BME Design: Progress reports

Title: Microvascular Channel Bioprinter shutoff valve

Date: 20 November 2025

Client: Dr. David Dean
Advisor: Dr. Paul Campagnola

- Steph Vigmond- *Communicator*
- Mahathi Karthikeyan - *BSAC*
- Sophie Speece - *BWIG*
- Ana Toscano - *BPAG*
- Dominique Gooden - *Team Leader*

Problem statement

Facilitate rapid switching between bioprinter input devices so that microchannels have rapidly decreasing diameter. Also come up with a shutoff mechanism to prevent excess fluid flow from valves.

Brief status update

The team is currently in the testing phase of ensuring IRE and circuit functionality through circuit testing, cytotoxicity testing, and durability testing.

Difficulties / advice requests

Cells died :(working on acquiring new ones for testing

Current design

See design matrix.

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
	3D Printed CEVIK & 5 KSMs	N/A (3D Printed)	N/A	N/A	N/A	09/19	1		$3.48	
	3D Printed CEVIC and 8 KSMs					10/20	1		$12.60	
	3D Printed CEVIC and gear					11/10	7		$7.63	
	3D Printed 10 IRE gears for testing samples					11/18			$12.65	
	3D printed connector for CEVIC and Servo Motor					11/20			$0.14	
Category 2										
	Purchase makerspace Servo	Smraza				10/24	2		$5.28	
	PLA 3D printing Rotational Element						3		$0.27	
	Additional Gear						3		$0.15	
	Makerspace 3D printed	3D ma				10/24	1		$1.83	
								TOTAL:	**$44.20**	

Major team goals for the next week

Next week's individual goals

- Dominique
  - Conduct more research entries and update labarchives Notebook
  - Begin working on poster section
- Ana
  - Complete rest of mandatory BME400 training
  - Work on poster section and final report
- Sophie
  - Receive and passage a new set of cells
  - Complete Cytotoxicity testing protocol
  - Complete Cytotoxicity testing
  - Complete Durability testing protocol
  - Complete Durability testing

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- Steph
    - Analyze testing results and interpret
    - Work on poster section and final report
    - Finish cell testing
- Mahathi
- Analyze circuit results
- Update lab notebook and poster section

Timeline

Task	Aug	September				October					November				Dec	
	26	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11
Project R&D																
Empathize				X												
Background…					X											
Prototyping					X			X	X	X			X			
Testings							X			X			X			
Deliverables																
Progress Reports		X	X	X	X	X	X	X	X	X						
Prelim presentation						X										
Final Poster																
Meetings																
Client			X	X	X	X	X	X			X		X			
Advisor		X	X	X	X		X					X	X			
Website																
Update		X	X	X	X	X	X	X	X	X	X	X	X			

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

- Ana
    - Completed new simulation
    - Assisted in creating a specific protocol for electronic circuitry testing
- Dominique
    - Completed rest of mandatory BME400 training
    - Wrote protocol for electronic circuitry testing; later expanded on it with Mahathi and Ana
    - Completed testing of circuitry
- Steph
    - Participated in circuit testing
    - Did cell and mechanical testing
- Sophia Speece
    - Began cytotoxicity and durability protocols
    - Began cytotoxicity testing
    - Printed test parts

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    - Modeled and printed connection between CEVIC and Servo
- Mahathi
    - Tested different circuit components

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Mahathi	19 NOV	- Circuit testing	2	2	30
Steph	19 Nov 20 Nov	Attended circuit testing Participated in cell and mechanical testing	0.5 2.5	3	33
Dominique	18 Nov 20 Nov 19 Nov 19-20 Nov	Wrote protocol for testing circuit components and ensuring validation metrics Attended BME400 laser training class Team Meeting Testing	1.5 hr 1.5 hr .5hr 2 hr	5.5 hr	>10 hr
Sophie	14 Nov 18 Nov 19 Nov 19 Nov 20 Nov 20 Nov	Passaged cells Modeled connection between CEVIC and Servo. Printed 10 test samples IREs Augmented connection between CEVIC and Servo. Printed this connector Team Meeting Wrote first half of Cytotoxicity protocol Cytotoxicity testing	0.5 1 1 0.5 1 2	6 hr	32
Ana	19 Nov 20 Nov	Did a new simulation, wrote new protocol Participated in the circuit testing Participated in the cell and mechanical testing	2 1 1.5	4.5	29.5