

Title: Adaptive overhead tether system for freely moving swine

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

Date: 9/11/2026 - 9/17/2026

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 overhead 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

Our team prepped for our client meeting by continuing our project research into the cerebral open-flow microperfusion procedure and competing designs. The team also had their initial client meeting and established the scope of the project. After meeting with the client, the team drafted their first Product Design Specification (PDS).

Difficulties/advice requests

N/A

Current design

N/A

Materials and expenses

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

Goals

Major team goals for the next week

1. As a team, discuss our first rough design ideas and sketches
2. Collaborate to create three solid design ideas
3. Create our design matrix and evaluate at least 3 designs based on what is most valuable to our client

Next week's individual goals

- Alisha Schaeffer
 - Brainstorm and create CAD sketches of possible designs
 - Research standards and specifications
 - Research competing design on the rotating enclosure for pigs
- Katelynn Johnson
 - Draft initial design sketches
 - Continue background research
- Gabriela Medina Medina
 - Brainstorm initial designs for the overhead motorized system

- Research more on existing overhead systems
 - Research catheter care
- Evan Hoffman
 - Sketch design ideas for matrix
 - Research current competing solutions
- Catherine Sit
 - Research other brain cannula cord management devices
 - Research swine welfare care guidelines
 - Draft design sketches
- Joshua Grauman
 - Research Omni-motional systems
 - Sketch out a basic design

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													
Background	X	X													
Prototyping															
Testings															
Deliverables															
Progress Reports	X	X													
PDS		X													
Design Matrix															
Prelim Presentation															
Prelim Deliverables															
Show and Tell															
Final Poster															
Final Deliverables															
Meetings															
Client		X													
Advisor	X	X													
Website															
Update	X	X													

Filled boxes = projected timeline

X = task was worked on or completed

Detailed accomplishments

Previous week's goals and accomplishments

The team conducted preliminary research to understand more about the project including the cerebral open-flow microperfusion procedure on rats, existing small-animal neuro-tether systems, and sterilizable materials. The team had their first advisor meeting where questions and concerns were addressed. Such as expectations for the product design specifications document, experience with small-animal models, and design notebook suggestions. In addition, the team had their initial client meeting where project scope and background were discussed. The team used this information to draft an initial Product Design Specifications document (PDS).

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Alisha Schaeffer	9/9/2026	Brainstormed questions for client meeting to be used for PDS	0.5	1	1
	9/4/2026	Created a calendar for the team to keep the team organized on deadlines and upcoming events to prepare for	0.5		
	9/16/2026	Worked on multiple sections the PDS and edited the PDS as a whole	2	5	
	9/11/2026	Found sources that listed the specific measurements and numerical values needed for certain parts of the design	1		6
	9/16/2026	Met with the client and PI of lab	1.5		
	9/13/2026	Brainstormed questions for the client meeting	0.5		
Katelynn Johnson	9/8/2026	Brainstormed questions for client meeting	0.5	1.5	6
	9/9/2026	Worked on timeline	0.5		
	9/10/2026	Wrote Problem Statement	0.5		
	9/13/2026	Worked on the PDS draft	1	4.5	
	9/15/2026	Overviewed client-provided information.	1		
	9/16/2026	Worked on the PDS draft	1		
	9/17/2026	Worked on the PDS draft	1.5		

Gabriela Medina Medina	9/10/2026	Brainstormed questions for client	0.5	1	1
	09/10/26	Got started on researching current devices	0.5		
	09/13/26	Researched more Devices	2	3.25	4.25
	09/13/26	Worked on PDS	1		
	9/17/2026	Worked on PDS	0.25		
Evan Hoffman	9/10/2026	Brainstorm client questions for meeting	0.5	1	2.5
	9/10/2026	Research current devices and solutions	0.5		
	9/17/2026	Researched standards about materials and safety concerns and worked on PDS	1.5	1.5	
Catherine Sit	9/10/2026	Research current devices and similar problems and solutions	0.5	2.25	3.25
	9/10/2026	Brainstormed questions for client	0.5		
	9/14/2026	Researched devices and cannula devices	1.5		
	9/17/2026	Worked on PDS	0.75		
Joshua Grauman	9/10/26	Research the catheter device used on pigs	.75	1	4.5
	9/9/26	Communicated with the client about meeting times	.25		
	9/13/26	Worked on PDS with group members	1.25	3.5	
	9/16/26	Meeting with Client	1.5		
	9/17/26	Research & Work on PDS	.75		