

# ALLEN PRASAD VARGHESE

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## Skills Summary

- Developed a high-impact polymer extrusion die **design algorithm**, reducing design cycle time by **98%**.
- Demonstrated strong capabilities in **technical research, systems engineering, and project management**.
- Proficient in multiple **programming languages** to **automate and enhance engineering workflows**.
- Ability to create and read **blueprints, schematics, engineering drawings, and technical specifications**.
- Extensive research experience in **fluid dynamics and aerospace propulsion systems**.

### Soft skills:

- Strong communication abilities with ability to clearly articulate complex engineering concepts.
- I am adept at reading interpersonal dynamics and responding empathetically.
- Creative problem-solver capable of coming up with innovative mechanical engineering solutions.

### Key Industry Skills:

- Six Sigma Green Belt Certified
- Blueprint
- Computer Aided Engineering (CAE) – ANSYS, Fluent, DualSPHysics, Converge, and Chrono.
- Computer Aided Design (CAD) – SolidWorks, CREO, and Fusion 360.
- Programming – UDF DevOps, MATLAB, VBA, C#, C++, Fortran, JavaScript, Python, and OpenMPI.

## Work Experience (2018-2026)

### 1. Research Scientist, August 2024 – January 2026

#### Southwest Research Institute (SwRI)

Liquid Propulsion Group

Hours per week: 40

Supervisor: Nathan Andrews

Duties & Responsibilities:

- Designed and came up with thruster profiles that target favorable fluid orientations during micro-gravity operations at low-Earth orbit and deep space near/on the moon.
- Participated in and led testing campaigns to go over experimental matrices to understand fluid behaviors pertaining to the aerospace sector mainly sloshing.
- Conduct research on fluid behavior in microgravity, surface tension effects, and convey attained knowledge to the rest of the team.
- Conduct Computational Fluid Dynamics simulations for various aerospace clients and show results in the form of presentations.

## **2. Research Assistant, August 2018 – August 2024**

### **New Jersey Institute of Technology (NJIT)**

#### **a. CFD Hydrodynamic Experience**

Funded by: National Science Foundation (NSF)

Supervisor: Dr. Angelo Tafuni

Duties & Responsibilities:

- Spearheaded computational efforts using expertise in DualSPHysics to establish novel hydrodynamics for vibrating beams submerged underwater near the free surface.
- Code development as well as prowess in MATLAB data analysis as evidenced by developing an algorithm to extract relevant hydrodynamic coefficients from fluid forces.

#### **b. CFD Cryogenic Multiphase Flow Analysis Experience**

Funded by: National Aeronautics and Space Administration (NASA)

Supervisor: Dr. Jason W. Hartwig, Dr. Angelo Tafuni & Dr. Samuel C.

Lieber Duties & Responsibilities:

- Cross-functional collaborator with acumen in design of cryogenic propellant management systems that delivered 92% expulsion efficiency under reduced gravity conditions.
- Complex CFD model development with extensive knowledge of cryogenic propellants, accurately describing flow in microgravity for long duration space missions.
- Demonstrated strong project management and technical research capability, leading to 2 publications in journal of American Institute of Aeronautics and Astronautics, and Journal of Spacecraft and Rockets.

#### **c. Polymer Process Automation Experience**

Funded by: New Jersey Precision Technologies (NJPT)

Supervisor: Robert Tarantino, Dr. Samuel C. Lieber & Dr. Angelo Tafuni

Duties & Responsibilities:

- Process automation mastery with experience in pioneering parametric design automation using SolidWorks API to accelerate polymer extrusion die design by 98%.
- Expert system developer with ability to construct self-learning knowledge databases drawing automated inferences from prior design cases to tackle the growing skills gap.
- Knowledge transfer facilitator with exposure in interviewing interdisciplinary engineers, to develop 4 robust standard working protocols based on gathered insights and bottlenecks across the organization.

## **Education**

### **Doctor of Philosophy in Mechanical Engineering (PhD)**

**Graduated**

New Jersey Institute of Technology

### **Master of Science in Mechanical Engineering (MS)**

**Graduated**

New Jersey Institute of Technology

### **Master of Engineering in Mechanical Engineering (MEng)**

**Graduated**

Lancaster University

### **Bachelor of Engineering in Mechanical Engineering (BEng)**

**Graduated**

Lancaster University

## **Professional Memberships**

- American Society for Gravitational and Space Research (ASGSR) – Member ID: 4080.
- American Institute of Aeronautics and Astronautics (AIAA) – Member ID: 1921197

## **Honors & Awards**

- Recognized with Chancellor's Medal for graduating highest distinction from Lancaster University Mechanical Engineering Master's program (2018).
- Awarded with the Young Innovators Award by HiTech India for the research and development of an IOT based fleet management device (2015).

## **Affiliations & Hobbies**

- Assisted in organizing community service events and fundraisers as the Secretary of Rotaract club.
- Directed, mentored, and fostered a teamwork environment as the President of Robotics club.
- Represented the Engineering department at various university events as the Student Ambassador.
- Learnt swimming and actively working on improving performance and endurance.
- I played as a midfielder for the school soccer team, developing skills in teamwork and sportsmanship.
- Flight simulation enthusiast, honing my skills in virtual cockpits and exploring the world of aviation.
- I participated in competitive Dota, where I developed strategic thinking, dynamic problem solving, situational awareness, and team collaboration, while competing with players worldwide.
- Fluent in speaking and listening in English, Malayalam, and Hindi. Proficient in reading and writing in French and Arabic. I am continuously seeking to expand language skills and fluency.