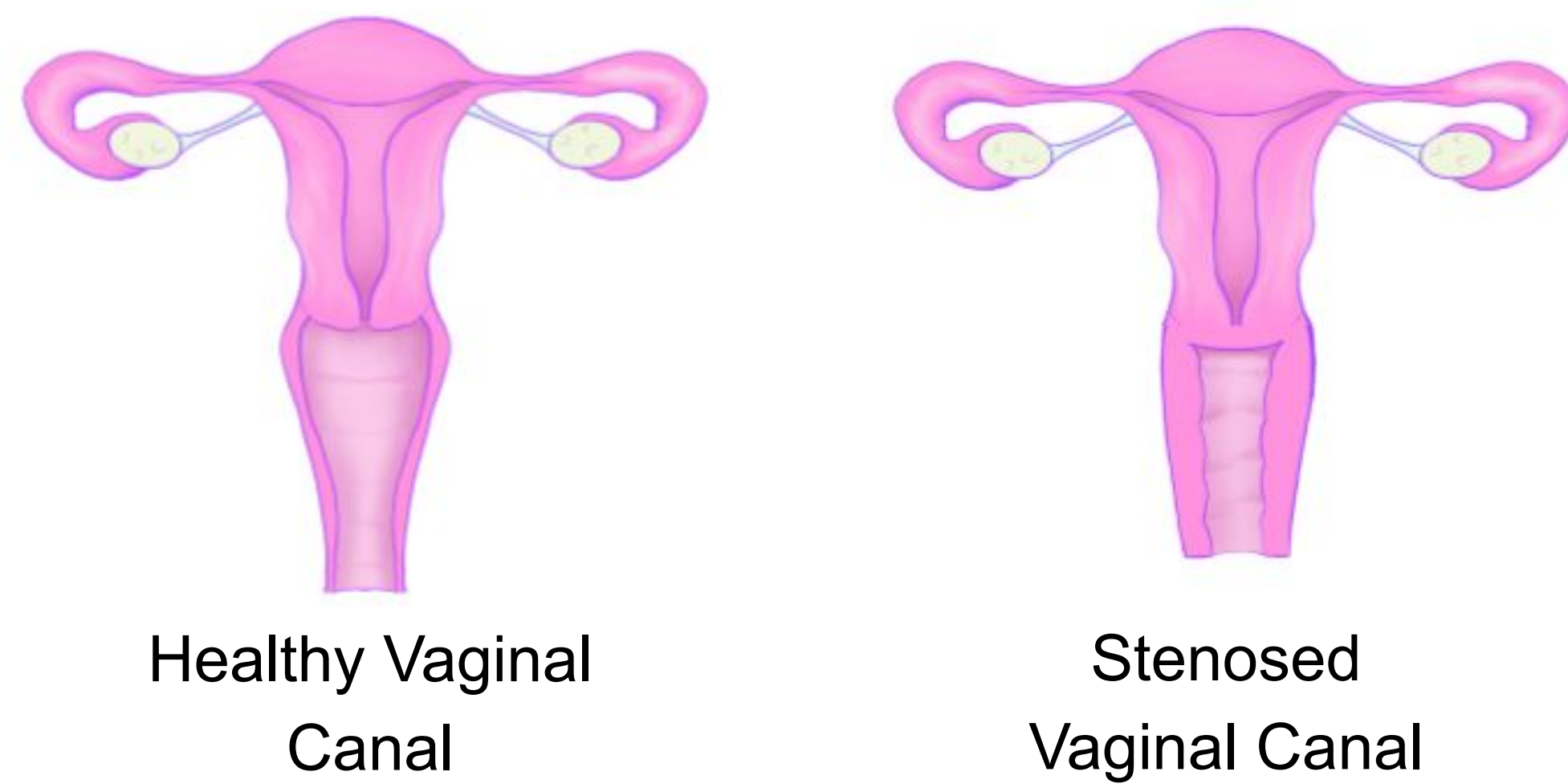


Yu Ming Li, Po-Han Chen, Karcher Morris, PhD,
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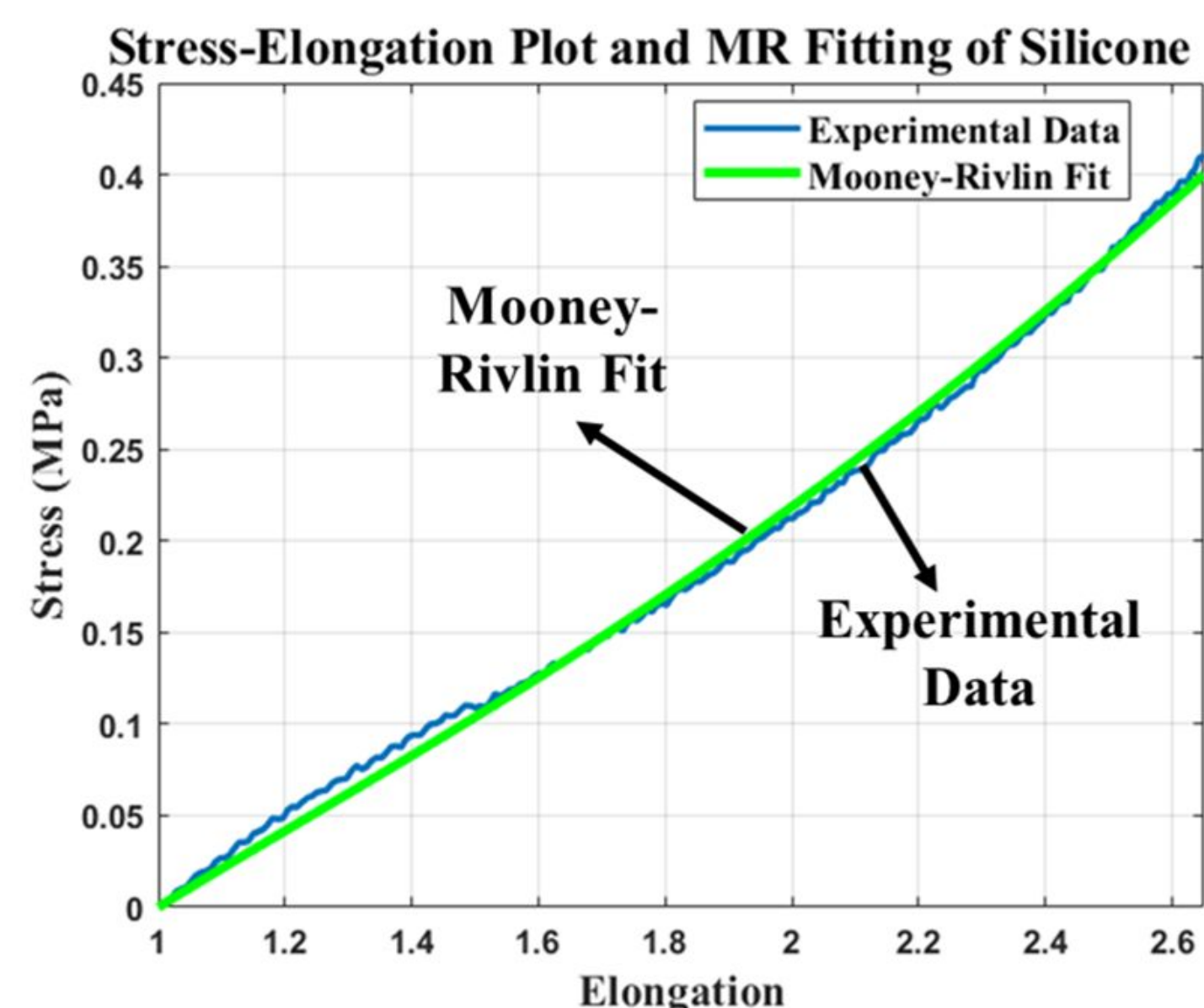
*Moores Cancer Center, ** Center for Memory and Recording Research

Medical Motivation

Vaginal stenosis is the narrowing and shortening of the vaginal canal. It is a **common side effect** of radiation treatment for cervical cancer. This condition **impairs quality of life** and limits **post-treatment clinical examinations**. The **current standard of care** for vaginal stenosis uses rigid dilators to expand the damaged tissue, but this approach suffers from **low treatment adherence**. Our research group proposes a novel inflatable dilator device that provides personalized and comfortable dilator therapy with progress monitoring, creating a **pain-free and effective dilator treatment**.



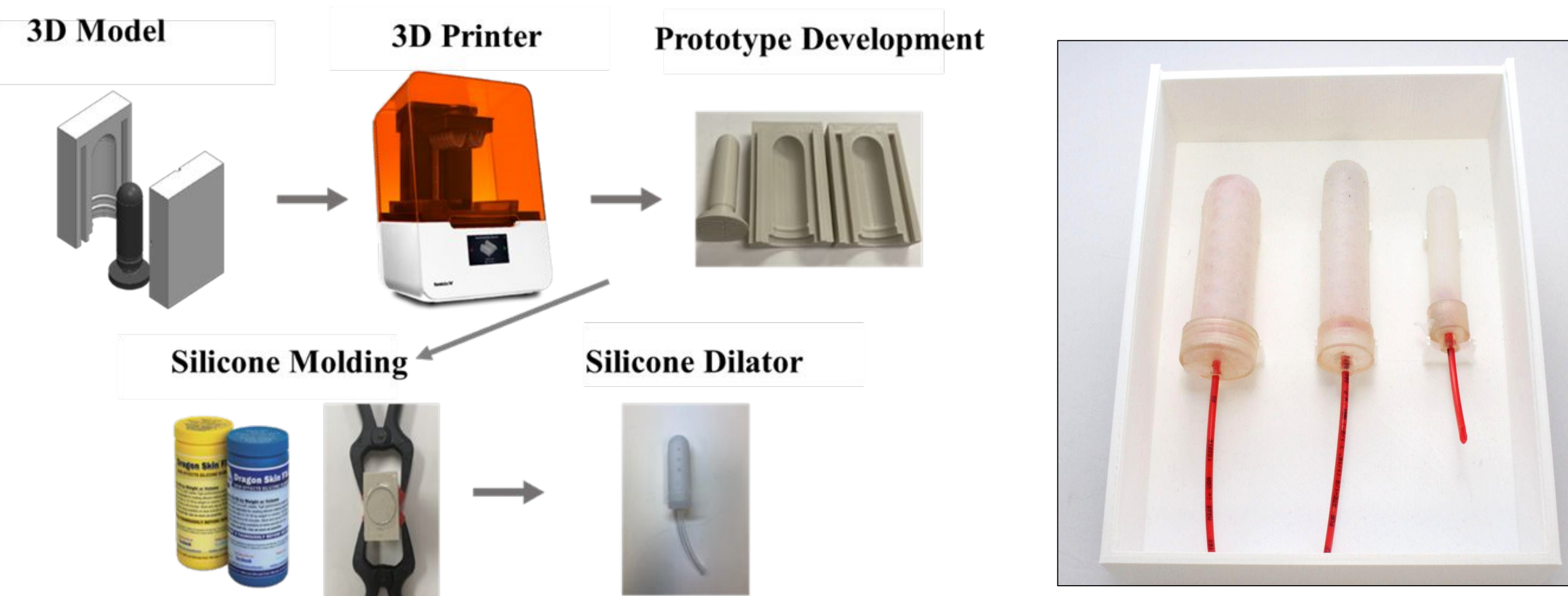
Material Characterization



Material study of dilator silicone elastic property

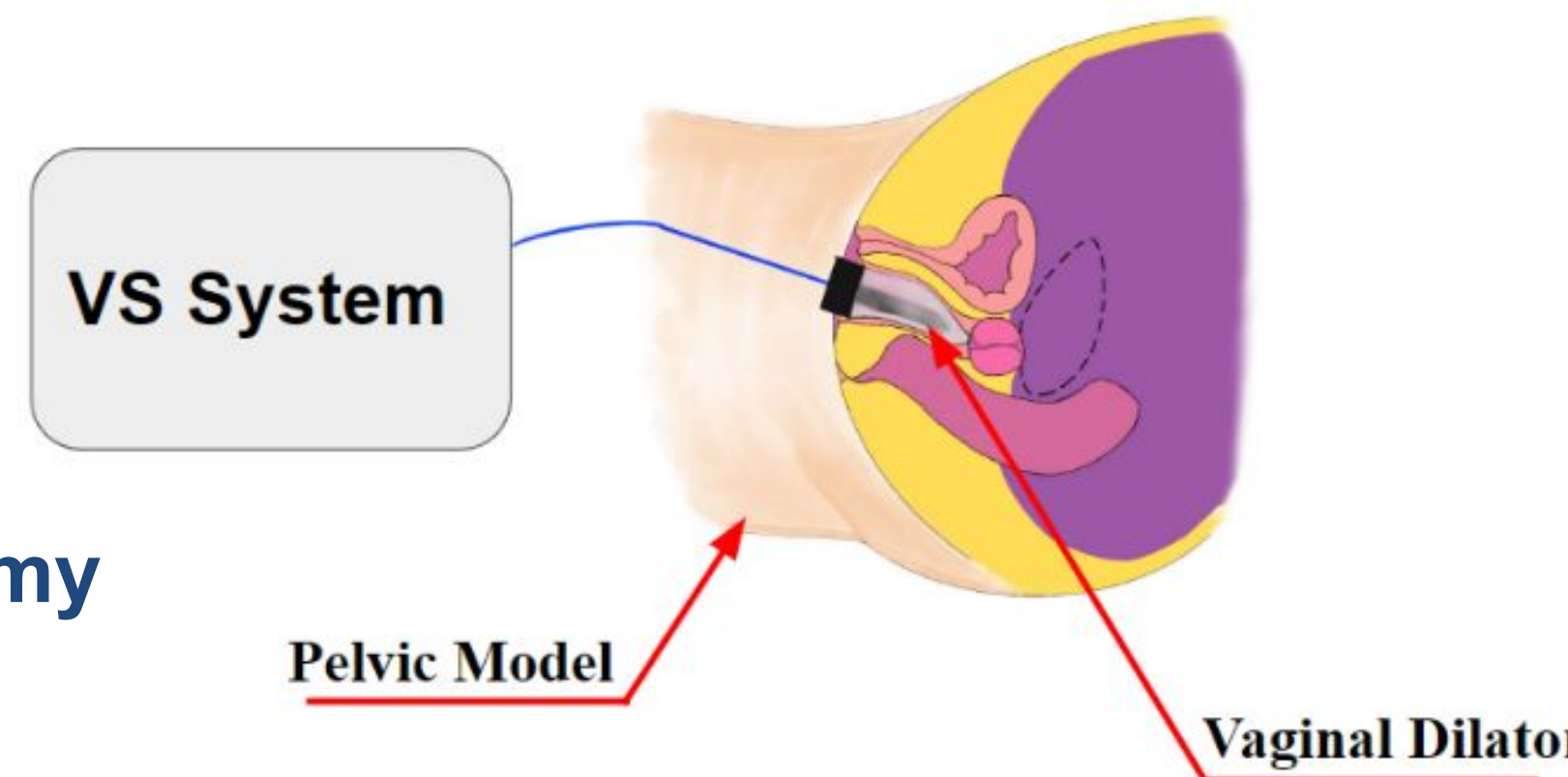
- High strain uniaxial tensile testing (100%+)
- Digital image correlation
- Mooney-Rivlin material fitting
 - ($C1 = 0.26 \text{ MPa}$, $C2 = 0.009 \text{ MPa}$)

Dilator Design and Manufacturing

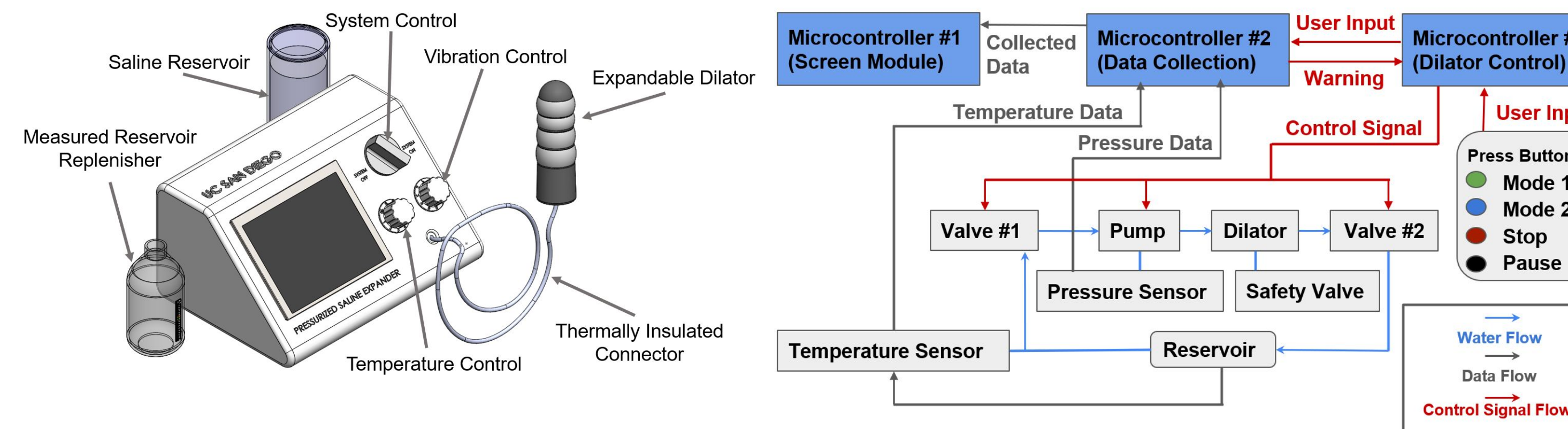


Biocompatible silicone balloon dilator with rigid inner rod.

- Fluid inflatable with pressure monitoring
- **Conforms to patient's anatomy**
- Gentle size increase based on patient comfort



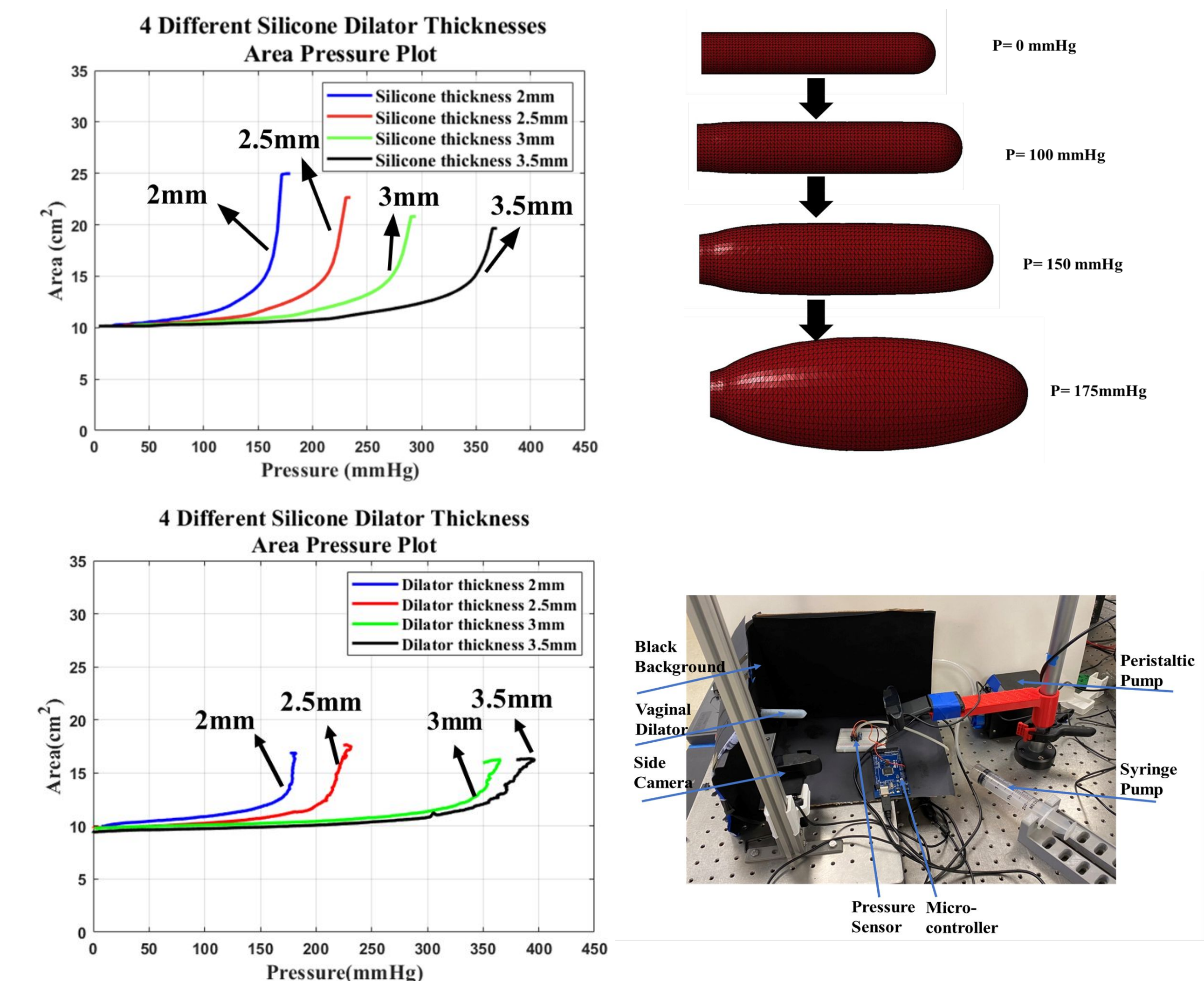
Control and Monitoring System



A clinical desktop treatment and monitoring system was made for pre-programmed treatment and pressure monitoring

- Safety pressure and temperature sensors
- PID controlled dilation sessions
- Treatment progress tracking

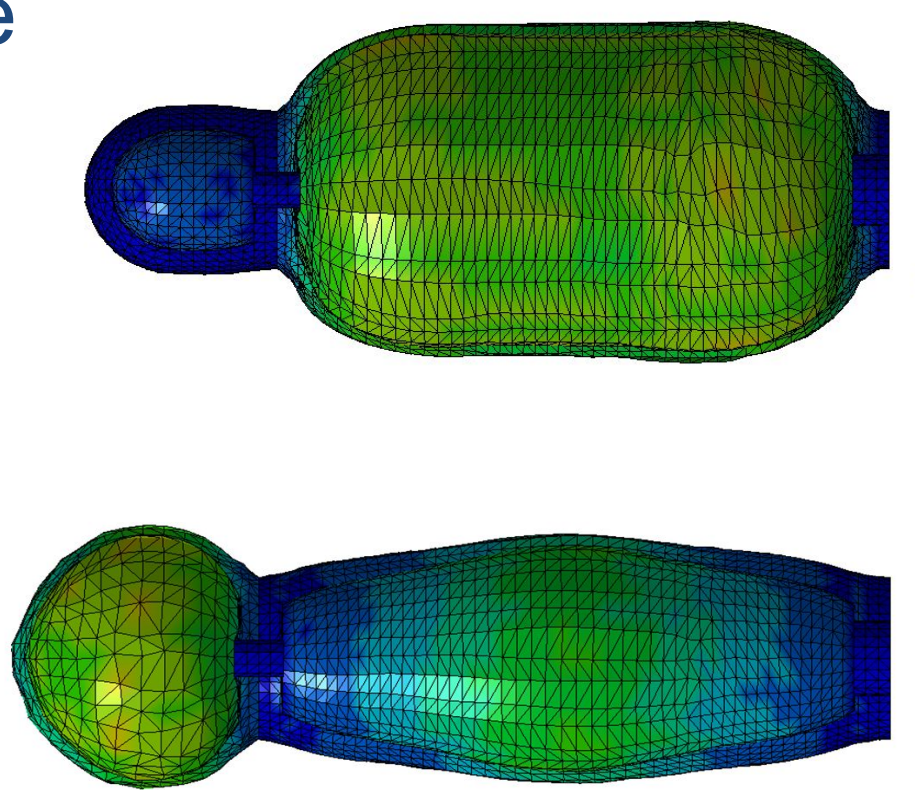
Inflation Simulation and Analysis



- FEA inflation simulation and experimental confirmations
- Findings used to inform PID pressure control

Future work

To further increasing patient adherence to treatment and increasing efficacy, the Talke Lab is developing a soft robotic inspired multi-chamber dilator that can perform area targeted dilation. Ex-Vivo and animal will be conducted for diagnostic viability of pressure monitor



Acknowledgements

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