

**BME 400 Weekly Progress Report**  
Team #31: Microscope Cell Culture Incubator

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Advisor: Professor Mitch Tyler  
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Progress Report Period: Wednesday, April 19th - Wednesday, April 26th

**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): 3D printing of final prototype.
- Steve (Communicator): Finished Outreach deliverables, cell culture testing, acquired glass
- 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): Worked to debugged PCB, made changes for potential future iterations. Integrated LCD into circuit board
- Peter (BSAC): CO2 Stability testing, Incubator Stability testing, Scratch Assay.

## Summary of Design Accomplishments:

### Activities

Person	Date	Activity	Time (hr)	Weekly Total (hrs)	Semester Total
Team	4/24/17	Team Meeting	1.0	1.0	23.0
Trevor	4/19/17 - 4/26/19	CAD and 3D Printing	10.0	10.0	45.5
Steve	4/21/17	Outreach Deliverables and Glass acquisition	1.0	5.0	28.0
	4/25/17	Cell Culture testing	4.0		
Jenny	4/20/17-4/21/17	Final edits and executive summary submission	1.0	11.0	39.5
	4/20/17	Relay setup and cell passaging	2.0		
	4/21/17	Entire system setup and testing	3.0		
	4/24/17	Cell passaging and poster formats	1.5		
	4/25/17	System testing with live cells	3.5		
Jack	4/23/17	PCB debugging/rewiring	3.0	5.0	45.75
	4/25/17	LCD work	2.0		
Peter	4/24/17	CO2 Sensor stability testing	2.0	8.75	37
	4/25/17	System testing with all parameters and control testing	2.5		
	4/25/17	Scratch Assay	3.5		
	4/26/17	Data Analysis/Poster work	.75		

### Team Goals for Next Week

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

## Individual Goals

- Trevor: Finish building prototype, prepare for tong.
- Jenny: continue cell culture upkeep, finalize and submit executive summary, testing for final cell culture results, poster
- Peter: Complete data analysis and poster prep for final deliverables
- Jack: Prepare for presentations, finalize design
- Steve: Finalize project, presentation prep

## Difficulties

Late problems with components hurt our timeline, but we have been working through alternatives to overcome these issues.

## 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		x			
Testing			x	x	x	x	x	x	x		x	x		x			
Final Design								x			x	x	x	x			
Deliverables																	
Progress Reports	x	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														x			

Final Report					x							x	x	x			
Meetings																	
Team	x	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	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