ALLEN PRASAD VARGHESE

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Skills Summary

- Developed a high-impact polymer extrusion die **design algorithm**, reducing design cycle time by **98%**.
- Designed an innovative **perforated plate system** to stabilize unstable cryogenic flows in reduced-gravity environments, achieving **92% expulsion efficiency.**
- 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