Dear All,

The Department of Chemical Engineering is pleased to invite you to the Industry Lecture Series of the January -2024 semester. The seminar is open to all and is mandatory for M. Tech students of PBS and CHE**.**

The Date and time of the lecture is as follows:
Date: 24/01/2024, Wednesday
Time: 4 :00 pm
Speaker: Dr. K.V. Venkatesh, Professor Department of Chemical Engineering, IIT Bombay and Founder Director, MetFlux Research Private Limited.

Tittle: Empowering Drug Discovery Using Investigative Physiology Platform: Leveraging Systems Biology-Based AI for Phenotypic Analysis, Target Identification, and Drug Design

Abstract

The complexity of biological systems and the vast heterogeneity of health conditions have presented a formidable challenge in drug discovery and nutraceutical research. Traditional approaches have been limited in their ability to fully understand the intricate interactions of biological systems and translate this understanding into effective therapeutic strategies. Further, there's a marked absence of physiology informed models representing both health and disease states that could provide valuable insights for drug development and research. The lack of a robust, unified platform capable of integrating diverse biological data has further hampered progress in these fields. Our solution is an innovative approach that utilizes Computational Systems Biology, which integrates mathematical modelling, computational simulations, and experimental biology. We aim to decipher the complexity of biological networks, bridging the link from genotype to phenotype. Central to our approach is the creation of physiology informed health and disease state models that offer a deeper understanding of the human body's responses.

Our trademarked Investigative Physiology Platform™, a platform building on systems biology-driven AI approach, lies at the heart of this initiative. Taking a systems biology perspective, we treat a disease diagnosis problem akin to a fault diagnosis problem in engineering systems. This approach has been applied to studying various diseases, such as arthritis, PCOS, and Non-Alcoholic fatty acid Liver disease, and developing child wellness platforms. In collaboration with pharmaceutical companies, we have used our platform to develop nutraceutical formulations for managing multiple PCOS symptoms. In another instance, we assisted a client to evaluate the therapeutic potential of a pre-existing Psoriasis drug for Inflammatory Bowel Disease treatment. With a range of services that

include drug discovery, target identification, dose optimization, pharmacokinetic modelling, In-Vitro-In Vivo correlation, PBPK analysis, pre-clinical and clinical study support, and product formulation and comparison, we are transforming the drug discovery and nutraceutical pipeline. Our innovative blend of computational systems biology, the creation of physiology-informed health & disease state models, and the Investigative Physiology Platform™ provide a pathway for driving innovation and ensuring effective, evidence-based therapeutic solutions.

Bio-sketch:

K V Venkatesh is a professor in the department of chemical engineering at IIT Bombay. He had his undergraduate degree from IIT Madras and a doctoral degree from Purdue University, USA. Since 1993, he has been as a faculty at IIT Bombay. His area of expertise is in systems biology, applying engineering systems principles to biological phenomena. He has developed novel theoretical platforms to understand the underlying design principles in nature thereby linking genotype to phenotype. His lab has been focusing on analyzing genetic, signaling and metabolic networks in microorganisms and in higher organisms. In the last decade, we have developed systems biology-based physiology models of organs and diseases, which have broad applications in drug discovery, wellness, and personalization of healthcare data. Based on these models, he has incubated a startup Met Flux research pvt limited, which offers specialized applications using system physiology models to FMCG/pharma and healthcare/wellness companies in product development and scientific characterization, drug discovery, disease management and wellness.

Thanks & Regards,
Anand Mohan, Course Instructor, CH50006
and
Suhanya, Course coordinator, PB50106