# Estrella Mountain Community College
# Ambitious Axolotls
## Vertical Profiler Non-ROV Device

### Design Goals:

For our first year of the competition, we were planning on designing something low cost and simple. Our first design did not meet these goals using a lot of complex pumps and valves. Our second and current design better meats these goals using simple PVC design, with a laser cut internal frame, and standardized components.

### System Description:

Starting with the buoyancy engine, we designed a liner actuator using a 3d printer lead screw and TT motor that drives a syringe pump that can take in and expel water from the vertical profiler changing the float's buoyancy. The buoyancy engine is controlled by a microcontroller through its range of travel using limit switches. Depth sensing of the float is preformed using a water pressure sensor and radio communication is preformed using the Adafruit Radio Feather microcontroller.

### Theory of Operation and Mission Profile:

To start the float is set to be neutrally buoyant when the actuator is at 50% of its full travel. Then it can be switched on and deployed using our ROV. Immediately after being switched on the float begins to send messages to the base station. Then after a preset delay to allow for deployment, the float begins its mission profile. First it fills the syringe with water making it negatively buoyant. Now the float begins to sink, and the pressure sensor begins to take data. The microcontroller looks at the data to see when the floats depth stops changing showing that the float has reached the bottom. Then the actuator expels all the water from the syringe causing it to rise to the top where it can then send data to the base station.

### System Integration Diagrams: