

# Democratizing Placement of Endoluminal Negative Pressure Devices for Gastrointestinal Leaks

**Client:** Dr. Amber Shada  
General Surgery  
UW School of Medicine and Public Health  
shada@surgery.wisc.edu  
(608) 263-1036

**Advisor:** Prof. John Puccinelli

**Team:** Simon Fetherston (Leader)  
Mariah Smeeding (Communicator)  
Evelyn Mikkelson (BSAC)  
Yeanne Hwang (BPAG, BWIG)

**Date:** February 13, 2026 - February 19, 2026

## Problem statement

Currently, large defects in the GI tract (often caused by surgical complications) are treated with surgery. For external wounds, the use of negative pressure wound therapy has become widely used. This therapy, colloquially called VAC therapy, leads to improved healing of superficial wounds. For the past few years, some surgeons have been placing similar VAC devices into the GI tract through the mouth or anus to treat defects in the GI tract. The success of this therapy has been outstanding, with some studies finding that 90% of wounds that would have otherwise required surgery can be closed without making any additional incisions at all. The process of VAC placement is currently labor intensive and requires some skill in manipulating an endoscope, which has limited its widespread use. Development of a streamlined way to deploy VAC therapy into the GI tract would allow more surgeons to use this therapy to heal anastomotic leaks.

## Brief status update

This week the team worked on the preliminary presentation. The presentation follows the design specifications, analysis of the design matrix, and the planned future work. The group will be presenting on 02/20/2026. After the presentation, the team will begin prototyping the chosen final design, the degradable coating.

## Difficulties / advice requests

One challenge the team discussed was how the sponge would be compressed. This is a challenge that will be explored through research and trial and error. The team is also planning on ordering materials to begin prototyping films and could use some advice on what companies are best to order from and how to set up a payment account to make purchases.

## Current design

The degradable coating design scored the most points in the design matrix and is now the current design. The team will conduct research into the materials needed to develop a film and create fabrication protocols. After this research is conducted, the team will have a complete design including material selection and fabrication of the degradable coating.

## Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
<b>Category 1</b>										
									\$0.00	
									\$0.00	
<b>Category 2</b>										
									\$0.00	
									\$0.00	
								<b>TOTAL:</b>	<b>\$0.00</b>	

## Major team goals for the next week

1. Research materials for degradable coating
2. Order materials to begin prototyping degradable coating
3. Determine a method to compress the sponge with a coating so it is inserted at a decreased volume
4. Brainstorm models and testing protocols that can be used to test the degradable coating design

## Next week's individual goals

- Simon Fetherston
  - Research material and fabrication of a biocompatible film in the esophagus
  - Research sponge compression methods
  - Look into models that can be built and used for testing
  - Work on preliminary report

- Evelyn Mikkelson
  - Research material for coating
  - Research methods of compressing sponge
  - Work on preliminary report
- Mariah Smeeding
  - Work on preliminary report
  - Research more into degradable and biocompatible materials such as chitosan
  - Look into models for the esophageal tract including a small more pliable cavity
- Yeanne Hwang
  - Research biocompatible cap material
  - Work on preliminary report

## Timeline

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
<b>Project R&amp;D</b>																
Empathize	X	X	X													
Background...	X	X	X	X												
Prototyping				X												
Testings																
<b>Deliverables</b>																
Progress Reports	X	X	X	X												
Prelim presentation				X												
Final Poster																
<b>Meetings</b>																
Client		X		X												
Advisor	X	X	X	X												
<b>Website</b>																
Update	x	X	X	X												

Filled boxes = projected timeline

X = task was worked on or completed

## Previous week's goals and accomplishments

- Individual:
  - Evelyn Mikkelson
    - Worked on preliminary presentations
    - Made SolidWorks drawings of designs
  - Simon Fetherston
    - Worked on preliminary presentation
    - Brainstormed potential testing protocols
    - Researched biocompatible and biodegradable materials

- Mariah Smeeding
  - Worked on preliminary presentation
  - Researched more information on anastomotic leaks and treatment options
  - Peer reviewed presentation slides and made revisions
- Yeanne Hwang
  - Prepare for preliminary design presentation
  - Ask for an advice from Dr.P to set direction for design
  - Research biocompatible plastic material
- Team :
  - Prepared for preliminary presentation

## *Activities*

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Evelyn M	02/16/2026 02/19/2026	Work on Presentation and SolidWorks Refining SolidWorks and Presentation	1.5 3.0	3.5	11
Simon F	02/16/2026 02/18/2026 02/19/2026	Work on preliminary presentation Meet with Dr. Shada to go over design matrix and next steps Continue researching biodegradable materials	1.5 0.5 1	3.0	13
Yeanne H	02/19/2026 02/18/2026	Prepare for preliminary design presentation Revise cap design	1.5 1	2.5	12
Mariah S	02/16/26 02/18/26	Presentation slides and anastomotic leak background research Peer reviewing of slides. Made revisions Meeting with Dr. Shada to discuss designs	2 1.5	3.5	14.6