Rudraksh Mohapatra

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EDUCATION

Stanford University GPA: 3.804

B.S Electrical Engineering and Minor in Mathematics *June 2027*

Fellowships: Rise Global Fellowship (Initiative of the Rhodes Trust and Schmidt Futures, Top 100 selected from 80,000+ globally for lifetime support)

Labs: Navigation and Autonomous Vehicles Lab (NAVLab), Stanford Smart Sensing Systems (S4) Lab

Relevant Coursework: Circuits 1, Signals and Systems 1, Digital Systems Design, Electromagnetics and Its Applications, Probability for Computer Scientists, Modern Physics for Engineers, Electronic Materials Engineering, Differential Equations with Linear Algebra, Fourier Methods, and Modern Applications, Computer Organizations and Systems

TECHNICAL SKILLS

- **Programming:** Python, TensorFlow, C, C++, Verilog, Bash, Git, MATLAB, FORTRAN, SQL
- **Hardware and Electrical:** Circuit design and debugging, schematic reading, capacitance/inductance modelling, RF Characterization.
- **Worked with:** LTSpice, FPGAs, Vector Network Analyzers, Oscilloscopes, Waveform Generators

RESEARCH & PROJECT EXPERIENCE

Navigation and Autonomous Vehicles Lab **Stanford, CA**

Gaussian Splatting for 3D Scene Reconstruction and Analysis *Sep. 2025 - Present*

- Developed optimization algorithms to benchmark Gaussian Splatting techniques and downsampling methods for 3d scene reconstruction, improving reconstruction in robustness.
- Implemented density-based clustering algorithms (DBSCAN, HDBSCAN, OPTICS) to segment 3D scenes and improve artifact detection in low-texture regions.
- **3D Perception:** Visualized and worked with spherical harmonics to analyze relationship between geometry and color, improving model interpretability for 3D perception.

Stanford Smart Sensing Systems Lab **Stanford, CA**

Algorithm Development for SAR-Based Satellite Backscatter Communication *Jun 2025 - Present*

- Implemented a signal processing algorithm for passive RF backscatter communication using existing SAR infrastructure. Partitioned the aperture into sublooks to encode bits, performed range/azimuth compression, and computed Signal-to-Clutter Ratio (SCR) per sublook and across sublooks.
- **Antenna Testing and Design:** Helping build and test the antenna array. Work involves looking at the results of the Vector Network Analyzer, understanding the s-parameters and providing detailed performance data.
- Created a Radar Cross Section (RCS) estimation program and validated with theoretical estimates to ensure proper calibration. This allowed for model optimization and verifiability when testing with large models.

Projects **Stanford, CA**

- **Built an AC to DC Converter:** Project involved reading schematics, working on taking measurements of waveforms using oscilloscopes. I soldered and assembled the circuit on a PCB, and worked on circuit validation using waveform generators, oscilloscopes, and software such as LTSpice.
- **Wavetable Music Synthesizer:** Implemented a real-time wavetable audio synthesizer on a PYNQ FPGA using Verilog. Designed a synchronized waveform visualization system using VGA/HDMI output, that displayed the live wave samples in real time. Added additional features such as chords, delays, and adjustable display.
- **Capacitive Accelerometer:** Built and calibrated a single axis capacitive accelerometer. I assembled the measurement circuitry and experimentally determined the FR4 Spring constant. Validated the accelerometer by testing the Earth's gravitational field.
- Also built the following: a 10 micro-H **air-core inductor** to experimentally measure inductance based on surrounding materials, and **characterized transmission line behaviour.**