

JOSHUA DALAL

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EXPERIENCE

Pratt & Whitney · Engine Dynamics & Loads Intern

May 2026 – Present · East Hartford, CT

- Building data-driven Python models correlating aircraft structural characteristics with whole-engine interface loads and dynamic response
- Standardizing and automating NASTRAN fan blade-off workflows to improve analysis reproducibility and post-processing consistency
- Characterizing squeeze-film damper performance experimentally to quantify how operating conditions drive vibration response and dynamic loads in rotating machinery

Hanwha Aerospace USA · Manufacturing Engineering Intern

Jun 2025 – Aug 2025

- Owned process-flow design of the F135 rotor Engine Core Upgrade, modeling 27 manufacturing, inspection, and cleaning operations
- Designed fixtures and tooling for a \$100k rate-increase clawback; qualified abrasive flow machining, reducing part cost 35%

Albacore Inc. · Propulsion & Systems Engineer

Jan 2025 – Jun 2025

- Developed an Unmanned Underwater Vehicle (UUV) for the US Navy, with a novel powertrain achieving 10x the range of existing models at 4x lower cost
- Designed CAD parts and assemblies, managed vehicle-level mechanical integration, and prototyped subsystems with testing to validate feasibility and performance
- Supported US Navy SBIR submissions; credited with the filing of a provisional patent

GRASP Robotics Lab, UPenn · Research Assistant

May 2024 – Nov 2024

- Designed a highly articulated robotic arm driven by one base-mounted motor, cutting weight by eliminating motors at each joint
- Prototyped a mechanical eyeball for an Air Force eye-tracking project: 0.3° accuracy at 600°/s

LEADERSHIP & PROJECTS

Project Wavefront · Co-Founder & Propulsion Engineer

Apr 2025 – Present

- Leading design of a student-built, 3D-printed Inconel 718 GOX/GCH4 rotating detonation rocket engine (RDRE) targeting 2 kN thrust, 255 s Isp, and 21 bar chamber pressure
- Built Python performance and feed-system models sizing 0.8 kg/s propellant flow at O/F $\approx$ 3.0; optimized sonic metering orifices in ANSYS Fluent, raising discharge coefficient from 0.81 to 0.985 and holding injector-array flow variation under 2%
- Co-founded the 501(c)(3) and sized the GOX/GCH4 feed system through choked-flow, Joule–Thomson, and pressure-drop analysis with oxygen-compatibility and operating-limit trades
- Ran conjugate-heat-transfer and pressure-drop CFD on the regenerative water-cooling jacket, cutting coolant-channel pressure drop from 130 to 42 psi at a $\sim$ 0.95 MW heat load

Penn Jet Propulsion · Propulsion Team Lead

Aug 2023 – Present

- Leading design and analysis of a hydrogen micromixing combustor, evaluating fuel distribution, recirculation, flame anchoring, and pressure loss with ANSYS Fluent species-transport CFD
- Coupling combustor thermal predictions with thermal-stress FEA of the 304 stainless liner and fuel-manifold CFD to assess thermal margin and injector uniformity
- Led thermodynamic cycle analysis, turbomachinery aerodynamic design, CFD, and structural analysis for Penn's first undergraduate axial turbojet, targeting 35 lbf thrust at 80,000 RPM

Engineers Without Borders, UPenn · Robotics Manufacturing Lead

Jan 2024 – Mar 2026

- Engineering a robotic system to safely collect broken glass in hazardous areas of Philadelphia
- Contributed to a sanitation system design for a Guatemalan school serving 90 students

Stirling Engine · MEAM 2010

May 2024

- Designed full engine assembly in SolidWorks with GD&T tolerance stackup; machined and assembled 18 parts in aluminum, brass, stainless steel, and walnut

EDUCATION

University of Pennsylvania

BSE + MSE, Mechanical Engineering

Aug 2023 – May 2027

Philadelphia, PA

GPA: 3.92

Minors in Mathematics & History

Coursework

Compressible Flow & Combustion · Aerodynamics · Turbulence · Heat & Mass Transfer · Fluid Mechanics · Mechanics of Solids · Machine Design & Manufacturing · FEA · Thermodynamics · Dynamics · Advanced Math

TEACHING

Teaching Assistant, IPD 5010

Graduate machine design & manufacturing

Aug 2025 – Present

Machine Lab Assistant

Precision Machining Laboratory: shop maintenance, design and CAM guidance for students

Aug 2024 – Present

SKILLS

Software

Siemens NX · SolidWorks (CSWA) · Onshape · ANSYS (CFD & FEA) · MATLAB · Python · Java (prior)

Manufacturing

ASME GD&T · CNC (MasterCAM, PT4) · 3-Axis Mill · Lathe · Injection Molding · Additive Manufacturing

ACTIVITIES

Wharton Undergrad Aerospace Club (WUAC)

Jan 2024 – Dec 2025

American Society of Mechanical Engineers (ASME)

Jan 2024 – Present

INTERESTS

Backpacking (30 countries) · Scuba Diving (PADI Open Water) · Karate (Sensei) · Baseball · Piano · World History