Workshop on Emerging Nanomaterial-Based Devices for Future VLSI Applications

Organized By
Department of Electronics Engineering
Indian Institute of Technology (ISM), Dhanbad, India-826004

About IIT(ISM), Dhanbad

Indian Institute of Technology (ISM), Dhanbad constituted under Institute of Technology Act, 1961 is administered through IIT Council-the apex body, Government of India under the Chairmanship of Honorable Minister, MoE for uniform and smooth governance of Pan-IIT in the country. Situated in the heart of the country's prime coking coal belt, 260 kms from Kolkata with a campus spread over an area of 393 acres (with 218 acres of existing campus and 175 acres under acquisition and development), the fully residential institute has all the facilities of world class premier academic institute. What started as an institution to impart mining education has graduated into a full-fledged technical institution of international acclaim offering a host of programmes that include B. Tech., M. Tech., M. Sc., M. Sc. Tech., MBA and PhD.

For more information, please visit: https://www.iitism.ac.in/iitismnew/

About the Workshop

Aimed to provide hands-on experience to the students primarily from universities, colleges, private academic institutions, and newly established institutes in handling/troubleshooting of high-end scientific instruments, software and such skill development on themes required for research work. **The program is meant to support motivated PG and Ph.D level students from AICTE approved University/ Institution within India, who are having a strong willingness to get excellence in their scientific and engineering research pursuits.** The following are the objectives of this high-end workshop:

1. To expose Novel material-based VLSI devices which enable next-generation Low-Energy & High-Performance VLSI Devices.

2. To demonstrate and hands-on Training on Tools with different advanced Modeling & Simulation among students.

3. To share information on various future VLSI research problems and interdisciplinary fields.

Who can attend: The workshop is open to motivated PG and Ph.D level students from AICTE approved University/ Institution within India. Preference will be given to the students interested in Micro/Nano-electronics, VLSI, 2D-FETs, Nanomaterials, Spintronics, and Neuromorphic VLSI Circuits. **Hands-on experience on tools like MATLAB, NanoTCAD ViDES, Quantum Espresso, Cadence will be provided.**

The total number of seats is limited to 25 and candidate will be selected based on eligibility, merit and first cum, first serve basis. No registration fee. The selection committee's decision will be final in the selection of candidates. The selected candidates will be provided with support in the form of TA reimbursement for their journey to the host institute from their hometown/ home institute, both ways, as per GoI norms. Selected participants will be accommodated in Institute guest house (if available) with catering facilities under the funds approved by SERB (as per norms). Certificates will be provided to participants after successful completion of the Workshop.

How to Apply? https://forms.gle/KFhHgQswauTY4hV5A

Resource Persons:
1. Prof. Biswajit Ray (University of Alabama, USA)
2. Prof. Saptarshi Das (Penn State University, USA)
3. Prof. Shanthi Pavan (IIT Madras)
4. Prof. Brajesh K. Kaushik (IIT, Roorkee)
5. Prof. Rohit Y. Sharma (IIT Ropar)
6. Prof. Chetan S. Thakur (IISc, Bangalore)
7. Prof. Shubham Sahay (IIT Kanpur)
8. Prof. Tarun Agarwal (IIT Gandhinagar)
9. Prof. Mukul Kumar Das (IIT(ISM), Dhanbad)
10. Prof. Subindu Kumar (IIT(ISM), Dhanbad)
11. Prof. R. Thangaval (IIT(ISM), Dhanbad)
12. Prof. Manodipan Sahoo (IIT(ISM), Dhanbad)

Important Dates:
Registration opens:
14th November, 2022
Last date of application:
30th November, 2022
Display of shortlisted candidates:
2nd December, 2022
Last date to accept the offer:
3rd December, 2022
Workshop dates:
(16-22) December, 2022

Event Organizers:
Prof. Manodipan Sahoo,
Assistant Professor, IIT(ISM), Dhanbad,
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(9523625566)
and,
Prof. Rajeev Kr. Ranjan,
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Venue: Indian Institute of Technology (ISM), Dhanbad, J.H.-826004, India.

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Sessions to be Covered within this Workshop:

Day-1. Inauguration, Lecture on kT/C noise in Electrical Networks, Organic Thin Film Transistor, Lecture on fabrication of 2D metal oxides and their applications, Lecture on Novel material based VLSI Interconnects.

Day-2. Designing future logic and memory devices using 2D materials, Emerging Nanomaterials for Optoelectronic Applications, and Hands-on Training on Modeling Nanomaterials.

Day-3. Lecture on Spintronics, Hands-on Training on Analysis of DFT and NEGF calculations using Quantum Espresso.

Day-4. Lecture on Neuromorphic Computing, Hands-on Training on Analysis of DFT and NEGF calculations using NanoTCAD ViDES.

Day-5. Lecture on Memory technologies, Hands-on Training on Circuit Simulation using Cadence.

Day-6. Lecture on Trends in VLSI: Classical to Non-classical, Lecture on Analytical Modeling of FET-based Biosensors using MATLAB, Lecture on VLSI Implementation of 2D Memtransistors.

Day-7. Lecture on Neuromorphic Devices, Circuits and Systems, Hands-on Training on Modeling of FET-based Biosensors using MATLAB, Valedictory Session.

International Speaker

Prof. Biswajit Ray (University of Alabama, USA).
TOPIC: **Novel material-based Memory technology**

Prof. Saptarshi Das (Penn State University, USA)
TOPIC: **Very Large-Scale Integration of Two-dimensional (2D) Memtransistors**

National Speaker

1. Prof. Shanthi Pavan (IIT Madras) [TOPIC: **kT/C Noise in Electrical Networks**]

2. Prof. Brajesh K. Kaushik (IIT Roorkee) [TOPIC: **Spintronics- Perspectives and Challenges**]

3. Prof. Rohit Y. Sharma (IIT Ropar) [TOPIC: **Novel material-based VLSI Interconnects**]

4. Prof. Chetan S. Thakur (IISc, Bangalore) [TOPIC: **Neuromorphic Devices, Circuits, and Systems: A Quest to Mimic to the Brain**]

5. Prof. Shubham Sahay (IIT Kanpur) [TOPIC: **Neuromorphic computing: mapping neural networks to hardware**]

6. Prof. Tarun Agarwal (IIT Gandhinagar) [TOPIC: **Designing future logic and memory devices using 2D materials**]

7. Prof. Mukul K. Das (IIT(ISM), Dhanbad) [TOPIC: **Recent advances in the fabrication of 2D metal oxides and their applications**]

8. Prof. Subindu Kumar (IIT(ISM), Dhanbad) [TOPIC: **Trends in VLSI: Classical to Non-classical**]

9. Prof. R. Thangaval (IIT(ISM), Dhanbad) [TOPIC: **Emerging nanomaterials for Optoelectronic Applications**]

10. Prof. Manodipan Sahoo (IIT(ISM), Dhanbad) [TOPIC: **Analytical Modeling of FET-based Biosensors**]

Contact Person: **Prof. Manodipan Sahoo,** Assistant Professor,**manodipan@iitism.ac.in** (**9523625566**).

Venue: Indian Institute of Technology (ISM), Dhanbad, J.H.-826004, India.

One Week High-End Workshop on
Emerging Nanomaterial-Based Devices for Future VLSI Applications
[Physical Mode]
DECLARATION FORM

1. Name (In Block Letters): ……………………………………………………………………………………….

2. Date of birth: …………………………………………….Gender: ……………………………………….

3. Category (M.Tech/M.E/M.S./Ph.D. student): …………………………………………………….…

4. Institution: ……………………………………………………………………………………………………….

5. Department: ……………………………………………………………………………………………………

6. Mobile: ……….

7. E-mail: ………..

8. Specialization: …………………………………………………………………………………………………..

9. Accommodation is required (Yes/No)…………………………………………………………………..

10. Official Address: ………………………………………………………………………………………………..

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Declaration: The information provided is true to the best of my knowledge. If selected, I agree to abide by the rules and regulations of the program and shall attend the course for the entire duration.

Name & Signature of the candidate

No Objection Certificate (NOC) from Project Supervisor/HoD/Head of Institution

I hereby certify that Mr./Ms. ……………………….. is a …………………….… (M.Tech/M.E/PhD) student of ………………………………………… …………………………………………… I have no objection to him/her undergoing a high-end workshop **(if selected)** on **"Emerging Nanomaterial-Based Devices for Future VLSI Applications"** at the IIT (ISM), Dhanbad, from **16th to 22nd December 2022**.

Place:

Date:

Name & Signature of Project
Supervisor/HoD/Head of Institution

(Department/Institute Seal)