



Microelectronics & VLSI Design

@ Indian Institute of Science



Objective:

- (1) World class research through master's and PhD students and knowledge creation to cater to the scientific and engineering needs of international semiconductor eco-system.
- (2) Make India self-reliant in future semiconductor technologies and VLSI design using disruptive and innovative approaches.

Group*: Mayank Shrivastava, Gaurab Banerjee, Santanu Mahapatra, Kuruvilla Varghese, Dipanjan Gope, Chetan Singh Thakur, Arup Polley, Sanjeev Sambandan, Kausik Majumdar, K. J. Vinoy, Varun Raghunathan and Amrutur Bharadwaj (*pictures in the same sequence)



Highlights

- Specialization drives semiconductor market worth US\$ 463 billion → growing over 10% per year.
- 12 core faculty members → Currently over 100 PhD students and 10 postdoctoral fellows on roll.
- Majority of our faculties have industry experience. They are involved in both scientific research and technology development for commercial and strategic needs. Faculties of this group also have several start-ups and collaborations with semiconductor industries.
- Collectively has over 850 international publications, ~100 Patents and has raised over 100 Crores worth funding in less than a decade.
- This group has executed over 100 sponsored research projects → Heavily funded by government and private
- This group has over 40 Crore worth lab infrastructure, and access to all central facilities.
- Post graduate program on “Microelectronics and VLSI Design” → industry as well as research centric → most sought after program in country (almost every GATE aspirant wants to get into this program) → also highly regarded across semiconductor and VLSI companies in India.

Notable S&T Initiatives (Ongoing and Upcoming)

- Program on Wide Bandgap Semiconductor
- Neuromorphic Hardware and Platform Technology
- Quantum technologies using 2D Materials
- mmW and THz Hardware and Platform Technology
- Radar-on-chip Technology
- Electronics for Quantum technologies
- Full Chip 3D Solvers
- Atoms – to – Chip Modelling
- Optoelectronics and Photonics Using Novel Materials
- Self Healing Circuits and Systems
- Centre for Excellence in Emerging Electronics

Faculty Position Opportunities

The group plans to hire new faculties in emerging area of micro/nanoelectronics and VLSI design. Some of the areas are listed below:

1. **Integrated Circuit Design:** Low Power Electronics, Integrated Power Electronics, mmW and THz Electronics/MMIC, RFICs for Communication and Sensing, Neuromorphic Hardware, etc.
2. Charge (**Nanoelectronics**) as well as Spin (**Spintronics**) based Devices
3. **Science** of Nanomaterials and Nanodevices
4. **Growth of Novel Materials** for Micro/nanoelectronics Applications
5. **Energy (Materials and devices):** Inorganic and Organic semiconductor photovoltaics, Energy harvesters, etc.
6. **Computational** Nanoelectronics
7. Materials and Devices for **Photonics, Neuromorphic and Quantum Technology**
8. Nano-mechanical Sensors and Systems, **NEMs** integration with microelectronics, RF-NEMs, etc
9. Wide bandgap and other **power semiconductor devices**