

Institute Lecture

Evolution of High Performance Analog Front End ICs

**Dr. Bhupendra Ahuja, IEEE Fellow,
NXP Semiconductors, San Jose, CA**



9th February 2018, Time: 6:15 PM, Venue: LH-17

Abstract

Semiconductor technology has influenced/improved our lives and created many new industries in areas of computing, communications and consumer electronics for last 40+ years. With annual sale of over 800B ICs, every person on this planet purchases more than 100 ICs. Being involved in this development since mid 70's, an overview and evolution of the technology, design techniques and applications from an Analog Designer perspective will be shared. As the technology scaled down feature sizes from 10um to 5nm, it enabled very high level of integration for SOCs, CPU clock speeds over 5GHz and connectivity into tens of Giga bits/sec. This has been made possible with high performance and complex Analog Front Ends. Modern day SOCs make use of DSP blocks to do many of the classical AFE functions and improve BW efficiency coming close to Shannon's channel capacity limits. With deep sub micron technologies and demands from Mobile applications for low power, power supply voltage for such AFEs has reached around 1V making analog designs very challenging and interesting. Design details of ADC, PLL and AFEs for Telecom, LAN and connectivity between computer peripherals will be discussed. Even though past has been full of innovations at circuit and device levels, Analog designers will be challenged for Low Power and BW efficient IC designs.

About the speaker

Dr. Bhupendra Ahuja graduated from this campus with B.Tech in EE back in 1973. He completed Master's and Ph.D. programs from Carleton University, Ottawa, Canada in 1976 and 1978. He started his professional career at Bell Labs AT&T where he designed world's first integrated PCM CODEC/Filters in CMOS technology. Over last 30+ years, Dr. Ahuja has worked in various roles of IC Design management such as Director and VP of Engineering at many leading companies like Intel, Neo Magic, Intersil, Nvidia, Qualcomm and now at NXP. Dr. Ahuja has led and introduced numerous IC products in areas of Telecom, Consumer, Communication and Computing. Just to name few: Codecs, Modems, Pentium micro-processor, DVD controllers, Video AFEs for Digital Cameras, High-speed LAN and DSL chip sets and many more. Over the years, Dr. Ahuja has also contributed and shared his knowledge by publishing over 30 papers in IEEE and other conferences and receiving many patents for his inventions. He is well known and referred in most Analog IC design text books for a compensation technique for operational amplifiers known as "Ahuja Compensation". He has also given many technical tutorials of Analog IC designs at IEEE chapters, Stanford University and UC Davis University. In 2006, IEEE society awarded him the most prestigious status of "IEEE Fellow" for his design contributions to "CMOS ICs for telecommunications and computer-communication systems".

In today's talk, Dr. Ahuja will walk us through Silicon technology and Analog IC design evolution and the design challenges in area of Communications, Computing and Consumer products thru his personal experiences.

Tea at 6.00 PM

All interested are welcome.

S. Ganesh
Dean of Research and Development, IIT Kanpur