Microbial Pill Sensor

Ethics & Professional Responsibility

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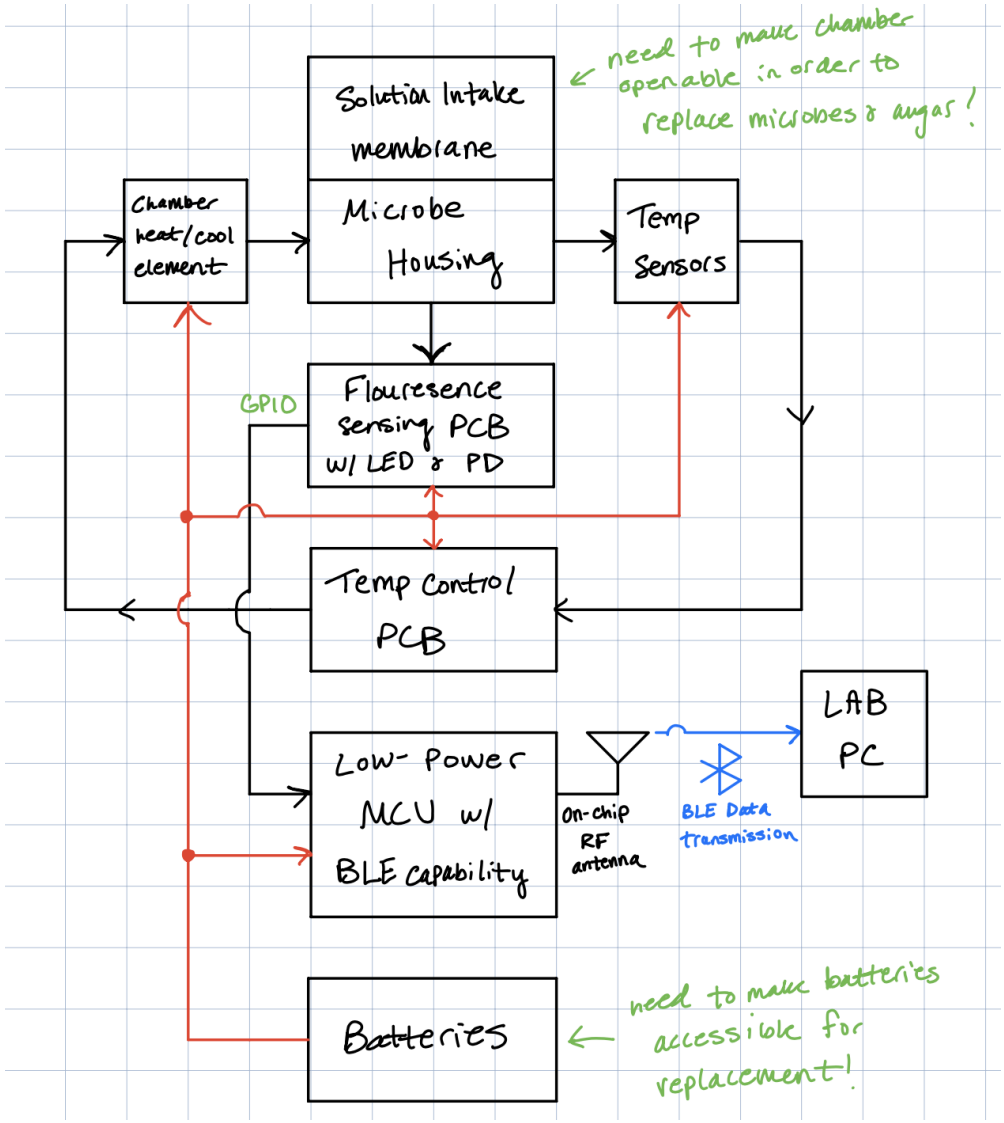
Project Overview

- Develop biosensing system that will house, monitor, and transmit data using bioengineered detection mechanism.
- Monitor and control the temperature of the housing unit to maintain cell growth.
- Optical circuit to emit light and measure fluorescent output
- Transmit the collected data through a Low-Energy Bluetooth connection.



Areas of Professional Responsibility

Our Team has performed well on **Communication Honesty:**

Relevance:

- Meet with our advisor/client every week and must clearly and honestly report our status of the project.
- Must be honest about individual teammate progress to ensure tasks are being completed.

Approach:

- Team members show off the work they completed during the week in our weekly meetings
- This work is cross compared to what their goals were at the start of the week

Reasoning:

- Sharing individual team member task progress allows other team members to cross validate what they said got done and ensure the project is honestly moving forward.
- This approach also allows the "shareholder" to be given information that all team members know to be true rather than one team member believing it to be true.

Areas of Professional Responsibility

Our Team has performed not-so-well on Social Responsibility:

Relevance:

- Create a product that pushes the usefulness of technology and research
- Create a safe controls system which will provide useful information

Approach:

- The team is working to find components that can be transferred between projects such as the digital RGB LED and PDs which PCB footprint match others.

Reasoning:

- The MicroBial Pill sensor is for a very specific application.
- Although the team is working to create a universal sensing system, features like the optical filters, LED intensity and wavelengths, and PD recognition limit this availibility.

Four Principles Chart

	Beneficence	Nonmaleficence	Respect for Autonomy	Justice
Public health, safety, and welfare	Enhances public safety by creating a biosensing system that monitors health indicators and contaminants effectively.	Avoids harm by ensuring safe application of bioengineered bacteria and preventing misuse.	Provides accurate, accessible health data for informed decisions by users.	Ensures equal access to the technology for all communities regardless of socio-economic status.
Global, cultural, and social	Promotes better global health outcomes by detecting pollutants and diseases in diverse contexts.	Avoids harm by considering cultural sensitivities in system design and deployment.	Respects cultural autonomy by tailoring features to community-specific needs.	Distributes benefits equitably, ensuring marginalized groups also gain from the innovation.
Environmental	Reduces environmental risks by detecting harmful pollutants quickly and efficiently.	Prevents ecological harm through sustainable material sourcing and manufacturing.	Respects environmental autonomy by avoiding interference with natural ecosystems.	Balances environmental benefits across regions and protects resources for future generations.
Economic	Reduces health monitoring costs through efficient and affordable technology.	Avoids financial harm by ensuring affordability and transparency in costs for users.	Empowers users to make cost-effective decisions with reliable, accessible information.	Balances economic benefits for all stakeholders, including underprivileged communities.

Project's Ethical Concerns

- Our groups largest ethical concerns with our project are:
  - Creating a universal monitoring system
  - A system which can be applied to multiple situations to improve the monitoring of possible harmful contaminates
  - Ensuring a safe application of bio-engineered bacteria in real world situations

Conclusion

- Our team has done a good job of making sure that we are communicating effectively and honestly to ensure project integrity holds.
- Our team is working hard to create a project which can be used responsibly to create benefits for society.

Thank you!
Any Questions?