

Improving the precision of small human tissue biopsy processing

Date: 2/25/26 - 3/4/2026

Client: Dr. Angela Gibson

Advisor: Dr. Tracy Jane Puccinelli

Team:

Ruhi Nagarkatte (Team Leader)

Ella Lang (Communicator)

Gianna Inga (BSAC)

Simon Nam (BWIG)

Sarah Raubenstine (BPAG)

Grace Spiegelhoff (MedTech)

Problem Statement

In the treatment of extensive burns or wounds, patients rely on emerging treatment research in the field of tissue growth and healing. Currently, studies into the healing properties of porcine skin are conducted to visualize how viable epidermis cells migrate over the site of the wound to promote cell regrowth. However, once in a culture, the porcine tissue samples cannot remain viable unless all fat is removed and the cells are able to absorb the culture media. Additionally, this process of creating samples is not standardized, resulting in samples of varying sizes with jagged edges, which limits the efficiency of sample preparation. To solve this, fabricating a tool that incorporates multiple sample slots, with uniform sizing, and a fixed blade will help to streamline research efficiency and produce more viable samples that can be successfully imaged.

Brief Status Update

The team has been fabricating and finalizing the design over the last week. A waterjet was used to machine the polycarbonate sheets since the bandsaw was not precise enough. Additionally, a new 3D print was made that fuses the bottom two layers together to provide a more accurate cut.

Summary of Weekly Team Member Design Accomplishments

- Team
 - Set up meeting with client and date to test the design with tissue samples
 - Combined and printed the bottom two layers of the design
 - Machined the polycarbonate sheets via waterjet
- Ruhi Nagarkatte
 - Assisted in waterjet planning and fabrication
 - Selected dates for client meeting and tissue testing
 - Prepared progress report #6
- Ella Lang
 - Organized the client meeting on March 4th and the upcoming tissue testing
 - Assisted in waterjet fabrication planning

- o Ensured testing protocols were finalized prior to tissue testing
- Gianna Inga
 - o Waterjet fabrication
 - o Met with client to discuss design and testing
- Simon Nam
 - o Assisted in waterjet planning and fabrication
 - o Met with the client to update the design iteration
 - o Ensured the materials were ready for moving to another sample testing stage
- Sarah Raubenstine
 - o Attended client meeting and discussed new design and upcoming tissue testing
 - o Finalize testing protocols prior to testing on Friday

Weekly/Ongoing Difficulties

The team is planning to meet with the client on Wednesday afternoon to discuss new changes and the design. Additionally, the team is hoping to test the new design later this week because the client is expecting to receive more tissue samples on Friday, 3/6.

Upcoming Team and Individual Goals

- Team
 - o Meet with client to discuss updates and new design
 - o Test the new design with porcine skin samples
 - o Continue to finalize fabrication and design
- Ruhi Nagarkatte
 - o Attend the client meeting and tissue testing with the new design
 - o Plan next steps for fabrication based on feedback
 - o Update FEA protocol based on the latest design and materials
 - o Start planning a schedule for all phases of testing
- Ella Lang
 - o Assist in executing formal tissue testing with the updated design
 - o Plan upcoming sterilization testing dates
 - o Plan next steps for fabrication based on client feedback
- Gianna Inga
 - o Document fabrication protocols for the device
 - o Test design with pig skin
 - o Fabricate final design
- Simon Nam
 - o Attend tissue testing with the new design (involving polycarbonate)
 - o Plan further with sanitization testing
 - o Update the journal according the progress and result being made
- Sarah Raubenstine
 - o Execute and document formal tissue testing with the new design

- o Implement suggestions from client based on feedback
- o Assist in any further fabrication measures needed

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Preliminary Oral Presentation	Friday, 02/06/2026	All	100%	X
Preliminary Deliverables	Wednesday, 02/25/2026	All	100%	X
Show and Tell	Friday, 03/20/2026	All	0%	
Executive Summary Draft	Friday, 04/03/2026	All	0%	
Executive Summary Final	Friday, 04/17/2026	All	0%	
Poster Presentations	Friday, 04/24/2026	All	0%	
Final Deliverables	Wednesday, 04/29/2026	All	0%	

Materials and Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat #	Date	QTY	Cost Each	Total	Link
PLA	3D printed polymer through BME design Makerspace budget	Makerspace	N/A	UW-Madison	N/A	2/10/26	1	\$2.81	\$2.81	N/A
BME Clear Resin	3D printed polymer through Makerspace design budger	Makerspace	N/A	UW-Madison	N/A	2/18/26	1	\$11.42	\$11.42	N/A
0.236 in PC	Polycarbonate Sheet: 0.236 in Thick, 12 in x 12 in, Colorless, Clear, 9,500 psi Tensile Strength	N/A	PS-PC-SR-189	Grainger	1ET Y6	2/20/26	1	\$21.20	\$21.20	https://www.grainger.com/product/Polycarbonate-Sheet-0-236-1ETY

