Md Mahmud-Ul-Tarik Chowdhury
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Education

PhD in Electrical and Computer Engineering **Aug 2022 (Expected)**
University of North Carolina, Charlotte, USA *GPA-4.00*

MS in Electrical and Computer Engineering **May 2016**
Northeastern University, Boston, USA *GPA-3.83*

BSc in Electrical and Electronic Engineering **Feb 2013**
Bangladesh Uni of Engr & Tech. (BUET), Dhaka, BD *GPA-3.66*

Relevant Coursework

- Power System Stability & Control
- Smart Grid: Char, Design & Analysis
- Computational Methods in Power Systems
- Power Generation: Operation and Control
- Linear Systems Analysis
- Advanced Power Electronics
- Power Electronics
- Introduction to Filter Synthesis
- Power System Analysis
- Control System

Experience

Power, Energy and Intelligent Systems Lab (PEISL) **Aug. 2019 – Present**
Graduate Research Assistant *UNCC, Charlotte, USA*

- Developed a SOCP OPF model for single-phase and three-phase radial power distribution networks with high DGs penetration. The proposed convex OPF model also retrieves the bus voltage angle difference.
- With the retrieved angle difference information, the proposed model provides an exact solution to the AC-OPF problem for mesh networks satisfying the cyclic constraints in a network.
- Proposed a new control algorithm for Voltage Control of power distribution system with inverter-based distributed generation.
- Designed and implemented a hardware test system for different experiments on smart-grid operation and control.

Department of Electrical and Computer Engineering **Aug. 2019 – Present**
Graduate Teaching Assistant *UNCC, Charlotte, USA*

- Provided hands-on assistance to the undergraduate students in ECGR 2161 (Basic Electrical Engineering) lab & ECGR 3131 (Fundamentals of Electronics Semiconductors) theory course.

University of Dhaka **July 2018 – August 2019**
Lecturer *Dhaka, Bangladesh*

- Courses taught: Electrical Machines, Power System Protection, Power System Analysis I & II, Digital Logic Design, Systems and Signals.
- Provided hands-on assistance to undergraduate students to perform their laboratory experiments in Electrical Machine Lab, Power System Protection Engineering Lab and Digital Logic Design Lab.

Bangladesh National Power Grid (PGCB) **Nov 2016 – July 2018**
Assistant Engineer *Gopalgonj, Bangladesh*

- Grid in-charge at the Gopalganj 132/33KV grid substation under the Power Grid Company of Bangladesh Ltd (PGCB).
- Gained hands-on experience in grid operation, maintenance and fault analysis.

Power Electronics and Renewable Energy Systems Labratory **Aug. 2015 – May 2016**
Graduate Research Assistant *NEU,Boston, USA*

- Proposed, designed and built a prototype of a novel, reliable and compact inverter for a PV system.
- The proposed inverter is capable of both buck and boost operation in hard and soft-switching modes.

Power Electronics and Renewable Energy Systems Labratory **Aug. 2014 – July 2015**
Graduate Research Assistant *UIC,Chicago, USA*

- Analyzed, designed and simulated a system for conditional charging access for EV consumers using a capacitor bank and battery system.
- Designed and built a prototype with a series-parallel resonance circuit for a wireless power transformer system.

Projects

PV based Micro-grid System | *Simulink, Matlab* **February 2021**

- Designed a 2 MW PV farm with MPPT connected with a 1.2 MWh battery with cascade control regulating the voltage at the DC bus. The PV- battery interconnect together to supply a local load of 375 kW. In addition to the local load, the DC Micro-grid also serves as a source to a 3-phase, 4 MVA grid-connected inverter.
- Later, designed a bi-directional converter (10 kHz) of 800 kW size such that the DC bus is regulated at 1200 V.
- Finally, designed a 3-phase, 4 MVA grid-connected inverter (6kHz) operating at 480 V ph-ph (RMS) on the grid side and powered by a constant DC source of 1200 V.

Micro-Grid Interconnection with Bus Feeder | *Simulink, Matlab* **April 2021**

- Implemented the previously designed DC and AC-microgrid models on a 7-bus and IEEE 13-bus network distribution systems.
- Tested and validated the interconnection between the micro-grid and the power grid at the PCC. Also, designed a control scheme to connect the AC micro-grid to the power grid for PCC voltage to 1 p.u.

Optimal PMU Placement in 7-Bus Network System | *PSAT* **April 2021**

- Designed the 7 bus system interconnected with a AC micro-grid using PSAT toolbox.
- Used the PMU placement tool on PSAT to place the PMUs on the 7 bus network system for optimal PMU placement.

Design of an Uninterruptible Power Supply System | *PSIM* **April 2016**

- A 1KW dual-conversion online static UPS and a Line-Interactive UPS systems were modeled and simulated using PSIM software.
- A bi-directional buck-boost converter, an inverter and a rectifier system were designed for the UPS system.

A 200W isolated SiC MOSFET full-bridge isolated buck converter | *PSIM* **November 2014**

- Designed a SiC MOSFET-based full-bridge isolated buck converter with a closed-loop system for a voltage of 40-60 volts input and fixed 12 volts output.
- The output current and voltage ripple were below 5% and overshoot and undershoot were below 5% of the buck converter.

Technical Skills

Languages: Matlab, Python, C
Simulation Tools: Simulink, OpenDSS, RSCAD, PSIM, LTspice, Pspice
Optimization Tools: MOSEK, GAMES
Design Tools: AutoCAD, Express PCB
Office Tools:Word, Excel, PowerPoint, Visio

Publications

- **Md Mahmud-Ul-Tarik Chowdhury**, Sukumar Kamalasadan. Optimal Power Flow (OPF) and Voltage Control Using Second-Order Cone Programming (SOCP) Model for Power Distribution Network.(Accepted in : IEEE Transactions on Industry Applications).
- **M. M. Chowdhury** and S. Kamalasadan, "An Angle Included Optimal Power Flow (OPF) Model for Power Distribution Network Using Second Order Cone Programming (SOCP)," 2020 IEEE Industry Applications Society Annual Meeting, 2020, pp. 1-7, doi: 10.1109/IAS44978.2020.9334785.
- **M. Chowdhury**, M. Amirabadi and J. Baek, "A novel reliable and compact inverter for wireless power transfer," 2015 IEEE Energy Conversion Congress and Exposition (ECCE), 2015, pp. 3160-3166, doi: 10.1109/ECCE.2015.7310103.
- **Chowdhury, Md Mahmud-Ul-Tarik**. A novel single-stage inverter topology. Northeastern University, 2016.
- **Chowdhury, Mahmud-Ul-Tarik**, and Md Saleh Ebn Sharif. "Design and Analysis of a Isolated SiC MOSFET based fullbridge DC-DC converter." 5th International Conference on Development of Renewable Energy Technology. 2018.
- M. S. E. Sharif, **M. Chowdhury**, M. Moniruzzaman and A. Mohit, "A probabilistic LOLE based method to determine optimal reserve and control power system frequency," 2017 3rd International Conference on Electrical Information and Communication Technology (EICT), 2017, pp. 1-6, doi: 10.1109/EICT.2017.8275201.
- Sharif, Md Saleh Ebn, **M. U. T. Chowdhury**, M. J. Ferdous, and M. Moniruzzaman. "An Efficient Method for Power System Frequency Control and Optimal Reserve Determination Considering Probabilistic Loss-of-Load Expectation Risk Index." IEEE Electrical Information and Communication Technology (2017).