Omkar Kulkarni

Saratoga, CA
(408)-800-9347 onk2@illinois.edu linkedin.com/in/omkarkulkarni27/ https://github.com/rakmok

Education

University of Illinois Urbana-Champaign **Aug 2021 – May 2025**
B.S. Electrical Engineering, Minor Computer Science | Graduating: May 2025 | GPA: 3.88 *Urbana-Champaign, IL*
James Scholar Honors Program | IEEE-HKN Member | Dean's List: Aug 2021 – May 2023

Relevant Coursework

- ECE 444: IC Device Theory & Fab.
- ECE 385: Digital Systems Lab
- ECE 340: Semiconductor Devices
- ECE 431: Electric Machinery
- ECE 342: Electronic Circuits
- ECE 330: Electromechanics
- CS 225: Data Structures
- CS 173: Discrete Structures
- ECE 220: Computer Systems

Technical Experience

Illini Solar Car **Aug 2021 – Present**
Physics Lead, Strategy and Telemetry Team | Openlab Representative *Champaign, IL*

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

Prev. Array Lead, Electrical Team | ASC '22 Electrical Pit Crew Member | 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 20+ surface mount components onto 24V power protection board, assessing overvoltage (up to 28V), overcurrent (up to 5A), and reverse polarity capabilities with test equipment, intended for microcontroller safety.
- Flashed new firmware C++ function from MCUXpresso IDE to driver interface for PWM lights control system.

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

- Assembling synchronous motor and cryocooler setup for low-pressure Multi-Layer Insulation (MLI) testing.
- Aided graduate student with motor coil insulator reliability testing by modeling partial discharge inception voltage.
- Connected K-type thermocouples to coils and analyzing thermal gradient for 200 cycles at 40A with 4+ batches.
- Measured initial phase-to-phase PDIV for all coils with power supply/transformer setup driving 800-1300V.

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.
- Modeled temp. coeff. of 8 KXDL relay segments for 5A, 20A setups, plotting temp. vs. resistance data for 10+ cycles.
- 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.

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

- Designed 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.

Projects

ECE 385 Final Project | *C · SystemVerilog · FPGA · Quartus Prime/ModelSim/Platform Designer* **Spring 2023**

- Developed a functional video game sequence using an Intel Max 10 FPGA and a VGA display console.
- Synthesized SV code to handle collision logic and sprite instantiations, and executed C code to control user input.

ECE 220 Honors Lab Individual Project | *C · VS Code · Git/Github · LLDB* **Fall 2022**

- Engineered a multilayered encryption routine to scramble user fed strings with a mono-alphabetic + hill cipher.
- Optimized steganography program to "stash" or hide the string in an image by replacing 1 bit/byte of non-metadata.

Technical Skills

Languages: C/C++ · LC3/Assembly · Python · SystemVerilog
Developer Tools/Frameworks: VS Code · Eclipse · Git/Github · Matlab · Docker
Hardware: KiCAD · SIMetrix · LTspice · FPGA · Arduino