3rd Lecture Under Decennial Lecture Series

Distinguished Guest	**Dr. Sharmila Mande** Chief Scientist and Head Bio sciences R and D, from TCS innovation labs, Pune	
Date	Tuesday,16 April 2019	
Title	Microbes and health: Making IT matter	
Attendees	All Students, All Faculty Members and Staff Members	
Venue	*308, Lecture Hall Building (LHB)*	
Time	*04:05 – 05:30 (70 minutes lecture + 15 minutes Questions & Answers followed by High Tea)*	
Abstract	Recent advances in science have indicated that human body harbours trillions of microbes which outnumber our own cells by a factor of 10. The genomes of these microbes are therefore expected to have great influence on our health and well being. These microbial communities form functional ecosystem within the body and is termed as 'human microbiome'. The emerging field of 'Metagenomics' is rapidly becoming the method of choice for studying the microbiomes present in various parts of the body. The sequencing data obtained from the microbiome studies are not only voluminous, fragmented and noisy, but also complex in terms of taxonomic composition. In order to obtain biologically meaningful insights from the enormous volume of the complex data, it is necessary to have appropriate analytics approaches. An understanding of the structural and functional aspects of microbiome residing in various body sites is necessary to delineate associations between microbial communities and human health. Our studies have shown that gut microbiome changes with nutritional status as well as lifestyle differences (rural/urban, ethnicity, diet). Diet plays an important role in determining the composition of the gut microbiota. Some of the microorganisms in the gut help in assimilating dietary nutrients. Such bacteria can utilize their enzymatic machinery to digest proteins, fats and carbohydrates which are indigestible by humans. The metabolites produced by them not only modulate gastro-intestinal immunity, but also impact distal organs like lung and brain. Our analyses on the metabolic potential of the gut microbiome indicate interesting findings. Given the important roles played by the microbes and their interactions with host physiology, it is evident that a dysbiosis in the microbial community would have health implications. This has led to growing interest in understanding dynamics of these microbial communities and their functions in health and diseases/disorders. Variations in the bacterial communities residing within us have the potential to serve as 'diagnostic biomarkers' that can predict the presence and/or stage of disease. Microbiome-based biomarkers hold a lot of promise, especially for early diagnosis of 'asymptomatic' diseases. We have utilized this to identify 'microbiome based diagnostic markers'. We have successfully identified microbiome-based diagnostic biomarker candidates that can accurately predict at an early stage certain diseases and disorders. Various computational challenges as well as some of the exciting outcomes from a select few microbiome studies by our group will be highlighted during my talk.	
Bio-data	Dr. Mande is a PhD in Physics from IISc Bangalore. Her research interests revolve around systems Biology and algorithm development for analyzing the large scale biological data and applying the same to understand human health. Her major focuses pertains to understanding role of human microbiome in diseases/disorder. She has a number of patented algorithms that address challenges faced by researchers in analysing large-scale biological data. She is a recipient of the TCS Distinguished Scientist Award. '	