

Abhinav Chinnusamy

☎(608) 658 7885 | 🔗 LinkedIn | 🐙 GitHub | 📁 Portfolio | 🎓 Google Scholar

EDUCATION

University of Wisconsin-Madison

Wisconsin, United States of America

Master of Science in Electrical and Computer Engineering GPA: 3.76

Aug 2024 – Anticipated May 2026

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

Indian Institute of Technology

Dharwad, India

Bachelor of Technology - Electrical Engineering

Aug 2020 – Apr 2024

Coursework: Intro 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

- Working 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, Karnataka

Undergraduate Researcher

Aug 2023 – June 2024

- Designed a solid-state circuit breaker for Electric Vehicles and DC homes with a spec range of 800V and 70A using SiC Devices under Dr. Satish B Naik.
- The device uses an onboard microcontroller to detect short circuits and over currents and MOV protection to prevent voltage spikes during switch opening.
- Designed the schematic and a compact PCB with copper busbar for high current applications, considering the thermal and electrical constraints.
- Also worked under Dr. Abhijit Kshirsagar on High Bandwidth current probe.

Power and Energy Group

Dharwad, Karnataka

Undergraduate Researcher

Dec 2022 – Apr 2023

- Worked under Dr. Abhijit Kshirsagar on "Half-Bridge Inverter using Infineon GaN devices".
- Created schematic designs from the ground up, made a small and efficient layout for the circuit board with separate power sources, and reflowed all the parts on the board in the facility.
- The gate driver on this board utilizes an RC circuit to produce a negative voltage during the turn-off period, ensuring compatibility with unipolar power supplies for gate-driving purposes.
- Conducted Double Pulse Test on this board and evaluated its performance and switching characteristics.

PUBLICATIONS

1. D. Dsa, A. Chinnusamy, S. N. Banavath, and E. L. Carvalho, "Implementation of Protection Features for a Modular Bidirectional Solid-State Battery Disconnecter," *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, June 2024.

PROJECTS

Power Dense GaN Three-Phase Inverter (YesWeGaN)

- Power density of 446.43 W/dm³ was achieved.
- Designed a 50 W, 3-phase inverter with TI's integrated GaN device and tested it using SVPWM.
- Operated at 200 kHz to minimize output filter requirements.

Synchronous Buck Converter

- Design and development of 100W Synchronous Buck converter which is self-powered by the input voltage.
- Designed the PCB and Schematics from scratch, custom power supply used for powering gate-drivers from input power.

SmartMeter(AC/DC) | [Webpage](#)

- Designed current and voltage sensor boards with bi-directional sensing capabilities and seamlessly integrated them with an Atmega 2560 microcontroller, enabling versatile data acquisition and control.
- Developed a comprehensive data logging system utilizing an ESP-01 module to transmit data to ThingSpeak for real-time monitoring. Implemented a custom web interface for data visualization and incorporated fault protection mechanisms to ensure data integrity and system reliability.

High Bandwidth Current probe

- Designed and fabricated an 80MHz current probe on 4-Layer PCB with TI's OPA855(QFN-2mm*2mm).
- Compatible with a Current Shunt Resistor and outfitted with SMA and MMCX connectors, ensuring rapid and secure connectivity and optimal signal integrity.
- Mainly for DPT Setups with GaN switches, where the demand for high bandwidth current probes is critical.

RP2040 dev-board | [GitHub](#)

- Designed and fabricated a development board using RP2040 in KiCad, demonstrating proficiency in electronic hardware design and hands-on manufacturing.
- Thoroughly documented the entire design and fabrication process, showcasing excellent attention to detail and the ability to communicate technical information effectively.

AWARDS & ACHIEVEMENTS

INovEX Challenge by DHARTHI: Upon presenting our concept for developing an SOS Band to DHARTHI Foundation, we secured Rs. 50,000. I designed the PCBs and fabricated it.(2023)

RT-Thread IoT Contest: Selected for final stage of the contest and received RISC-V hardware board(CH32V208) as a token of appreciation. (2023)

2nd Pos. in Electronics Design EXPO: Presented our EDL lab project, SmartMeter, in the Annual Electronics Design EXPO of IIT Dharwad and secured 2nd position with a cash prize. (2023)

3rd Pos. PCB Design Hackathon, IPTIF, IIT Palakkad: Designed a schematic and PCB of Boost converter for 250W PV applications. (10V-23V DC to 24V DC). (2022)

SKILLS

Tools:	Altium, KiCad, Matlab, Simulink, LTSpice, PLECS, SIMetrix, Inkscape
Equipments:	Scopes, AFGs, Current Probes, Power Analyzers, LCR meters, SMD microscopes
Boards:	Ti DSPs and MSPs, Arduino, RP2040
Soldering:	Hot Air, Reflow oven
CAD Design:	SolidWorks, Fusion360
Languages:	English, Tamil, Hindi

REFERENCES

Dr Jinia Roy

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University of Wisconsin-Madison
Email: jinia.roy@wisc.edu

Dr Abhijit Kshirsagar

Assistant Professor, Department of Electrical Engineering
Indian Institute of Technology, Dharwad
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Dr Satish Naik

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Indian Institute of Technology, Dharwad
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