Sarbani Mukherjee

Research Engineer
Rolly-Royce@NTU Corporate Laboratory, Singapore

E-mail: sarbani.nit@gmail.com | **D.O.B.:** 11th October, 1984 | **Ph:** +65 98148006(M)

Professional Summary

- Experienced Power Electronics engineer currently involved with Industrial Research
- Proficient in design and simulation of electrical power train
- Able to work independently or as part of a professional engineering team

Work Experience

Research Engineer — Jun. 2019 – till date

Rolly-Royce@NTU Corporate Laboratory, Singapore

- **Hybrid Aerospace Converter**
  - Design and simulation of aerospace converter to comply with requirement specifications
  - System level modelling for aerospace drive train
  - Failure Mode and Effects Analysis (FMEA) in system level model of hybrid Aerospace Drive Train
- **Grid Tied Converter**
  - Design and simulation of AC/DC converter for different operational modes of microgrid application
- **Development of Serial Hybrid Rail Converter**
  - Hardware-in-loop simulation for hybrid railway drivetrain in PLECS RT Box
  - High voltage high power testing of railway converter

Senior Project Fellow — Sep. 2013 – Feb. 2019

Surface Engineering & Tribology, CSIR-CMERI, WB, India

- **Hybrid Energy Storage Systems (HESS) for Unmanned Ground Vehicle Applications**
  - Model based simulation towards optimum sizing of energy sources and power electronic components in a HESS
  - Design and development of bidirectional dc-dc converter to integrate Supercapacitor in a battery based ESS for UGV Applications
  - Development and implementation of power sharing strategy in DSP controller to control power flow dynamically in HESS
- **Multi-level Inverter for EV Applications**
  - Development of prototype 3-level NPC inverter for induction motor drives
  - Development of energy efficient modulation strategies for traction drives
  - Mitigation of capacitor voltage unbalance issue with modified modulation strategies
- **System Integration & Control of Additive Manufacturing (AM) System**
  - Development of Multi-Metal Deposition (MMD) system by integrating various subsystems such as laser, powder feeder, motion controller, 5-axis stages, driver etc for co-ordinated and synchronized operation
  - Design and development of a close-loop system for layer-by-layer height control of deposited metal structure

Aerospace Systems Engineer — Mar. 2012 – Sep. 2013

TechBLA Solutions Pvt. Ltd, Kolkata, India

- Development of flight controller model in MATLAB/Simulink
- Co-simulation between Simulink and Flight simulators

Areas of Interest

- ☑ Control and modulation of power converters
- ☑ Power electronics interface for energy storage devices
- ☑ Power electronics solutions for Electric Vehicles

Hardware Skills

- ❒ Strong understanding of electrical and electronic circuits and operations
- ❒ Testing and troubleshooting of hardware
- ❒ HiL simulation in PLECS RT Box, dSPACE Control desk, NI PXI System

Software Skills

- ❒ Model based programming
- ❒ C/Embedded C (TI Delfino/ Piccolo/MSP430, Microchip dsPIC,)
- ❒ MATLAB/Simulink, PSIM, PLECS

Additional Skills

- ❒ Thermal modelling of power devices
- ❒ SPICE simulation
- ❒ PCB designing (ALTIUM, EAGLE, ORCAD)

Technical Officer (R&D) **Apr. 2011 – Feb. 2012**

Chloride Power Systems & solution, Kolkata, India

- **CC CV Charger/Discharger**
  - Development of CC/CV charger & discharger for in-house battery testing
- **Battery Health Monitoring System**
  - Development of Battery Health Monitoring System (BHMS) to monitor the status of any individual cell and/or the entire battery

Technical Assistant **Oct. 2009 – Mar. 2011**

Narula Institute of Technology, W.B.U.T., Kolkata, India

- Demonstration of experiments on Microprocessor & Microcontroller, Digital Electronics, VLSI, DSP

Other Achievements and Association

- Student member of IEEE technical society
- Participated in International Power Electronics conferences
- Participated in TI MCU design contest 2014-2015: Developed a MSP430 based smart watch

Education

PhD in Electrical Engineering 2016 - 2020
National Institute of Technology (NIT), Durgapur, WB
Research Topic: **Modulation and Control of Multilevel NPC inverters for EV Applications**

B.Tech in Electronics & Communication 2006 – 2009
Narula Institute of Technology (W.B.U.T.), Kolkata, WB

Diploma in Electronics & Tele-Communication Engineering 2003 - 2006
Siliguri Govt. Polytechnic, WB

Research Outcome and Key Publications

1. **Sarbani Mukherjee**, Santu Kr. Giriand Subrata Banerjee, "An Improved Adjustable Modulation Strategy for Three-Level NPC Inverters Considering Dynamic Loading Applications", ***IEEE Transactions on Industry Applications*** **[pdf]**.
2. **Sarbani Mukherjee**, Santu Kr. Giri and Subrata Banerjee, "A Flexible Discontinuous Modulation Scheme with Hybrid Capacitor Voltage Balancing Strategy for Three-Level NPC Traction Inverter", ***IEEE Transactions on Industrial Electronics*** **[pdf].**
3. **Sarbani Mukherjee**, Santu Kr. Giri, Sourabh Kundu and Subrata Banerjee, "A Generalized Discontinuous PWM Scheme for Three-Level NPC Inverter with Minimum Switching Loss for Electric Vehicles", ***IEEE Transactions on Industry Applications*** **[pdf]**.
4. Santu Kr. Giri, **Sarbani Mukherjee**, Sourabh Kundu, Subrata Banerjee and Chandan Chakraborty, "An Improved PWM Scheme for Three-Level Inverter Extending Operation into Overmodulation Region with Neutral Point Voltage Balancing for Full Power Factor Range", ***IEEE Journal of Emerging and Selected Topics in Power Electronics*** **[pdf]**.