

# Akshit Agarwal

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## Education

Sep 2023 - **California Institute of Technology**

Present MS in Electrical Engineering

Sep 2019 - **University of California San Diego**

Dec 2022 BS in Electrical Engineering with Minor in Economics, *GPA: 3.981 with Summa Cum Laude*

### Academic Honors -

- Henry G. Booker Award recipient
- Tau Beta Pi Scholarship recipient for CA Psi Chapter
- Tau Beta Pi Engineering Society member (available only to students in top 12.5% of the class)
- Provost Honors for academic performance for 8 academic terms

**Coursework** - Analog and Digital IC Design, RF Circuit Design, Feedback Systems Design and Analysis, LTI System Analysis, Control Theory, C/C++ programming, Electromagnetism

## Technical Skills

### Programming

Arduino C C/C++ Verilog System Verilog Python MATLAB

### Design and Simulation

SolidWorks Eagle PCB Altium (PCAD) Spice Circuit Simulators Cadence Virtuoso Keysight ADS  
Ansys HFSS

## Research and Professional Experience

Feb 2023 - **Research and Development Engineer, UCSD Qualcomm Institute**

Jul 2023 **Adviser:** Dinesh Bharadia

- Developed a novel system for Angle of Arrival (AoA) estimation for RF signals in the sub 6 GHz spectrum
- Utilized Ansys HFSS and MATLAB simulations for designing antenna arrays for wideband performance

Feb 2021 - **Undergraduate Researcher, UCSD Energy-Efficient Microsystems Lab**

Dec 2022 **Adviser:** Patrick Mercier

### ○ Wi-Fi backscatter Tag:

- Designed, implemented, and validated performance of a new architecture to improve range and wake-up times of Wi-Fi backscatter systems through a discretely implemented backscatter tag
- Optimized power and area for layout design of hardware blocks on a custom Printed Circuit Board (PCB)
- Utilized Verilog coding to implement multiple functional blocks like custom clocking and UART on FPGAs
- Automated data collection process for validation and debugging, leading to faster validation process

### ○ Bio-Fuel Cell (BFC) Touch sensor:

- Tested the use of BFCs as a power source for health and Bluetooth applications using a custom PCB
- Harvested power from BFC to transmit sensor data through Bluetooth advertisement to minimize power

## Projects

Nov 2022 - **OTA Design**

Dec 2022 Designed a self-biased Operational Transconductance Amplifier (OTA) with given specifications of gain, unity gain bandwidth, gain margin and phase margin using Cadence Virtuoso

May 2022 - **Custom Architecture 8-Bit Adder**

Jun 2022 Designed a custom architecture 8-bit adder based on a variable-length carry increment adder with 4GHz maximum operational frequency using Cadence Virtuoso

Jan 2021 - **Chromotherapy Lighting System**

Mar 2021 Led a team of engineering students for an IEEE project to develop an IoT device that used chromotherapy and audio commands given by a user to change lighting conditions in a room to elevate user mood

Jan 2021 - **Baboons on the Move**

Jun 2021 Used Python algorithms to improve efficiency for detecting and mapping baboon movement in a video clip

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## Teaching and Mentoring Experience

Mar 2021 - **ECE Instructional Assistant, UCSD Jacob School of Engineering**

- Dec 2022
- Cultivated a comfortable learning environment for students for upper-division ECE course (ECE 101 – Linear System Fundamentals), received close to 100% recommendation over a period of six academic terms
  - Designed and graded assignments, conducted assessments and held office hours to facilitate learning

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## Publications

ISSCC 2023 S.-K. Kuo, M. Dunna, H. Lu, **A. Agarwal**, D. Bharadia, P.P. Mercier, "An LTE-harvesting BLE-to-WiFi Backscattering Chip for Single-Device RFID-like Interrogation" *IEEE International Solid-State Circuits Conference 2023*

arXiv M. Dunna, S.-K. Kuo, **A. Agarwal**, P.P. Mercier, D. Bharadia, "BeamScatter: Scalable, Deployable Long-Range backscatter communication with Beam-Steering" *Cornell University arXiv*