



ಬಿ.ಎಂ.ಎಸ್. ತಾಂತ್ರಿಕ ಮತ್ತು ವ್ಯವಸ್ಥಾಪನಾ ಮಹಾವಿದ್ಯಾಲಯ
BMS Institute of Technology and Management

(An Autonomous Institution Affiliated to VTU, Belagavi)
Avalahalli, Doddaballapur Main Road, Bengaluru – 560119

Department of Electronics and Communication Engineering
M.Tech.-VLSI System Design (VSD)

Talk: 1	Report on Expert Talk	Date:13.01.2026
Speaker: Mr. Chidanand N M and Mrs. Suvarna Khembhavi Aryavarta Circuits Pvt. Ltd.		
Title: Analog and Mixed-Signal IC Design and Management		
Venue/Mode: M.Tech.VLSI Laboratory/ Offline		
Target Audience: I sem. PG VLSI System Design Students and Faculty		

Objectives of the Event:

- To provide industry-oriented knowledge on analog and mixed-signal IC design
- To explain real-world VLSI design flow and career opportunities
- To expose students to emerging semiconductor technologies and market trends

The talk aimed to bridge the gap between academic learning and real-world semiconductor industry requirements, especially for students pursuing **M.Tech. VLSI and related programs**.

Overview of VLSI Design Flow and Career Paths:

The session began with a comprehensive overview of the **VLSI design flow**, covering stages from specification and architecture to design, verification, fabrication, and testing. The speakers clearly explained how each stage contributes to the successful realization of a silicon chip.

They further elaborated on **various career paths in VLSI**, including:

- **RTL Design Engineer**
- **Verification Engineer**
- **Testing and DFT Engineer**
- **Analog Design Engineer**

Special emphasis was placed on the interdisciplinary nature of **mixed-signal SoCs**, where digital and analog blocks coexist, making **signal integrity** and noise management critical design challenges.

Signal Integrity in Mixed-Signal SoCs:

A key technical highlight of the session was the discussion on **signal integrity issues** in mixed-signal systems. The speakers explained how substrate noise coupling, power supply variations, clock jitter, and layout-induced parasitics can severely impact analog

performance. Practical examples demonstrated why careful floorplanning, shielding, grounding, and isolation techniques are essential in modern SoC design.

India's Semiconductor Ecosystem and Market Growth:

The speakers provided valuable insights into **India's rapidly growing semiconductor ecosystem**. They discussed government initiatives under the **India Semiconductor Mission (ISM)**, highlighting incentives aimed at strengthening domestic chip design and manufacturing.

They also addressed the emergence of **fabless design companies in India**, supported by major investments and collaborations involving organizations such as:

- **Tata Group**
- **Micron Technology**
- **PSMC (Powerchip Semiconductor Manufacturing Corporation)**

This segment emphasized the expanding opportunities for VLSI professionals within India's semiconductor landscape.

Future Trends in Semiconductor Technology

The future of semiconductor technology was presented as both **exciting and challenging**.

The speakers highlighted several cutting-edge trends, including:

- **3D IC stacking** for higher integration density
- **Chiplets-based architectures** to improve scalability and reduce design complexity
- **Sub-2nm technology nodes** to overcome power, performance, and area constraints

These advancements were discussed in the context of rising design complexity and the growing importance of cross-domain expertise.

Impact of Artificial Intelligence on Analog and Mixed-Signal Design

A major focus of the talk was the **influence of Artificial Intelligence (AI)** on VLSI design.

The speakers explained how:

- **Machine learning models** are being used for analog layout automation and design optimization
- **AI-driven hardware accelerators** are increasingly integrated into mixed-signal chips for **edge computing**
- Emerging applications include **neuromorphic sensors, low-power IoT devices, and smart embedded systems**

Importantly, the speakers emphasized that **AI cannot replace analog engineers**, as analog design requires intuition, deep physical understanding, and experience that cannot be fully automated.

Analog and Mixed-Signal IC Design Techniques

The technical depth of the session was further enhanced through discussions on **core analog and mixed-signal blocks**, including:

- Operational amplifiers (Op-Amps)
- Analog-to-Digital Converters (ADCs)
- Digital-to-Analog Converters (DACs)
- Phase-Locked Loops (PLLs)
- RF integration in mixed-signal systems

Common **layout pitfalls**, such as mismatch, parasitics, poor routing, and inadequate power planning, were explained with practical insights from industry projects.

Design Management and Best Practices:

Beyond technical design, the speakers highlighted the importance of **management practices** in IC development. They discussed:

- Efficient **project planning**
- Use of **agile methodologies** in IC design workflows
- Managing **tape-out timelines**
- Cross-team collaboration between analog, digital, and verification teams

This section underscored that successful IC design requires both strong technical skills and effective project management.

Motivation for Students:

The session concluded with strong motivation for students, especially those pursuing **M.Tech. VLSI**, to:

- Align academic projects with **current industry needs**
- Develop hands-on skills in analog and mixed-signal design
- Stay updated with semiconductor market trends

The speakers stressed the importance of **industry–academia collaboration** in producing industry-ready engineers.

The expert talk on **Analog and Mixed-Signal IC Design and Management** was highly informative and inspiring. It provided a balanced blend of **theoretical foundations**, **practical design insights**, and **industry trends**, offering students a clear roadmap for building successful careers in VLSI. The session effectively strengthened the connection between academic learning and real-world semiconductor challenges, making it a valuable experience for all participants.




 PG-VSD Coordinator
 Dr. Banuprakash R


 HoD ECE
 Dr. A Shobha Rani