

## **Silicon Technology Roadmap to address wireless communication from Sub 6GHz to Sub THz frequencies**

**Presenter:** Dr. Anirban Bandyopadhyay, IEEE Fellow and Senior Director of Strategic Applications, GlobalFoundries, Santa Clara, USA

**Abstract:** The mobile broadband (MBB) connectivity based on 4G and 5G cellular connectivity has enabled high data throughput and low latency applications. The enhanced MBB (eMBB) using 5G particularly mmwave frequency bands has the capability of further enhancing data rate to > Gb/s and also addressing large data traffic density in a crowded ambience. While mmwave (24-52GHz) allows huge bandwidth of channels to enable enhanced broadband, it also poses a lot of technical challenges in terms of coverage, generating enough transmitted power efficiently particularly in the uplink, system cost & scaling and long term reliability of the hardware system. In future, carrier frequencies will go even higher to > 100GHz particularly D-band (120-160GHz) for both communication and sensing. Current talk will highlight the hardware challenges for sub 6GHz, mmwave and sub THz radio and performance limits of semiconductor technologies particularly CMOS over process nodes. I will go over the roadmap of differentiated Silicon technology development to address the above challenges starting from current sub 6GHz, mmwave to future 140GHz and provide examples of silicon proof points on differentiated partially and fully depleted SOI (PDSOI & FDSOI) and SiGe technologies.