High End Workshop on

Emerging Electronics for Logic and Memory devices: Towards Next-generation Computing System

15th – 21st Sep, 2022

Funded By
Science & Engineering Research Board (SERB) under the Accelerate Vigyan Scheme

Coordinator
Dr. Shivendra Kumar Pandey, Asst. Prof., Department of E & IE, NIT Silchar

INTRODUCTION
The data demands of artificial intelligence, connected cars, IoT, mobile devices and numerous other applications are driving innovation in memory technologies and logic devices which mainly includes MOS based flash and resistive switching devices such as RRAM, PCRAM, FeRAM, STT-RAM etc. These technologies are different in terms of device physics and materials to enable high-throughput, energy efficient and area- efficient data processing.

OBJECTIVES
* To learn fundamentals of advanced memory technologies and their applications in various areas such as logic and neuromorphic computing.
* To design emerging memory concept based on material innovation: Simulation, growth and characterization.
* To understand the need for emerging memory technologies with non-volatility and low power-consuming as compare to current dynamic RAM and NAND flash.
* To explore the multi-disciplinary approach for design and fabrication of memory devices.
* To address the challenges with traditional digital computers based on the von Neumann architecture and metal–oxide–semiconductor field- effect transistors based memory devices.
* Familiarization of advanced instruments such as Magnetron Sputtering System and SourceMeasure Unit with simulation using TCAD and Finite Element Method.

WHO CAN APPLY
PhD and PG students from various engineering as well as basic science background.

IMPORTANT DATES
Last date for online registration: 30th Aug. 2022
Date of confirmation to participants: 01st Sept. 2022
Acknowledgement and acceptance of the offer by selected candidate: 03rd September 2022
(on or before 05:00 pm)

REGISTRATION & CERTIFICATION
There is no registration fees.
Number of participants is limited to 25.
Interested candidates can register by filling the online registration form. Certificate will be provided to the active participants. Accommodation with food will be provided to selected participants. TA for their journey may be admissible as per the SERB norms.

Online registration form
https://forms.gle/zHxxWwDebTFJmdBw6

TENTATIVE RESOURCE PERSONS
*Prof. M. Anbarasu, IIT Madras
*Prof. Ashwin A. Tulapurkar, IIT Bombay
*Prof. Brajesh Kumar Kaushik, IIT Roorkee
*Prof. Rajesh Kumar, IIT Indore
*Prof. Jawar Singh, IIT Patna
*Prof. Asim Roy, NIT Silchar
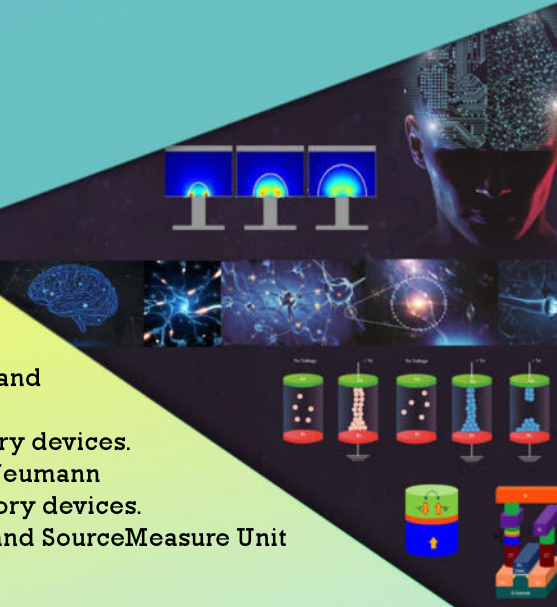*Dr. Sreetosh Goswami, IISc Bangalore
*Dr. Pavan Nukala, IISc Bangalore

CONTACT DETAILS
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INTRODUCTION

The data demands of artificial intelligence, connected cars, IoT, mobile devices and numerous other applications are driving innovation in memory technologies and logic devices which mainly includes MOS based flash and resistive switching devices such as RRAM, PCRAM, FeRAM, STT-RAM etc. These technologies are fundamentally different in terms of device physics and materials to enable high- throughput, energy efficient and area- efficient information processing. Furthermore, these help in packing more bits into tighter spaces with higher aspect ratios to meet performance, latency, and capacity demands.

OBJECTIVES

- To learn fundamentals of advanced memory technologies and their applications in various areas such as logic and neuromorphic computing

- To design emerging memory concept based on material innovation: Simulation, growth and characterization

- To explore the multi-disciplinary approach for design and fabrication of resistive switching memory devices

- To address the challenges with traditional digital computers based on the von Neumann architecture and metal–oxide–semiconductor field- effect transistors based memory devices

- Familiarization of advanced instruments such as Magnetron Sputtering System and SourceMeasure Unit with simulation tools using TCAD and finite element method.

WHO CAN APPLY

PhD and PG students from various engineering as well as basic science background.

REGISTRATION & CERTIFICATION

- There is no registration fees.

- Number of participants is limited to 25. Only selected participants will be informed by email.

- Acknowledgement and acceptance of the offer by selected candidate for participation in the workshop through return email is mandatory.

- Accommodation with food will be provided to selected participants. TA for their journey may be admissible as per the SERB norms.

- Registration can be done by filling the online registration form (https://forms.gle/zHxxWwDebTFJmdBw6).

- After successful completion of the workshop, certificate will be provided to participants.

IMPORTANT DATES

- Last date for online registration: **30th August 2022**

- Date of confirmation to participants: **01st September 2022**

- Acknowledgement and acceptance of the offer by selected candidate: **03rd September 2022 (on or before 05:00 pm)**

ABOUT NIT SILCHAR

National Institute of Technology Silchar is one of the 31 National Institutes of Technology of India and was established in 1967 as a Regional Engineering College Silchar in Assam. In 2002, it was upgraded to the status of National Institute of Technology and was declared as Institute of National Importance under the National Institutes of Technology Act, 2007. NIT Silchar is a fully residential campus situated on the banks of river Barak and on a sprawling green campus spread over 625 acres of land surrounded by scenic tea gardens on the outskirts of Silchar. NIT Silchar is a teaching and research institute which reflects in the top NIRF ranking. NIT Silchar has been ranked internationally for the very first time by the highly reputed Times Higher Education (THE) World University Ranking 2021 with a rank in the band of 801-1000. NITS ranked in band of 11-21st rank in Atal Ranking of Institutions on Innovation Achievements 2021. In 2022 NIRF ranking, NIT Silchar secured 38th rank in engineering and 76th in overall category.

ABOUT DEPARTMENT

The Department of Electronics & Instrumentation Engineering was established in the year of 2008 and currently offers a four year B.Tech. programme in Electronics & Instrumentation Engineering, M.Tech. in Instrumentation Engineering and Ph.D. in the related areas. Department is having Design and Simulation Lab and Instrumentation Lab, which is useful for the development and characterization of nanoscale devices. In addition to this, the department is developing nanofabrication facility with the funded research grant from SERB-DST.

TENTATIVE RESOURCE PERSONS

Highly qualified and experienced faculties from various reputed institutes (IITs, NITs etc.).

- **Prof. M. Anbarasu, Professor**
  Department of Electrical Engineering, IIT Madras

- **Prof. Ashwin A. Tulapurkar, Professor,**
  Department of Electrical Engineering, IIT Bombay

- **Prof. Brajesh Kumar Kaushik,**
  Professor, Department of Electronics & Communication Engineering
  IIT Roorkee

- **Prof. Jawar Singh, Professor,**
  Department of Electrical Engineering, IIT Patna

- **Prof. Rajesh Kumar, Professor,**
  Department of Physics, IIT Indore

- **Prof. Asim Roy, Professor**
  Department of Physics, NIT Silchar

- **Dr. Sreetosh Goswami, Assistant Professor,**
  Centre for Nanoscience and Engineering, IISc Bangalore

- **Dr. Pavan Nukala, Assistant Professor,**
  Centre for Nanoscience and Engineering, IISc Bangalore

VENUE

Seminar Room (Room No.: EI 106)
New Academic Building
Department of Electronics and Instrumentation Engineering
National Institute of Technology Silchar
Silchar, Cachar, Assam, India, 788010

CHIEF PATRON
Prof. Sivaji Bandyopadhyay,
Director, NIT Silchar

PATRON
Prof. S. Baishya, Dean R&C, NIT Silchar

CONVENER
Dr. M. K. Bera, HoD, Dept. of E&I Engineering

COORIDNATOR
Dr. Shivendra Kumar Pandey
Assistant Professor, Dept. of E&I Engineering

ORGANIZING COMMITTEE MEMBERS
Dr. S. H. Laskar, Dr. R. Dasgupta, Dr. L. Seban, Dr. J. Hazarika, Dr. S. Sahoo, Dr. M. Khanra, Dr. A. K. Sunaniya, Dr. R. Hazra, Dr. K. Mukherjee, Dr. Shankar. K., Dr. S. Chakraborty, Dr. A. K. Sharma, Dr. V. C. Pal

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