BME 301 Progress Report

Automated Bioanalytical Chemistry Sample Tube Uncapping and Capping Device

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* **Client:** Dr. Robert Radwin (ISyE, BME)
* **Advisor:** Dr. Chris Brace (Dept. of Radiology)
* **Report Period:** February 26th - March 3rd

*** Project Overview:** Employees in a commercial laboratory cap and uncap more than 500-700 test tubes per day for a rapid, high throughput analyzer. This is causing undesired stress in the lab technician's fingers and hands. A design of a completely automated sample bottle cap cassette is desired that will eliminate much of the manual work by the technician during use of the analyzer.

*** Last Week's Goals:** Plan and assemble Slide-Through prototype, conduct proof-of-concept testing, develop preliminary report, finalize team notebook, and present current status to Dr. Brace.

*** Summary of Design Accomplishments:** Began assembling prototype device and discussed proof-of-concept testing methods.

*** Summary of Team Role Accomplishments:**
Katie (Leader) – Maintained communication with teammates
Alec (Communicator/BSAC) – Attended BSAC meeting; emailed with client regarding test tube processing data.
Jake (BWIG) – Updated website
Sam (BPAG) – Ordered materials

*** Activities:**

Date	Person	Task (hours)	Previous Total	Weekly Total	Semester Total
1/26	**Katie** (Leader)	*Progress Report (0.75)*	*0*	*0.75*	*0.75*
2/1		*PDS (1)*	*0.75*	*1*	*1.75*
2/9		*Update PDS, Design Matrix Criteria (0.5)* *Research Biology/Physiology (1.5)* *Brainstorm/Sketch Design Idea (1.5)*	*1.75*	*3.5*	*5.25*
2/15		*Preliminary Presentation (2)*	*5.25*	*2*	*7.25*
2/18		*Prototype Planning (2)* *Team Notebook (2)* *Preliminary Report (1.5)*	*7.25*	*5.5*	*12.75*
1/26	**Sam** (BPAG)	*Brainstorm capping mechanism (0.75)*	*0*	*0.75*	*0.75*
2/6		*Research potential motor upgrades (0.75)* *Sketch design idea (1.0)*	*0.75*	*1.75*	*2.5*
2/15		*Preliminary Presentation (2)*	*2.5*	*2*	*4.5*
2/18		*Brainstorm, sketch rack holder design ideas (1.5)* *Preliminary Report (1.5)*	4.5	3	7.5
2/27		Advancement of holder designs, specifics of device mechanism (2.0)	7.5	2.0	9.5
1/26	**Alec** (Comm./ BSAC)	*Initial Contact with Advisor and Client (0.5)*	*0*	*0.5*	*0.5*
2/1		*PDS formation (1)*	*1*	*1*	*1.5*
2/8		*PDS update(0.5)* *Design Matrix Criteria(0.5)*	*2*	*2*	*3.5*

		Brainstorm design idea(1)			
2/15		*Preliminary Presentation (2)*	*2*	*2*	*7.5*
2/28		Worked on assembling initial prototype (3)	3	3	10.5
1/26	**Jake** (BWIG)	*Fix up existing device (1)*	*0*	*1*	*1*
2/1		*PDS (1)*	*1*	*1*	*2*
2/6		*Brainstorm uncapping mechanism (1)*	*2*	*1*	*3*
2/8		*Design slide-through uncapping mechanism (2.5)*	*3*	*3.5*	*5.5*
2/15		*Preliminary Presentation (2)*	*5.5*	*2*	*7.5*
2/18		*Prototype Planning (2)* *Preliminary Report (1.5)*	7.5	3.5	11
2/28		Research of flexible motor shafts (0.5)	11	0.5	11.5

*** Team Goals**: Begin assembly of Slide-Through prototype and consider proof-of-concept testing methods, given Covance's input.

*** Individual Goals:**
Katie – Ensure progress report completion and submission
Sam – Look into flexible shafts so stoppers aren't completely rigid, work on initial prototype
Alec – Attend BSAC meeting on 3/3; Finish initial prototype and conduct testing.
Jake – Update the team website, create prototype for Slide-Through design idea

*** Project Schedule/Timeline**:

Tasks	January		February				March				April				
	22	29	5	12	19	26	5	12	19	26	2	9	16	23	30
Project Development															
Research	X	X			X										
Brainstorming	X	X	X	X		X									
Design Matrix			X	X											
Materials					X	X									
Final Design					X	X									
Fabrication					X	X									
Testing					X										
Deliverables															
Progress Reports	X	X	X	X	X	X									
PDS		X	X												
Preliminary Presentation				X											
Preliminary Report				X	X										
Final Poster															
Final Report															
Meetings															
Team		X		X	X										
Advisor	X	X	X	X		X									
Client		X			X										
Website															
Updates	X		X	X	X	X									

*** Difficulties**: Mounting the plastic gears to a metal rod is the biggest challenge we currently face. We are considering either using glue or soldering the gear to the metal rod, but we have limited gears, so we must be careful about not ruining any gears unless we know that the approach will work.

*** Expenses**:

Material	Date Ordered	Company	Cost	Funding
12V DC Motor	Fall 2016	ServoCity	N/A	N/A
Plastic Gears	2/18	Amazon	$6.79	Team
Rubber Stoppers	2/18	Amazon	$8.96	Team
5mm Rods	2/18	CoE Scrap Room	$0.00	N/A
Mounting Plate	2/18	CoE Scrap Room	$0.00	N/A
Total			$15.75	