Adaptive overhead tether system for freely moving swine

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

11/6/2026 - 11/12/2026

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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.

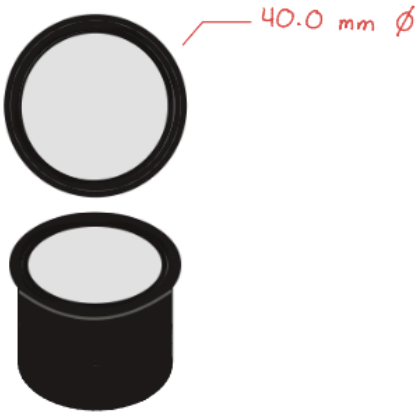
Brief status update

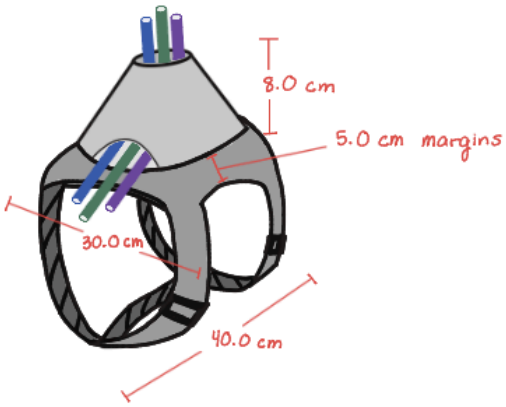
This week, the team divided tasks that included developing a CAD model for our 3D-printable devices, researching 3D-printed materials, and developing a fabrication plan to use moving forward. We were also able to schedule a meeting tomorrow, November 13th, to talk with the UW veterinary staff and discuss safety protocols with the swine.

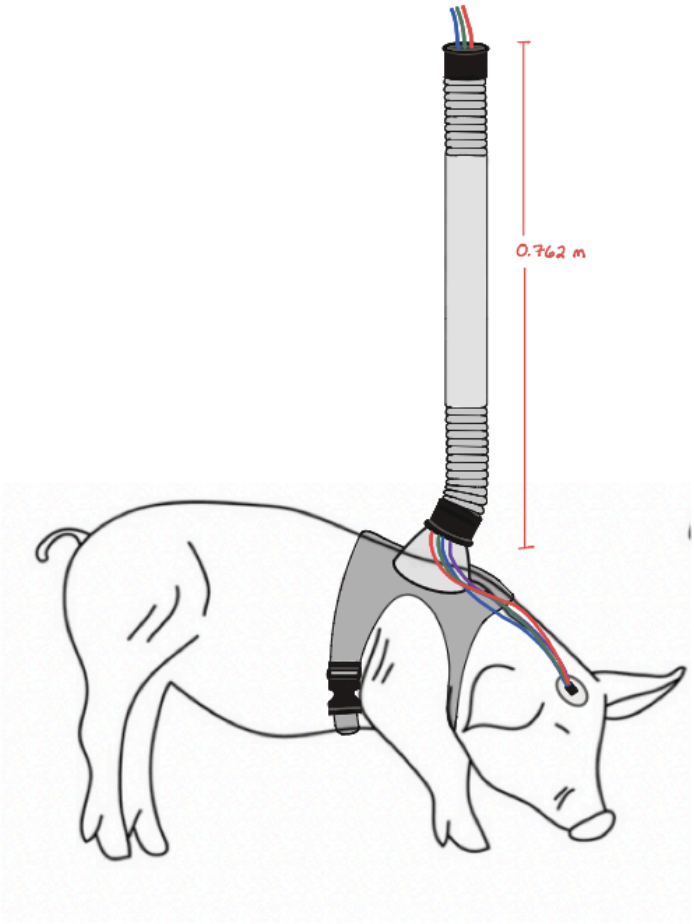
Difficulties/advice requests

N/A

Current design







Materials and expenses

First Prototype										
Clear plastic tub	Thick clear plastic tube used for the middle section of the protot			Wendt		10/16/2026		$0.00	$0.00	
PVC pipe	Thick and thin sections of PVC attached to ends of clear tube. Rc			Wendt		10/16/2026		$0.00	$0.00	
Clear flexible tub	Clear flexible tubing used at ends of straight tube for flexibility			Wendt		10/16/2026		$0.00	$0.00	
Thin flexible plas	This was used to make our first iteration of the cone that will att			Wendt		10/16/2026		$0.00	$0.00	
Hot Glue	The 2 sections of PVC pipe were glued together using hot glue a			Wendt		10/16/2026		$0.00	$0.00	
Duct Tape	We taped the PVC to the clear tube and also taped the cone to t			Wendt		10/16/2026		$0.00	$0.00	
Lazy Susan	Bearing of a lazy susan that we can use to make the overhead sv			Wendt		11/5/2026		$0.00	$0.00	
Materials Being Ordered										
Harness	Harness that will secure the teth	Pig Gear	N/A	Pig Gear	N/A	10/19/2026	1	$25.00	$25.00	https://www
Polycarbonate Tu	Rigid section of the tether	APPROVED VEND	ULK-PT-PC-27	Grainger	55PF57	10/30/2026	1	$31.43	$31.43	https://www
oring PVC Tubing	ttachment from head to harness	KURIYAMA	K7160-16X5	Grainger	796KH4	10/30/2026	$1.0	$28.72	$28.72	https://www
								TOTAL:	**$56.43**	

BPAG Expense Spreadsheet

Goals

Major team goals for the next week

1. Connect harness and tethering portion of prototype
2. Meet with veterinary staff and discuss safety protocols
3. Finish CAD model

Next week's individual goals

- Alisha Schaeffer
  - -
- Katelynn Johnson
  - Continue working on fabrication plans
  - Begin planning testing methods
- Gabriela Medina Medina
  - Continue to develop the fabrication protocol as we develop our design
  - Begin planning testing methods
- Evan Hoffman
  - Assemble our prototype using final materials
  - Develop the final version of the tether to harness connector/protector
- Catherine Sit
  - Build final prototype with materials
  - Work on fabrication plans and methods
- Joshua Grauman
  - Help with fabrication of new materials
  - Give feedback/test on CAD model

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	X					
Testings															
Deliverables															
Progress Reports	X	X	X	X	X	X	X	X	X	X					
PDS		X	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		X					
Website															
Update	X	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

- Meeting with UW veterinary staff set-up
- Materials purchased arrived

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Alisha Schaeffer	–	–	–	–	34
Katelynn Johnson	11/12	Platform to tether CAD modeling	2	2	40
Gabriela Medina Medina	11/12	Fabrication Protocol	0.5	0.5	29.75
Evan Hoffman	11/10	Tether to harness CAD modeling	1.5	1.5	23.5
Catherine Sit	11/10	Harness-Tether attachment point CAD	2.5	2.5	22.75
Joshua Grauman	11/11/26 11/12/26	Material Research	1	1	34