Soham Manjrekar

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Education

Georgia Institute of Technology Aug. 2024 – Dec. 2025
Master of Science in Electrical Engineering *Thesis Advisor: Dr. Deepak Divan*

- Chair, IEEE Power & Energy Society Student Chapter

University of Illinois Urbana-Champaign Aug. 2020 – May 2024
Bachelor of Science in Electrical Engineering

- Hoeft Technology and Management Minor

Experience

Graduate Research Assistant Aug. 2024 – Present
Georgia Institute of Technology – Center for Distributed Energy (CDE) *Atlanta, GA*

- Research Advisor: Dr. Deepak Divan
- Research focused on designing, modeling and prototyping grid-connected inverters integrating distributed energy resources to be rapidly adopted and scaled for digitalization, decentralization, and decarbonization

Undergraduate Research Assistant Aug. 2023 – May 2024
University of Illinois Urbana-Champaign – Power and Energy Group *Champaign, IL*

- Advisor: Dr. Arijit Banerjee
- Research to experimentally characterize transformer core losses when excited by a signal of multiple frequencies

Electrical Engineering Intern May 2023 – Aug. 2023
Northrop Grumman - Mission Systems *Baltimore, MD*

- Tested and validated Electronic Warfare (EW) systems aboard the EA-18G Growler platform
- Supported design and analysis of the Power Processing Unit (PPU) for electrical systems on the F-35 Lightning II

Electrical Engineering Intern May 2022 – Aug. 2022
Black & Veatch - Power Delivery *Overland Park, KS*

- Worked on the physical design of GIS substations across the Midwest and performed a site survey to validate lightning arresters
- Developed proposal for street-side EV charging bays presented to City of Kansas City

Electrical Engineering Intern May 2021 – Oct. 2021
American Battery Solutions *Lake Orion, MI*

- Developed an automated system with Python scripts to report simulated requirement testing and validation of battery packs in an ETAS LABCAR with a real BMS
- Built a low-cost CANalyzer alternative using open-source software and economical hardware to transmit CAN signals directly to a mobile app or web server

Projects

Medium Voltage Inertia-Less Isolated Converter
Center for Distributed Energy (CDE), Georgia Institute of Technology *Atlanta, GA*

- Design and prototype of a multi-level medium-voltage, single-stage isolated converter, 800 Vdc to 2.4 kVac at 100kW/slice. Work included topology definition, high-frequency transformer design, control and protection implementation, hardware and firmware testing and validation.

Regenerative Clamp Converter
Center for Distributed Energy (CDE), Georgia Institute of Technology *Atlanta, GA*

- Design and analysis of a regenerative clamp converter to recover leakage-inductor energy in high-power isolated converter topologies, reducing device stress and improving efficiency; extended clamp architecture into a multiport interface enabling PV/DER integration via the auxiliary port while maintaining clamping functionality.

Integrated Home Energy Fast Charger

Center for Distributed Energy (CDE), Georgia Institute of Technology *Atlanta, GA*

- Design of a 50 kW bidirectional home fast charger, 120 Vac split-phase to 250-400 Vdc, with interleaved PFC, active power decoupling, and isolated DC–DC stage. Supported automatic PV/storage integration, and EV charging using SiC MOSFETs.

Rogowski Coil Analog Current Sensor

Center for Distributed Energy (CDE), Georgia Institute of Technology *Atlanta, GA*

- Design and validation of a wideband, low cost, analog Rogowski coil current sensor for closed loop current control of high frequency power converters.

Single-Stage Isolated DC–AC Energy Router

Center for Distributed Energy (CDE), Georgia Institute of Technology *Atlanta, GA*

- Designed and prototyped a 1 kW single-stage isolated converter based on the inertia-less isolated converter, delivering 240 Vac from a 48 Vdc source with a $\Sigma\Delta$ modulation scheme.

Power Quality Monitor and Submetering Device

ECE Senior Capstone, University of Illinois Urbana–Champaign *Champaign, IL*

- Designed a low-cost submeter with integrated power-quality monitoring, ESP32 control, and ADE9153A/ADE9430 ICs; implemented real-time cloud telemetry, 24+ hour self-powered operation, and web-based GUI

Machine Learning for Weld Acoustics Monitoring

Caterpillar Inc. and University of Illinois Urbana–Champaign *Peoria, IL*

- Developed a machine learning system to classify weld quality from acoustic signals using MFCC feature pipelines and SVM classifiers; built Python-based GUI feedback, Arduino/LED prototype alert stack, and achieved 75–84% test accuracy on Caterpillar welding lab datasets.

Publications & Patents

[1] Deepak Divan, Joseph Benzaquen, and Soham Manjrekar. *Automatic Integration of PV Solar Energy into Multiport Dual Active Bridge Converter-Based EV Chargers*. Provisional Patent Disclosure, Georgia Institute of Technology. June, 2025.

[2] Ruomu Hao et al. "A Multiport Bidirectional HF-Link Split-phase DC/DC/AC Universal Minimal Converter". In: *IEEE Energy Conversion Congress & Expo (ECCE)*. Accepted. 2025.

[3] Soham Manjrekar et al. ""AC Cube": A Single-Stage PV/Battery/Grid Energy Router". In: *2025 IEEE Energy Conversion Congress & Exposition Asia (ECCE-Asia)*. Bengaluru, India, 2025, pp. 1–6. DOI: 10.1109/ECCE-Asia63110.2025.11111930.

[4] Navami Prabhu et al. "Solar Plug – Universal Off-Grid Microconverter for Low-Cost Tier-1-4 Energy Access". In: *IEEE International Decentralized Energy Access Solutions (IDEAS) Conference*. Presented. 2025.

Awards

Frank C. Mock Scholarship Dec. 2023

- This scholarship is given in honor of the Frank C. Mock family to be used to help top ECE students

Grainger Power Engineering Award May 2024

- To reward highly qualified and well-motivated undergraduate and graduate students who have chosen to pursue a field of study in electric power engineering

Technical Skills

Modeling & Simulation: MATLAB/Simulink, PLECS, LTspice, PSIM
Hardware Tools: Cadence Allegro, Altium, ORCAD, KiCad, Oscilloscopes, Power analyzers, LEM Sensor platform, DSP/FPGA platforms (C2000, DE0-Nano)
Programming: Python (NumPy, scikit-learn, Librosa), C/C++, SystemVerilog, MATLAB, JavaScript, HTML/CSS
Developer Tools: Git, VS Code, Quartus, Code Composer Studio, Eclipse