

**Navakanta Bhat**

Dean, Division of Interdisciplinary Sciences

Professor, Centre for Nano Science and Engineering (CeNSE)

Indian Institute of Science, Bangalore-12

Tel: +91-80-2293-3312

Fax: +91-80-2360-6475

Email: navakant@iisc.ac.in

URL : <http://www.cense.iisc.ac.in/navakanta-bhat>

<https://www.iisc.ac.in/academics/divisions/division-of-interdisciplinary-research/>

**Title :**

Sensor Scaling and Heterogenous Integration for Smart Nanoelectronics

**Abstract :**

Since the invention of the semiconductor transistor in 1947, the phenomenal progress in electronics systems is enabled by the transistor scaling in the micro to nano regime coupled with giga scale integration, driven by compute and storage applications. However, the basic tenet of transistor scaling is staring at the red brick wall, due to scientific and technological challenges. It is contemplated that new architectures enabled by nanotechnology and heterogeneous integration must drive the Moore's law in future and enable the intelligent systems, beyond the conventional scaling era.

The stage is now set for a new wave of nanoelectronic systems to be equipped with massive sensory functions, specifically with biological and chemical sensors, going beyond conventional compute and storage paradigm. However, not much attention is given to develop a holistic approach to manage the diversity and scaling issues of such heterogenous systems. I will present two case studies from our research:

- (i) Biosensor systems for point of care diagnostics : the story of managing the sensing of multiple analytes in blood and urine with an eventual goal to realize "Lab on Palm"
- (ii) Gas sensor systems for environmental monitoring, breath analysis and hazardous gas leakage detection, with an eventual goal to realize the "Electronic Nose" on a chip.