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 12th - Wednesday, April 19th

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): Worked on CAD for the final prototype.
- Steve (Communicator): Worked on Outreach deliverables, tested water heating
- Jenny (BWIG): began cell line isolation for cell culture tests, tested new water heating strategy, began cell culture testing section and procedures for final report
- Jack (Leader): Finished PCB fabrication and uploaded code
- Peter (BSAC): Tested various methods heating, cell culture, and final presentation prep

Summary of Design Accomplishments:

Activities

Person	Date	Activity	Time (hr)	Weekly Total (hrs)	Semester Total
Team	4/18/17	Team Meeting	1.25	1.25	22.0
Trevor	4/13/17 - 4/16/17	CAD for moat design	2.0	2.0	35.5
Steve	4/9/17	Outreach Deliverables	0.5	3.5	23.0
	4/14/17	Water Heating Testing/purchasing	3.0		
Jenny	4/17/17- 4/18/17	Cell culture work, updating poster and starting final report testing sections	1.5	5.5	28.5
	4/14/17	New water heater purchase and testing, cell passaging	4.0		
Jack	4/13/17	PCB fabrication/SMD soldering	1.5	4.5	40.75
	4/14/17	Attempted to install Arduino bootloader, subsequent circuit debugging	2.0		
	4/17/17	Successfully installed UART drivers and bootloader	.5		
	4/18/17	Added through hole components	.5		
Peter	4/13/17 - 4/18/17	Testing new methods of temperature control	3.5	4.5	28.25
	4/16/7	Cell culture	1.0		

Team Goals for Next Week

- Fabricate final design and integrate with final trail live cell testing
- Prepare for presentations

Individual Goals

- Trevor: Finish building prototype, test it.

- Jenny: continue cell culture upkeep, finalize and submit executive summary, testing for final cell culture results, poster
- Peter: Test cell culture in incubator, complete poster and practice presentation, prepare final report.
- Jack: Fabricate final prototype.
- Steve: Complete Outreach deliverables, order glass, testing final prototype, finalize project

Difficulties

We've hit unexpected delays late in the semester with the heater we are using and obtaining the correct CO2 sensor. This has delayed the timeline for live cell testing and fabrication of the enclosure.3

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	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	x				
Deliverables																	
Progress Reports	x	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	x				
Meetings																	
Team	x	x	x	x	x		x	x	x		x	x	x				
Advisor		x		x	x			x				x	x				
Client		x			x		x										
Website																	
Updates	x	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