Liver Allograft Viability Sensor

**Problem:** Each year 9.5k livers are donated and only 7.5k are transplanted; a discard rate of 10%, leaving 42% people on the waitlist

**Need:** Normothermic Machine Perfusion increases marginal tissue health through active metabolism; **no quantitative metric** to determine use

**Testing Results:** Venous Occlusion test showing a predicted decrease in Hbo2 and increase in Hb; vertical lines indicate occlusion begin and end

**Solution-Design: Electronics**

- Arduino Uno
- 730 & 850 nm LED
- Detector 1 (12.10 mm)
- Detector 2 (13.45 mm)
- Detector 3 (6.25 mm)
- Flexible Printed Circuitboard

**Solution-Design: Fixation**

- Bungee cables to fix sensor to various size livers without impeding NMP tubing/wires
- Modular basin to:
  a) Adjust placement and tension as needed
  b) Accommodate variety of liver dimensions
  c) Drain blood to minimize contamination
- Opaque backing to block light

**Prototype:**

**Objective:** Provide quantitative metric for determination of liver allograft tissue viability during Normothermic Machine Perfusion.

**Societal Impact:** Provide a POC to increase use of other marginal organs while reducing cost of failed transplantation. Overall, this design will decrease the percentage of discarded livers.