



# Guidewire Organizer for Endovascular Catheter Procedures

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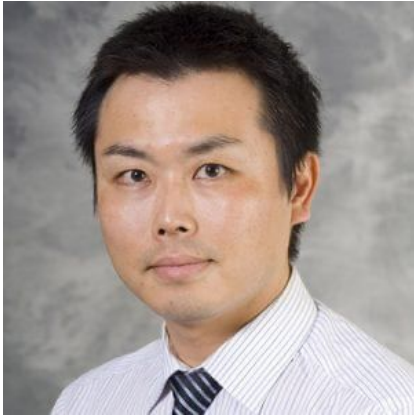
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# Client & Advisor

## Dr. Dai Yamanouchi

- Specialties: vascular and endovascular surgery



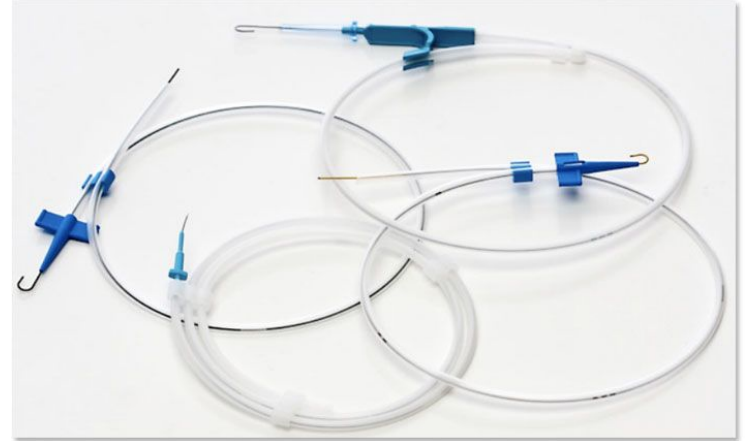
## Dr. Kip Ludwig

- Leads the Ludwig Laboratory



# Problem Statement

- Surgeons must use multiple guidewires during a single procedure
- Guidewires are hard to manage
- Goal: hassle-free guidewire organizer that will increase procedure efficiency



# Background

## Dispensing Tubing

- Slowly pulled out and inserted into the patient
- Guidewire becomes tangled

## Issues

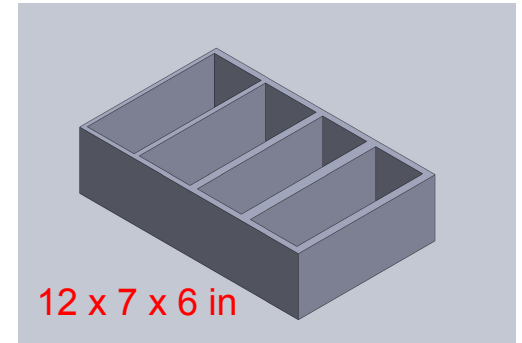
- Inefficient
- Unorganized
- Client suggests a ring like device



# Product Design Specifications

## Physical and Operational Characteristics:

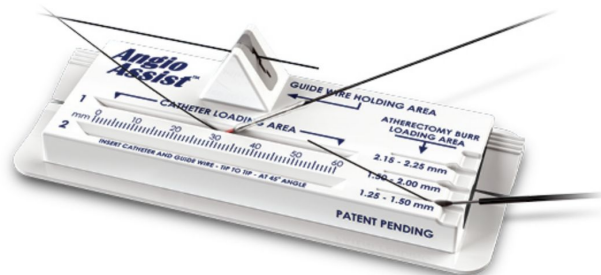
- Two parts: (1) a divided crate to store (2) 4-5 wheels in which the guidewires will be placed.
- 11.8 inch diameter of each wheel
- Guidewire diameter sizes of 0.014 to 0.035 inches.
- Organized and unknotted when inserted and removed from the wheel
- Easy to load and remove
- Withstand heavy chemicals needed to sterilize medical tools in the operating room



# Competing designs

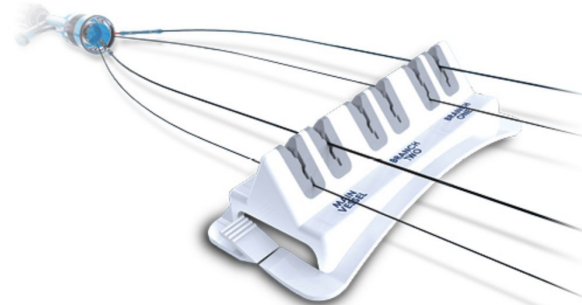
## Angio Assist Docking System

- Slots facilitate alignment and introduction of guidewires into catheters
- Three groove sizes facilitate different guidewire sizes



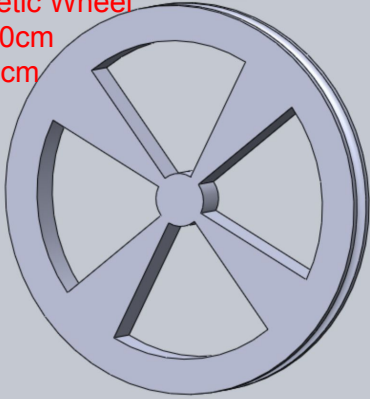
## Teirstein Edge Device Organizer

- Six friction fit slits secure guidewires and catheters
- Allows for controlled, micro movements of catheters and wires



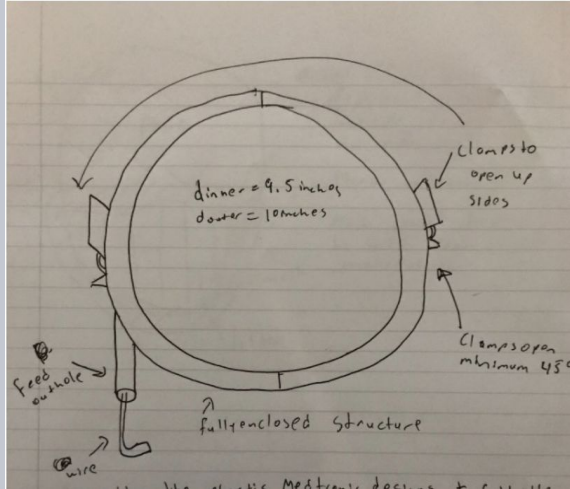
# Design Ideas

Magnetic Wheel  
OD: 30cm  
ID: 28cm



## Magnetic Wheel

- Magnetized wheel
- concave lip on perimeter of wheel to hold guidewire
- Wire spooled around wheel



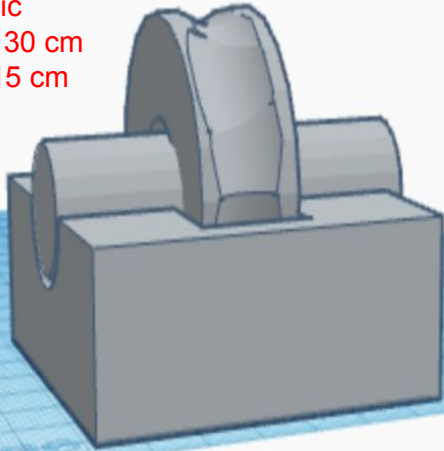
## Clamped Wheel

- Primarily plastic, hollow encasing on perimeter
- Can be opened vertically for insertion of guidewire
- Small opening for guidewire access



# Design Ideas (cont.)

Wheel of  
Magic  
OD: 30 cm  
ID: 15 cm



## Wheel of Magic

- Acts as spool for guidewire
- guidewire access through the bottom encasing surrounding wheel

OD: 30 cm  
Guidewire Hoop:  
OD: 30cm  
ID: 29cm



## Guidewire Hoop

- Magnetic hoop with internal concavity
- encased externally
- Guidewire inserted in concave area along perimeter

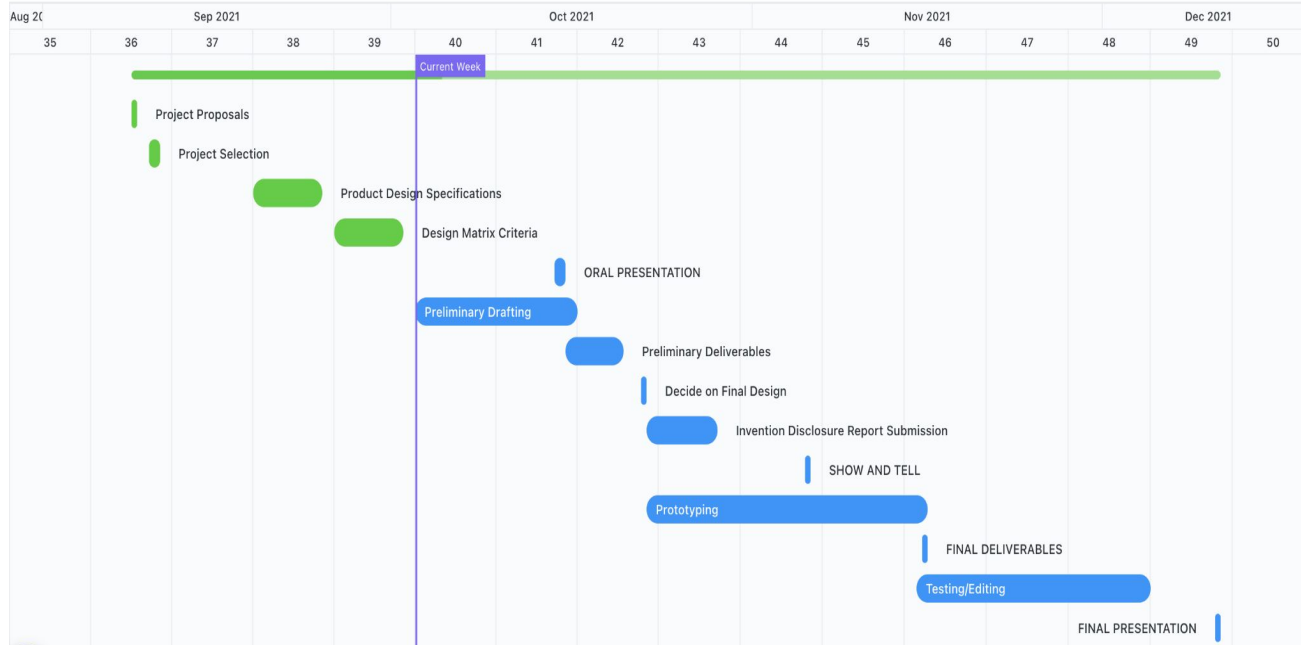




# Design matrix

Design	 Magnetic wheel		 Clamped Wheel		 Wheel of Magic		 Guidewire Hoop	
	Feasibility (30%)	4/5	24	3/5	18	4/5	24	5/5
Efficiency (25%)	3/5	15	4/5	20	2/5	10	5/5	25
Durability (20%)	3/5	12	3/5	12	3/5	12	4/5	16
Safety (10%)	5/5	10	5/5	10	5/5	10	5/5	10
Learning Curve (10%)	4/5	8	3/5	6	4/5	8	5/5	10
Cost (5%)	3/5	3	5/5	5	5/5	5	4/5	4
<b>Total for each design:</b>	<b>72</b>		<b>71</b>		<b>69</b>		<b>95</b>	

# Future Work



- Expected pitfalls in design process
- Quantitative Testing
- FDA
- MDR

# Acknowledgements

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Special thanks to Dr. Dai Yamanouchi, MD, PhD - Associate Professor *Division of Vascular Surgery*.

## References

[1] Dr. D. Yamanouchi, “Client Meeting One,” 17-Sep-2021.

[2] Angio Assist Docking System: “Interventional Accessories: US.” *Teleflex*, Apr. 2018, [teleflex.com/usa/en/product-areas/interventional/coronary-interventions/interventional-accessories/index.html](https://teleflex.com/usa/en/product-areas/interventional/coronary-interventions/interventional-accessories/index.html).

[3] Teirstein Edge Device Organizer: “Interventional Accessories: US.” *Teleflex*, Apr. 2018, [teleflex.com/usa/en/product-areas/interventional/coronary-interventions/interventional-accessories/index.html](https://teleflex.com/usa/en/product-areas/interventional/coronary-interventions/interventional-accessories/index.html).