ABHINAV CHINNUSAMY

📞(608) 658 7885 | 🌐 Portfolio | 🎓 Google Scholar

EDUCATION

University of Wisconsin-Madison Madison, WI
Master of Science in Electrical and Computer Engineering *Aug 2024 – May 2026 (Anticipated)*

Coursework: Power Electronic Circuits, Power Electronics Lab, Solid State Power Conversion, Introduction to Optimization

Indian Institute of Technology Dharwad, India
Bachelor of Technology - Electrical Engineering *Aug 2020 – Apr 2024*

Coursework: Introduction to Power Electronics, Electrical Machines and Power Electronics Lab, Design of Photovoltaics, Electronic Design Lab, Batteries for Electric Transportation, Introduction to Electric Vehicle Architecture, Design of Power Converters, Advanced Power Electronics and Drives

RESEARCH EXPERIENCE

WEMPEC Madison, WI
Graduate Researcher *Aug 2024 – Present*

- Collaborate with Dr. Jinia Roy on pulsed power supplies.
- Designed and developed PCBs for high-voltage Marx Generators using TI AM263P for testing.

Power and Energy Group Dharwad, India
Undergraduate Researcher *Aug 2023 – Jun 2024*

- Designed a solid-state circuit breaker for electric vehicles and DC homes with a specification range of 800V and 70A using SiC devices under Dr. Satish B. Naik.
- Implemented an onboard microcontroller to detect short circuits and overcurrents, with MOV protection to prevent voltage spikes during switch opening.
- Developed a schematic and compact PCB with copper busbar for high-current applications, considering thermal and electrical constraints.
- Collaborated with Dr. Abhijit Kshirsagar on a high-bandwidth current probe.

Power and Energy Group Dharwad, India
Undergraduate Researcher *Dec 2022 – Apr 2023*

- Developed a half-bridge inverter using Infineon GaN devices under Dr. Abhijit Kshirsagar.
- Designed schematics and a compact, efficient circuit board layout with separate power sources, and reflowed all components in the facility.
- Utilized a gate driver with an RC circuit to produce a negative voltage during the turn-off period, ensuring compatibility with unipolar power supplies.
- Conducted double-pulse testing to evaluate performance and switching characteristics.

INTERNSHIP EXPERIENCE

Annapurna Labs (Amazon Web Services) Austin, TX
Hardware Development Engineer Intern *Jun 2025 – Aug 2025*

- Conducted testing and validation of next-generation Trainium accelerator cards.
- Developed tools to enhance debugging processes for accelerator card diagnostics.
- Analyzed and repaired RMA cards, identifying and resolving hardware bugs.

PUBLICATIONS

1. D. Dsa, A. Chinnusamy, S. N. Banavath, and E. L. Carvalho, "Implementation of Protection Features for a Modular Bidirectional Solid-State Battery Disconnector," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Nov. 2024.

2. A. Chinnusamy, D. Dsa, and S. N. Banavath, "Intelligent Battery Protection System for Electric Vehicle Applications," *IEEE 18th International Conference on Compatibility, Power Electronics and Power Engineering*, Poland, Jun. 2024.

PROJECTS

Power-Dense GaN Three-Phase Inverter (YesWeGaN)
- Achieved a power density of 446.43 W/dm^3.
- Designed a 50 W, three-phase inverter with TI's integrated GaN device, tested using space vector PWM.
- Operated at 200 kHz to minimize output filter requirements.

Synchronous Buck Converter
- Designed and developed a 100 W synchronous buck converter, self-powered by the input voltage.
- Created PCB and schematics from scratch, with a custom power supply for gate drivers powered by the input.

SmartMeter (AC/DC)| *Webpage*
- Designed current and voltage sensor boards with bidirectional sensing, integrated with an Atmega 2560 microcontroller for versatile data acquisition and control.
- Developed a data logging system using an ESP-01 module to transmit data to ThingSpeak for real-time monitoring, with a custom web interface for visualization and fault protection mechanisms for reliability.

High-Bandwidth Current Probe
- Designed and fabricated an 80 MHz current probe on a four-layer PCB using TI's OPA855 (QFN-2mm×2mm).
- Ensured compatibility with a current shunt resistor, equipped with SMA and MMCX connectors for rapid, secure connectivity and optimal signal integrity.
- Designed for double-pulse test setups with GaN switches, where high-bandwidth current probes are critical.

RP2040 Development Board| *GitHub*
- Designed and fabricated a development board using RP2040 in KiCad, demonstrating proficiency in electronic hardware design and manufacturing.
- Documented the design and fabrication process thoroughly, showcasing attention to detail and effective communication of technical information.

AWARDS & ACHIEVEMENTS

- **INovEX Challenge by DHARTHI:** Presented an SOS Band concept to DHARTHI Foundation, securing INR 50,000. Designed and fabricated the PCBs. (2023)
- **RT-Thread IoT Contest:** Selected for the final stage and received a RISC-V hardware board (CH32V208) as a token of appreciation. (2023)
- **2nd Place, Electronics Design EXPO:** Presented the SmartMeter project at IIT Dharwad's Annual Electronics Design EXPO, securing second place with a cash prize. (2023)
- **3rd Place, PCB Design Hackathon, IPTIF, IIT Palakkad:** Designed a schematic and PCB for a 250 W PV boost converter (10V–23V DC to 24V DC). (2022)

SKILLS

Tools: Altium, KiCad, MATLAB, Simulink, LTspice, PLECS, SIMetrix, Inkscape

Equipment: Oscilloscopes, arbitrary function generators, current probes, power analyzers, LCR meters, SMD microscopes

Boards: TI DSPs and MSPs, Arduino, RP2040

Soldering: Hot air, reflow oven

CAD Design: SolidWorks, Fusion 360

Languages: English, Tamil, Hindi

References

Dr. Jinia Roy
Assistant Professor, Department of Electrical & Computer Engineering
University of Wisconsin-Madison
Email: jinia.roy@wisc.edu

Dr. Abhijit Kshirsagar
Assistant Professor, Department of Electrical Engineering
Indian Institute of Technology, Dharwad
Email: kabhijit@iitdh.ac.in

Dr. Satish Naik
Assistant Professor, Department of Electrical Engineering
Indian Institute of Technology, Dharwad
Email: satish@iitdh.ac.in

Last updated on 2025-07-10.