

A photograph of an industrial welding process. A bright, intense blue-white light from the welding torch illuminates the scene, creating a strong lens flare. Sparks and smoke are visible at the point of contact between the torch and the metal workpiece. The background is dark, with some industrial structures faintly visible.

TCA Manufacturing Portfolio

By- Sanchit Arora

A bit about me

- Sophomore at Purdue graduating in '27
 - Majoring in Aerospace Engineering
 - Minor in Mathematics
 - Interested in propulsion and advanced manufacturing
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Background

- Started tinkering in high school
 - Currently work at the Bechtel Innovation and Design Center (BIDC)
 - Manufacturing and propulsion engineer on Purdue Space Program (PSP)
 - Undergrad Research Assistant at Zucrow Labs
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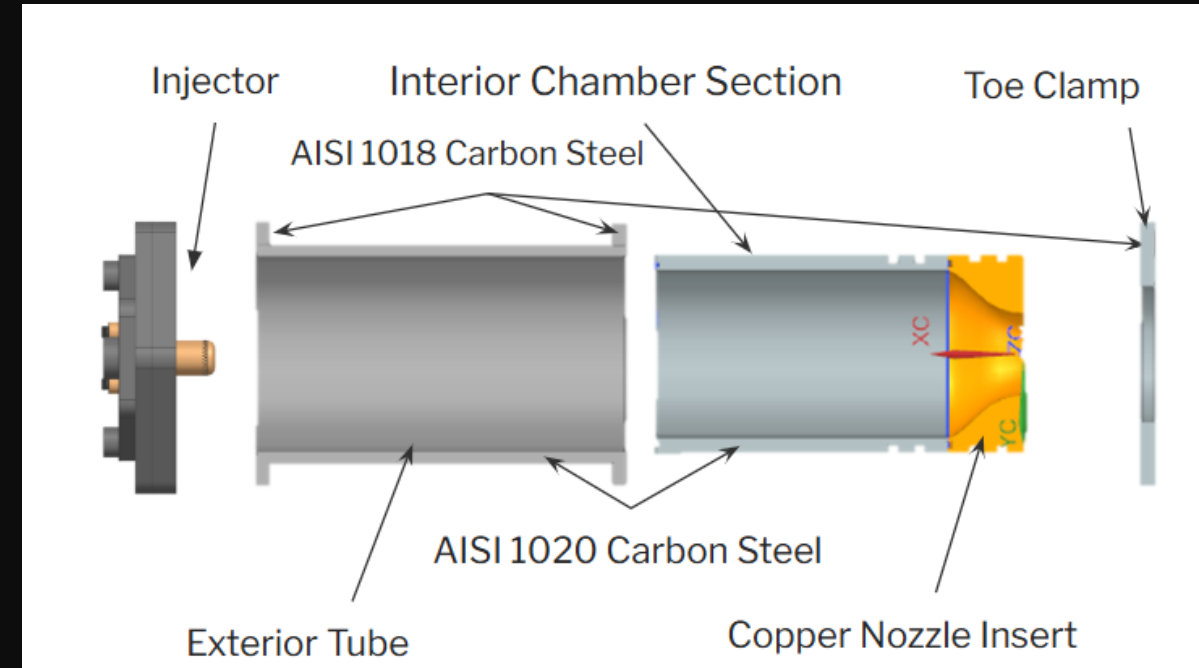
What I work on

- Manufacture a wide variety of parts for PSP
 - Recently been focusing on TCA's
 - Preparing to transition to manufacturing lead
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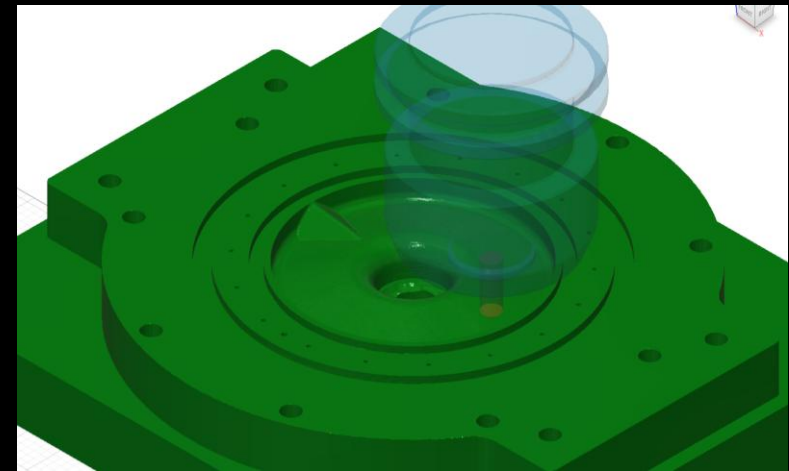
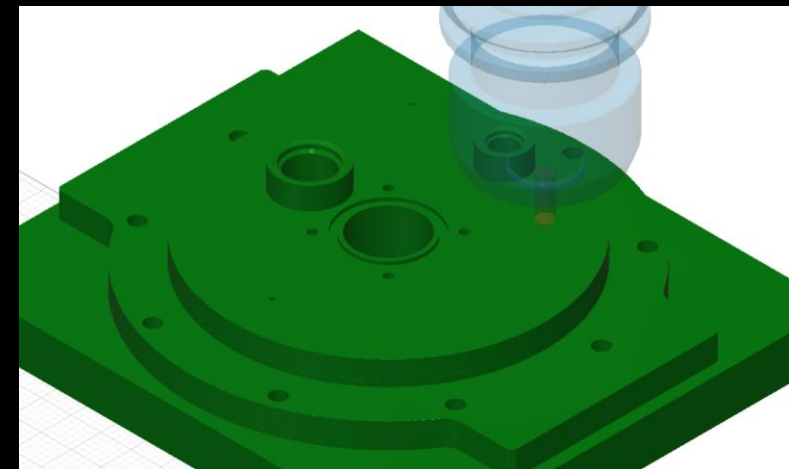
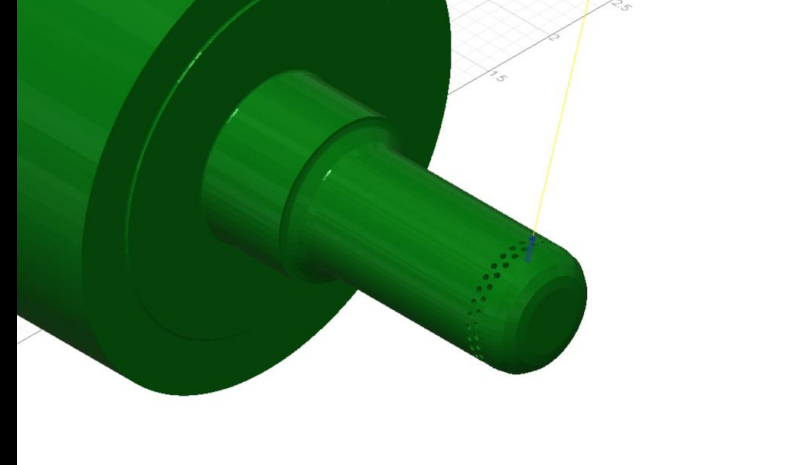


Phoenix Heatsink Engine

- Used for test cell validation
 - First full TCA I worked on
 - Worked on the design as well
 - Fully owned TCA manufacturing
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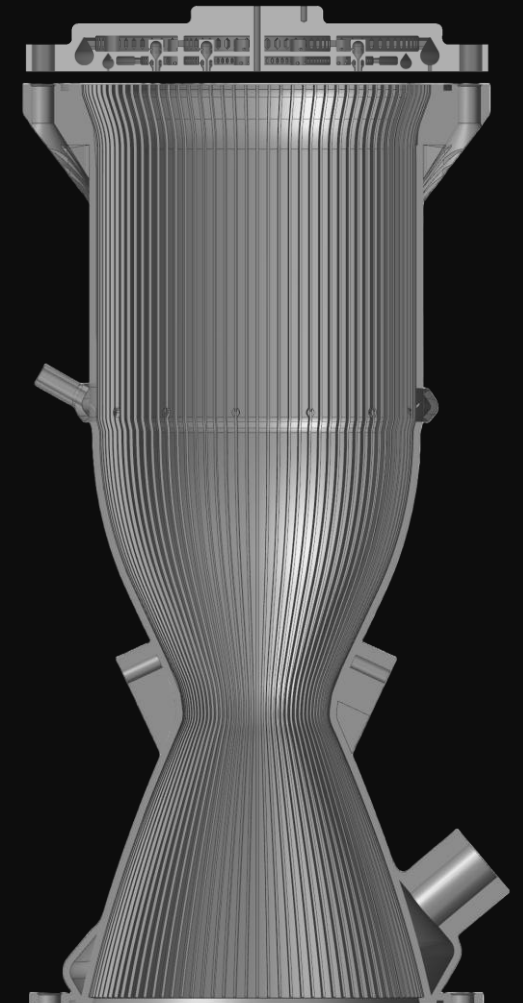


Phoenix Heatsink Injector



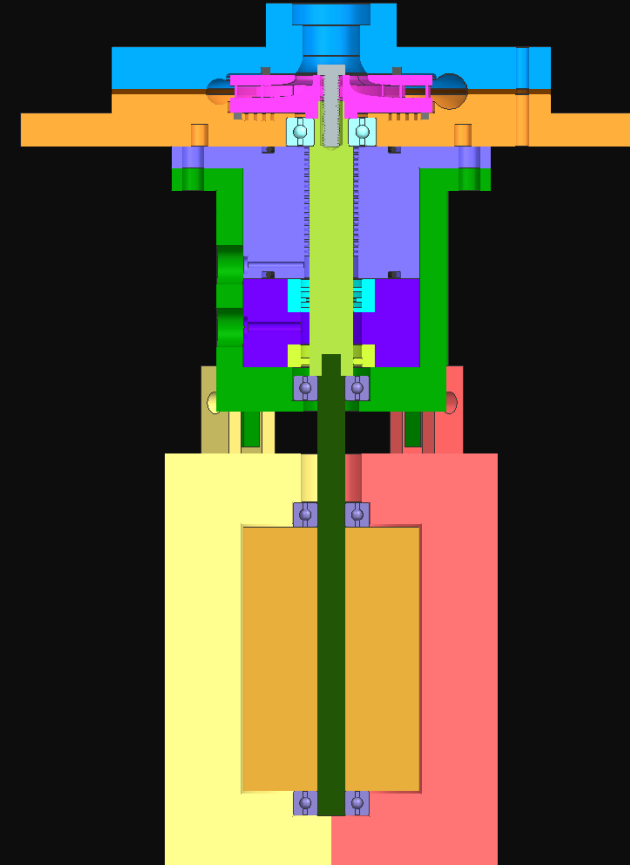
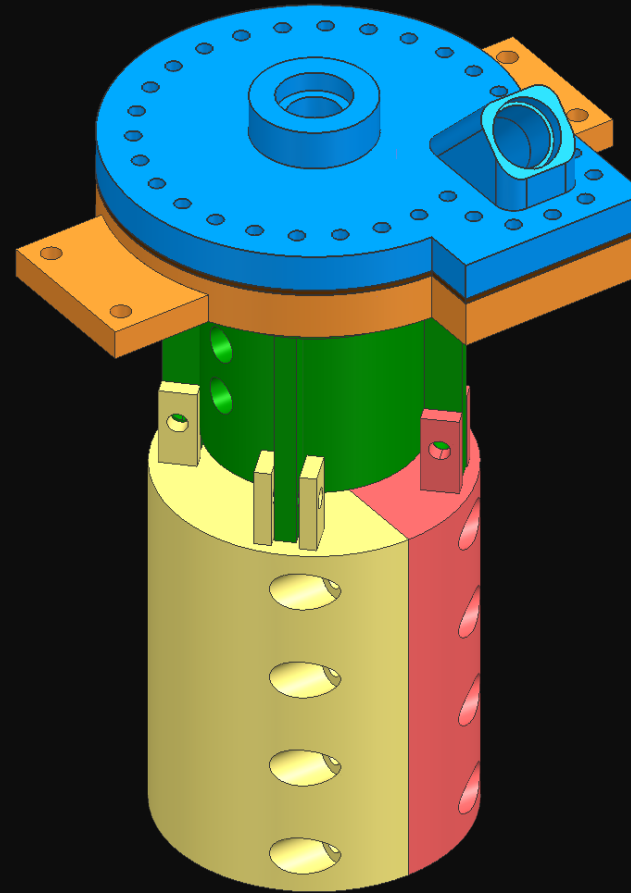
Copperhead

- PSP's next flagship rocket
 - Regeneratively cooled engine
 - Pump fed
 - 1800 lbf thrust
 - Ouroboros - Flight Engine
 - Ostrich - Test Engine.
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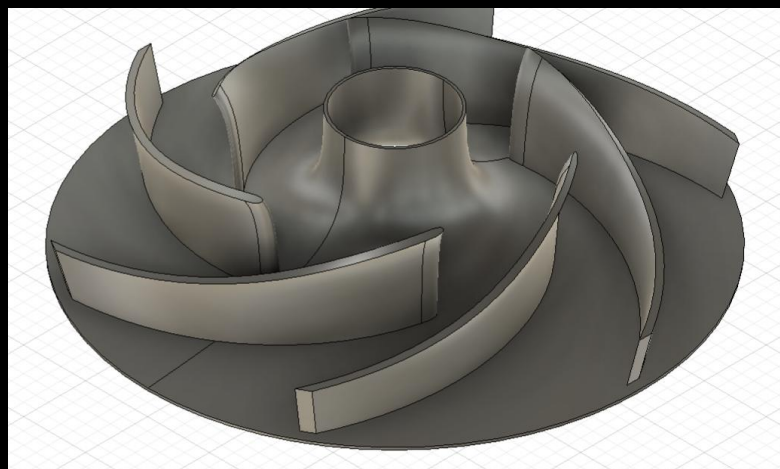
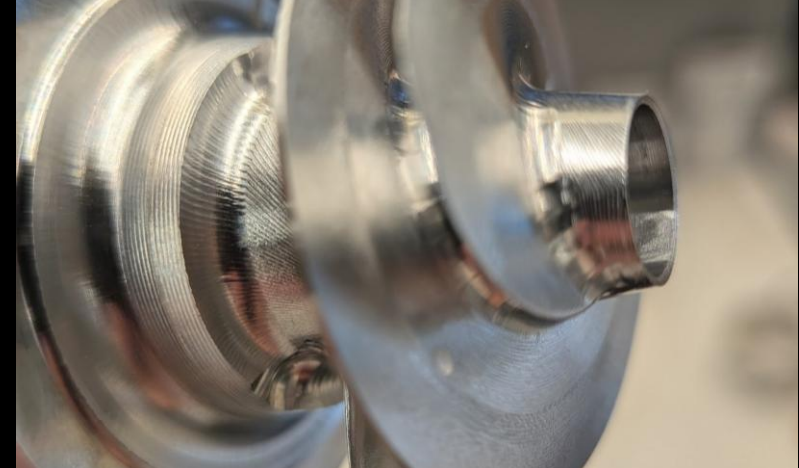
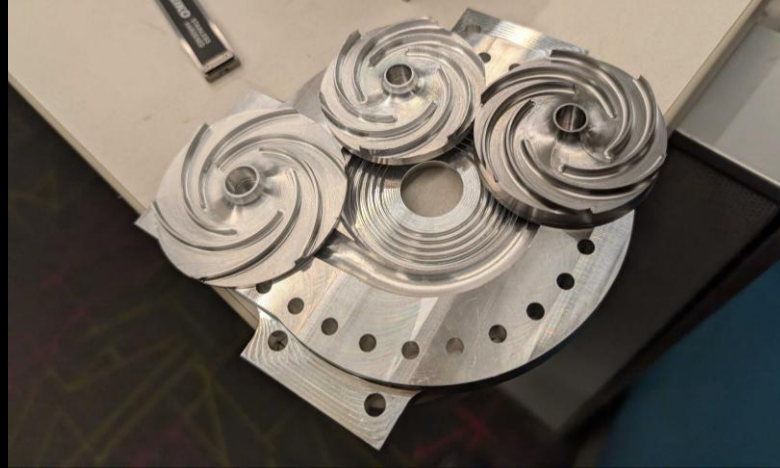


Copperhead- Pumps

- First collegiate pump fed rocket
 - Building out custom test rig
 - Flight pumps will be printed and post-machined
 - All test pump components are traditionally manufactured
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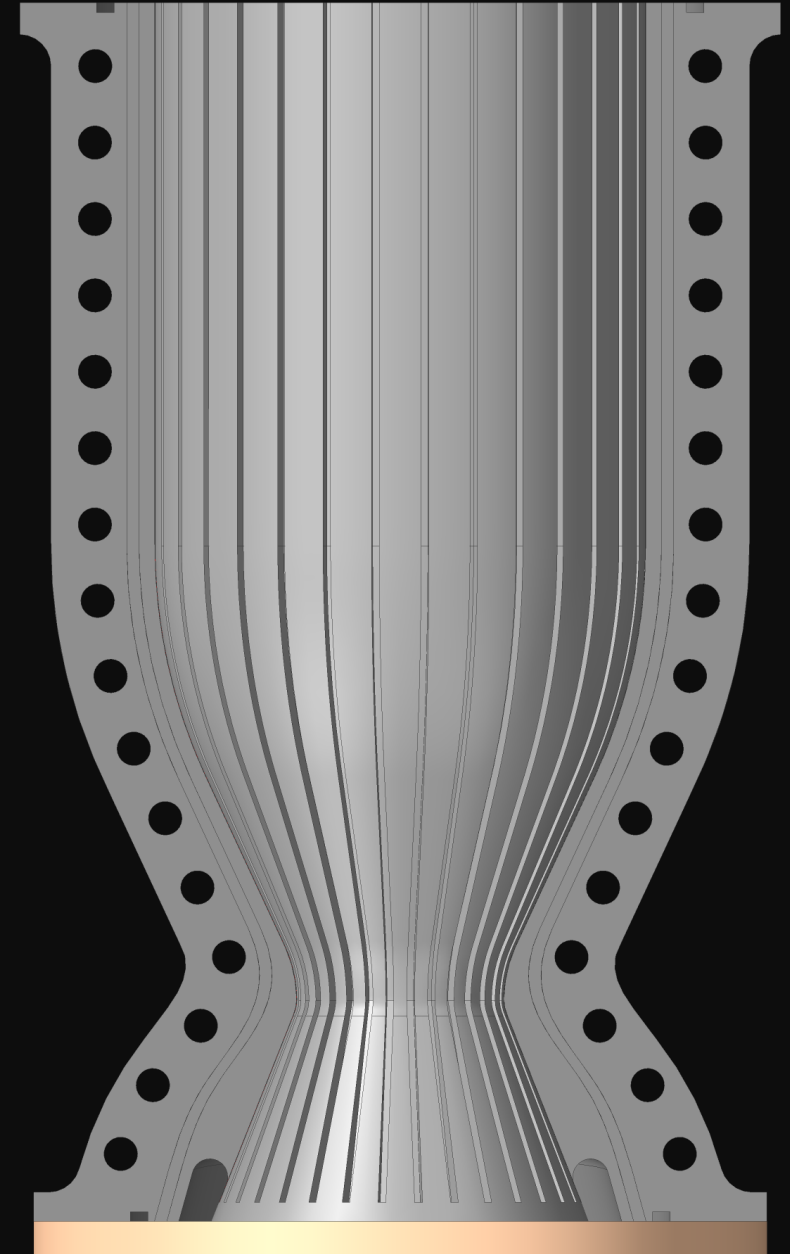


Copperhead Pump Photos

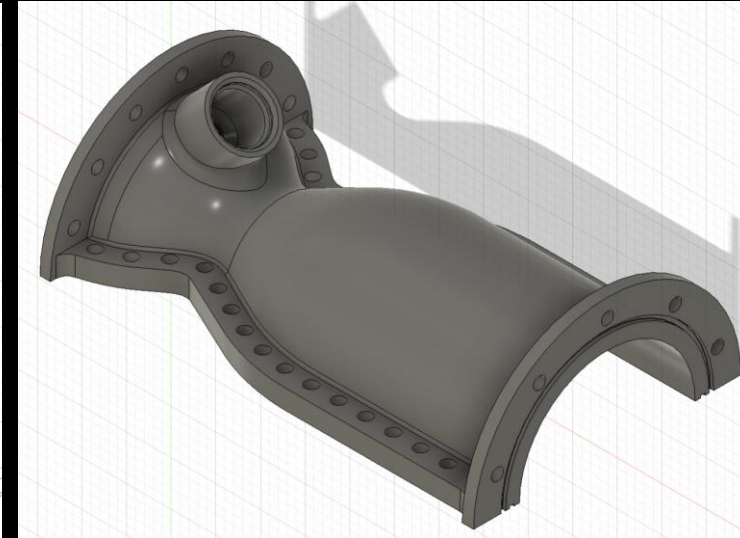
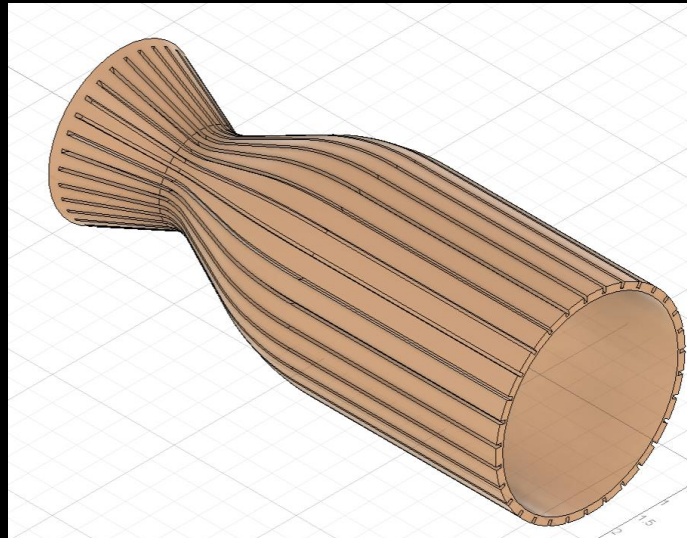
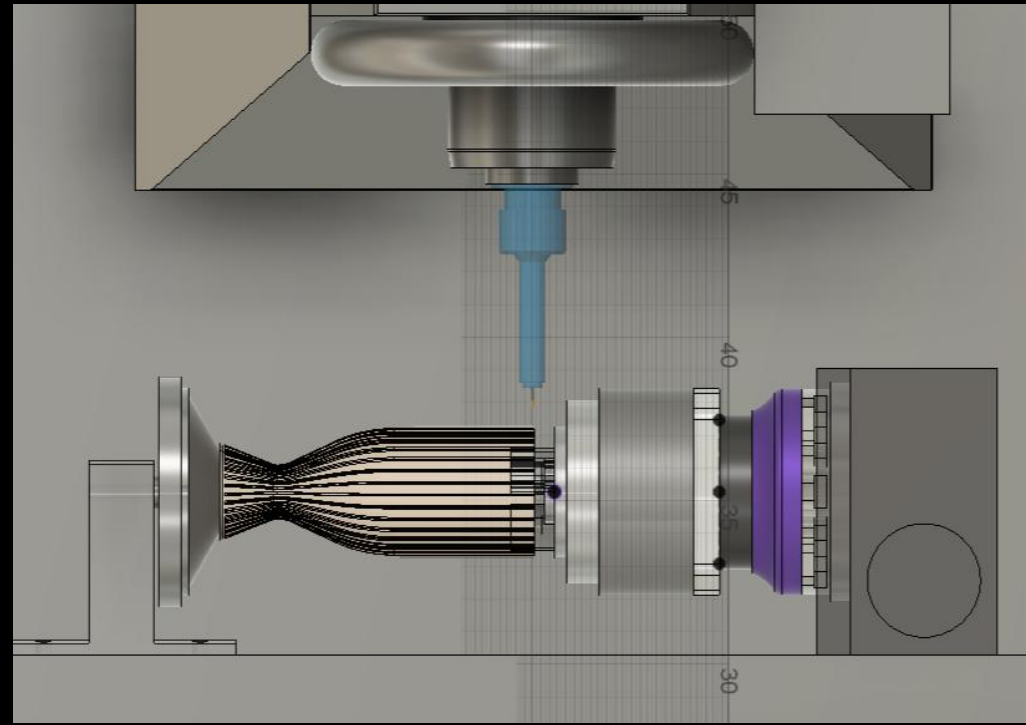
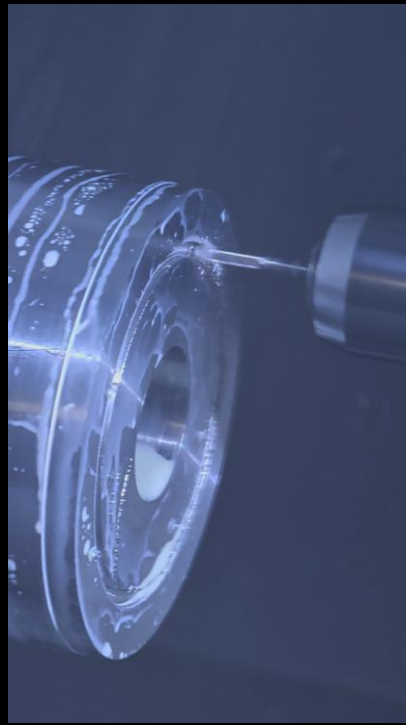


Copperhead- Ostrich

- Test engine to prove out sizing and regen code
 - Traditionally manufactured
 - Clamshell design
 - 400 lbf thrust
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Copperhead Ostrich Photos



Skills Learnt

- CNC machine operation
 - Design for manufacturing (DFM)
 - Non-destructive testing (NDT)
 - Rocket subsystem integration
 - End-to-end product development
 - Leadership
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Lessons Learnt

- A failure/crash isn't the end
 - Stay curious, Stay hungry
 - Good communication is vital
 - Always push yourself
 - There's always more to learn
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Questions?

Tom Feldman
PSP Liquids