



Indian Institute of Technology Kanpur Department of Electrical Engineering

Professor KR Sarma Distinguished Lecture Series in Electrical Engineering

Professor Sandip Tiwari

Charles N. Mell owes Professor in Engineering Emeritus
Cornell University

on

**“Cultures: Science, engineering, interdisciplinarity
and the fallacy of Ockham’s razor”**

Date: 13 March, 2023 (Monday)

Venue: L14

Time: 06:15 PM (Tea will be served at 06:00 PM)

ABSTRACT: What exactly constitutes science and what is engineering (or what is technology) is nebulous at best. Progress in science depends on development of new tools. Experimental tools arise from progress in technology and engineering. Theoretical tools too are creations where one connects physical and mental worlds. The natural world is chaotic. It is an open, dynamic and nonlinear system. Randomness, causation, interactions, thermodynamics, etc., all matter. So, simplistic views—Pasteur’s quadrants, Wallace-Darwin’s adaptation, Snow’s two cultures, Kuhn’s paradigm, Ockham’s razor in making simplest of choices with least axioms, and many others—are insufficient. The conduct of science and engineering has continuously changed since the dawn of modern science, it changes the world and the world changes it, changes are fast and slow and nonlinear, local context matters as can be seen best through commerce. How institutions practice and succeed and evolve matters for the future trajectory. Today, most problems need a simultaneous in-depth understanding of multiple disciplines even within the sciences. I discuss from personal and the broader world’s experiences the resulting conflicts: cultural such as what Snow brought up, how science and engineering has evolved from the heydays of Bell Labs or IBM Research, and in what shows up in the conduct of science and engineering in the world it inhabits in the modern society, particularly in USA and Europe where I have spent enough time experiencing the daily living. The problem is of dimensionality reduction in complexity. In this complex world, the only rule one can draw is the Mencken’s rule that for every complex problem, there is an answer that is clear, simple and wrong. I will speculate based on this argument the interesting problems for our community that the intertwined science and engineering can fruitfully and gracefully approach.



About the speaker: Prof. Sandip Tiwari is a distinguished alumnus of IIT Kanpur. He is currently the Charles N. Mellowes Emeritus Professor of Engineering at Cornell University. He was earlier the Director of National Nanotechnology Users Network, Director of the National Nanotechnology Infrastructure Network, and a research scientist at IBM T. J. Watson Research Center. At IBM he carried out pioneering research work on compound semiconductor transistors - codeveloping SiGe transistor and nanocrystal memory. At Cornell University, his research focused on adaptive approaches for low power design, three-dimensional integration, inexact computing, and Bayesian implementations. Prof. Tiwari in the current semester is visiting the Electrical Engineering Department and is hosted by the Samtel Centre for Display Technologies.

Prof. KR Sarma Distinguished Lecture Series in Electrical Engineering

Professor Kalluri Ramalinga Sarma, affectionately known as 'KRS', can be best described as a creator of institutions. He joined the Electrical Engineering Department at IIT Kanpur in 1961 after completing B.Tech (Hons., 1957), M.Tech (1958) from IIT Kharagpur and Ph.D (1961) from Cornell University. Working closely with Prof. Kelkar, the visiting Professors from KIAP program and young colleagues, Prof. Sarma put together a curriculum that became a bench-mark for other institutions in the country. He was the Dean of Research and Development at IIT Kanpur and was also the Head of EE-ACES (76-79). Professor Sarma strove to build the institute in its research activities. His contributions dot the campus in the form of ACES, LTP, CAD Centre and the Television Centre. His latest addition in this list is the Samtel Centre for Display Technology, a unique blend of academic, industrial, and government collaboration.



In 1988 he moved to the DST in Delhi and played a key role as an advisor in National Programs in Instrumentation, Lasers and Robotics. From 1991-97 he was the Director of the Central Scientific Instrument Organization (CSIO), Chandigarh. After retiring from CSIR, Prof. Sarma joined the Samtel Group as an Advisor. Professor Sarma is a recipient of the first Outstanding Teacher Award at IIT Kanpur. In recognition of his outstanding contribution, the Board of Governors of IIT Kanpur conferred upon Prof. KR Sarma the title of Honorary Institute Fellow of IIT Kanpur in 2007.

The Lecture series is instituted by Prof. Dr. K. Srinageswari, wife of Prof. KR Sarma as a recognition to his dedication to IIT Kanpur for 28 long years and which is still continuing. Srinageswari did her MBBS from Banaras Hindu University, MD from GSVM Medical College Kanpur in Physiology. She worked as Scientific Officer at IIT Kanpur, Scientist at Defence Institute of Physiology and Allied Sciences (DIPAS) and as Professor and Head of Physiology at Government Medical College Chandigarh and Hindustan Institute of Medical Sciences and Research, Greater Noida. She has done pioneering work on "Microwave Radiation Effects on Biological Systems" and " Medical Education" and has 50 publications, 4 awards and has written 4 books in Physiology.