

ClearPulse: Stethoscope with noise canceling headphones (and amplification option)

Date: 9/18/26 - 9/24/26

Client: Dr. Lenard Markman

Advisor: Prof. Randy Bartels

Team: Charlie Fischesser, Christian Dittmar Greaves, Johnny Sellers, Jonas Zhang, Josh Slager, Sam Wallin

Name	Email	Role
Josh Slager	jslager@wisc.edu	Co-leader
Charlie Fischesser	fischesser@wisc.edu	Co-leader
Christian Dittmar Greaves	cdittmargrea@wisc.edu	Communicator
Johnny Sellers	jsellers4@wisc.edu	BSAC
Sam Wallin	swallin3@wisc.edu	BWIG
Jonas Zhang	jjzhang6@wisc.edu	BPAG

Problem statement:

Traditional stethoscopes can be difficult to use effectively in noisy or high-vibration environments, including hospitals, helicopters, and ambulances. Environmental noise and poor acoustic conditions can interfere with healthcare providers' ability to accurately hear and distinguish heart and lung sounds, potentially compromising the reliability of auscultation. Additionally, prolonged use of traditional stethoscope ear pieces can lead to discomfort or ear canal irritation.

Our team will address these limitations by designing and fabricating a stethoscope system that incorporates active noise cancellation and optional noise amplification with passive noise isolation of over-the-ear headphones. The system will improve the clarity of heart and lung sounds across a broad range of environmental conditions while prioritizing comfort and ease of use. The final design must be durable, cost-effective, and manufacturable, with potential for commercial development through WARF or other outside organizations.

Brief status update:

We had our first advisor meeting, where we discussed our project and any issues we were running into. We mainly discussed our budget limitation and potential workarounds. Our team had a meeting to create and work on the design matrix. We met to discuss each of our brainstormed ideas and ultimately combined them into 3 distinct designs. We discussed which criteria were important for each design and graded them appropriately.

Difficulties / advice requests:

We're having difficulty figuring out if some of our designs are novel/can be patented, given there's already products on the market that solve a similar problem, with an overall similar design scheme, albeit more advanced. **Essentially, we're wondering if our simpler version of existing digital stethoscope options is unique enough to be patented.**

Goals:

Major team goals for the next week

1. Decide on a design to move forward with
2. Prepare and practice preliminary presentation
3. Set up a meeting with the client to discuss preliminary design ideas
4. Begin researching amplifier/filter circuits applicable for our design

Next week's individual goals

Josh:

- Create and prepare for the preliminary presentation
- Continue research on our selected design
- Go through and completely update my Lab Archives

Charlie:

- Assist in preparation of preliminary presentation
- Continue researching, with an emphasis on circuits related to our design
- Ensure Lab Archives has all files uploaded from brainstorming to research, etc.

Christian:

- Add in notes of Patent research to Lab Archives.
- Finish the design Matrix
- Prepare for presentation.

Johnny:

- Prepare for our preliminary presentation
- Continue to work on required trainings
- Continue researching to help determine which design makes most sense and how said design will work

Sam:

- Prepare for preliminary oral presentations, ensuring all necessary files are uploaded/prepared
- Continue narrowing down the best design for our goals that uniquely meets given criteria/objectives, considering novel and creative solutions
- Finish work on/complete all required trainings

Jonas:

- Finish intro to machining training
- Prepare for presentation
- Learn about electrical components and fix Lab Archives

Timeline

Task	Sept				October				November					December		
	8	15	22	30	2	9	16	23	1	8	15	22	29	5	12	19
Project R&D																
Empathize		X														
Background	X	X	X													
Prototyping																
Testings																
Deliverables																
Progress Reports	X	X	X													
Prelim presentation																
Final Poster																
Meetings																
Client	X															
Advisor			X													
Website																
Update	X	X	X													

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

At the time of the writing of this report, we are finishing up the final details in our design matrix. We decided on 3 different designs, with pros and cons for each. Creating the matrix helped the team communicate as a whole, with everyone throwing ideas around to compile into each design.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Josh Slager	9/18/2026	Advisor Meeting	0.5	3.5	11.5
	9/21/2026	Team Meeting	1		
	9/22/2026	Ongoing Research	1		
	9/24/2026	Design Matrix	1.5		
Charlie Fischesser	9/18/2026	Research	1	4	11.5
	9/18/2026	Advisor Meeting	0.5		
	9/21/2026	Team meeting	1		
	9/24/2026	Design Matrix	1.5		
Christian Dittmar Greaves	9/21	Team Meeting	1	3	8.5
	9/22	Patent Research & Design Matrix	1.5		
	9/24	Ongoing Research	.5		
Johnny Sellers	9/21/2026	Team meeting	1	3.5	8
	9/22/2026	Design Matrix section	0.5		
	9/23/2026	Patent Research	1		
	9/23/2026	Chemical OHSA Training	1		
Sam Wallin	9/21/2026	Meeting prep/continuing research	1	3.5	10
	9/21/2026	Team meeting	1		
	9/21/2026	Intro to shop training	1		
	9/23/2026	Design Matrix work	0.5		
Jonas Zhang	9/21/2026	Team meeting	1	3.5	9
	9/22/2026	Intro to machining training	1.5		
	9/22/2026	Design Matrix section	0.5		
	9/24/2026	Research	0.5		

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

Current design:

No current design to report.

Materials and expenses:

No expenses to report.