

BME Design: Progress reports

Title: Microvascular Channel Bioprinter shutoff valve

Date: 25 September 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

Steph printed a CEVIK and KSM this week using the client's CAD files. The team met and discussed the current CEVIC/KSM design and began to brainstorm ideas for the design matrix.

Difficulties / advice requests

N/A

Current design

See design matrix. In progress.

Materials and expenses

Item	Description	Manufacturer	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	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$3.48	

Major team goals for the next week

Next week's individual goals

- Dominique
 - More research entries about processes where automated switching was utilized
 - More design ideas specific to minimizing fluid backflow in pressurized systems
 - Work on assigned sections and contribute to prelim presentation by 10/2
- Ana
 - More research on social impact
 - Work on preliminary presentation
 - Add dimensions drawing design matrix
- Sophie
 - Create a Solidworks/Meshlab model for the Design Matrix rather than a drawing
 - If the team decides to go with this design, then having a model ready to go will be advantageous
 - Complete assigned sections of the preliminary presentation
 - Continue research, especially on fluid dynamics
 - Identify Computational Fluid Dynamics modelling softwares available for the team to use
- Steph
 - Work more on potential designs
 - Finish preliminary presentations
 - Continue research into potential designs
- Mahathi
 - Start looking for rotary valve parts'
 - Work on preliminary presentation
 - Start research on fluid dynamics involved in the design

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...																
Prototyping					X											
Testings																
Deliverables																
Progress Reports		X	X	X	X											
Prelim presentation																
Final Poster																
Meetings																
Client			X	X												
Advisor		X	X	X												
Website																
Update		X	X	X												

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Ana
 - Completed BME 400 reflection from Outreach Seminar
 - Researched chaotic printing
 - Created a design idea for design matrix, scored it for all categories and wrote explaining the design and justifying the scores
- Dominique
 - Started to catch up on completing research entries and missed work
 - Brainstormed 1 design idea and shared with team during team meeting
 - Completed missed BME400 reflection assigned by Tracy P.
- Steph
 - Printed CEVIK device & KSMs 1-5
 - Worked on preliminary design - research and conceptualizing/drawing one for design matrix
- Sophia Speece
 - Brainstormed the Integrated Rotational Element idea, described and ranked it for the design matrix
 - Researched fluid dynamics
- Mahathi
 - Started research on rotary valves and how it could work with labview or arduino
 - Completed section for design matrix and helped team with design criteria.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Mahathi	9/20	Research on rotary valves	1	3	10
	9/19	Outreach seminar	1		
	9/24	Meeting for design matrix	1		

Steph	9/18 9/19 9/24	- Researched some background on KSMs - 3D printed CEVIK & KSMs at Wendt - drew potential for design and researched options	2 1 1	4	12
Dominique	9/23 9/24 9/24 9/24	-Completed post outreach assignment -brainstormed design idea -completed a journal entry -worked on design matrix	.5 .5 1 2	3	>10
Sophie	9/24 9/24 9/24 9/25	-Completed research on fluid dynamics and computational models -Brainstormed potential solution for the design matrix -Met with team to discuss designs -Completed assigned sections of Design Matrix and Progress Report	1.5 0.5 1 2	5	8
Ana	9/24 9/24 9/25 9/25	-Completed post outreach -Create a drawing for the design matrix, explained my idea to the team, and scored against each categories -Wrote explaining the design, and the scoring justification	0.5 2 1.5	4	10