Ray Sun

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https://electronictoast.github.io/
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EDUCATION

CALTECH | B.S. IN ELECTRICAL ENGINEERING
Expected June 2020 | Pasadena, CA • Cum. GPA: 4.2 / 4.3 • Major GPA: 4.1 / 4.3

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 powertrain modules for ground testbed and flight aircraft.
- Developed Simulink model of powertrain system.
- Designed and tested 15 Mbps isolated dual-channel CAN transceiver.

CALTECH | TECHLAB STUDENT ASSISTANT
April 2017 – September 2017 | Pasadena, CA

- Trained Caltech students and staff in the use of 3D printing resources.
- Maintained 3D printers and fulfilled print job requests.

RESEARCH

CALTECH MISSION OPERATIONS CENTER
STUDENT TEAM MEMBER
April 2019 – Present | Pasadena, CA

- Collaborating with JPL and University of Michigan on uplink/downlink operations and data analysis of CubeSat missions.
- Designing VHF/UHF groundstation for small satellite connunications and ops center on campus.
- Abstract submitted to 2020 CubeSat Developers' Workshop.

CALTECH AEROSPACE ROBOTICS AND CONTROL LAB
UNDERGRADUATE RESEARCHER
September 2017 – March 2018 | Pasadena, CA

- Assisted setup and conduct of spacecraft simulator and UAV experiments and demonstrations.
- Designed STM32-based second-generation thruster controller boards.

SUMMER UNDERGRADUATE RESEARCH FELLOW
Summer 2017 | Pasadena, CA

- Assisted development of 6-DOF spacecraft simulator robots for formation flight and docking experimentation.
- Performed hardware selection and thruster characterization.
- Designed low-level thruster controller board.

SKILLS

HARDWARE & FIRMWARE

Design:
STM32 / TI SimpleLink / ARM • Xilinx / Intel FPGA • Arduino / AVR • Embedded wireless • Raspberry Pi
Tools:
Altium/CircuitMaker • KiCad • EAGLE • LTSpice • Inventor • SolidWorks
Fabrication:
3D printing • Laser cutting • Machining

OTHER

General class amateur radio license • Control theory

PROGRAMMING

Languages:
VHDL • Verilog • C/C++ • Python • Linux • Assembly (AVR, ARM, x86)
Other:
ROS • MATLAB/Simulink

SPOKEN & WRITTEN

Fluent:
English
Elementary:
Chinese, German, Japanese

ACTIVITIES AND ORGANIZATIONS

IEEE: Chair of the Caltech IEEE student branch, leading committee organizing events for networking, outreach, and education.
Caltech Formula SAE Team : Designed temperature sensing board and high voltage sensing circuit for 2nd generation electric vehicle battery management system. Designed, verified, and integrated 3rd-generation STM32-based vehicle pedal sensors board; designed 4th generation board.
Team CoSTAR : Student member of Caltech DARPA Subterranean Challenge team, working on hybrid ground-aerial vehicle prototype avionics.
Hacktech : Organizer of intercollegiate hackathon; 3 years of involvement.
Tau Beta Pi : Member of engineering honor society, Secretary of Caltech chapter.

COURSEWORK

ELECTRICAL ENGINEERING

Embedded Systems Lab (Teaching Assistant): Wireless embedded systems and robotics with TI SimpleLink ARM MCU
Intro Embedded Systems (Teaching Assistant): Designed 8-bit CPU; implemented AVR assembly code for game
Experimental Circuits Lab: Designing 5kW GaNFET-based STM32 brushless motor driver
Analog Electronics Lab: Designed accurate, high-current analog function generator
Advanced Digital Systems: VHDL arithmetic circuit implementation on resource-constrained Lattice / Xilinx FPGAs
FPGAs with VHDL: VHDL circuit projects on Intel / Altera Cyclone V, Snake game project with VGA driver

ROBOTICS

Experimental Robotics: Designed obstacle course navigating robot with team of 5; Arduino and Raspberry Pi
Autonomy: Designed 6-DOF robot arm card playing robot with team of 4; mechanical design, ROS
Electronics for Space: Built high-altitude weather balloon payload for characterization of upper atmosphere

OTHER

Mechatronics (Teaching Assistant) • Algorithms (C++) • Machine Learning (Python) • Computing Systems (C, x86 assembly)

PROJECTS

Bifrost: Arduino Nano-based open source RGB LED controller with music visualization capabilities and Bluetooth.
Triumph: Accurate and robust analog function generator with sine, square, and triangle output
High Altitude Balloon: Stratosphere characterization with Arduino Due and sub-RF communications
Wearable Computer: Raspberry Pi-based wearable computer with custom transparent display
FireFly: ATmega8 prototyping board in compact yet accessible form factor
Binario: AVR assembly program for game board with quad encoders, LED matrix, SPI EEPROM
Self Balancing Robot: Proof of concept for future human-rideable project