Prof. Biswarup Mukherjee
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Work Experience & Association with the Institute

Prof. Biswarup Mukherjee is associated with the institute since 2005. He is currently an **Assistant Professor** with the Department of Electronics and Communication Engineering. Apart from that he was also **coordinator of first year** B.Tech program at NITMAS in the academic year 2018-19 and **mentor** of 4th year students of ECE department. Apart from this Prof. Mukherjee is also a guest lecturer at The Neotia University.

He worked at **Indian Telephone Industry** (ITI, India) and **Digi Cable Comm Ltd**. and engaged with multi-mode multi-band RF transceiver handling for E-10B, OCB exchanges and CATV broadcasting head end before joining the Institution.

He is a **corporate member of The Institution of Engineers (India)** and member of **International Association of Engineers (Hong Kong).**

Under-Graduate (B.TECH), Post-Graduate (ME/MTECH) thesis supervised

He has supervised many projects in the UG as well as in PG level. Few notable UG projects under his supervision are

- ✓ Low power MAC unit Design,
- ✓ Low power DETFF Design,
- ✓ Low power Vedic Multiplier Design,
- ✓ Wireless walkie-talkie design,
- ✓ Design of a low power full adder,
- ✓ Design of a low power VCO,
- ✓ Traffic Signal Control using VHDL
- ✓ CMOS ALU Design
- ✓ Automated home security using FPGA

He has also supervised projects like "STUDY, DESIGN & ANALYSIS OF LOW POWER OPAMP" in PG course. Under his supervision few student research papers have been published in journals & conferences.

Student thesis published:

- ✓ P. Deb, S. Chandra, B. Mukherjee; "Design & Analysis of a Low Power, Low Latency, Area Efficient Radix-4 GDI Based Booth Wallace Multiplier for On-Chip Signed Bit Multiplications", IEEE CAS student paper contest, Kolkata, 2019
- ✓ A. Ghosal, C. Hati, A. Chatterjee, A. Dewan, S. Bera, B. Mukherjee, "Design and Implementation of an Intelligent Security System Using Microcontroller and GSM" International Journal of Emerging Technology and Advanced Engineering, Vol. 6, issue 5, pp-336-341, 2016
- ✓ Sarkar, B. Narayan Kundu, S. Sengupta, M. Kanti Maity, B. Das and B. Mukherjee," Design & Study of a Low Power High Speed 8 Transistor Based Full Adder Using Multiplexer & XOR Gates", IEEE EDS Student Paper Conference 2011, IESPC-2011
- ✓ Sarkar, B. Narayan Kundu, S. Sengupta, M. Kanti Maity, B. Das and B. Mukherjee," Design & Study of a Low Power High Speed Full Adder Using Multiplexer", FOSET,2010

Research Interest & Notable Publications

His research interests include **CAD and low-power design methodologies for VLSI and Nanotechnology.** He is a registered research scholar in The Calcutta University. Currently he is actively involved in design and development of Low Power Dynamic Voltage Scaling Multiplier and Accumulator (MAC) Unit and Filter Section for Portable DSP Systems at Institute of Radio Physics and Electronics, University of Calcutta. He pioneered the low power technique, **"Cyclic Combinational Gate Diffusion Input (CCGDI)",** which has been cited in many research articles of international repute. Prof. Mukherjee has published many research articles in collaborations with Dr. A. Dandapat, NIT Meghalaya, Dr. A. Biswas, RIE, Shizuoka University, Japan, Dr. A. Ghosal, IRPEL, CU and Prof. B. Roy, NITMAS in highly cited international conferences and journals. He is on the board of reviewers of several international journals/conferences including IEEE Transaction on VLSI, IEEE Pub., Circuits, Systems & Signal Processing, Springer Pub., Circuit World, Emerald Pub., Microelectronics Reliability, Elsevier Pub., Engineering Science and Technology, An International Journal, Elsevier Pub. and many more. Few notable publications are,-

Journal Publications:

- ✓ B. Mukherjee, A. Ghosal, " Low power dynamic voltage scaling and CCGDI based Radix-4 MBW multiplier using parallel HA and FA based counters for on-chip filter applications" Sādhanā. Springer Publication, Vol.: 45. https://doi.org/10.1007/s12046-020-01340-2, 2020
- ✓ B. Mukherjee, A. Ghosal, "An Area Efficient Sub-threshold Voltage Level Shifter using a Modified Wilson Current Mirror for Low Power Applications", IETE Journal of Research, https://doi.org/10.1080/03772063.2019.1615389 , 2019
- ✓ B. Mukherjee, A. Ghosal, "Design of a low power, double throughput CCGDI based radix-4 MBW multiplier and accumulator (MAC) unit for on-chip RISC processors of MEMS sensor", Journal of Micromechanics and Microengineering, IOP Publishing Ltd. Vol. 29, No. 6, page: 064003, https://doi.org/10.1088/1361-6439/ab1504 , 2019
- ✓ B. Mukherjee, A. Ghosal, "Design and Implementation of Low Power, High Speed, Area Efficient Gate Diffusion Input Logic Based Modified Vedic Multiplier for Digital Signal Processor", International Journal of Innovative Knowledge Concepts Vol. 7 , Special issue on Recent Advances in Informatics , Communication Management, ISSN: 2454-2415, pp: 243-250, 2019
- ✓ B. Mukherjee, A. Ghosal, "A Novel Architecture for Low Power Equiripple Half-Band FIR Filter using GDI Based Dual Edge Triggered Flip-Flop", Journal of Mechanics of Continua and Mathematical Sciences, Vol. 13, Issue: 3, pp. 146-158, https://doi.org/10.26782/jmcms.2018.08.00009 , 2018
- ✓ A. Ghosal, C. Hati, A. Chatterjee, A. Dewan, S. Bera, B. Mukherjee, "Design and Implementation of an Intelligent Security System Using Microcontroller and GSM" International Journal of Emerging Technology and Advanced Engineering, Vol. 6, issue 5, ISSN: 2250-2459, pp: 336-341, 2016

Conference Publications:

- ✓ B. Mukherjee, A Ghosal," Counter Based Low Power, Low Latency Wallace Tree Multiplier Using GDI Technique for On-chip Digital Filter Applications", IEEE International Conference on Devices for Integrated Circuit (DevIC), https://doi.org/10.1109/DEVIC.2019.8783456 , March 2019
- ✓ B. Mukherjee, A Ghosal," Design and Implementation of Low Power, High Speed, Area Efficient Gate Diffusion Input Logic Based Modified Vedic Multiplier for Digital Signal Processor ", RAICMHAS International Conference, 2019
- ✓ B. Mukherjee, A Ghosal," Design and Analysis of a Low Power High Performance GDI Based

Radix 4 Multiplier Using Modified Booth Wallace Algorithm", IEEE Electron Device Kolkata Conference (2018 IEEE EDKCON), https://doi.org/10.1109/EDKCON.2018.8770494 , 2018

- ✓ B. Mukherjee, A Ghosal,"Design and Implementation of Low Power Dual Edge Triggered Flip-Flop Using GDI and TG for High Speed FIR Filter", IEEE International conference on Devices for Integrated Circuit (DevIC), https://doi.org/10.1109/DEVIC.2017.8074031 , March 2017
- ✓ B. Mukherjee, A Ghosal,"Design & study of a low power high speed full adder using GDI multiplexer",Recent Trends in Information Systems (ReTIS), IEEE 2nd International conference on Recent Trends in Information Systems (ReTIS), https://doi.org/10.1109/ReTIS.2015.7232924, July 2015
- ✓ B. Mukherjee, B Roy, A Biswas, A Ghosal, "Design of a low power 4× 4 multiplier based on five transistor (5-T) half adder, eight transistor (8-T) full adder & two transistor (2-T) AND gate", IEEE 2nd International conference on Computer, Communication, Control and Information Technology (C3IT), https://doi.org/10.1109/C3IT.2015.7060143 , 2015
- ✓ B. Mukherjee, A Ghoshal, "Design and Study of a Low Power High Speed 8 Transistor Based Full Adder Using Multiplexer and XOR Gates" , International Conference on Systems, Control, Signal Processing and Informatics (SCSI 2015), ISBN: 978-1-61804-290-3 , pp.21-25, April 2015
- ✓ B Mukherjee, B Roy, A Biswas, A Ghosal, "Cyclic Combinational Gate diffusion input (CCGDI) Technique-a new approach of low power digital combinational circuit design", IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), https://doi.org/10.1109/ICECCT.2015.7226150 , pp. 1-6, 2015
- ✓ B. Roy, B Mukherjee, "Design of a Coffee Vending Machine Using Single Electron Devices:(An Example of Sequential Circuit Design)",International Symposium on Electronic System Design (ISED), pp. 38-43, https://doi.org/10.1109/ISED.2010.16, December 2010
- ✓ B. Mukherjee, AK Dandapat,"Design of Combinational Circuits by Cyclic Combinational Method for Low Power VLSI", International Symposium on Electronic System Design (ISED), pp. 107-112, https://doi.org/10.1109/ISED.2010.29 , December 2010
- ✓ B. Mukherjee , "Design & Simulation of Combinational Circuits by Cyclic Combinational Method", National Conference VCaN-2010

Awards and Achievements

Prof. B. Mukherjee was felicitated with **Best teacher award** for his significant contribution in teaching, research, student motivation & institutional development by **Honorable Vice Chancellor, MAKAUT** on September 2018. He has been felicitated by **IEEE, Electron Devices Society, Kolkata Chapter** for his contribution in modern research in the year 2018. Besides that he has been felicitated by **SRISTI** for motivating the students in Gandhian Young Technological Innovation (GYTI) in 2017. Apart from academic achievements he has also awarded as **"Awnkan Visharad"** from Sarba Bharatiya Sangeet O Sanskriti Parishad. Also he has received **gold medal** from **Department of Parliamentary Affairs, Government of West Bengal,** for his meritorious performance in the Youth Parliament Competition.

Other activities and administrative roles and responsibilities

Contribution in students' motivation:

- Being a motivator of student activities Prof. B. Mukherjee has become the SPOC of
  - ✓ Smart India Hackathon
  - ✓ Bengalathon
  - ✓ Ideathon
  - ✓ India International Science Festival (IISF) 2018.

- Not only limited into encouraging the students to participate in competitions but the he has motivated the students for various project competitions like
    - ✓ GYTI award,
    - ✓ FOSET 2009 (2nd runner up award)
    - ✓ IEEE CAS student paper contest 2019 (1st runner up award)
- He motivated students in participating in various trainings, seminars, technical presentations, tech-start-ups:
    - ✓ Training and seminars organized by Institutions,
    - ✓ SPOC of Canada India Acceleration program of AICTE start ups

Contribution in Institutional Development:

- He has contributed in development of **Advanced IC design** laboratory in the institution. Established in 2010, this laboratory as been advancing through research in fields of digital IC design and providing knowledge by delivering information to the students and researchers.
- He is an active member of organizing committee various seminar/workshops in the institution.
    - ✓ Seminar: Bridge the gap between school education and higher education
    - ✓ High school level Quiz contest at institutional campus
    - ✓ Winter workshops on VLSI, induction programme etc.
- He is also active member of various committees at NITMAS
    - ✓ Institutional website committee,
    - ✓ Anti ragging,
    - ✓ Disciplinary Action,
    - ✓ Grievance redressal,
    - ✓ Examinations (MAKAUT exam, WBJEE exam etc.),
    - ✓ Internal Complaints Committee