Title: Adaptive overhead tether system for freely moving swine

Team: Porcine Innovations Group (P.I.G.), BME 200/300

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

Client: Dr. Marco Failla Mulone
Advisor: Dr. Jonathan Soucy

P.I.G

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Problem statement

The UW-Madison Department of Neurosurgery is developing a chronic large-animal neuromonitoring platform using multiple intracranial catheters for continuous or repeated brain interstitial fluid sampling. A cranial fixation device that organizes and protects these catheters has already been developed; however, the lab requires the development of a complementary tether and harness system that manages tubing and cables extending from the cranial device, while simultaneously allowing the animal to move naturally within a stationary enclosure. The developed system needs to be able to dynamically follow the animal, maintain appropriate tubing length, minimize tensile and rotational forces, prevent entanglement or kinking, and allow normal behaviors.

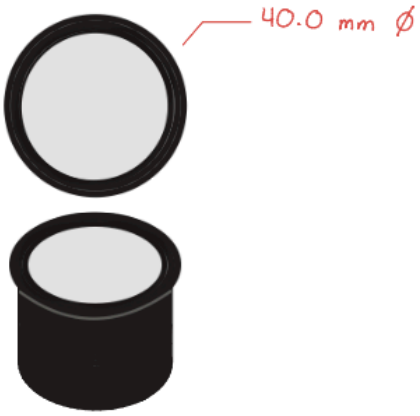
Brief status update

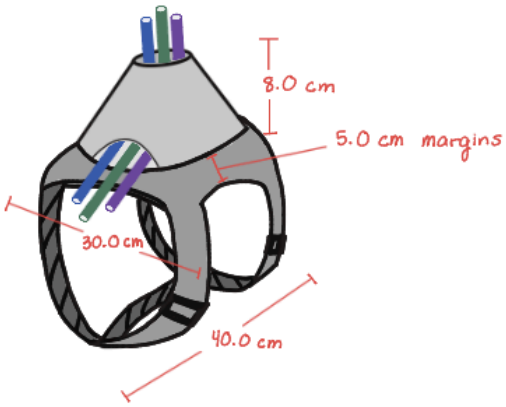
This week, our team ordered the materials needed to continue building the prototype and finalize the design. We also continued researching potential design improvements and prepared for our mock show-and-tell presentation on Friday, where we plan to present our progress and receive feedback.

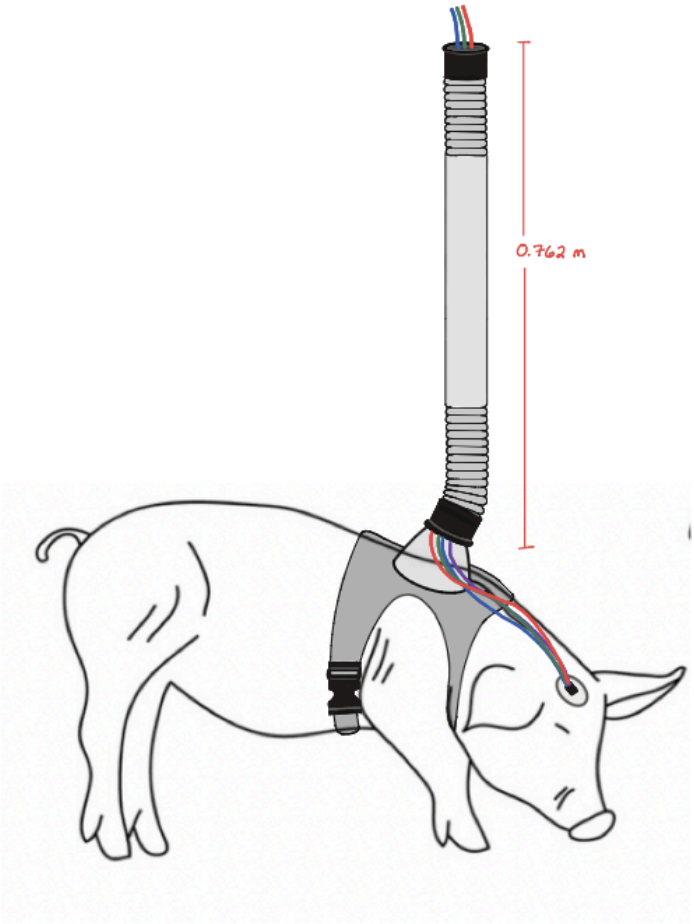
Difficulties/advice requests

N/A

Current design







Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
First Prototype										
Clear plastic tub	Thick clear plastic tube used for the middle section of the prototype					10/16/2026		$0.00	$0.00	
PVC pipe	Thick and thin sections of PVC attached to ends of clear tube. Roughly 6 in. long					10/16/2026		$0.00	$0.00	
Clear flexible tub	Clear flexible tubing used at ends of straight tube for flexibility					10/16/2026		$0.00	$0.00	
Thin flexible plas	This was used to make our first iteration of the cone that will attach onto the harness.					10/16/2026		$0.00	$0.00	
Hot Glue	The 2 sections of PVC pipe were glued together using hot glue and the flexible tube was also					10/16/2026		$0.00	$0.00	
Duct Tape	We taped the PVC to the clear tube and also taped the cone to the flexible tube					10/16/2026		$0.00	$0.00	
						10/16/2026		$0.00	$0.00	
Materials Being Ordered										
Harness	Harness that will secure the teth	Pig Gear	NA/	Pig Gear	N/A	10/19/2026	1	$25.00	$25.00	https://www
									$0.00	
								TOTAL:	**$25.00**	

BPAG Expense Spreadsheet

Goals

Major team goals for the next week

1. Show and Tell, receive feedback, act on feedback
2. Continue prototyping and modifying the harness portion of design

Next week's individual goals

- Alisha Schaeffer
    - Help assemble harness portion of prototype
    - Continue research
- Katelynn Johnson
    - Make fabrication plan for tether
    - Make fabrication plan for harness
- Gabriela Medina Medina
    - Help fabricate tether and cone
    - Continue with pig physiology/biology research
- Evan Hoffman
    - Design the cone and harness interface
    - Help fabricate our tether
- Catherine Sit
    - Assist with tether and harness fabrication plans
    - Finalize materials for tether and harness
- Joshua Grauman
    - Help assemble harness portion of prototype
    - Continue research

Timeline

Task	September				October					November				December	
	10	16	18	25	2	7	16	23	30	6	20	26	30	4	9
Project R&D															
Empathize	X	X	X	X											
Background	X	X	X	X											
Prototyping							X	X	X						
Testings															
Deliverables															
Progress Reports	X	X	X	X	X	X	X	X	X						
PDS		X	X	X	X	X	X	X	X						
Design Matrix			X	X											
Prelim Presentation				X	X										

Prelim Deliverables					X	X	X								
Show and Tell									X						
Final Poster															
Final Deliverables															
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

Detailed accomplishments

Previous week's goals and accomplishments

The team researched materials to order for the tether and began the ordering process for the harness. After, the team finalized the materials to use for the tether and sent out a request for the materials.



Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)

Alisha Schaeffer	10/11/2026	Worked on my sections of the Preliminary Report	2.5	10	**33**
	10/12/2026	Revised some of the preliminary report	1		
	10/13/2026	Watched a surgery of the insertion of wires and cardiac arrest experiment	5		
	10/14/2026	Went over some revisions to final design at the Client Meeting	1		
	10/14/2026	Created a document for questions and brainstormed some questions for meeting with Swine laboratory researcher	0.5		
	10/16/2026	Helped fabricate tether proof-of-concept prototype	1.5	**3.5**	
	10/21/2026	Met with team over Zoom to discuss materials and orders to prepare for final fabrication of the prototype	1		
	10/22/2026	Researched what materials to use for certain parts of the prototype	1		
	10/23/26	**Met with team and discussed material selection**	**1.5**	**1.5**	
Katelynn Johnson	10/11/2026	Updated design matrix drawings	1.5	8	36
	10/12/2026	Edited the preliminary report	2		
	10/13/2026	Edited the preliminary report	3		
	10/14/2026	Prepared questions for client meeting	0.5		
	10/14/2026	Updated final design sketch after client meeting.	1		
	10/16/2026	Worked with team to develop proof-of-concept tether prototype	2	3	
	10/22/2026	Researched materials to order	1		
	10/23/2026	**Researched materials to order**	**1**	**2**	
	10/28/2026	**Worked with Evan to order materials**	**1**		
Gabriela Medina Medina	10/12/2026	Edited preliminary report	0.5	4	26.25
	10/13/2026	Updated PDS	2		

	10/13/2026	Edited preliminary report	1		
	10/14/2026	Prepared questions for client	0.5		
	10/21/2026	Team Meeting discussing material selection	1	3	
	10/16/2023	Worked with team to develop proof of concept	2		
	10/23/2026	**Researched Materials to order**	**1**	**1**	
Evan Hoffman	10/9/2026	Materials and fabrication research and working on report	2	3.5	20
	10/12/2026	Modeled prototype and looked into limits of catheters	1.5		
	10/16/2026	Fabricating initial prototype	1	**5**	
	10/21/2026	Team meeting to discuss material selection and prototype fabrication	1		
	10/22/2026	Created CAD model of prototype and worked on sourcing materials	3		
	10/28/2026	**Final materials research and ordering**	1	1	
Catherine Sit	10/11/26	Worked on preliminary report	1	4.5	19.25
	10/13/26	Finished section on preliminary report	2.5		
	10/14/26	Client meeting	1		
	10/16/16	Fabricated prototype tether	2	3	
	10/22/26	Researched harness materials and tether materials	1		
	10/23/26	**Researched materials and fabrication methods**	**1.5**	**1**	
Joshua Grauman	10/09/26	Discussed with the group fabrication materials for the prototype	1	5	**25**
	10/11/26 10/13/26	Finished part of preliminary report	3		
	10/14/26	Met with client to go over presentation	1		
	10/16/26	Fabricated tether portion of prototype	2	4	
	10/21/26	Met with team via Zoom to discuss materials, harness prototype, and the	1		

		connection point of the harness and tether			
	10/22/26	Researched materials	1		
	10/23/26	**Met with team and discussed material selection**	**1.5**	**1.5**	