



**INDIAN INSTITUTE OF TECHNOLOGY DELHI
DEPARTMENT OF BIOCHEMICAL ENGINEERING &
BIOTECHNOLOGY**

2018-19 Seminar Series

Wednesday, 24th October, 2018



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Title: Bio/ Molecular Materials for Health, Energy and Environment

Bio/molecular materials facilitate nature's design of 'things' towards material fabrication and organization. Living cells routinely exhibit autonomous structuring of matter at nano and microscale, by controlling reactions and self-organization in space (which nano/chemical engineering has largely mastered), as well as in time. This talk will be an overview of my research in the area of bio/molecular materials highlighting multidisciplinary applications: in drug delivery, catalysis, clean energy and environmental remediation. To this end, I will present my recent research in the area of genetically engineered biogenic photovoltaic materials towards fabrication of a solar cell (DSSC). The unique supramolecular interfaces and inherent biological membrane properties of these materials have been demonstrated to have interesting applications in heterogeneous catalysis, heavy-metal recovery/mining and cleaner production. We will critically examine the role of biogenic materials (mainly microbial, owing to easy scale-up) towards some of the above mentioned applications, based upon the following: i) Hierarchical, molecular self-assembly of inorganic components; ii) Membrane mediated surface properties and; iii) Genetic engineering of host cells towards novel structural/chemical advancements. Interestingly, these are all inter-related phenomenon in living systems, which in turn, makes biogenic materials as a promising candidate for environmentally sustainable applications. Last but not the least, I will also discuss my research in the area of biomedical applications including bio-sensing and drug delivery. I will present some results from our recent paper on 'Medibots', which is a dual-action bio-hybrid micromotor capable of performing microsurgery at a cellular-level together with drug delivery properties among other recent projects.

All are welcome

Seminar will be held in DBEB Seminar room at [Block I, Room 223](#) at 4 pm

For additional information, contact Seminar coordinator Dr. Preeti Srivastava at preeti@dbeb.iitd.ac.in or Dr. D. Sundar at sundar@dbeb.iitd.ac.in