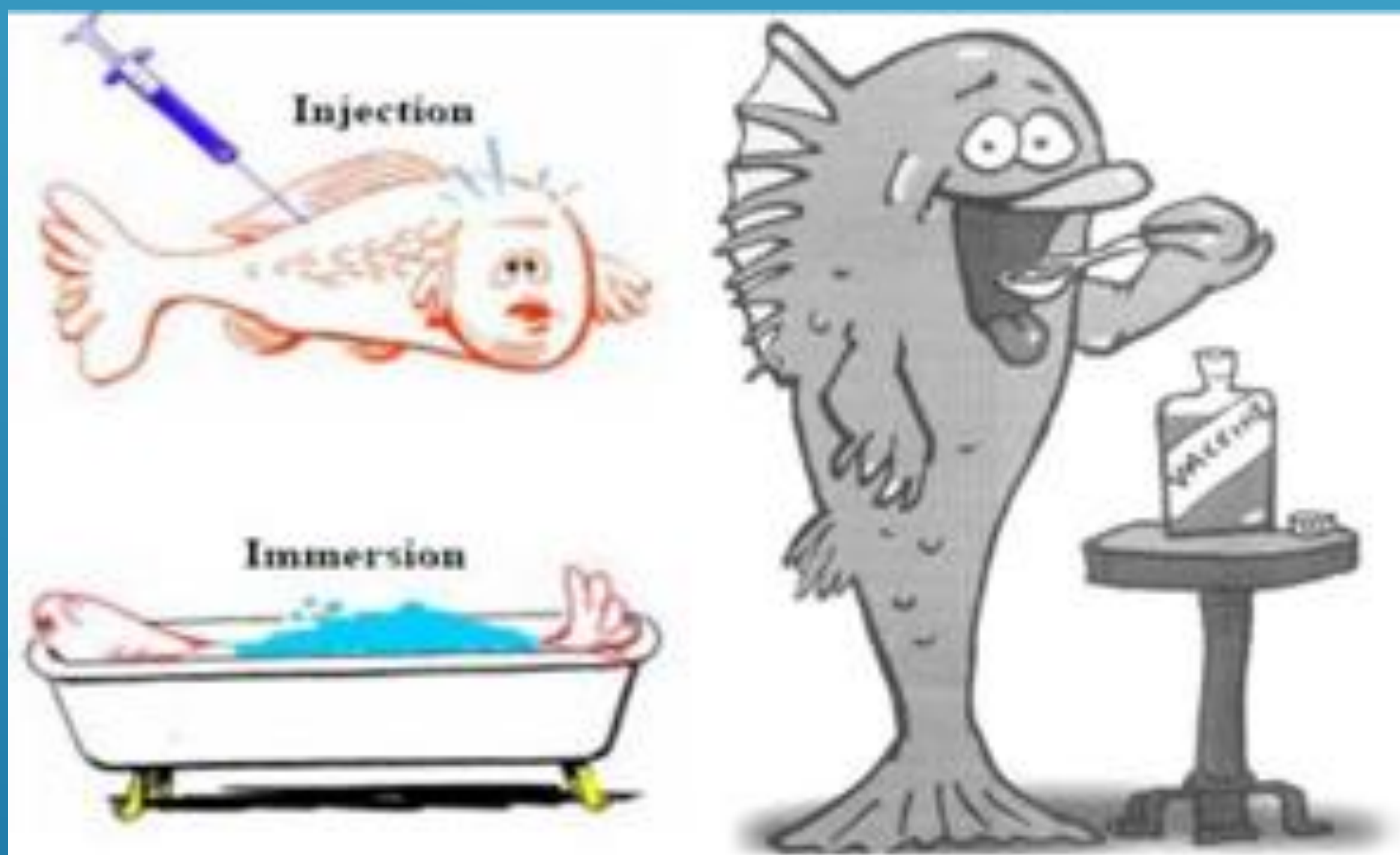


ALTERNATE AQUACULTURE VACCINE DELIVERY SYSTEM

Ben McBride, Cody Gibson, Hasan Alajmi

Background and Objective:

- 3 methods for vaccination (Injection, Immersion, Oral)
- It's known that fish with a fin removed or puncture in the skin prior to immersion have an increased vaccine uptake
- It is our goal to develop a device that combines the injection and immersion processes to increase vaccine uptake in fish while remaining humane and time efficient



Key Requirements:

- Should contain non-specific parts where possible to allow for easy repair
- Two Prototypes (Lab model and production model)
- Product should be adjustable to vaccinate a variety of different sized fish
- Humane method of puncturing the fish

Prototype Evolution:



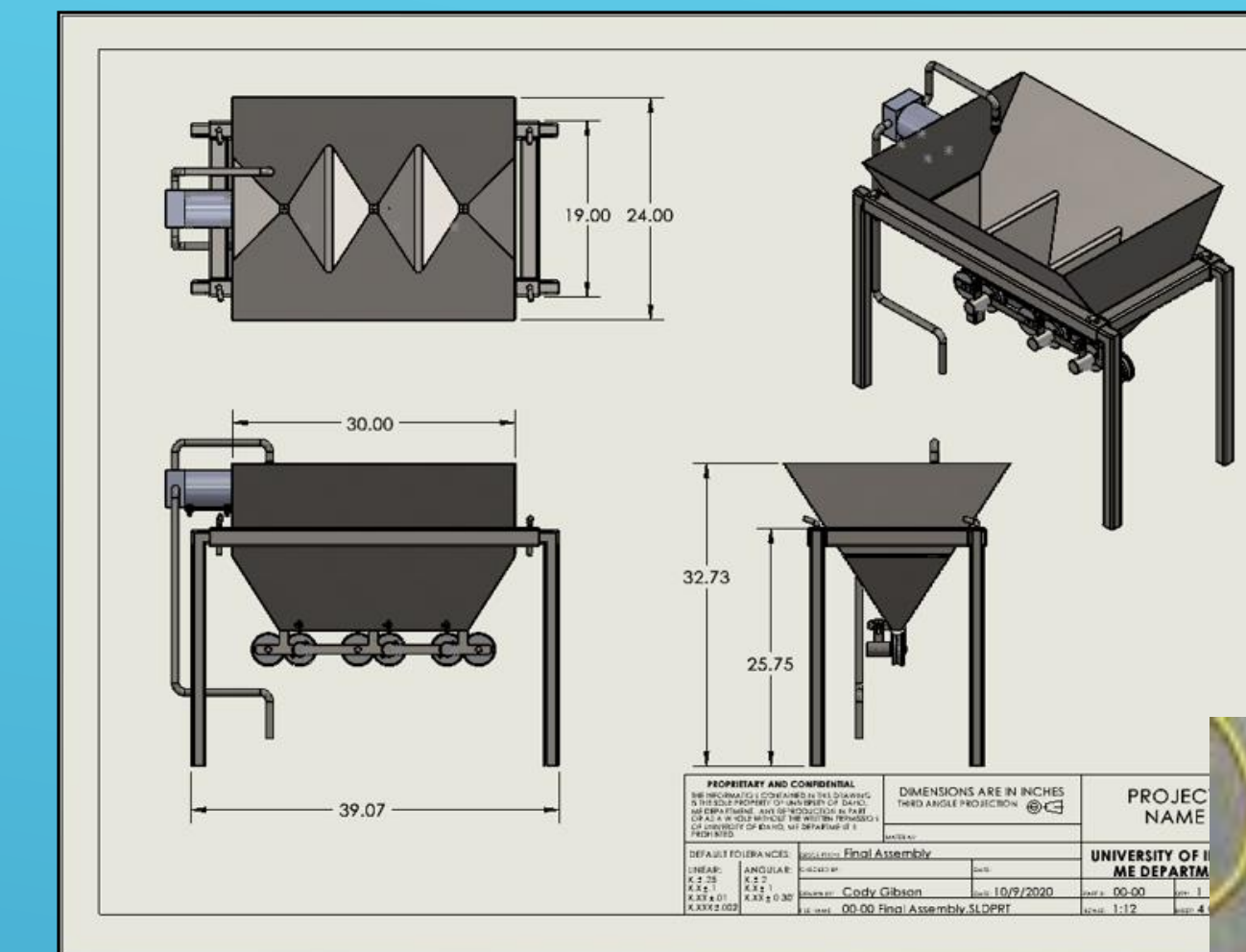
Validation:

- Test 1: **Started testing 8/31/2020**
 - Tested initial lab prototype: Test failed.
- Test 2: **Initial prototype 9/4/2020**
 - 3 diff. needle densities: Test Failed
- Test 3: **Initial prototype 9/30/2020**
 - 3D printed rollers with hypodermic needles: Test Success

Acknowledgements:

- Thank you to our sponsors and mentors
- Sponsor: UI CNR Dr. Ken Cain
 - Advisor: Dr. Matthew Swenson
 - Mentor: Max Johnson
 - And everyone else who helped along the way

The Final Design:



Assembly Drawing of the Final Prototype

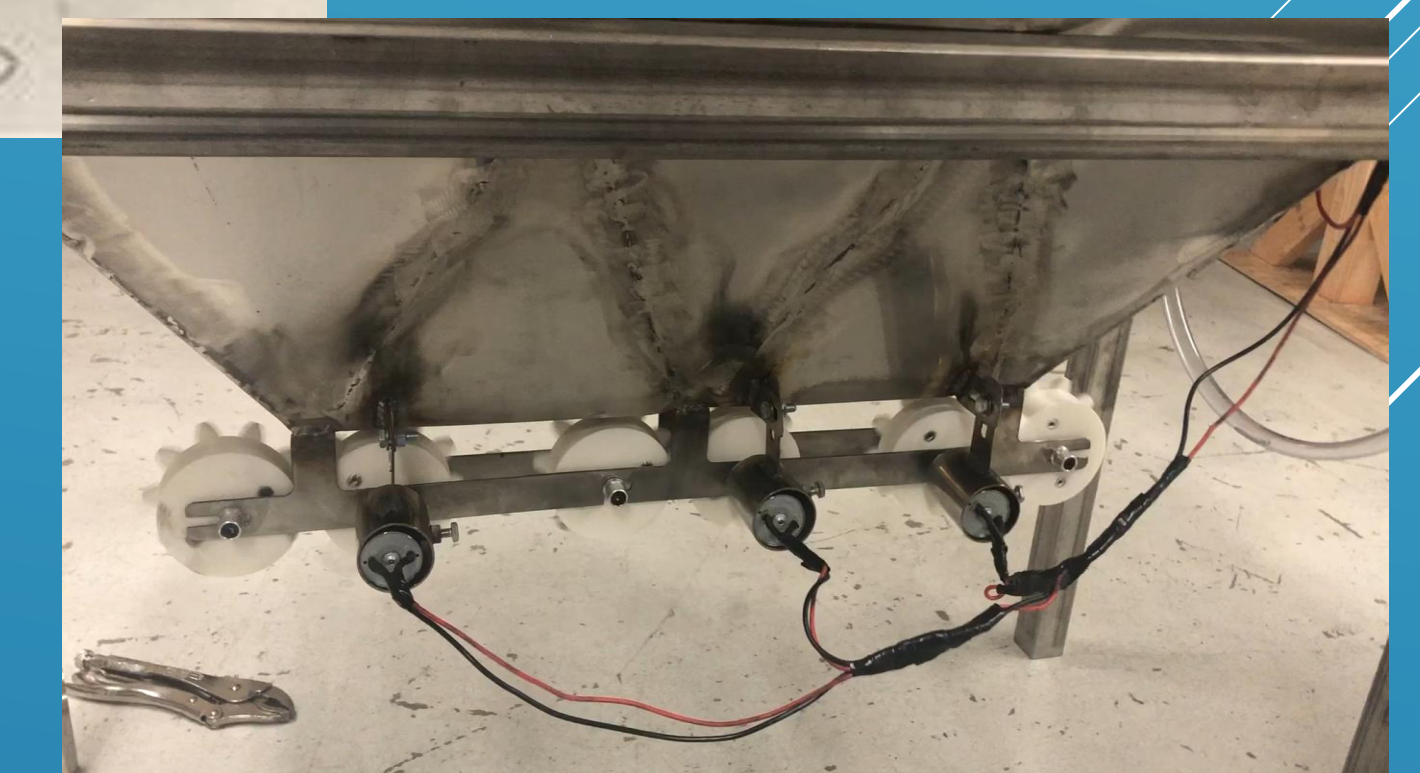
Chute Fit Up Before Welding



Finished Chute with pump and motors installed



Geared Roller Demonstration



Project Hand-off:

Design Structure Testing: During assembly we identified weak points in the motor/roller interfaces that may need to be addressed in the next iteration. Puncture tests and fish volume tests still need to be conducted before moving forward with live fish testing.