

Avighna Wuthoo

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EDUCATION

University of Virginia, School of Engineering and Applied Science

B.S. in Aerospace Engineering, Minor in Physics

- Relevant Coursework: Ordinary Differential Equations, Multivariable Calculus, Linear Algebra, Modern Physics, Advanced Classical Mechanics, Data Structures & Algorithms, Engineering Foundations I-II

Charlottesville, VA

Expected May 2029

EXPERIENCE

Solar Labs

Dec 2025 – Present

Founder & CEO

- Founded Solar Labs to commercialize a passive, self-cleaning photovoltaic surface film originating from ISEF research (Project EGSD27T), overseeing product development, R&D, and go-to-market strategy.
- Engineered a retrofit film for existing solar panels combining hydrophilic transport channels with laser-microtextured hydrophobic regions, cutting water use and eliminating chemical cleaning agents and electrical/mechanical cleaning systems entirely.
- Built a design engine that ingests regional weather, soil, and air-quality data to generate site-specific cover configurations (microtexture pattern, tilt angle) so suppliers can tailor the product to local climate and rainfall conditions.
- Leading go-to-market into utility-scale solar farms across India and South Africa, closing the company's first customer deployment.

Cloud9 Advisers

Jun 2026 – Present

Data Architecture & AI Systems Intern

- Cloud9 Advisers brokers engagements between companies offering AI services and companies seeking them; served as data architect for the firm's core client-intelligence platform.
- Designed and built a data architecture in Python and Java for a central knowledge engine that unifies every client touchpoint — meeting notes, Slack history, and other communications — into a persistent, continuously updated profile scaling to 7,800+ records per client (2,400 typical).
- Developed indexing and retrieval algorithms returning a 2.1s median query latency (4.7s P95) at \$0.006 average cost per query, validated across 500 test queries with a 487/500 (97.4%) success rate.
- Architected a multi-agent deployment layer offering 3 task-specific rentable agents that draw context from the shared knowledge engine and are offered back to client companies as a service.

Zenbu Labs

Jan 2026 – Present

AI Developer Tools Contributor — Open-source AI workflow automation and integration tooling

Remote

- Triageed 9 GitHub issues by reproducing local setup, API authentication, and model-provider configuration failures; validated fixes and isolated failure modes.
- Rewrote 6 integration guides covering environment variables, API key handling, local installation, and provider setup; added troubleshooting checks for new contributors.

AWARDS & HONORS

- International Science and Engineering Fair (ISEF) 2026 Finalist, Project EGSD27T, Energy: Sustainable Materials — extended prior self-cleaning photovoltaic research into a deployable panel-cover product; findings became the technical foundation for founding Solar Labs.
- Regeneron ISEF 2025 Finalist, Energy: Sustainable Materials — passive photovoltaic cover surface inspired by lotus-leaf water transport and surface-cleaning behavior, using hydrophilic transport pathways and laser-microtextured hydrophobic regions to control droplet motion, particulate removal, and optical-surface fouling.
- IT Cadre Innovation Award, LCPS Regional Science & Engineering Fair — recognized for passive photovoltaic microtextures that helped rainwater clean solar panels; demonstrated a 21%+ reduction in dirt buildup without chemical coatings or active cleaning.
- Ricoh Sustainable Development Award — honored for sustainability research reducing solar-panel fouling, cleaning cost, and water use through physical surface design instead of active cleaning systems.

PROJECTS

Ultralight Turbofan Engine Prototype | CAD, Fabrication, Propulsion Integration

Jul 2025 – Sep 2025

- Designed, fabricated, and assembled a 350 g turbofan prototype (35 N design target) through 5 major CAD iterations, reaching 18.6 N measured static thrust — a 5.4:1 thrust-to-weight ratio — across 9 static test runs.
- Modeled the casing, mounting structure, and internal component layout in CAD, holding a 0.30 mm designed radial clearance to a measured 0.32 ± 0.04 mm at a peak shaft speed of 165,000 RPM.
- Evaluated manufacturability, material selection, and component-integration tradeoffs across iterations to improve packaging density and structural stability.

Adaptive-Pitch Electric Propeller Test Rig | Python, MATLAB, SolidWorks, Instrumentation

Jan 2024 – Jun 2024

- Designed and built a benchtop propulsion rig instrumented with a 5 kg (49 N) load cell and a 100 Hz DAQ pipeline to log thrust, RPM, and power draw for a passively morphing electric propeller.
- Swept blade pitch 10°–30° in 5° increments across 2,500–7,500 RPM, testing 25 operating points (3 repeat runs each) spanning 1.3–8.1 N thrust and 45–220 W input power.
- Benchmarked morphing-pitch performance against fixed-pitch baselines, measuring a 7.8% thrust improvement at equal power draw.

HELIOBLOOM Morphing Thermal Skin | Independent Aerospace Research Project

Jul 2025 – Jan 2026

- Modeled a passive 0.08 m² spacecraft radiator with 8 temperature-responsive petals (280 g prototype) that open and close across a 45–60°C transition band to regulate heat rejection without active mechanisms.
- Iterated petal geometry across 6 design versions, validating a nonlinear thermal simulation against physical prototype testing.
- Measured 21 W heat rejection closed vs. 47 W open — a 2.24:1 turndown ratio — against fixed radiator surfaces.

Optical Small-Body Detection Prototype | Python, Raspberry Pi, Telescope Camera

Aug 2024 – Feb 2025

- Built a Raspberry Pi and telescope-camera imaging pipeline in Python, processing 1280×720 frames across an 8,400-frame dataset at 140 ms/frame (7.1 fps).
- Implemented frame-differencing and candidate-tracking logic against 63 ground-truth moving objects, cutting false detections from 186 to 41 (78% reduction) while holding 90% detection recall.
- Tested robustness under image noise, exposure variation, and changing backgrounds to further reduce false positives from stars and exposure shifts.

TECHNICAL SKILLS

Software & AI: C++, C, Python, Java, MATLAB, pandas, NumPy, SciPy, scikit-learn, AWS SageMaker, SQL & data architecture, REST APIs, multi-agent systems, Git, Excel

Engineering & Design: SolidWorks, Ansys Fluent, CATIA, propulsion analysis, spacecraft thermal-control modeling, basic FEA, CAD prototyping, surface microtexturing, hydrophilic/hydrophobic surface design, environmental/weather-data modeling

Testing & Fabrication: static thrust testing, thermal-cycle testing, thermocouples, load cells, DAQ integration, sensor calibration, Raspberry Pi, 3D printing