Title: From Brain to AI/ML and Back

Date: 19th October, Wednesday

Time: 4:00 pm

Venue: RM-301

Biography:

Ambuj K. Singh is a Distinguished Professor of Computer Science at the University of California, Santa Barbara, with part-time appointments in the Biomolecular Science and Engineering Program and the Technology Management Program. He received a B.Tech. degree from the Indian Institute of Technology, Kharagpur, and a PhD degree from the University of Texas at Austin. His research interests are broadly in the areas of machine learning, network science, and bioinformatics. He has led a number of multidisciplinary projects including UCSB's Interdisciplinary Graduate Education Research and Training (IGERT) program on Network Science and a Multidisciplinary University Research Initiative (MURI) on the Network Science of Teams. He has served as the Department Chair and Associate Dean. He has graduated over 30 PhD students and published over 250 papers over his career.

Abstract:

Artificial intelligence and machine learning (AI/ML) have been extremely successful in predicting, optimizing, and controlling the behavior of complex interacting systems. Robustness and explainability of existing AI/ML methods, however, remain big challenges, and clearly new approaches are needed. The human brain motivated the early development of the field of deep learning and neuroscientific concepts have contributed to the profound success of deep learning algorithms across many areas. The next leap in AI/ML may again come from a deeper understanding of modularity, robustness, and adaptability of brain architectures. Some of the challenges along this goal are to analyze and integrate heterogeneous brain signals across modalities, tasks, and subjects; decipher brain organizational structures; engineer novel deep learning architectures; and apply the insights into platforms that can effectively interact, support, and collaborate with humans. In this talk I will discuss some recent methods that integrate multimodal brain data to infer brain subnetworks, understand heterogeneity, learn representations of dynamic brain signals, and reconstruct complex high-fidelity imagery from input brain signals.