

Flow Limitation

Progress Report #1

Date: 9/07/2026

Client: Dr. Chris Green

Advisor: Dr. Mehmet Orman

Team: “Flow State”

Lakshika Nanda Kumar Reddy: Co-Leader

Julia Shefchik: Co-Leader

Caroline Blust: Communications

Eliza Kubicek: BSAC

Brady Mayer: BPAG

Jillian Seibert: BWIG

Problem statement:

Develop a physical model of human large airways using smooth but compliant/compressible tubing surrounded by a container representing the chest wall. The airways will be supplied with flowing air via a balloon or similar to make pressure in the distal airway higher than the pressure surrounding the airway.

Demonstrate the flow limiting segment moving distally as expiration proceeds.

If time allows, use an airway that bifurcates into airways with different tube laws to demonstrate that different airways may be flow limited (or choked) at differing places depending upon differing airway tube laws (“compliances”).

The device developed may be used physically or via video clips to teach medical trainees about flow limitation in human airways.

The project will entail mechanics and depending upon its implementation may entail electronics and/or software.

Brief status update:

The team is doing preliminary research to understand more about the project, and what the previous team was able to accomplish. This includes research on forced expiratory flow limitation, thorough reviews of the previous team’s documentation, and research on materials that could be used on the project. The team has already met with the client, which has provided guidance for research questions.

Difficulties/advice requests:

None at this time.

Current design:

None at this time.

Materials and expenses:

None at this time.

Major team goals for the next week:

- Work on the PDS and ensure accuracy across all categories
- Understand the project and clarify any questions with the client

Next week's individual goals:

Lakshika Nanda Kumar Reddy

- Continue researching materials that are thin enough to simulate flow limitation
- Start research on material to connect the model of the alveoli to the model of the branches in the lung model
- Start to brainstorm design ideas

Julia Shefchik

- Brainstorm design ideas for the project
- Refine the PDS and come up with any additional questions for the client

Caroline Blust

- Contact past project members about SolidWorks files (?) and brainstorm new design ideas
- Write and edit PDS
- Schedule additional meetings as necessary

Eliza Kubicek

- Conduct research on materials that will best model human airways based on previous research
- Contribute ideas and writing to the PDS
- Begin brainstorming design ideas based on research and collaboration with team members

Brady Mayer

- Brainstorm design ideas and research effective materials based on previous research and the previous teams input.
- Retrieve past semesters project and learn from that what steps to take next
- Meet with the client and discuss specification and design ideas

Jillian Seibert

- Get a good understanding of the project and what needs to be refined from last year
- Researching some design ideas
- Figure out what materials would be best
- Update the website when needed

Previous week's goals and accomplishments:

Lakshika Nanda Kumar Reddy

- Started researching materials that are thin enough to simulate flow limitation
- Found review articles and research papers on types of lung models that model choke points
- Read through the previous teams' final report to gain an understanding of the project
- Brainstormed questions for the client meeting

Julia Shefchik

- Brainstormed questions for the client meeting
- Reviewed previous team's deliverables to understand the project
- Found a review article on expiratory flow limitation

Caroline Blust

- Contacted client and advisor to set up initial introduction meetings
- Reviewed past project's final report and documentation
- Found research article on expiration flow limitation to understand basic physiology

Eliza Kubicek

- Reviewed last year's final reports from both semesters and recorded notes
- Brainstormed questions for the client during the client meeting
- Conducted research on flow limitation, tube law, and physical properties of human airways for future design use

Brady Mayer

- Continue researching background information on the trachea and bronchi
- Continue researching materials and possible designs for the project
- Read over the past semesters project to understand their ideas and issues

Jillian Seibert

- Researched some general topics about flow limitation
- Went through clients materials given to us to grasp the project
- Updated the website

ACTIVITIES

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Lakshika Nanda Kumar Reddy	9/7/2026	Review previous team's final report	1	2.5	2.5
	9/7/2026	Brainstorm questions for the client meeting	0.5		
	9/10/2026	Conducted research on flow limitation and took notes	1		
Julia Shefchik	9/7/2026	Review previous team's deliverables (final report, PDS, final poster)	1	4	4
	9/7/2026	Brainstorm questions for the client meeting	0.5		
	9/9/2026	Annotated and read a review article on Expiratory Flow Limitation	1.5		
	9/9/2026	Researched mechanical properties of the Airway Tree	1		
Caroline Blust	9/7/2026	Brainstorm questions and review past project	0.5	1	1
	9/7/2026	Add research entry to LabArchives	0.5		
Eliza Kubicek	9/5/2026	Read through last semester's final report documentation and took notes on previous work and potential starting points in LabArchives	2	6	6
	9/7/2026	Brainstormed questions for the client meeting	0.5		
	9/7/2026	Conducted research on flow limitation during forced expiration and took notes in LabArchives	2		
	9/9/2026	Conducted research on tube law and physical properties of human airways for future design use and took notes in LabArchives	1.5		

Brady Mayer	9/7/2026	Researched background information and brainstormed questions for client meetings. I also further researched information about the trachea and bronchi and updated lab archives after previous issues.	4	4	4
	9/9/2026				
Jillian Seibert	9/7/2026	Added research entries to LabArchives and contributed to research more background information	1.5	2	2
	9/7/2026	Went through previous teams reports and clients powerpoint	0.5		

PROJECT TIMELINE

[illegible]

Materials and expenses:

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Lin k
Category 1										
									\$0.00	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	