Samir Yunus
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EDUCATION

Rutgers University — **New Brunswick, NJ**
***Bachelor of Science,* Aerospace Engineering** | *GPA 3.7 (Deans List)* — *September 2024 - May 2027*
Brookdale Community College — **Lincroft, NJ**
Mechanical Engineering | *GPA 3.5 (Dean's List)* — *September 2022 - May 2024*

TECHNICAL SKILLS

Engineering: SolidWorks, AutoCAD, CFD (Ansys), FEA (SolidWorks), Wind Tunnel Testing, Aerodynamics, Aircraft Performance, Stability and Control, External Loads, Rocket Flight Dynamics Modeling, 6-DOF/3-DOF Simulation, Guidance & Control Logic, Gravity-Turn Trajectory Analysis, Landing Burn Modeling, FlightGear FDM Integration, Hand Tools (Manual, Pneumatic and Power Tools), 3D Printing, System Integration, Manual/CNC Machining, Composite Fabrication (Inlays), Laboratory Testing, Technical Report Writing, Engineering Documentation, Precision Measurement Instruments, Oscilloscopes, Multimeters, Power Supplies, Lathe/Mill Operation, Material Testing Equipment, OpenRocket
Programming & Data: MATLAB, Simulink, Machine Learning, C++, html, Arduino, Image Processing, Python
Languages: English (Fluent), Bangla (Native), German (Beginner)
Courses: Fluid Mechanics, Mechanics of Materials, Thermodynamics, Measurements, Mechatronics, CAD Design, Calculus 5, Design of Mechanical Components, Engineering Economics, Coding for Engineers

PROFESSIONAL EXPERIENCE

Rutgers Rocket Propulsion Lab (RRPL) — **Piscataway, NJ**
Structures Team Member — *September 2025 - Present*

- Co-leading the design and implementation of the team's first deployable air brake system using mechanical engineering principles, targeting 10,000 ft altitude for the IREC Rocket Flight Competition.
- Ran CFD simulations in Ansys Fluent and Mechanical and validated results through wind tunnel testing, including writing the wind tunnel SOP and collecting experimental data for design verification.
- Assisted the Avionics Team in modeling and fabrication of ignitor key sleds for use in the 100k foot competition rocket, supporting system safety and modularity improvements through hands-on fabrication, troubleshooting, and launch readiness activities.
- Active AIAA Member pursuing Level 1 High-Power Rocket Certification to support advanced propulsion system testing.

Rutgers University Department of Mechanical & Aerospace Engineering — **Piscataway, NJ**
Automated Rust Detection Researcher — *September 2024 - December 2024*

- Supported development of a corrosion detection system using Python and image analysis targeting possible use on mechanical components in underwater environments and DOT vehicle inspections.
- Conducted data preprocessing and analysis on 300 samples, doubling the original dataset size and labeling the ground truth data to improve semantic segmentation model performance and reduce missed detections during cross-validation resulting in 90% accuracy.
- Applied semantic segmentation convolutional neural networks (CNNs) and data analytics to further optimize model performance and robustness.
- Authored a step-by-step Label Studio installation and setup guide for new research members, detailing configuration within Windows Subsystem for Linux (WSL).

Visual Computer Solutions - Jobs4Blue — **Freehold, NJ**
Senior Account Representative *(Full Time)* — April 2023 - Present

- Developed systematized communication strategies across 160+ police departments, maintaining up-to-date contact lists, ensuring operational efficiency using both Microsoft 365 and Google Workspace.
- Streamlined scheduling workflows by implementing a rotating job board system, assigning 2-3 employees per hour on ongoing tasks while I managed 200+ daily activity logs and coordinated calls, vendor and police requests within a 50-member team.

PROJECTS

Reusable Rocket Launch and Landing Dynamic Simulation

- Built a full MATLAB and Simulink simulation of a reusable booster including ascent, gravity turn, flip maneuver, boost-back, entry, and landing phases with 6-DOF and PID controller.
- Modeled 2D rocket dynamics with thrust depletion, ISA-based drag, pitch control logic, and trajectory propagation.
- Implemented a first-order pitch response model and custom guidance logic to stabilize attitude through all flight phases.
- Integrated real-time 3D visualization in FlightGear using UDP external Flight Dynamics Model interface to display trajectory, attitude, velocity, and flight profile.

Thrust Vector Control (TVC) Prototype

- Co-Led a five-member team developing a thrust vectoring gimbal system for small-scale rocket simulations, improving dynamic stability and applying mechatronics principles.
- Designed and fabricated a custom 3D-printed gimbal assembly using SolidWorks, integrating MPU6050 accelerometers and servo motors for real-time thrust vector adjustments.
- Programmed in Arduino C to process 100+ IMU sensor readings per second, enabling automatic zeroing to 1–2° with the push of a button.

Toyota Chaser Manual Transmission Swap

- Conducted research and planning, including extensive review and application of Toyota service manuals, to ensure technical accuracy (torque specs) and successful execution of the swap on a 1996 Toyota Chaser.
- Designed and fabricated 2 custom brackets for transmission lines, ensuring precise fitment for a successful transmission swap.
- Finalized a full transmission swap in 12 hours, integrating newly fabricated components for full compatibility.

PUBLIC PRESENTATIONS

***Guest Speaker* (NASA-Funded Program) The Mythology and Science of Eclipses**

- Presented a 120-minute public lecture on the science and mythology of eclipses to 50 attendees at the Monmouth Public Library
- Bridged scientific and mythological views, enhancing public engagement in astronomy

EXTRACURRICULAR ACTIVITIES

Rutgers Car Club - Personal automotive project featured in Rutgers Magazine for engineering innovation and craftsmanship