exploiting Oxygen Defects in lanthanides for biomedical intervention

Engineered rare earth oxide nanoparticles (NP) having mixed valences on their surface are found to be redox active. In case of nanoceria, such valencies can scavenge excess reactive oxygen species (ROS), due to their redox active nature. Specially designed nanoceria mimics the catalytic properties of antioxidative enzymes and induces protective effect through regenerative scavenging potential and ameliorates the disease states further. In particular, rare earth-NPs trigger angiogenesis by modulating the intracellular oxygen environment and stabilizing hypoxia inducing factor 1alpha endogenously. Atomistic simulation was also used, in partnership with in vitro and in vivo experimentation, to reveal that the surface reactivity of NPs and facile oxygen transport promotes pro-angiogenesis. Few other research examples will be cited at the end of the talk.

Prof. Sudipta Seal *joined University of Central Florida (UCF) in fall 1997 after a postdoctoral work at University of California, Berkeley. He served as a Director of Advanced Materials Processing Analysis Center, and Nanotechnology Center, currently Chair of newly created Materials Science and Engineering. He is the recipient of the 2002: Office of Naval Research Young Investigator Award (ONR-YIP), JSPS fellowship, Alexander Von Humboldt Fellow, ASM IIM Lecturer award, Royal Soc of Eng - Visiting Professor Distinguished Fellowship at Imperial College, UK, etc.*
He was elected to attend the Frontiers of Eng Symposium by National Academy of Engineering. He is the recipient of Fellow of FASM, FAAAS, FAVS, FIoN, FAIMBE, FNAI, FECS, FMRS, FRSC, FACERS. He is inducted the Florida Hall of Fame of Inventors, elected World Academy Ceramics Academician and a recent recipient of ASM International Albert Sauveur Materials Achievement Award. He has more than 450 journal papers, books and h index> 108. He has more than 85 issued patents and his technology is responsible for various startups.

Schedule:

A. Friday, **03.11.2023**, 11.00 am.

B. Monday, **06.11.2023**, 11.00 am.

Place:

IMIM PAN
(ul. Reymonta 25, 30-059 Kraków)
Conference room, 2nd floor

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