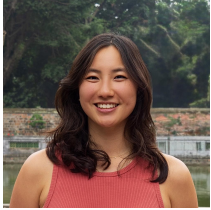


A Collapsible and Motorizable Endoscopic Spiral Attachment for Safe and Efficient Intestinal Access

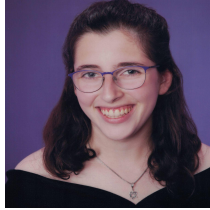
**URTC Conference
October 11, 2025**

Alexandra Lee, Alaz Cig, Casey Fienberg, Max Tan,
Avani Narula, Haani Mahmood, Alayo Oloko

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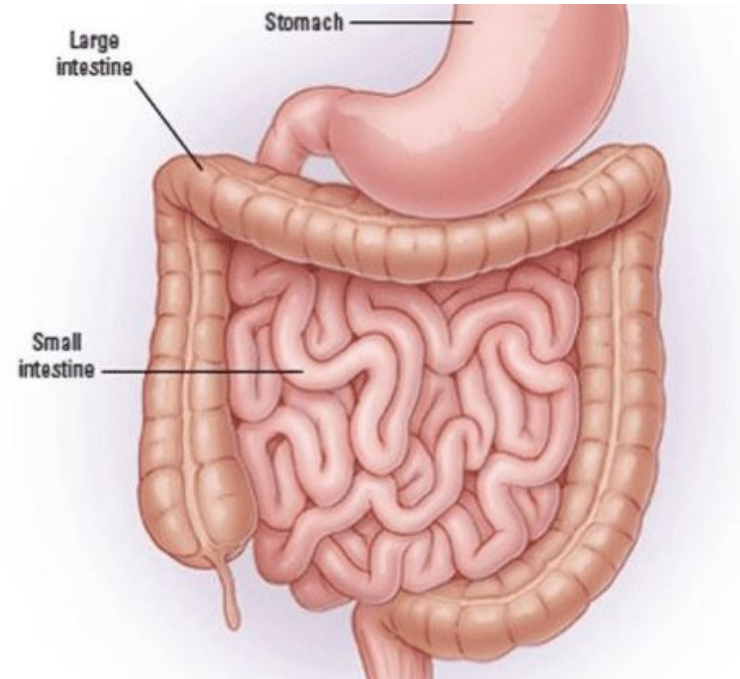
Dr. Daniel Stein

Dr. Elena Kalodner-Martin

Alaz Cig

Irma Ceco

Problem: The lower bowel is **hard to reach**



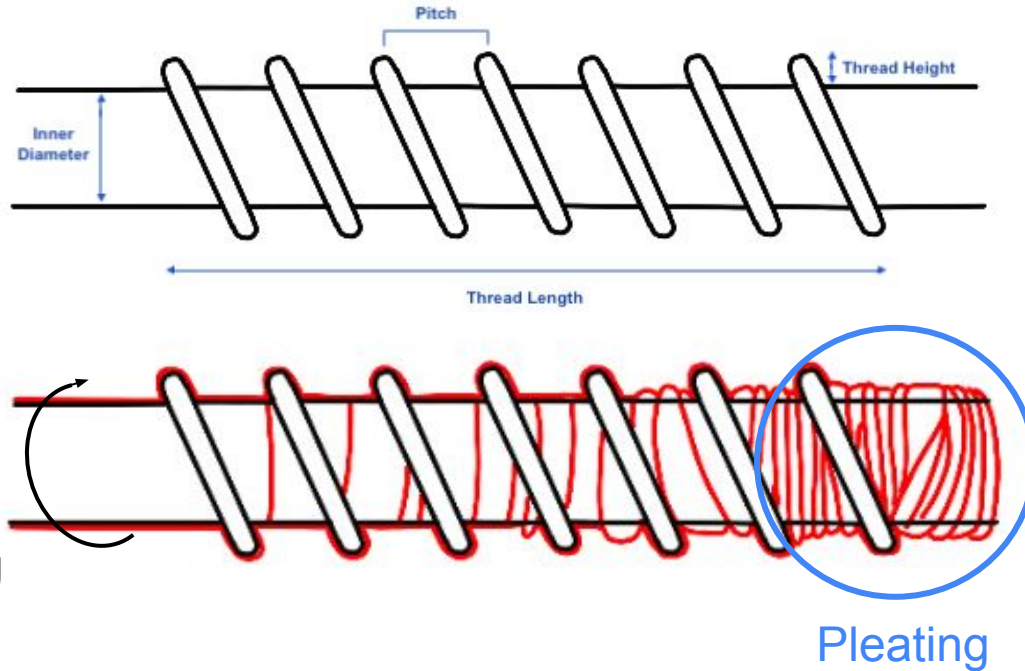
Current Solutions



Our Mission

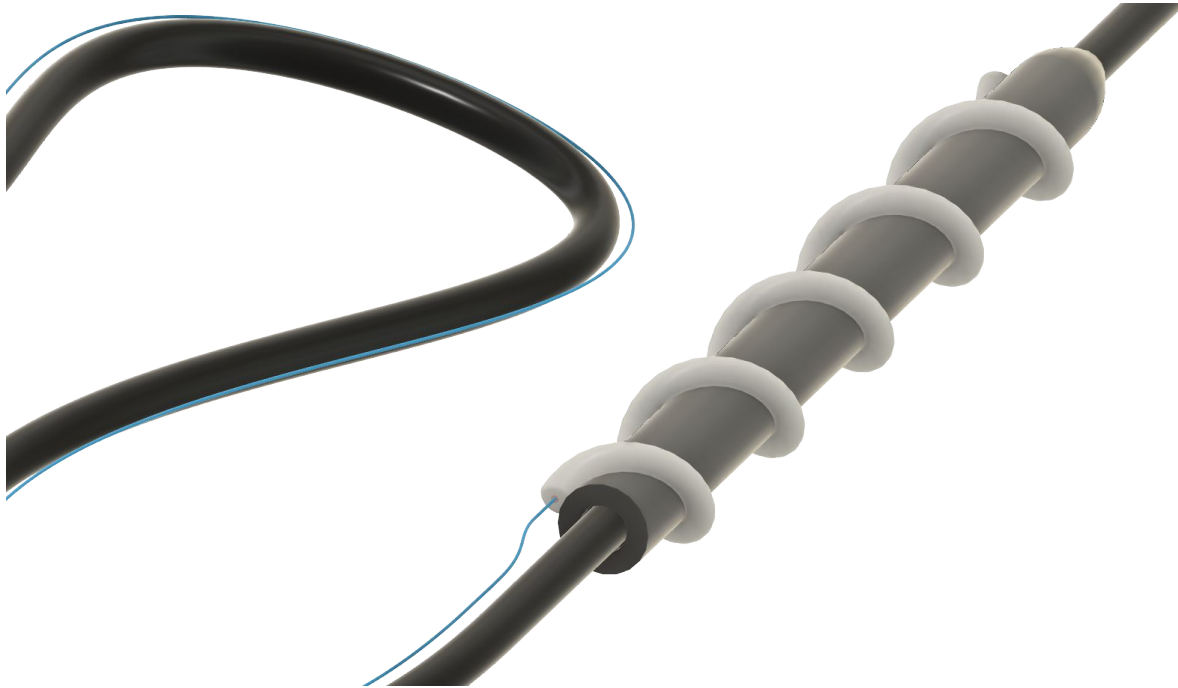
- Create a **collapsible, powered “spiral” endoscope attachment**
- **Improve lower GI procedures** for patients and physicians
 - **safer**
 - more **efficient**
 - more **effective**

Scope Advancement By Pleating



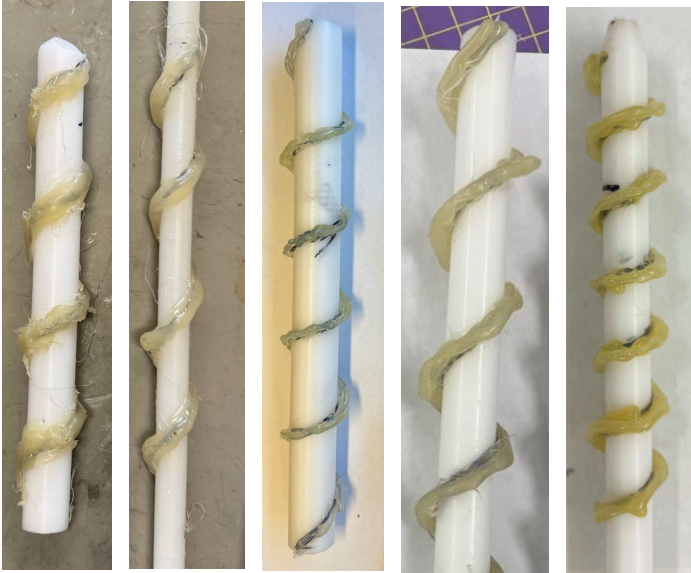
Requirement	Specification
Engages Intestine	Pleats
Efficient	> 1.2 mm/second
Flexible	< 5 mm bending radius difference
Collapsible	Intestine Disengagement
Safe for Intestine	< 0.6 MPa on walls

Our Solution



Prototypes

Solid Models: Dimensioning

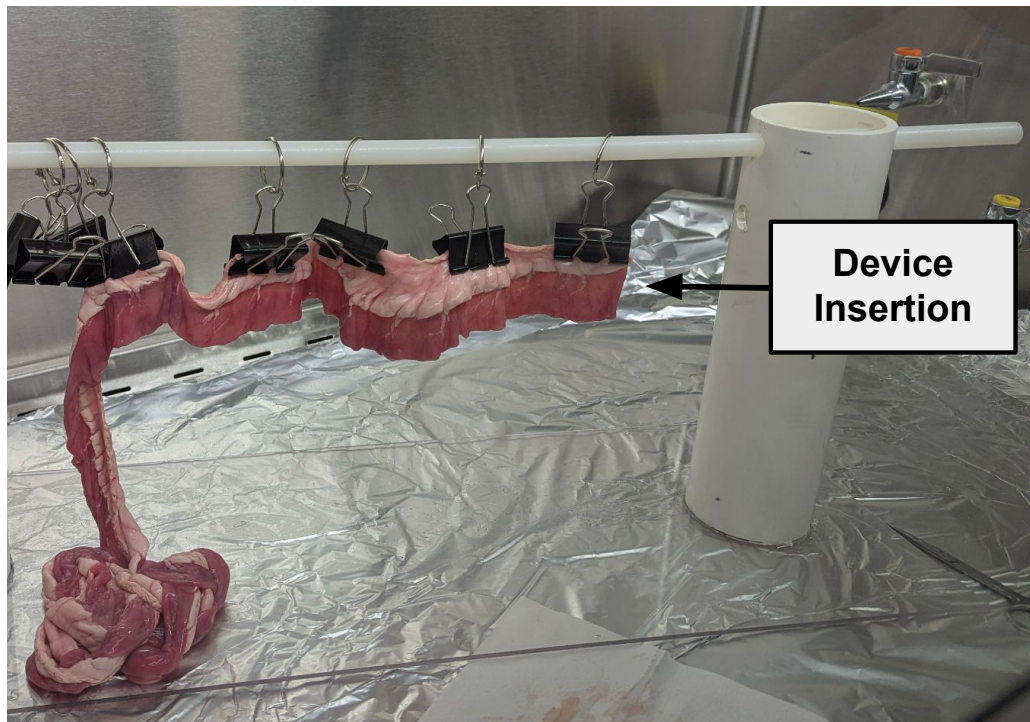
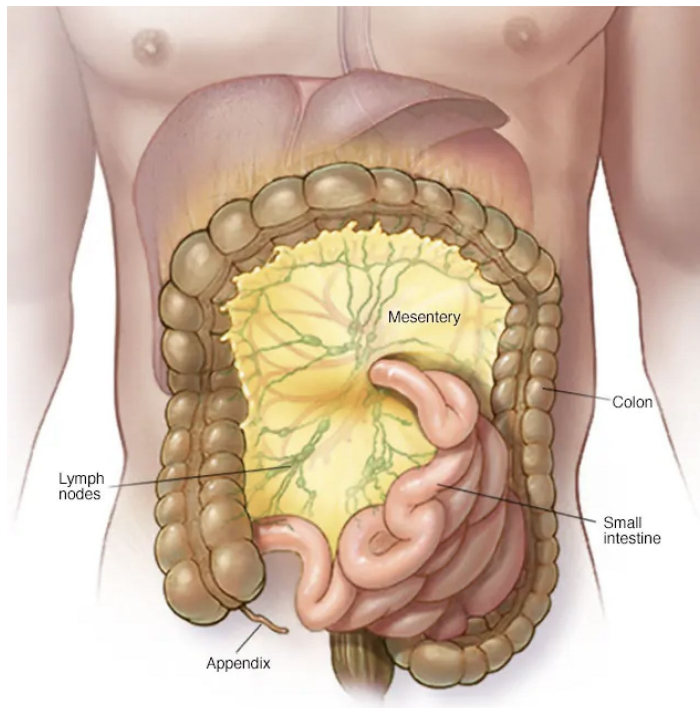


Pneumatic Models

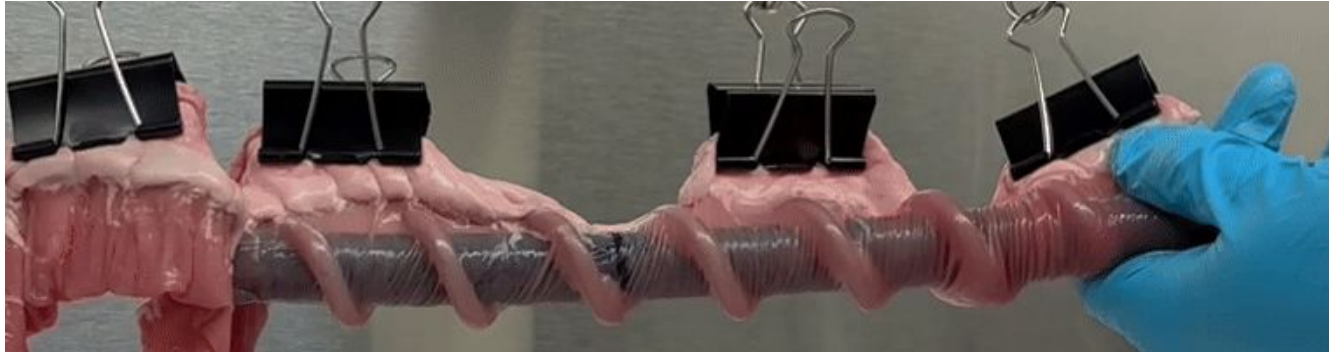




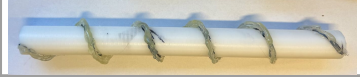
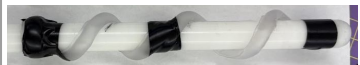
Ex Vivo Pleat Testing



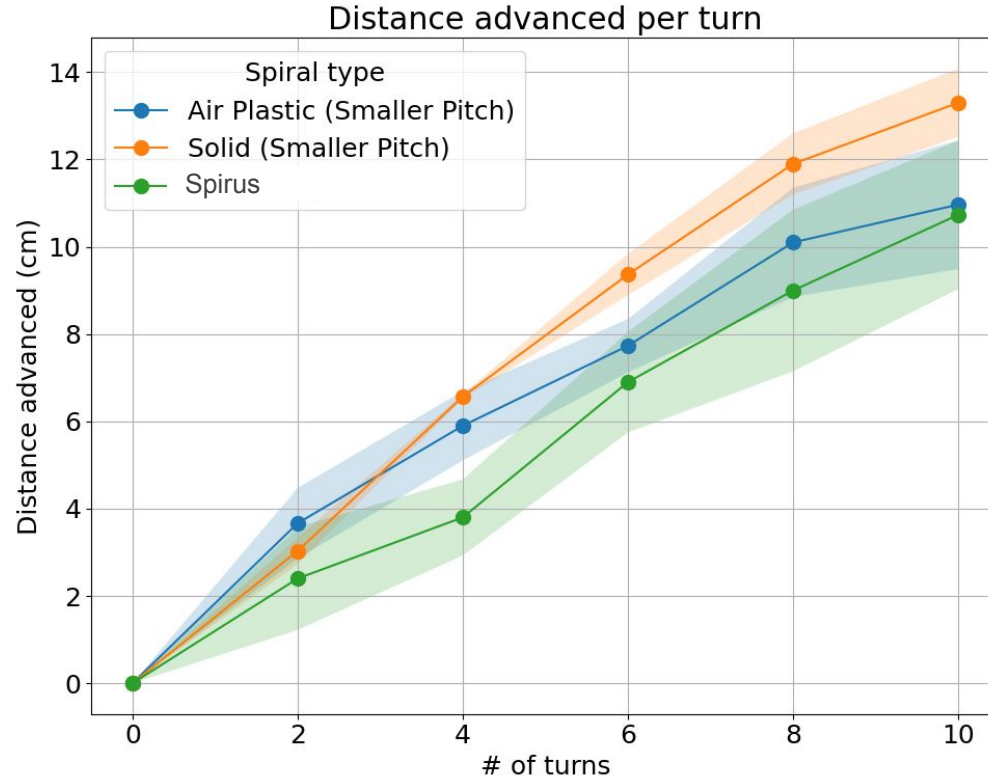
Ex Vivo Pleat Testing



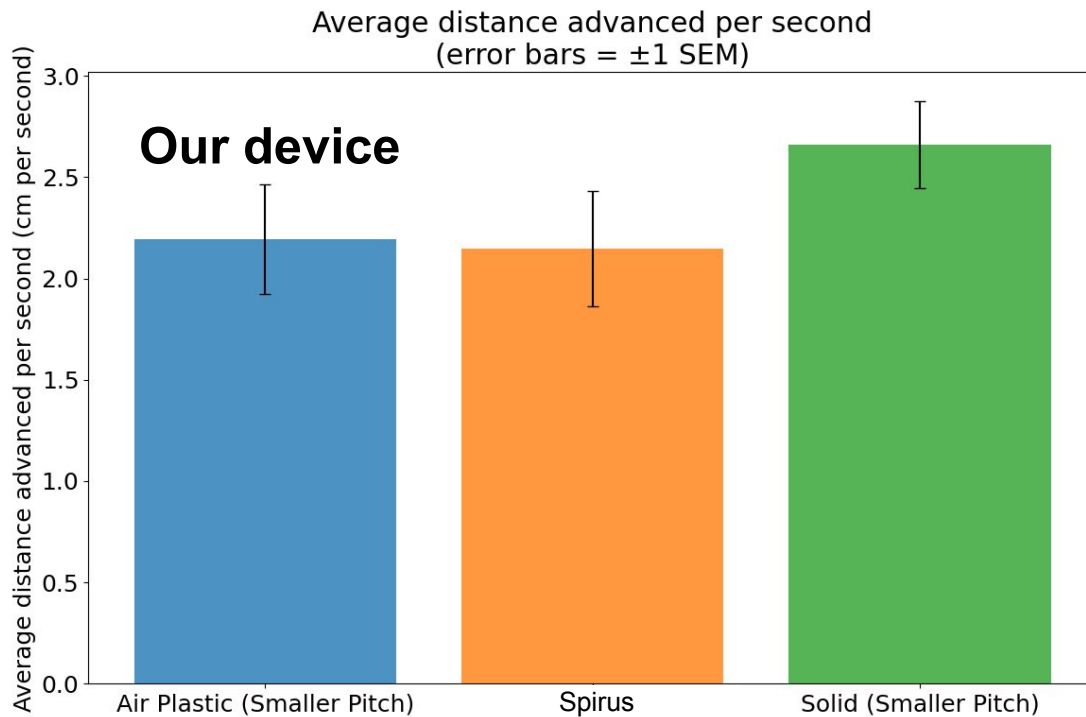
Prototypes and Pleating

Model	Type (Spine-Shaft)	ID (mm)	OD (mm)	Pitch (mm)	Does It Pleat?	Can it collapse?
	Tube-Wood	5	10	46	✗	✗
	Glue-Plastic	13	27	53	✗	✗
	Glue-Plastic	25	39	57	✓	✗
	Glue-Plastic	19	35	52	✓	✗
	Air-Plastic	19	36	58	✓	✓
	Air-Air	28	31	43	✗	✓
	Spirus	17	29	29	✓	✗

Distance Advanced in Intestine Across Prototypes



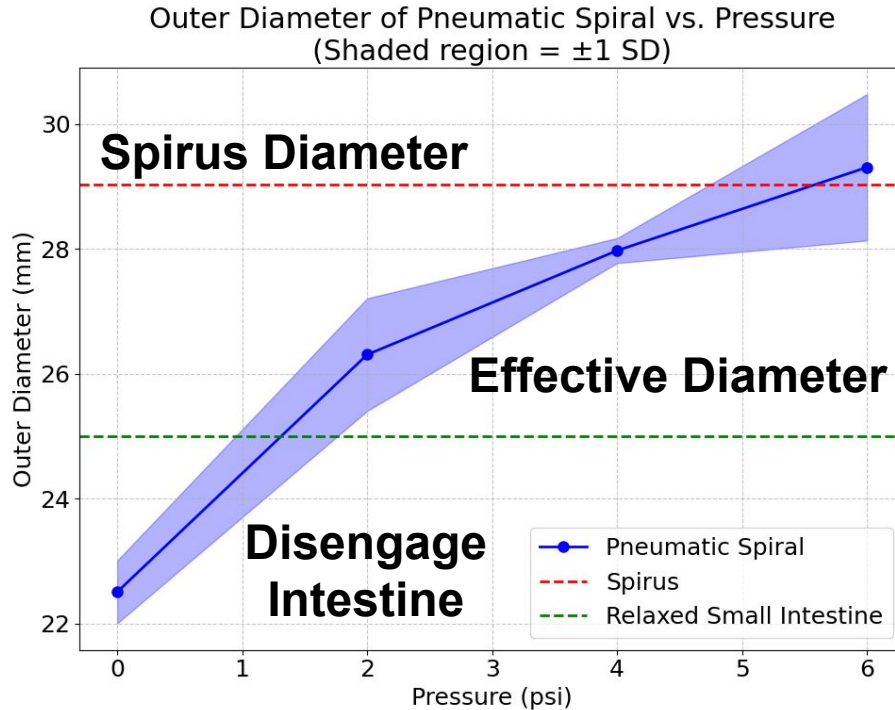
Pneumatic Prototype Advances Quickly Through The GI Tract



Bending Stiffness



Intestine Disengagement by Depressurization



Inflated state will **engage** the intestine.
Uninflated state will **disengage** the intestine

Testing Conclusions

Inflatable spirals can be a default lower bowel endoscopy method

- 
- ✓ Engages Intestine
 - ✓ Efficient
 - ✓ Flexible
 - ✓ Collapsible
 - ✓ Safe for Intestine

Pleats

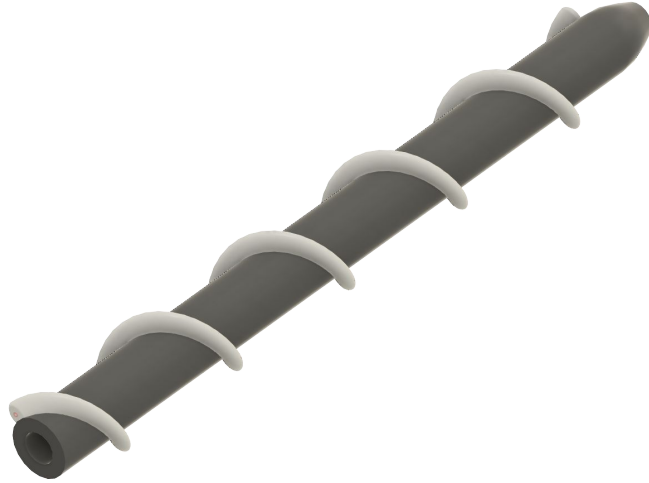
> 1.2 mm/second

< 5 mm bending radius difference

Intestine Disengagement

< 0.6 MPa on walls

Next Steps



Scalable fabrication



**Integration of spiral, pneumatics,
and motorization**

Thank You!

Acknowledgements to

Dr. Daniel Stein
Dr. Giovanni Traverso
Dr. Elena Kalodner-Martin
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Irma Ceco
Dr. Alexander Slocum
Dr. Nevan Hanumara

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