



**IEEE Madras Section
IEEE Electron Devices Society, Madras Chapter
IEEE Computer Society, Madras Chapter
IEEE Communications Society, Madras Chapter
And
IEEE SB of Anna University, Chennai**

cordially invite you for the IEEE Distinguished Lecture on

“Semiconductor Device Progression and Impact on Human Thought Process”

by

Dr. M. K. Radhakrishnan

**Vice-President, IEEE Electron Devices Society
Founder Director, NanoRel LLP -Technical Consultants Singapore**

on Thursday, 13th Jul 2017 at 3.00 p.m.

at

**Mini Auditorium, 2nd Floor, Dept. of ECE
Anna University, Chennai - 600025**

Programme: 3.00 p.m. – Lecture :: 4.30 p.m. – High Tea

About the Talk: The semiconductor device progression in the last six decades has immensely influenced in reducing the space-time gap in every phase of human activity. The technology evolution during this period has enormously helped in understanding various materials, interfaces and their interactions at the most miniaturized scale. The studies in turn have assisted in developing many useful tools and techniques for the benefit of mankind. All these technological innovations and related advancements in the society – life style, health care and well-being, etc. - are indebted to semiconductor device technology.

Currently, we stand at another juncture, where the fruits of developments in the last century science and the depth of knowledge mankind acquired through research in material science and various mathematical tools merge to emerge in the form of nano-electronics, a new set of advancement for technological evolution.

As the dimensions shrink, one of the major challenges in device technology is controlling various parameters to obtain high reliability. Device reliability is the resultant of various analyses of the design, process and product and understanding innumerable phenomenon to control the extension of even atomic level defects in its performance, especially when the dimensions are at nanometer level. Understanding the physical phenomenon with which devices mal-function becomes more striving in solving both the device and process problems. Difficulties arise in the area of fault localization, physical failure analysis as well as identifying the physical phenomenon and solving the related problems.

One of the most important and challenging areas is interfaces and comprehending the related issues. Studies on interfaces of basic transistor structure have shown un-assumable problems through physical analysis which provide insights into the device reliability. Study of the device physics in terms of electron conduction through various interfaces provides a deep insight into the challenges in the technology progression.

The reliability problems are being solved time to time. The resultant, many gadgets with innumerable apps to curb our mind and movements. This technology outburst without disturbing the basic laws of science has created a remarkable impact on human behavior. The entire human thought process with which humanity and the civilization has developed through thousands of years is now taking a different turn with the influence of technology. Knowingly or unknowingly, we all are becoming a part of this where the behavior is now changing the learning process itself, and nature is ignored. That is where, we may still need to look into ourselves to understand who are we? Look back, we can see many numbers clubbed with neuron cells to mosquitos, which still challenge us to learn further from nature.

The progression of devices from micro to nano level in practical applications, and how some of the interesting technical challenges are solved, and where we stand now is reviewed in this talk. Also, an insight into the present situation where learning process is changing from the application of brain to finger tips, and probably its impact on humanity. The procedure of developing Wisdom from Knowledge is concomitant to knowing the self through inductive – deductive process.



About the Speaker: Dr. M.K. Radhakrishnan (M82, SM94) is the Founder Director of *NanoRel LLP* -Technical Consultants Singapore providing analysis based solutions to micro and nano electronic industries for improving reliability of devices.

As a researcher in the area of semiconductor devices, analysis and reliability physics for more than 40 years, he worked as a Senior Member Technical Staff / Program Manager with the Institute of Microelectronics Singapore - National University of Singapore (1993-2001), Director and Principal Consultant to Philips Electronics Singapore/Netherlands (2001-2004), Device Program Leader in ST Microelectronics (1991-1993) and a Scientist in ISRO (1985-1991). He was an Adjunct Professor at National University of Singapore (1994-2007) and a Visiting Professor at IISc, Bangalore in 2003-4.

Dr. Radhakrishnan was a Senior Consultant to ITU, Geneva as a UN Expert in the area of Reliability and Failure Analysis in 1995-1997. During 2000-2001 he was a member of ESDA Standards Committee, USA which develops ESDA and JEDEC Standards for devices. He was also a research collaborator of SMA (Singapore MIT Alliance) research team in 1998-2001.

As a researcher, academician and technical consultant he works with various MNCs in Asia, Europe and USA. He continues to do extensive training on device analysis & reliability and electro static discharge (ESD) to various Industries, Universities and Research Centers.

Dr. Radhakrishnan is currently the Vice-President, IEEE Electron Devices Society (Regions and Chapters). He is an IEEE EDS Distinguished Lecturer from 1997 onwards. He serves as the Editor of IEEE Journal of Electron Devices (IEEE JEDS), Editorial Board Member of Microelectronics Reliability Journal (UK), Editor of the European Journal *Facta Universitatis* and was Guest Editor to IEEE TDMR.

He was an Elected Member of the Board of Governors of IEEE Electron Devices Society (2011-2016), Editor-in-Chief of IEEE EDS Newsletter (2013-17), IEEE EDS Region 10 SRC Vice Chair (2010-2015) and Chapter Partner and Coordinator for development of Chapters in South Asia (2000-2010).

In 2000-2001, he was the IEEE REL/CPMT/ED Singapore Chapter Chair. He was the Editor of Journal of Semiconductor Technology and Science (JSTS) from 2002-2005. He was General Chair for IEEE conferences IPFA 1999 and IEDST 2009, and Member of IPFA Board of Governors, Singapore (2004-10)

Dr. Radhakrishnan has given plenary and keynote talks at numerous major international conferences around the globe, and has given more than 100 Distinguished Lectures. He has more than 60 research publications in the area of device failure analysis, reliability and ESD. He is a Fellow of IETE, Senior Member of IEEE, Member of ED-FAS and ESDA.