

BME Design: Progress reports

Title: Microvascular Channel Bioprinter shutoff valve

Date: 30 October 2025

Client: Dr. David Dean

Advisor: Dr. Paul Campagnola

Team:

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

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 two sub teams continue to meet and work towards individual goals. This week's goals continue to revolve around preparing a prototype to bring to the Show and Tell deliverable.

Difficulties / advice requests

N/A

Current design

See design matrix. In progress.

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	
Category 2										
	Purchase makerspace Cervo	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:	\$23.51	

Major team goals for the next week

Next week's individual goals

- Dominique
 - Continue further valve shutoff mechanism testing
 - Print updated tube holder
 - Documented test protocols for evaluating valve shutoff mechanism success
- Ana
 - Writing the code and adapting
 - Write protocol for shear stress, turbulent and laminar flow, and velocity
 - Research materials
- Sophie
 - Passage cells from 28 to 29
 - Tighten interface between CEVIC and IRE components and print in BioMed resin
 - Create something to hold the Servo motor and CEVIC-IRE device
 - Begin writing testing protocols and fabrication protocols
- Steph
 - Begin testing
 - Continue research
- Mahathi
 - - Purchase relay for clamp automation
 - - Begin writing test protocol for circuit testing

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																
Background...					X											
Prototyping					X			X	X	X						
Testings							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								
Advisor		X	X	X	X		X									
Website																
Update		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
 - Created velocity Fluent simulation
 - Worked on material research
- Dominique
 - Printed tube holder from makerspace and modified dimensions
 - Didn't do too much else; was sick earlier this week
- Steph
 - Modeled and 3D printed gears
 - Created circuit and code to make motor turn
 - Connected gears and made them turn
- Sophia Speece
 - Passaged cells from 27 to 28
 - Used SolidWorks to model a connection between the two CEVIC halves and the IRE that allows for rotation and interface with the Servo motor
- Mahathi
 - Got code for servo motor and met with team to discuss plan for show and tell
 - Researched possibilities for using a relay to control circuit
 - Did more research on cost efficient clamps

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
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Mahathi		- Did research on code for servo motors - Met team for show and tell	4 0.5	4.5	24.5
Steph	26 October 27 October 28 October	- created a circuit and coding to make servo motor turn & modeled gears - Printed modeled gears - Assembled motor & gears - made them spin	4 0.5 0.5	5	28.5
Dominique	24 october 28 October	Printed tube holder part Modified tube holder dimensions based on servo motor size	1 hr	1 hr	>10
Sophie	10/29/25 10/29/25 10/29/25	Solidworks modelling Team meeting Passaged cells	2 0.5 0.5	3	22.5
Ana	2025/10/30 2025/10/30	Fluent simulation Material Research	2 1	3	24.5