



3D Printing of Guillotine to Produce Precise Components for Electrochemical Systems

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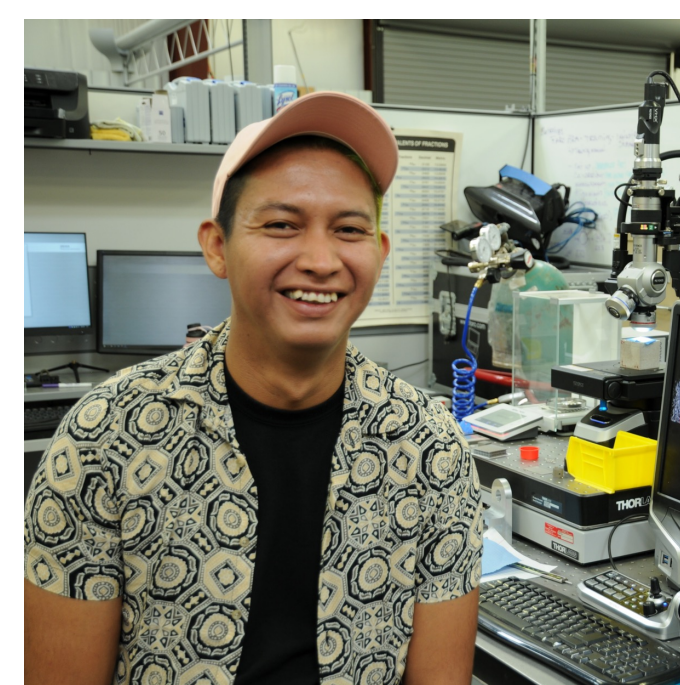


Overview

A fuel cell stack is an electrochemical system that produces power from chemical reactions. It generates electricity in the form of direct current (DC) from these electrochemical reactions. In Fuel cell stacks is important to isolate individual cells. Particularly, the bolts that are used to secure the stacks. Here we propose manufacturing a 3D printed guillotine that is versatile to accommodate varying tube diameters and lengths.



Final product has to produce accurate sleeves: diameter and length.

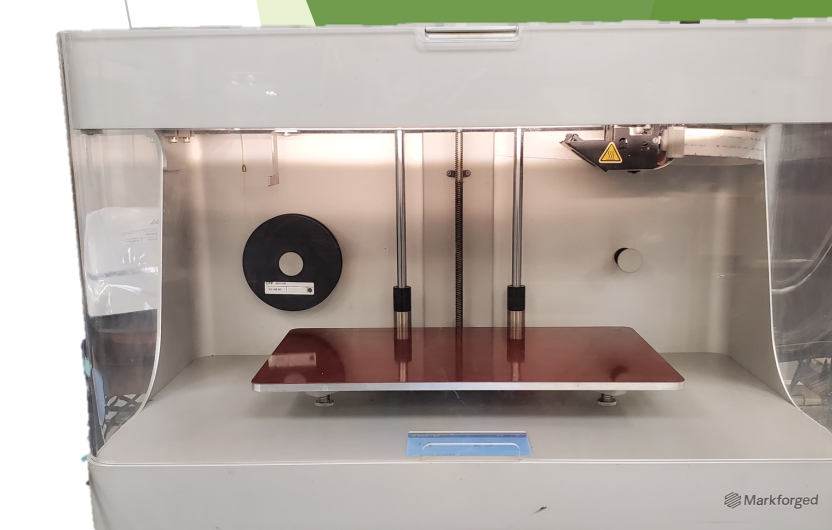


I am Joel Yazzie and I'm from Sanders, Arizona. I am enrolled at Navajo Technical University pursuing a bachelors in Mechanical Engineering



I am Wynona Wilson, originally from Ft. Defiance Arizona, I reside in Crownpoint, NM. I am a full time student enrolled in the mechanical engineering program and mathematics.

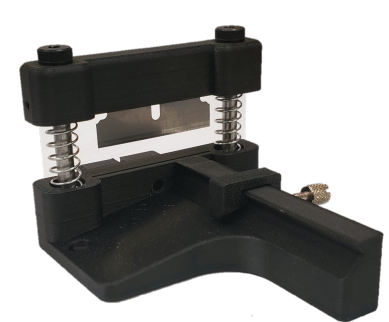
Experimental Set-up



- Markforged Mark Two Onyx 3D Printer
- Material used: Onyx
- Print Time: 16 mins - 5 hours
- Support material removal post processing

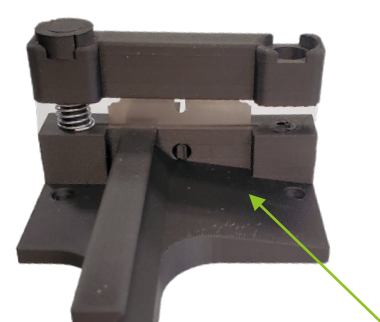
Accomplishments

Phase I: Safety



- Improved safety using a sleeve to cover the blade
- Single orifice isn't versatile

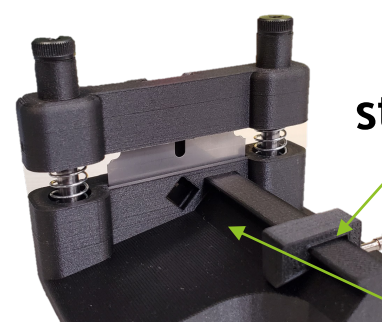
Phase II: Versatility



Orifice

- Replaced orifices with Diamond shape
- Added length control

Phase III: Verification



stopper

Diamond shape

- Used Diamond shape for final product.

Future Work

- How accurate are cuts from this device?
- Can we add a scale to ensure accuracy of stopper placement for reproducibility?
- Approaches used on this project will be used towards developing new fuel cell hardware designs .

Our Goal

To be able to apply these designing approaches to overcome various manufacturing challenges

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