

## **Title: Optical Transceivers for Data Center Networking and AI Hardware**

### **Abstract:**

Data centers are becoming the backbone of digital economy as they support all sorts of applications. Furthermore, with recent advancements in AI/ML tools, including generative AI and its applications, the demand for increase in numbers and capacities of data centers is now growing explosively. By year 2030, it is projected that more than 8% of the global electricity demand would come from the data centers. Optical interconnects become crucial in the data centers as AI workloads specifically demand extremely high bandwidths for training and inference, among other applications.

A continued improvement in the capacity, cost, energy efficiency and latency is needed in the optical transceivers for such interconnects. This talk will present an overview of the underlying technologies and trends that support optical transceivers going from 800Gbps per module to several Tbps/module, which include direct detect and coherent techniques based pluggable optics modules, and co-packaged optics based solutions. The advancements made by our team in this area would also be presented.

**Speaker: Prof. Shalabh Gupta (IIT Bombay)**

### **Bio:**

Shalabh Gupta is currently a Professor of Electrical Engineering at IIT Bombay. Prior to joining IIT Bombay, he has worked in industry in the area of high-speed analog/RF integrated circuits and coherent optical links. His current research interests include optical interconnects, and high-speed electronic and photonic integrated circuits. Dr Gupta has been an inventor/co-inventor in more than 15 pending/granted US and Indian patents in the area. He is also a founder of the domestic startup Aortic Labs that is aimed at developing optical transceivers for high-capacity cost and energy efficient data center interconnects, using the path-breaking technologies developed indigenously by his group at IIT Bombay.