Amputee Advanced Donning Device

Client: Mr. Daniel Kutschera

Advisor: John Pucinelli

Team: Carly Villa cpvilla@wisc.edu (Co-Team Leader/ BWIG)

Eleanor Hollander erhollander@wisc.edu (Co-Team Leader/ BWIG)

Ava Hopper aghopper@wisc.edu (BPAG)

Anna van Riessen avanriessen@wisc.edu (Communicator)

Sam Kamin sjkamin@wisc.edu (BSAC)

Date: September 25th 2025 - October 4th 2025

Problem Statement:

During rehabilitation, it is critical for amputee patients to wear a specialized compression garment known as a shrinker. A shrinker aims to shape the residual limb in preparation for prosthetic fitting and prevent post-operative complications like swelling and excessive fluid retention. For application of the shrinker, patients currently rely on basic donning tubes, in which the shrinker is stretched over a plastic tube and pulled over the residual limb. Because shrinkers are designed to apply strong, consistent compression, they can be very difficult to stretch over donning tubes. This challenge is especially significant for elderly patients, who may have limited strength, dexterity, or mobility. This project aims to create an advanced donning device that stretches the garment to the desired diameter using electronics, simplifying shrinker application and eliminating the need for the user to manually stretch the garment.

Brief Status Update

This week, the team brainstormed design ideas, established design criteria, and evaluated potential choices based on those criteria. Using a design matrix, we made decisions regarding the materials to be used and the overall structure of the device. The team also began exploring circuit design and conducting the necessary research for that component. Finally, we prepared for preliminary presentations, where the device's progress will be shared with advisors and peers.

Summary of Weekly Team Member Design Accomplishments in

- Team:
    - Established design criteria
    - Evaluated design choices according to design matrix
    - Made selections for material and overall design
    - Completed the Preliminary Presentation

- Carly:
    - Create CAD representation of our final design
    - Researched components of our circuit and materials for our design
    - Finalised materials and final design matrix for preliminary report
    - Worked on preliminary report
    - Met with group members to discuss and practice preliminary presentation
- Eleanor
    - Conducted materials research
    - Researched potential circuit elements/circuit design
    - Produced circuit model in LTspice
    - Evaluated designs according to criteria and helped make selections for materials and overall designs
    - Contributed to preliminary presentation
- Ava:
    - Contribute to preliminary design presentation
    - Conduct individual research
    - Discuss designs and materials moving forward with team
- Anna:
    - Contributed to the preliminary presentation
    - Communicated with our client
    - Continued brainstorming and individual research
- Sam:
    - Contributed to the preliminary presentation
    - Conducted materials research
    - Researched Onyx 3D printing material

Difficulties / advice requests

N/A

Upcoming Team and Individual Goals

- Team:
    - Produce Preliminary Report document
    - Finalize circuit design
    - Finalize materials list and begin acquiring necessary materials
- Carly:
    - Begin ordering necessary materials
    - Work on preliminary report
    - Conduct further research on motors
    - Create a finalized CAD circuit box for 3D printing
- Eleanor

    - Finalize circuit design and produce model in LTspice
    - Begin device fabrication
    - Contribute to preliminary report
- Ava:
    - Discuss materials cost with client
    - Begin fabrication
    - Begin preliminary report
- Anna:
    - Contribute to design development
    - Begin testing materials
    - Connect with Makerspace staff
- Sam:
    - Conduct research on more concepts pertinent to the design such as circuits or other materials that may be included
    - Begin working on prototyping the device
    - Begin creating tests for device prototypes

Expenses

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

Project Timeline

Task	September			October				November					December			
Project R&D																
Empathize																
Background…																
Prototyping																
Testings																

Deliverables																
Progress Reports																
Prelim presentation						10/3										
Final Poster														12/5		
Meetings																
Client																
Advisor																
Website																
Update																

Dates & Deadlines:

- Product Design Specifications: Friday, September 19th
- Design Matrix Criteria: Friday, September 26th
- Preliminary Presentations: Friday, October 3rd
- Preliminary Report: Wednesday, October 9th
- Show and Tell: Friday, October 31st
- Final Poster Presentations: Friday, December 5th
- Final Deliverables Due: Wednesday, December 10th