

# Ray Sun

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Analog/RF IC design PhD student pursuing opportunities in circuit design and RF/mmWave systems

## LINKS

Website: [electronictoast.github.io](https://electronictoast.github.io)  
Github:// [electronictoast](https://github.com/electronictoast)  
LinkedIn:// [ray-sun-2020](https://www.linkedin.com/in/ray-sun-2020)

## EDUCATION

### USC

PHD | ELECTRICAL ENGINEERING  
MS Dec 2022 | Los Angeles, CA

### CALTECH

BS | ELECTRICAL ENGINEERING  
June 2020 | Pasadena, CA

## SELECTED COURSES

### USC

Advanced Analog/Mixed-Signal  
Circuit Design • Advanced VLSI •  
Computational Electromagnetics •  
Biomedical Imaging

### CALTECH

Advanced Digital System Design •  
FPGAs with VHDL • Analog Design  
Laboratory

*Teaching Assistant*

Advanced Embedded Systems •  
Embedded Systems • Mechatronics

## SKILLS

### IC DESIGN

Cadence Virtuoso, Spectre • Calibre •  
Ansys HFSS, Maxwell • TSMC 65nm

### HARDWARE / FIRMWARE

Tools:

Altium Designer • KiCad • LTSpice •  
Autodesk Inventor • SolidWorks

Technologies:

STM32 / ARM MCUs • Xilinx FPGA •  
Arduino / AVR • Raspberry Pi

### PROGRAMMING

C/C++ • Python • Verilog • Assembly  
(AVR, ARM) • MATLAB/Simulink •  
LaTeX • Linux

### MISCELLANEOUS

Amateur radio license (General class) •  
Mandarin Chinese (spoken) • German  
(elementary) • Japanese (basic)

## RESEARCH

### ANALOG/RF IC, MICROSYSTEMS, & ELECTROMAGNETICS LAB

USC | GRADUATE RESEARCH ASSISTANT

August 2020 – Present | Los Angeles, CA

- Designed 1.2-1.7 / 2.9-4 GHz concurrent dual-frequency drift-compensated magnetic spectrometer (65nm CMOS) enabling single-step and wash free magnetic label immunoassays on-chip. **Presented at ESSCIRC 2022.**
- Designed 14 GHz spectrometer (65nm CMOS) for novel wearable and point-of-care biomedical applications. **Taped out Sep. 2022.**
- Designing FPGA (Xilinx Artix-7) data acquisition system / proof-of-concept portable biosensing platform for 14 GHz spectrometer.

### AEROSPACE ROBOTICS AND CONTROL LAB

CALTECH | UNDERGRADUATE RESEARCH ASSISTANT

June 2017 – March 2018 | Pasadena, CA

- Assisted development of spacecraft simulator robot: hardware selection; thruster characterization; designed low-level thruster controller board.
- Designed STM32-based second-generation thruster controller boards.

## EXPERIENCE

### MICRO-VU CORP. | ELECTRICAL ENGINEERING INTERN

Summer 2019 | Windsor, CA

- Supported hardware and FPGA (Xilinx, Verilog) development for non-contact and multi-sensor metrology machines.
- Designed and prototyped low-latency, fault-robust Bluetooth machine remote with STM32 and SiLabs Blue Gecko.

### AMPAIRE INC. | POWERTRAIN INTERN

Summer 2018 | Los Angeles, CA

- Assembled and validated high voltage electric aircraft powertrain modules for ground testbed and flight aircraft.
- Designed and tested 15 Mbps isolated dual-channel CAN transceiver.

## RECENT PROJECTS

**Jackrabbit:** 100 MHz 16-channel logic analyzer probe

**Aurora:** RGB LED controller with music visualization capabilities, microphone

**SAR ADC:** 8-bit time-interleaved, 45nm (schematic), 1 GS/s, 11 mW, 5.5 ENOB

**SRAM:** 8x16-bit with 6T cell (layout), max 4 GHz; compute-in-memory (schematic)

**OTA:** 2-stage DC-coupled, 45nm (schematic); 2.2 GHz UGBW, 11 mA, rail-rail input

**Triumph:** Accurate and robust analog function generator (sine, square, triangle)

**GaN FET Motor Controller:** 5kW BLDC, STM32F4, CANBus interface

## ACTIVITIES AND ORGANIZATIONS

**IEEE :** Member of USC IEEE student branch. Former chair of Caltech student branch.

**USC Solar Car Team :** Advising undergraduate solar car vehicle competition team.

**Caltech Formula SAE Team :** Designed, verified, and integrated 2 generations of STM32F4-based electric vehicle pedals interface PCB. Designed temperature sense and high voltage sense circuit for 2<sup>nd</sup> generation battery management system.

**Tau Beta Pi :** Member of engineering honor society.