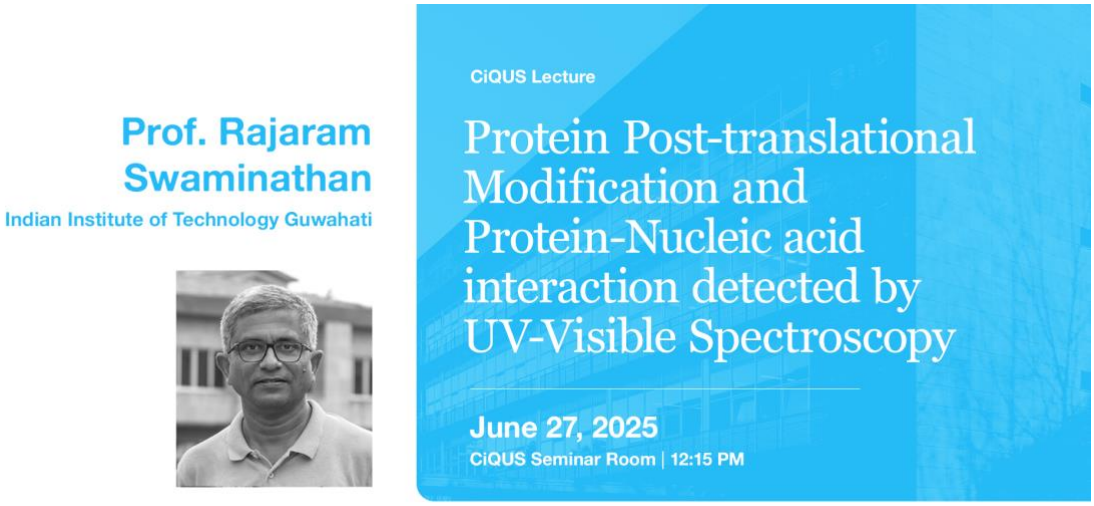

Prof. Rajaram Swaminathan
Indian Institute of Technology Guwahati

Abstract

Protein post-translation modifications (PTMs) like acetylation or phosphorylation are important in regulating their function inside the cell. Protein nucleic acid interactions (PNIs) are vital in regulating gene transcription and several other downstream events in the cell. However these events are not directly observable either inside the cell or in a test tube. Acetylation removes charge from lysine sidechain while phosphorylation introduces new charges in the side chain of Ser/Thr/Tyr. Nucleic acids are polyanionic chains which can influence the charge atmosphere in a protein when bound to them. Here using the Protein Charge Transfer Spectra which is influenced by the spatial proximities among the charged groups in the protein 3D fold, we attempt to detect PTMs and PNIs in aqueous solutions. Interestingly our approach can differentiate between specific and non-specific DNA binding in a protein.

Short Bio

Rajaram Swaminathan (he/him) completed his Master of Science degree in Biotechnology from the Indian Institute of Technology Bombay (Mumbai) in 1990 and later obtained his Ph.D. in Chemistry from the Tata Institute of Fundamental Research, Mumbai in 1996. He worked with Prof. Alan Verkman at the University of California San Francisco to investigate diffusion of small fluorescent probes inside the cell cytoplasm and mitochondrial matrix of mammalian living cells using fluorescence techniques. He joined Indian Institute of Technology Guwahati in 1999 as Assistant Professor and in 2009 became a full professor in the Biosciences and Bioengineering Department. His research interests are on applying novel spectroscopic techniques to investigate events in protein biochemistry.