BME Design: Progress reports

Title: Microvascular Channel Bioprinter shutoff valve

Date: 13 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 working on improving current prototypes, developing code for IRE and CFD, and implementing feedback from Show and Tell last week.

Difficulties / advice requests

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	
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:	**$31.41**	

Major team goals for the next week

Next week's individual goals

- Dominique
    - Finalize shutoff mechanism prototypes on solidworks + conduct more research on shutoff
    - Reprint the testing prototype box
    - Wrap up trainings and upload to notebook
- Ana
    - Finalize simulation for shear stress and velocity
    - Start testing
- Sophie
    - Continue writing fabrication and testing protocols for testing
    - Verify fit on connection between CEVIC and Servo motor for the IRE design
    - Confirm Waterjet training through creating a waterjet-cut part (part itself unrelated to project)
- Steph
    - Begin testing on mechanical designs & cells
    - Make further edits to Solidworks model of IRE
- Mahathi
    - Begin testing the completed circuit for IRE design work with Dominique for circuit for clamp design
    - Wrap up notebook research start assigning roles for final presentation

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						
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
  - Researched new protocols for sheer stress and velocity
  - Worked on completing the required BME 400 trainings
- Dominique
  - Conducted further research on shutoff valve mechanisms used in biomedical applications
  - Developed a new design matrix for more recent design ideas - shutoff valve mechanism
  - Worked on scheduling/completing required BME400 trainings
- Steph
  - Worked on researching
- Sophia Speece
  - Worked on modelling connection between Servo and CEVIC device
  - Completed waterjet training
- Mahathi
  - Finalized circuit components and code
  - Began working on circuit for clamp design

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)

BME Design: 200, 300, 301, 400 and 402

Mahathi	11/12	- Research	2	2	25
Steph	11/13	Did research	1	1	30
Dominique	11/7/25 - 11/11/25 11/7/25	Worked on mandatory BME400 training Worked on design matrix for valve shutoff ideas	1.5 1	2.5	>10
Sophie	11/13 11/13	Waterjet Training Modelling connection between CEVIC and IRE	0.5 1	1.5	26
Ana	11/13 11/12	Research and created simulation	1.5	1.5	26