

"Nano-biophysics for healthy living: your life in your hand"

We live in nanoworld - we sense nano, breathe nano, eat nano, feel nano, and act nano. Nanoscale structure and activity are the building block of all biological systems; they control every facet of our life and healthy living. Two major nanophysics inventions in early 80s, namely, STM/AFM and nanotube/buckyball allowed us, for the first time, to see nano-scale structures, measure nano-scale activities, manipulate them, and create new functional nano-structures. Emergent enabling nanotechnologies allowed us to see biological structures at molecular resolution in physiological condition as well as to nano-dissect, -manipulate, -transport biological systems. Translation of new knowledge and enabling technologies over thirty-five years has opened a new field of precision theranostics for global health. Precision theranostics (Therapy and Diagnosis) provides new paradigms for managing life threatening diseases, including dementia, cancer, heart diseases, infections, and emerging pandemics. I will discuss, primarily using the work done in my laboratory over three decades, the near-term prospects for efficient management of global health, especially testing, tracking, and treating dementia and pandemics.

Biographical Sketch:

Prof. Lal holds joint professorships in Mechanical Engineering, Materials Science, and Bioengineering at UCSD. He received his MS and M Phil in physics from JNU, India, Ph.D. in Neurobiology from UAB, and postdoctoral training in nano-biophysics at Caltech. Before joining UCSD, he held faculty positions at UChicago and UCSB. At UChicago, he was a professor of Medicine, Biophysical Sciences and Cell Physiology and the Director of the Center of Nanomedicine. He is a Fellow of AAAS and AIMBE, and an Associate Editor of Nanomedicine. He holds several patents on Array-AFM, microfluidics, optoelectronics, nano-biosensors and in-vivo medical nanodevices. He is a Founder and Chairman of Ampera Life, Inc, and Vessel ANI, Inc, a Director of Nanopsy, LLC.

