# Omkar N. Kulkarni

Newark, CA

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## Education

**University of Colorado Boulder** **Aug 2025 – May 2027**
*M.S. Electrical Engineering · Power Electronics Subplan | GPA: 3.90/4* *Boulder, CO*

**University of Illinois Urbana-Champaign** **Aug 2021 – May 2025**
*B.S. Electrical Engineering · Minor Computer Science | GPA: 3.89/4* *Urbana-Champaign, IL*

## Research

**Colorado Power Electronics Center** *Boulder, CO*
*Graduate Research Assistant, Maksimović Research Group* **Aug 2025 – Present**

- Assist in developing test PCBs for monolithic 100V, 40V, 15V GaN devices & full prototype PCBs w/ STM32 + C2000.
- Simulated TSAB+multiphase buck topology in spice for proof-of-concept, efficiency tuning, and control loop validation.
- Devised PCB layouts in Altium Designer for 4/6-layer GaN Point-of-Load (PoL) boards for DARPA Space applications.

*Graduate Research Assistant, Horowitz Research Group* **May 2026 – Present**

- Running tests at ambient temperature + sweep in Tenney thermal chamber for GaN/Si FET low-current calibrations.
- Designed 5 PCBs & test setup for transistor junction thermal characterizations intended for M.S. thesis defense.

**The UIUC Grainger Electric Machinery Lab** **Jan - Apr 2023, Sept 2023 – Jan 2025**
*Undergraduate Research Assistant, Haran Research Group* *Urbana, IL*

- Implemented instrumentation setups for multiple thermal experiments with a vacuum chamber and cryocooler
- Constructed layout for 1500V SiC PWM 4-layer Inverter PCB intended to measure self-inductance of coil windings.
- Aided grad. student with motor coil insulator reliability testing by modeling partial discharge inception voltage (PDIV).
- Measured initial phase-to-phase PDIV for all coils with power supply/transformer setup driving 800-1300V.

**The UIUC Advanced Power Applications Lab** **Aug – Nov 2021, Aug – Oct 2022**
*Undergraduate Laboratory Assistant, Banerjee Research Group* *Urbana, IL*

- Fabricated 3 acrylic safety enclosures for graduate students' power electronic projects with Adobe Illustrator.
- Laser cut and assembled acrylic sheets, drilling extra holes and gluing with adhesives as necessary.

## Publications & Poster Presentation

A. Bharathan, **O. Kulkarni**, A. H. Butler, M. J. Podel, T. E. Byrd, R. P. Strittmatter, and D. Maksimović, "Effects of Device and Gate Driver Designs on the Performance of Point-of-Load Power Converters using E-Mode GaN FETs," *Proceedings of the Government Microcircuit Applications and Critical Technology Conference (GOMACTech)*, 2026.

**O. Kulkarni** and M. Mikolajczak, "Introducing Calypso, Illini Solar Car's Next Generation Vehicle," poster presented at the *Power and Energy Conference at Illinois (PECI)*, 2024.

## Teaching Experience

**ECEE Department, CU Boulder** **Fall 2026**
*GLA, ECEN 4797/5797: Intro to Power Electronics | Under Prof. Luca Corradini* *Boulder, CO*

- Host Zoom recorded review sessions on midterm material.
- Hold weekly office hours, grade assignments, and proctor exams for 90 students.

**ECEE Department, CU Boulder** **Spring 2026**
*GLA, ECEN 3250: Microelectronics | Under Prof. Dragan Maksimović* *Boulder, CO*

- Delivered a 50-minute lecture on amplifiers configurations & other analog IC design fundamentals.
- Held weekly office hours, graded assignments for 80+ students, and assisted with exam proctoring.

**ECE Department, UIUC** **Aug 2024 – May 2025**
*CA, ECE 330: Power Circuits & Electromechanics | Grader, ECE 333: Green Electric Energy* *Urbana, IL*
*Under: Profs. Olga Mironenko, Richard Zhang, & Jonathan Schuh*

- Held weekly office hours, graded assignments, and proctored exam sessions for 145+/175+ student courses.

## Experience

**Illini Solar Car** **Aug 2021 – July 2025, Summer 2026**

*Student Advisor | ASC '26 Strategy Lead | Prev. Strategy and Telemetry Team* *Urbana, IL*

- Constructed Python physics library to improve accuracy of vehicle state prediction algorithm intended for competition.
- Characterized 35+ Li-Po battery pack modules with high power supply/load setup for new car battery pack

*Prev. Array Lead, Electrical Team | ASC '22, '24 Electrical Pit Crew | Battery Management System Member*

- Devised wiring configuration and placement for 257 array cells, and installed array on new car.
- Revamped KiCAD layout of sensing board, enhancing cell voltage/temperature measurements for Li-ion battery pack.
- Hand-soldered 10+ PCBs for vehicle powertrain, validating performance and reliability with test equipment.
- Flashed new firmware C++ function from MCUXpresso IDE to driver interface for PWM lights control system.

**The Aerospace Corporation** **May 2023 – July 2023**

*Electronics and Power Systems Department Technical Intern | Space Force 2030* *El Segundo, CA*

- Analyzed, simulated, and breadboarded differential amplifier circuit with SIMetrix to validate the proof-of-concept.
- Implemented Python script to interface with an eload/power supply, enabling solar array IV curve characterization.
- Drafted KiCAD schematic captures for capacitor stress test board and Device Under Test (DUT) current sense board.

## Awards, Honors & Professional Affiliations

**First Place, Student Design Competition – ITEC+EATS** 2025

*IEEE/AIAA Transportation Electrification Conference and Electric Aircraft Technologies Symposium*
"Design of a High-Voltage Power Distribution System for a 90-Seater Electric Aircraft"
**O. N. Kulkarni**, M. Witharamalage, A. Bose

**Grainger Power Engineering Award** | *The Grainger Foundation* 2025

**Engineer-in-Training (EIT)** | *California BPELSG* 2025

**James Scholar Honors Program** | *The Grainger College of Engineering* 2022 – 2025

**IEEE-Eta Kappa Nu (HKN) Member** | *ECE Honor Society* 2022 – 2025

**Omron Electrical Engineering Scholarship** | *Omron Electronics, Inc.* 2023 – 2024

**Samsung Technology Track Scholarship** | *Samsung Electronics* 2023 – 2024

## Relevant Coursework (UIUC - ECE/CS, CU Boulder - ECEN)

- ECEN 6950: Master's Thesis
- ECEN 5817: Resonant and Soft-Switching Techniques in Power Electronics
- ECEN 5517: Power Electronics and Photovoltaic Power Systems Lab.
- ECEN 5797: Intro to Power Electronics
- ECE 598: Adv. Power Electronics
- ECE 464: Power Electronics
- ECE 469: Power Electronics Lab.
- ECE 445: Senior Design Lab.
- ECE 444: IC Device Theory & Fab.
- ECE 431: Electric Machinery
- ECE 448/CS 440: Artificial Intelligence
- CS 441: Applied Machine Learning
- CS 225: Data Structures
- CS 173: Discrete Structures

## Selected Technical Projects

**ECEN 5517 Cascaded Power Converters for PV System** | Soldering · C2000 · Bode 100 *Spring 2026*

- Designed and debugged sensing and control hardware for an MPPT buck converter using a TI C2000 microcontroller.
- Measured control-to-output and loop-gain responses of a double boost converter using Bode 100 and designed an analog feedback PID compensator; calculated for and hand-wound inductors for all converters.
- Built a modified sine-wave inverter stage producing 120 $V_{rms}$, 60 Hz output from the boost 150 VDC bus.
- Won 1st place in our group for full design charging battery at 55 W from 85 W-rated panel at 1100 W/$m^2$ irradiance.

**ECE 445 Senior Design Group Project** | KiCAD · ESP32 · UART/I2C/SPI/JTAG/TTL *Spring 2025*

- Engineered pet feeding system to regulate dispensing & preserve food hygiene through embedded hardware design.
- Integrated bootloader, ADC, level shifters, and WiFi/RFID/motor control interface into brain board with ESP32 MCU.
- Built and tested a 3s2p Li-ion battery pack with buck regulators for reliable 3.3V/5V/12V bus power.

## Technical Skills

**Programming Languages**: C/C++ · Python · LC3/Assembly
**Tools & Frameworks**: Git/Github · VS Code · Matlab · Docker · Eclipse · Arduino · C2000 · Bode 100
**Hardware & Electronics**: KiCAD · LTspice · Altium Designer · SIMetrix