

## Design Constraints

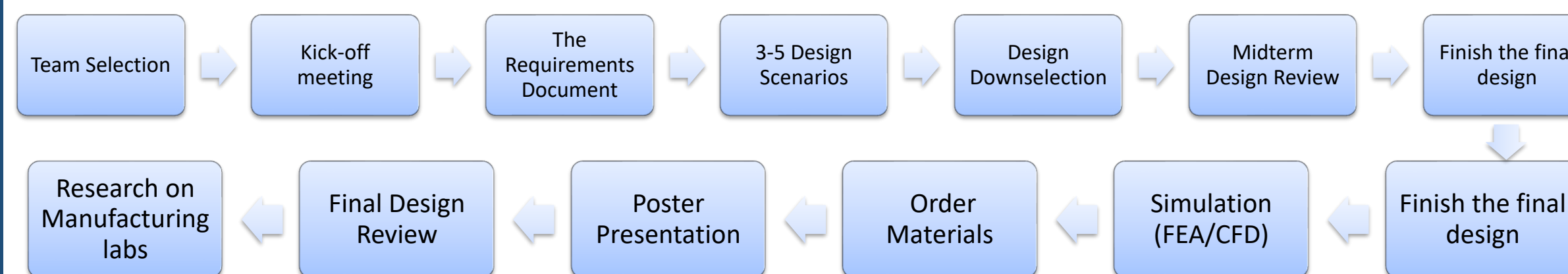
The design of the sprayer should be such that it will:

- Provide 100 PSI targeted IPA spray
- 1 meter insertion depth
- Water proof and chemical resistant
- Maximum 2 mm diameter
- Singled handed operation
- Ergonomic
- Redundant safety system
- Spark proof electronics/mechanics
- \$1000-\$2000 budget

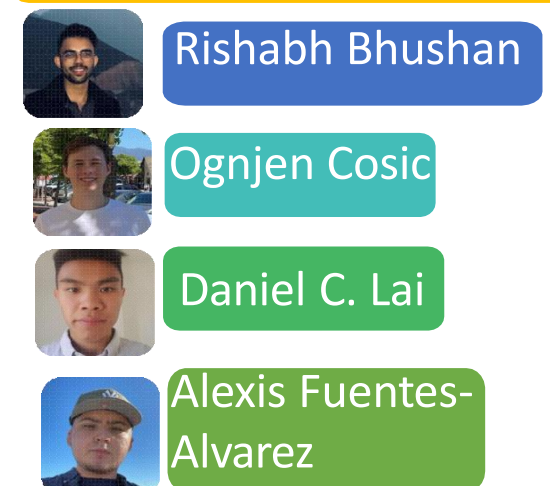
## Purpose of the Device

The purpose of this project is to create a flexible isopropyl alcohol (IPA) sprayer to navigate through complex geometries of 3D printed components and to fully coat it in IPA. Our task is to check for foreign object debris (FOD). It will be done by going inside of these parts, spraying IPA, and then going through an inspection process to check for cleanliness.

## Project Timeline: Fall 2021



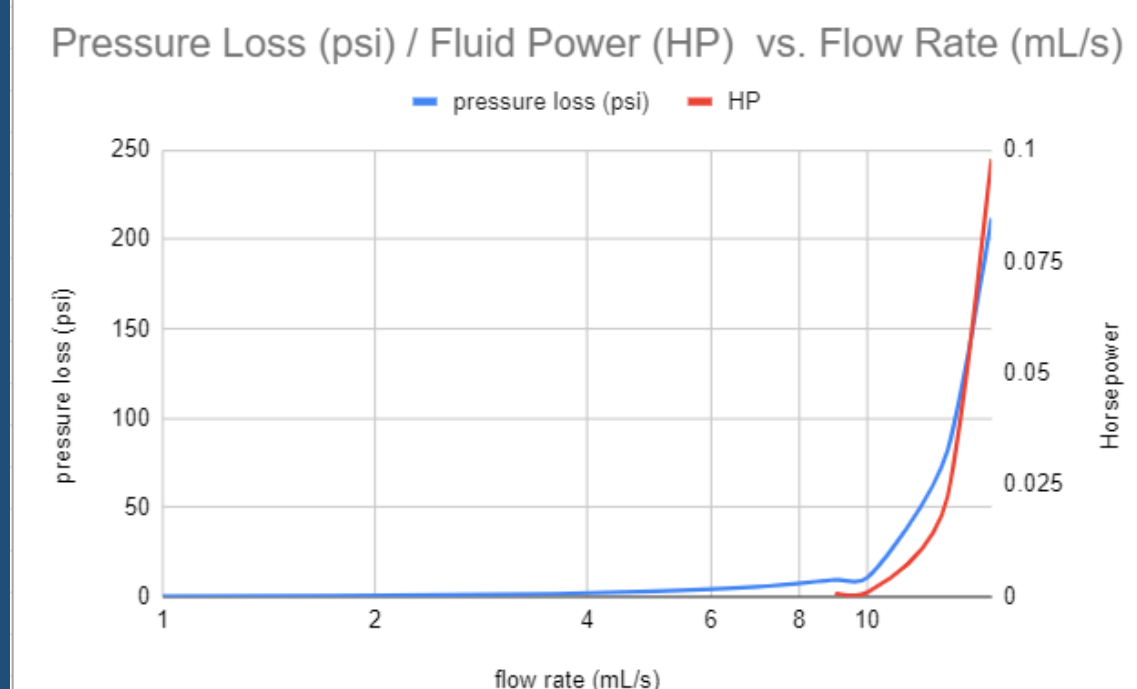
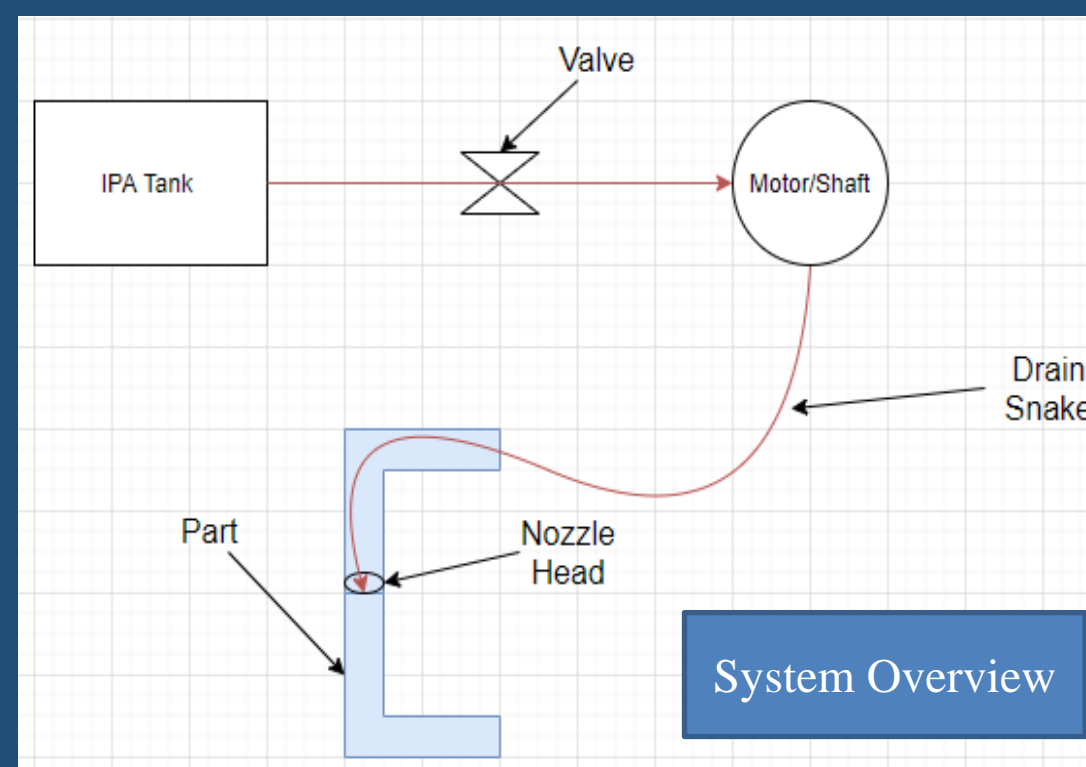
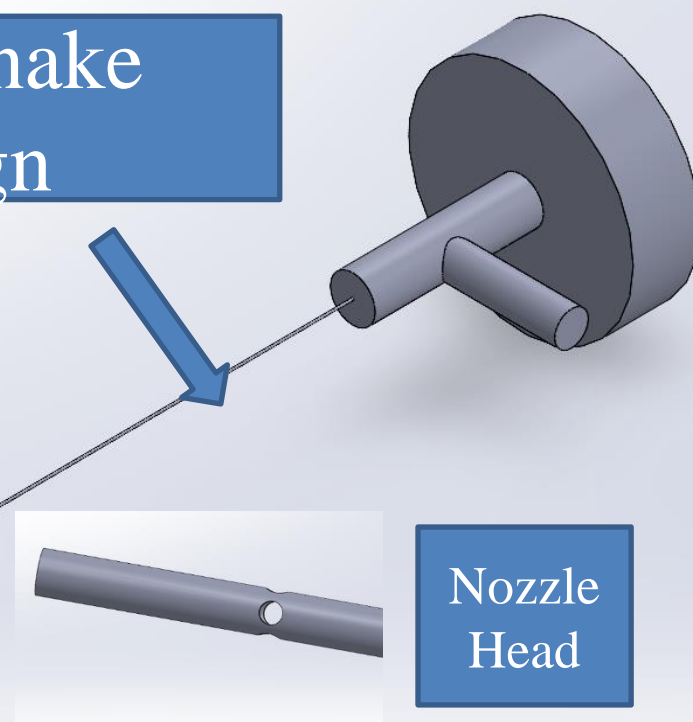
## Team Roster



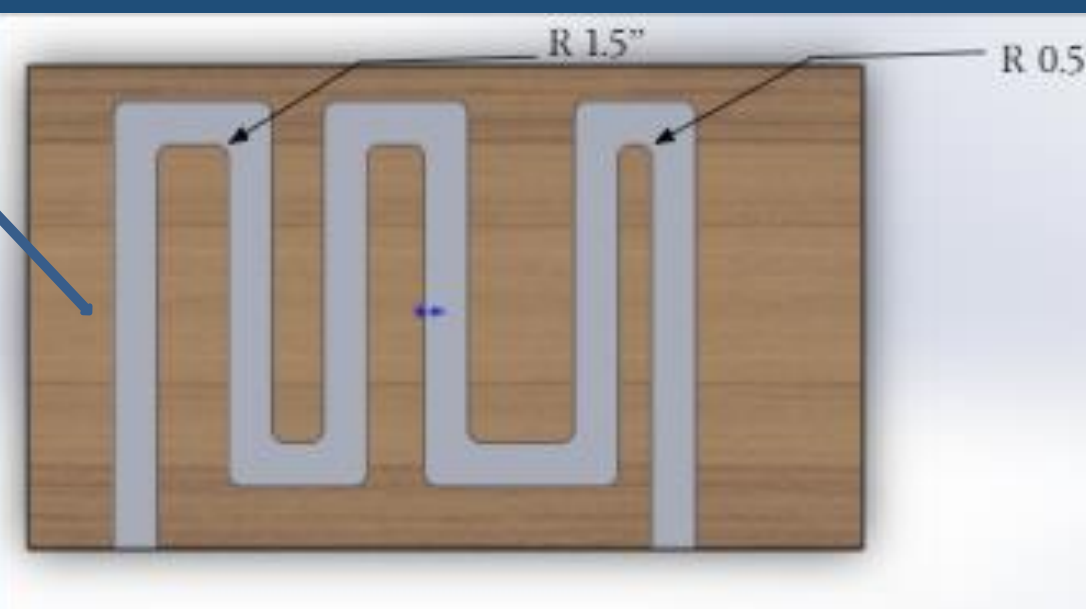
## Solution

Our primary objective is to coat the internal geometry with IPA as efficiently as possible. We want this product to be user friendly and highly effective. After going through an exhaustive design selection process, our team has finalized on an idea similar to a drain snake. We will rotate a tube via a manual crank. Our IPA flow will be powered through a pump within the geometry to fully coat the part.

## Drain Snake Design



## Sample Internal Geometry



Velocity (m/s)	Diameter of hole (mm)	Flow rate (m <sup>3</sup> /s) Q = AV	Diameter of tube (mm)	Tube length (m)	Pressure loss (psi)
10.2	.25	5 E -6	2	1	3
18.3	.25	9 E -6	2	1	8.9
10.2	.25	1 E -5	2	1	10.8
30.6	.25	3 E -5	2	1	82.6
34	.25	5 E -5	2	1	212.6