

# ABHINAV CHINNUSAMY

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## EDUCATION

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### University of Wisconsin-Madison

Madison, WI

*Master of Science in Electrical and Computer Engineering*

*Aug 2024 – Anticipated May 2026*

**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

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### 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, 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.
- Used an onboard microcontroller to detect short circuits and overcurrents, with MOV protection to prevent voltage spikes during switch opening.
- Designed the schematic and a compact PCB with copper busbar for high-current applications, considering thermal and electrical constraints.
- Worked under Dr. Abhijit Kshirsagar on a high-bandwidth current probe.

### Power and Energy Group

Dharwad, India

*Undergraduate Researcher*

*Dec 2022 – Apr 2023*

- Worked under Dr. Abhijit Kshirsagar on a half-bridge inverter using Infineon GaN devices.
- Created schematic designs, designed a compact and 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.

## WORK EXPERIENCE

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### Annapurna Labs (Amazon)

Austin, TX

*Intern*

*Jun 2025 - Aug 2025*

- Will work on voltage regulators and validate the latest generation server cards.

## PUBLICATIONS

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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, Jun. 2024.

## PROJECTS

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### Power-Dense GaN Three-Phase Inverter (YesWeGaN)

- Achieved a power density of 446.43 W/dm<sup>3</sup>.
- 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).
- Compatible 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.
- Thoroughly documented the design and fabrication process, showcasing attention to detail and effective communication of technical information.

## AWARDS & ACHIEVEMENTS

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- **INovEX Challenge by DHARTHI:** Presented an SOS Band concept to DHARTHI Foundation, securing Rs. 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

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**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

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### **Dr. Jinia Roy**

Assistant Professor, Department of Electrical & Computer Engineering  
University of Wisconsin-Madison  
*Email:* [jinia.roy@wisc.edu](mailto:jinia.roy@wisc.edu)

### **Dr. Abhijit Kshirsagar**

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Indian Institute of Technology, Dharwad  
*Email:* [kabhijit@iitdh.ac.in](mailto:kabhijit@iitdh.ac.in)

### **Dr. Satish Naik**

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Indian Institute of Technology, Dharwad  
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