Amputee Advanced Donning Device

Date: 10/23/2026 - 10/29/2026

Client: Dr. Daniel Kutschera
Advisor: Dr. Justin Williams

Team:

Freyja Heggeland - Team Leader (heggeland@wisc.edu)

Adam Bauer - Communicator (abauer24@wisc.edu)

Megan Pearson - BSAC (mepearson4@wisc.edu)

Carl Assmus - BWIG & BPAG (cassmus@wisc.edu)

Problem statement: During physical rehabilitation, it is critical for amputee patients to wear a specialized compression garment known as a shrinker sock. A shrinker sock aims to shape the residual limb in preparation for prosthetic fitting and prevent post-operative complications like swelling and excess fluid retention. To apply the shrinker, patients currently rely on basic donning tubes, where 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 and mechanical means, simplifying shrinker application and eliminating the need for manual user input to stretch the garment.

Brief status update: This week, the team printed their first complete prototype. The production has gone smoothly thus far.

Difficulties / advice requests: None to report

Current design:

No current design to display

Materials and expenses:

Item	Description	Manufac-turer	Mft Pt#	Vend-or	Vend-or Cat #	Date	#	Cost Each	Total	Link
Materials										
3D filament	PLA	UW Makerspace	UW Makerspace	UW Makerspace	UW Makerspace	10/16/2026	1	$6.21	$6.21	https://making.engr.wisc.edu/
3D filament	PLA	UW Makerspace	UW Makerspace	UW Makerspace	UW Makerspace	10/23/2026	1	$4.80	$4.80	https://making.engr.wisc.edu/
NEMA17 Stepper Motor	Nema 17 Stepper Motor Bipolar 1.5A 1.8 Degree 45Ncm 12V for DIY CNC/ 3D Printer/Extruder	Oyosteppe r	17HS15-1504S-X1	Oyostepper	-	10/26/2026	1	$10.13	$10.13	https://www.oyostepper.com/goods-493-Nema-17-Stepper-Motor-Bipolar-1.5A-18deg-45Ncm-12V-for-DIY-CNC-3D-PrinterExtruder.html
50:1 Planetary Gearbox	TQMG Series Planetary Gearbox Gear 50:1 Backlash 50 Arc-min for Nema 17 Stepper Motor BLDC Motor & Servo Motor	Oyosteppe r	TQMG 17-G50	Oyostepper	-	10/26/2026	1	$28.69	$28.69	https://www.oyostepper.com/goods-1157-PLM-Series-Planetary-Gearbox-Gear-50-1-Backlash-50-Arc-min-for-Nema-17-Stepper-Motor.html

Major team goals for the next week

1. Begin constructing testing protocols
2. Continue fabrication with 3D prints, perform tests with the existing model.
3. Take feedback from the Show and Tell session and incorporate it into our design ideas.

Next week's individual goals

- Freyja Heggeland
  - Create testing protocols and assist team fabrication of our final design
- Adam Bauer
  - Brainstorm testing protocols
  - Help fabricate final design
- Megan Pearson
  - Create testing protocols and schedule out when testing will be completed
- Carl Assmus
  - Create a working model for the final circuit prototype using tinkerCAD
  - Continue researching electrical components

Timeline

Task	Week				Week					Week				Week	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project R&D															
Empathize	X	X													
Background	X	X	X	X											
Prototyping					X	X	X	X	X						
Testings															
Deliverables															
Progress Reports	X	X	X	X	X	X	X	X	X						
Prelim presentation					X										
Final Poster															
Meetings															
Client	X				X										
Advisor	X	X	X	X	X	X	X	X							
Website															
Update	X	X	X	X	X	X	X	X	X						

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

- Freyja Heggeland
  - Continued 3D print fabrication and development
  - Communicate with team regarding CAD file directions
  - Learn from makerspace regarding aluminum infill supports
- Adam Bauer
  - Continue to use solidworks testing
  - Work on adding a motor into CAD to better simulate our design
- Megan Pearson

    - Began brainstorming testing plans
- Carl Assmus
    - Ordered motor and gearbox
    - Created a simple circuit prototype

Activities

Name	**Date**	**Activity**	**Time (h)**	**Week Total (h)**	**Sem. Total (h)**
Freyja	10/23/2026	- Evaluating 3D print models, beginning fabrication protocols, and printing 3D files	2	2	27
Adam	10/23/2026 10/29/2026	- Evaluated CAD models - Research on solidworks motion simulation	2 2	4	19.5
Megan	10/28/2026	- Began brainstorming testing plans	1.5	1.5	19.5
Carl	10/26/2026 10/28/2026 10/29/2026	- Order Parts - Work on circuit prototype - Complete circuit prototype	0.5 1.5 2	4	25.5