BME 400 Weekly Progress Report

Team #31: Microscope Cell Culture Incubator

Client: Dr. John Puccinelli
Advisor: Professor Mitch Tyler
Team: Jack McGinnity - mcginnity@wisc.edu (Leader)
Trevor Zarecki – tzarecki@wisc.edu (BPAG)
Steven Gock – gock@wisc.edu (Communicator)
Jenny Westlund – jwestlund@wisc.edu (BWIG)
Peter Hartig – phartig@wisc.edu (BSAC)

Progress Report Period: Wednesday, April 5th - Wednesday, April 12th

Project Overview

Live cell imaging systems provide a controlled environment for cells to continue to live in while imaging is performed. Current live cell imaging chambers that are compatible with a standard inverting microscope are expensive do not perform well with small culture vessels such as microfluidic devices. The team's goal is to design a low-cost incubator for use on a microscope that can sustain cell life while imaging is performed on a variety of cell-culture platforms.

Restatement of Second Semester Team Goals

- Further develop the prototype so that it is user friendly and readily available for extensive testing
- Conduct further testing and systems validation of the model
- Produce comprehensive written report

Summary of Team Accomplishments

- Trevor (BPAG): Arranged exchange of CO2 sensor, developed CAD for the final box.
- Steve (Communicator): Worked on Outreach deliverables, final editing/formatting remain
- Jenny (BWIG): final deliverable report and poster laid out, executive summary work
- Jack (Leader): Worked on the enclosure redesign
- Peter (BSAC): Found new water heater, worked on revisions from preliminary report feedback.

Summary of Design Accomplishments:

Activities

Person	Date	Activity	Time (hr)	Weekly Total (hrs)	Semester Total
Team	4/6/17	Team Meeting	1.25	1.25	20.75
Trevor	4/6 - 4/10	Emails and shipping of CO2 sensor	1.25	3.75	33.5
	4/11/17	CAD Design	2.5		
Steve	4/9/17	Outreach Deliverables	1.0	2.0	19.5
	4/11/17	Outreach Deliverables	1.0		
Jenny	4/7/17 - 4/12/17	Drafting executive summary	2.5	3.25	23.5
	4/7/17	Planned out final deliverables (report and poster), website updates	0.75		
Jack	4/10/17	Enclosure design	1.0	1.0	36.25
Peter	4/5/17 - 4/12/17	Finding/purchasing new water heater	1.5	3.5	23.75
	4/7/17	Preliminary report revisions from advisor feedback	2.0		

Team Goals for Next Week

- Collaborate on enclosure design, prepare CAD model to print
- Work on testing protocol for live cell testing
- Validate immersion heater and new CO2 sensor
- Fabricate PCB

Individual Goals

- Trevor: Develop CAD and test for final prototype
- Jenny: Work with Dr. Puccinelli for live cells and their culture protocols, assist CAD design and start final testing runs
- Peter: Begin culture in incubator by the end of the week
- Jack: Fabricate printed circuit board with digikey components, install the Arduino bootloader and upload code. Help out as much as possible with the enclosure redesign

- Steve: Complete Outreach deliverables, glass shop, other glass cutting service providers in area, final prototype testing.

Difficulties

Ordering a new CO2 sensor and not having a working immersion heater have stopped our ability to test for right now. We've shifted our focus to fabricating a new enclosure, and once the components come in we will be able to test them.

Project Schedule

Tasks	Jan		February				March					April				May	
	20	27	3	10	17	24	3	10	17	24	31	7	14	21	28	5	8
Project Development																	
Research	x	x	x	x					x								
Brainstorming	x	x	x	x					x			x					
Design Matrix				x													
Materials			x	x		x	x	x			x	x					
Fabrication				x	x	x	x	x	x		x	x					
Testing			x	x	x	x	x	x	x		x	x					
Final Design								x			x	x					
Deliverables																	
Progress Reports	x	x	x	x	x	x	x	x	x		x	x					
PDS		x															
Mid-semester Powerpoint				x	x												
Mid-semester Report					x												
Patenting																	
Final Poster																	
Final Report					x							x					
Meetings																	

Team	x	x	x	x	x		x	x	x		x	x					
Advisor		x		x	x			x				x					
Client		x			x		x										
Website																	
Updates	x	x	x	x	x	x	x	x	x		x	x					

Colored boxes are anticipated work. X's indicate progress or completion.

Expenses to date for second semester

- Multi-Output AC DC Converter: $28.48
- 15Ohm 2W Resistors (2): $0.40
- 36Ohm 5W Resistors (2): $1.12
- Immersion heater: $26.00 + $10.00 shipping = $36.00
- CO2 Tank: $13.94
- PCB Components: $74.16

Total: $148.10