RACHEL D'SOUZA

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EDUCATION

Purdue University - B.S. Electrical Engineering **(C. GPA: 3.5/4.0)**   *Expected Graduation: December 2028*
Activities/Societies: John Martinson Honors College, Global Engineering LC, Engineering Projects in Community Service *(Aerospace Engineering), Women in Engineering, Society of Women Engineers, Effective Altruism, Purdue Undergraduate Research Propulsion Lab (PURPL), Vertically Integrated Projects, HEAL Ambassadors, OUR Ambassador, EPICS Ambassador*
Skills: Microsoft Suite, AutoCAD, Excel, Fusion360, NX, Python, MATLAB, C Programming, JavaScript, Java, Google Suite

EXPERIENCE

Electrical Engineering Co-Op - GE Appliances, a Haier Company   *January 2026 - May 2026*
Quality Engineering Intern - Heartland Food Products Group   *May 2025 - August 2025*
- Authored and updated multiple SOPs, including RMA Returns, Sensory Testing for Syrups and Sauces, Kroger Drum Transactions, and Weigh-Up processes, ensuring alignment with upcoming Warehouse Management System implementation
- Conducted in-depth quality investigations, including Statistical Process Control for stork bottlecap pull-up values and syrup weights, HACCP Food Safety Plans, and root cause analysis for consumer complaints on single-serve Splenda products
- Gained hands-on microbiology lab experience performing environmental monitoring, contamination testing, and product analysis using techniques such as PCR, Sanger sequencing, selective media plating, and pH/water activity testing to support food safety and regulatory compliance

Space and Earth Analogs Research Chapter - Purdue University   *August 2024 - Present*
- Executive Outreach Committee member and contributor to Software and Research subteams; organized guest speaker programs for 50+ members to foster career development
- Planned and executed large-scale social events reaching 9,000+ community members, promoting the SEARCH mission and strengthening organizational engagement

Engineers Without Borders - Purdue University   *August 2024 - Present*
- Designed and implemented head tanks, reservoirs, and tap stands for Rubona Projects, providing clean water to 10,000+ Nyakabizi residents; conducted ongoing quality monitoring for five sections of mile-long pipelines
- Developed pipeline profiles, ravine-crossing maps, and hydraulic models using Hazen-Williams equations, elevation data, AutoCAD, and Excel to enhance water system efficiency and reliability

RESEARCH

Undergraduate Researcher - Liu Research Group   *August 2025 - Present*
- Engineered epitaxial superlattices integrating plasmonic and dielectric layers with semiconductor-grade smoothness and lattice matching, enabling CMOS-compatible hyperbolic metamaterials for optoelectronic applications
- Optimized thin-film deposition parameters for TiN to achieve high electrical conductivity, mechanical stability, and thermal tolerance as properties critical for semiconductor device integration and high-temperature processing
- Performed nanoscale characterization (TEM, spectroscopic ellipsometry, lifetime measurements) to evaluate photonic density of states enhancement and emission control, supporting potential integration into semiconductor photonic and plasmonic circuits

Undergraduate Researcher - Tao Research Group   *January 2025 - May 2025*
- Built software to preprocess, analyze, and visualize proteomics data for biomarker discovery that supports the identification of Alzheimer's disease using machine learning and statistical models
- Analyzed mass spectrometry data using R to test for normality and homogeneity of variances and conducted single reference and median normalization

PUBLICATIONS

Early Introduction of Multi-Allergen Mixture for Prevention of Food Allergy: Pilot Study — *Nutrients Journal*
Co-author of nutrition paper under guidance of Dr. Kari Nadeau analyzing benefits of immunotherapy in the prevention of food allergies in 180 infants based on statistical data by calculating IgE and IgG4 ratios from baseline and 1-year data