

Microbial Pill Sensor

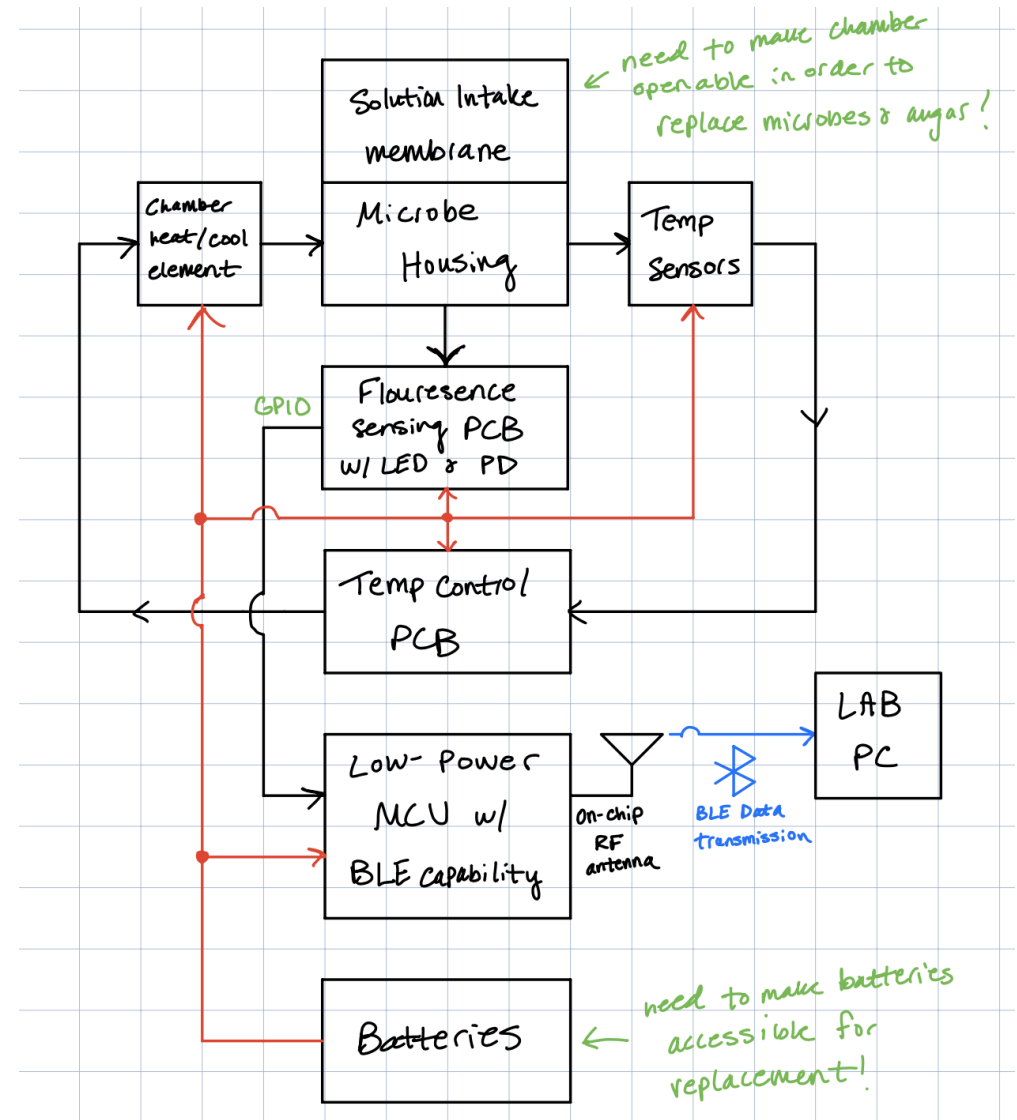
Project Planning

SDMAY25-17

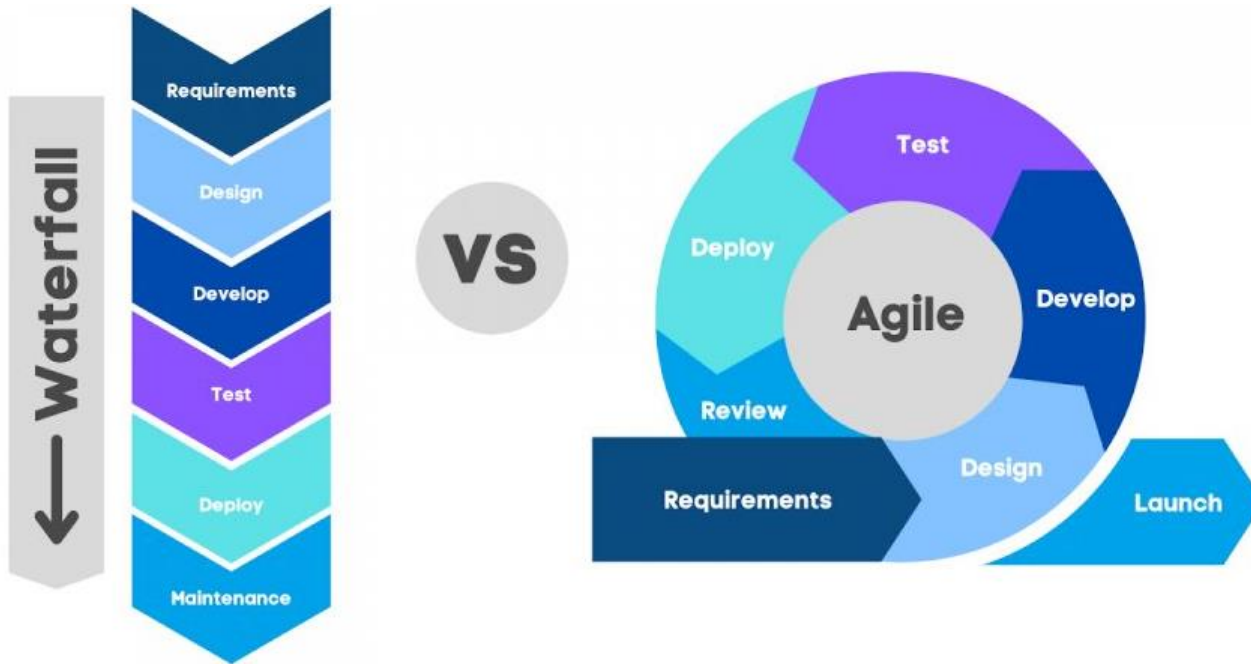
CADE KUENNEN, ALEX UPAH, WES RYLEY, RAKESH PENMETS

Project Overview

- Develop an Electrical system that will house, monitor, and transmit data that is collected from a biosensor using bioengineered detection mechanism.
- Monitor and control the temperature of the housing unit to maintain cell growth.
- Create a circuit that will excite the biosensor with an LED, as well as a circuit to collect the emitted response.
- Transmit the collected data through a Low-Energy Bluetooth connection.



Management Style



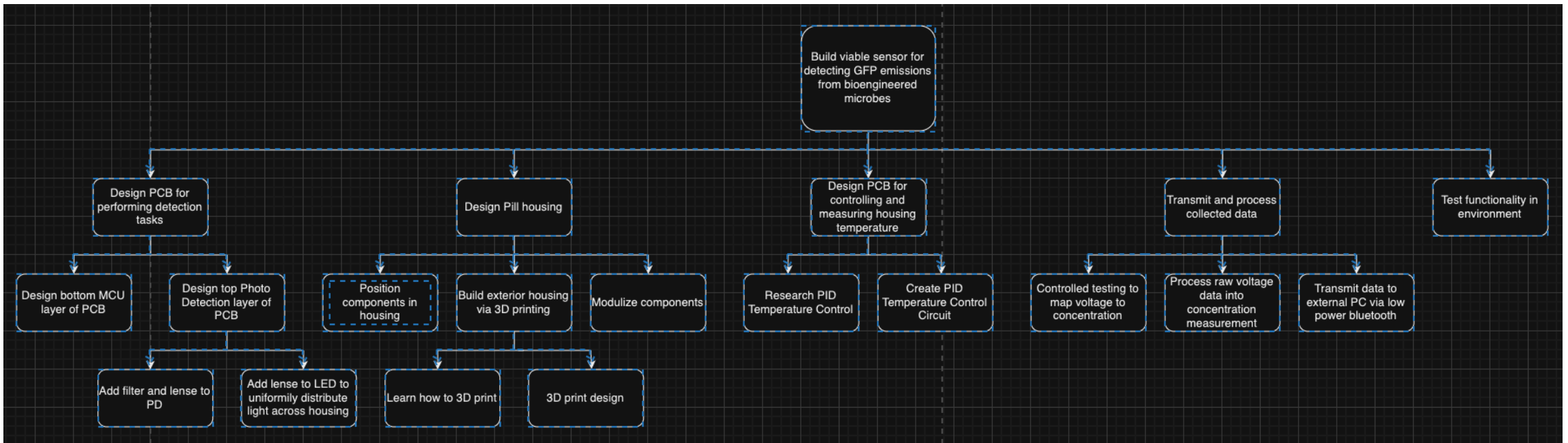
Hybrid Management Style:

- Waterfall:
 - Working together as a group on sequential project steps
 - Garner collective understanding of design domain
- Agile:
 - Break out into individual sprints based on project tasks
 - Keeps project tasks moving forward
 - Allows for more flexibility

Task Decomposition

Our project can be broken into five different sub-tasks:

- Microbe Fluorescence Detection Design
- Pill Housing Design
- Temperature Control Design
- Data Transmission Design
- Functional testing



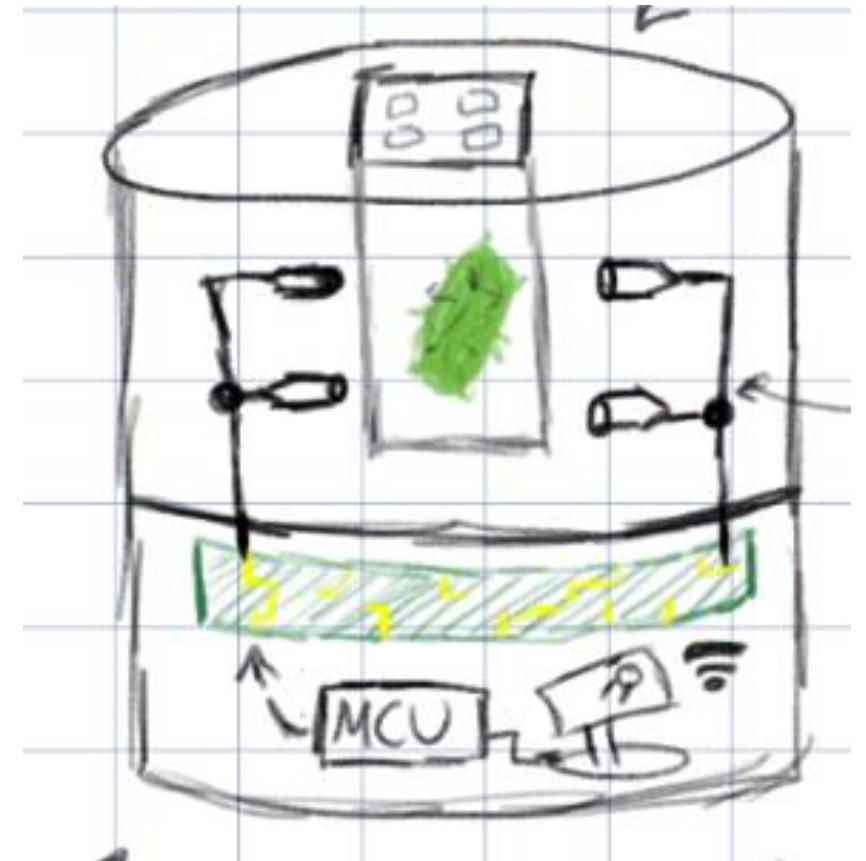
Milestones & Metrics

Milestones:

- October: Breadboard prototype of system
- November: PCB design simulation
- December: PCB prototype with USB power and no temp control capability
- January: Functional testing
- March: Battery powered PCB prototype (still no temp control) and functional testing
- April: Battery powered PCB prototype with temp control and testing

Metrics:

- The microbial pill sensor will record analyte concentrations within an accuracy of 95%



Risks & Mitigation



Risks:

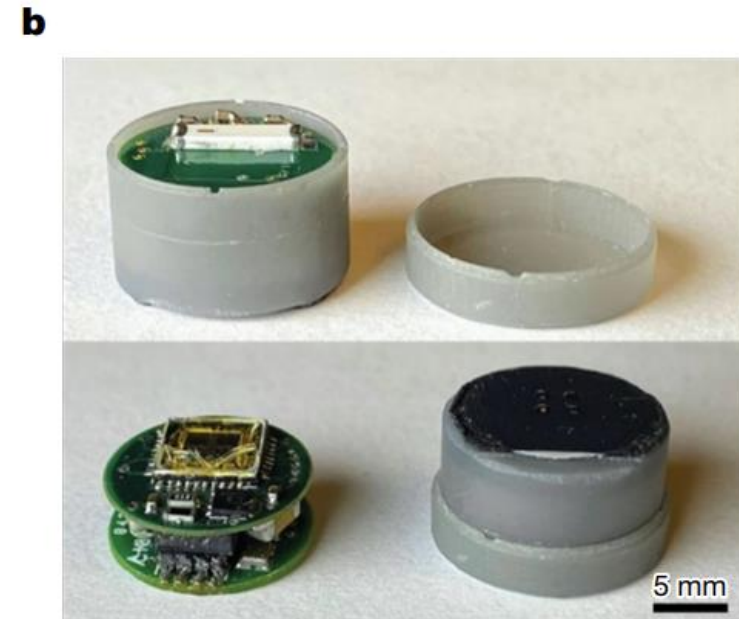
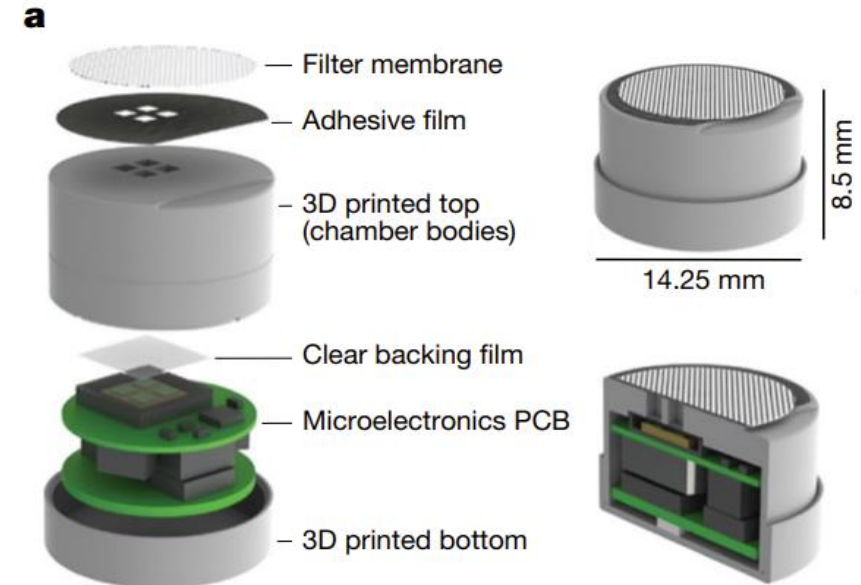
- Contamination of environment sensor is placed in by escaping bioengineered microbes.
- Contamination of environment sensor is placed in from battery degradation.
- Housing material harmful for the environment

Mitigations:

- Create filter membrane that doesn't allow bioengineered microbes to escape into environment
- Create battery housing that doesn't allow chemical discharge from battery to escape into environment
- Create device housing our of materials that are not harmful to the environment

Conclusions

- Our project will follow a plan considering these points:
 - We will use a hybrid management style throughout the project's lifespan.
 - Tasks can be decomposed into more manageable tasks as shown in our task decomposition chart
 - Hitting high-level milestones based on agreed upon timeframes we believe are doable.
 - We recognized a few potential risks associated with our project design and determined mitigation strategies for each risk.





Thank You!

Any Questions?