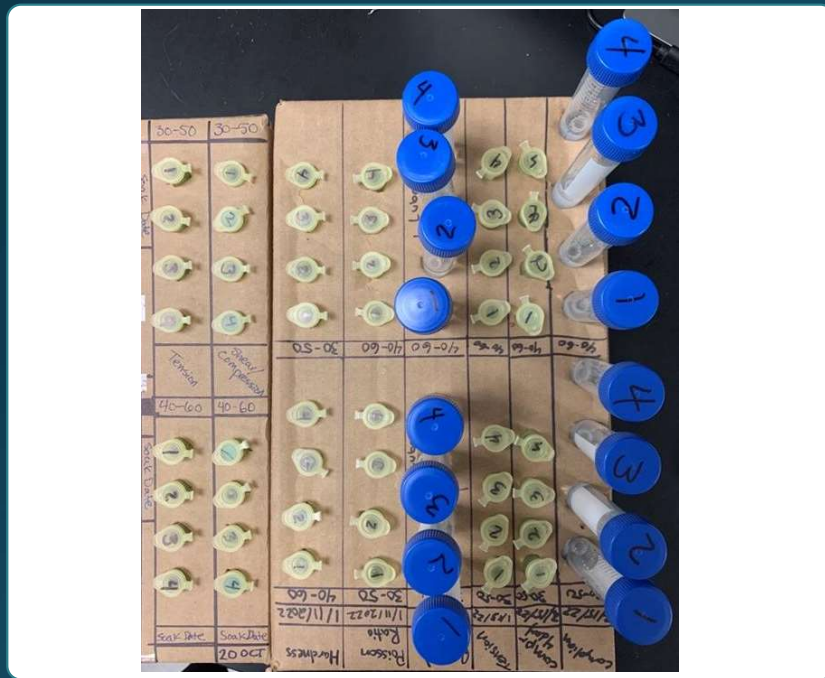


67% Update



Team BDL/Aneuvvas

Isaac Smith - Project Manager

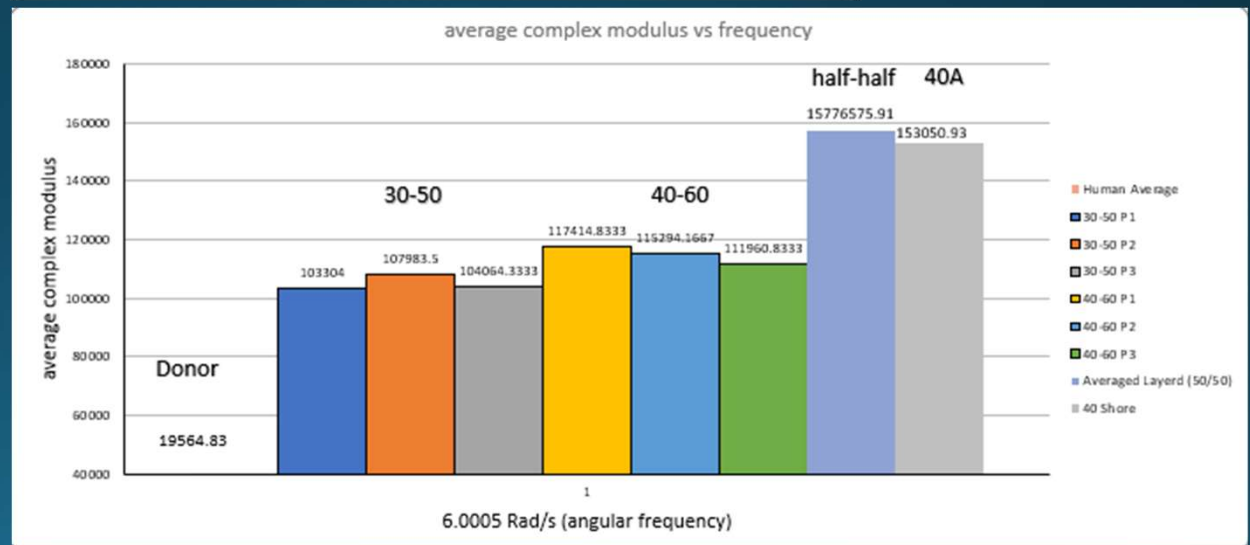
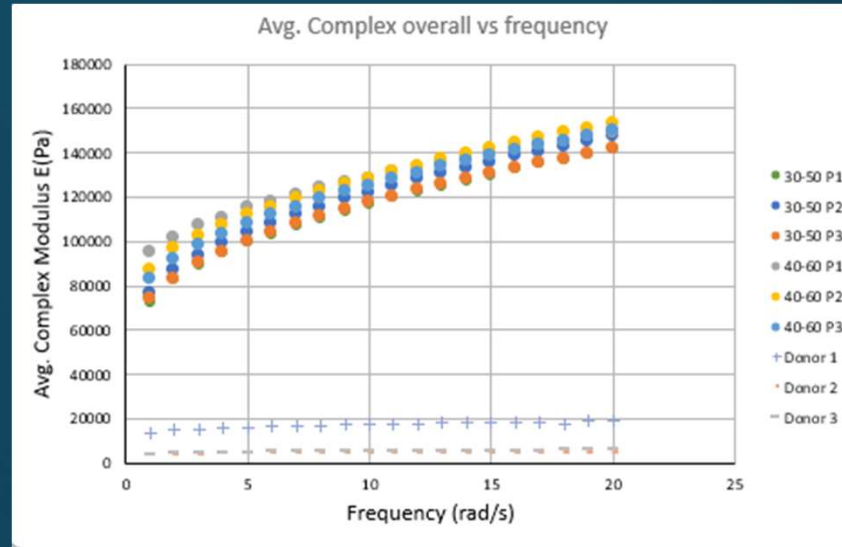
Luke Nelson – Website & Data Manager

Kathryn Nelson - Budget Manager

Aditya Ponugupaty - Testing Manager

Shear

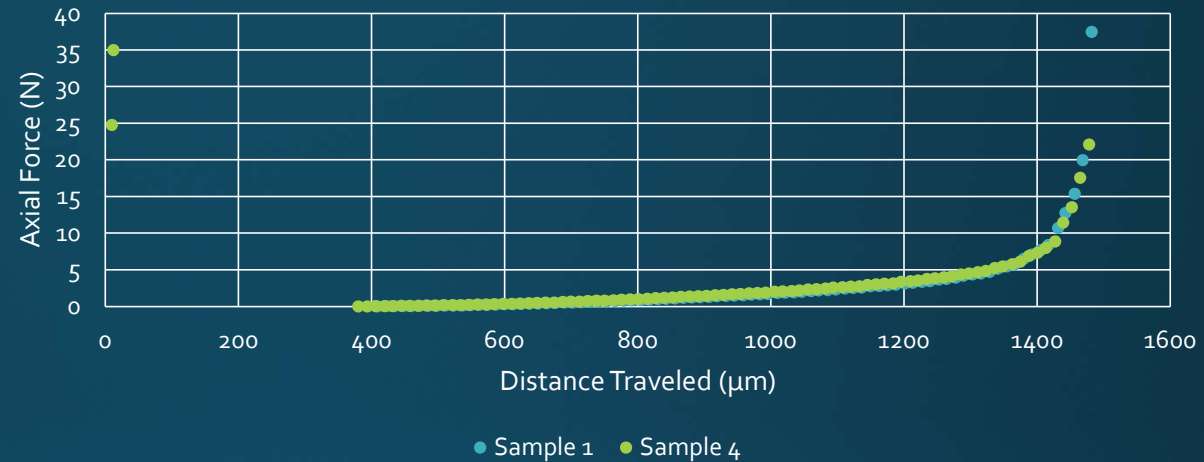
- Shear in polymers is significantly greater than shear in vasculature.
- Our ratio came closer to human shear than previous studies.
- Proof of concept: Validated that ratio change may influence the polymer reaction to be closer to human vascular response.



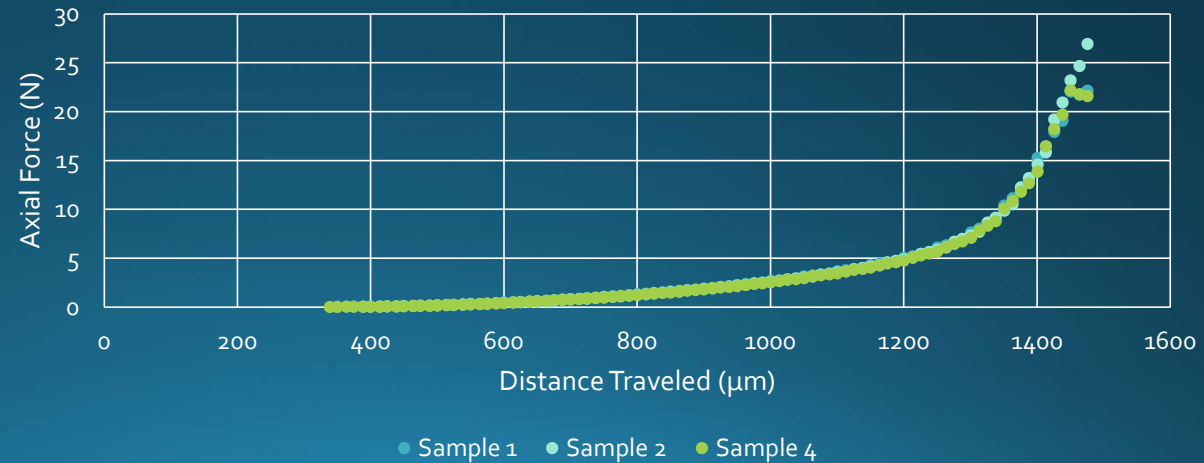
Hardness

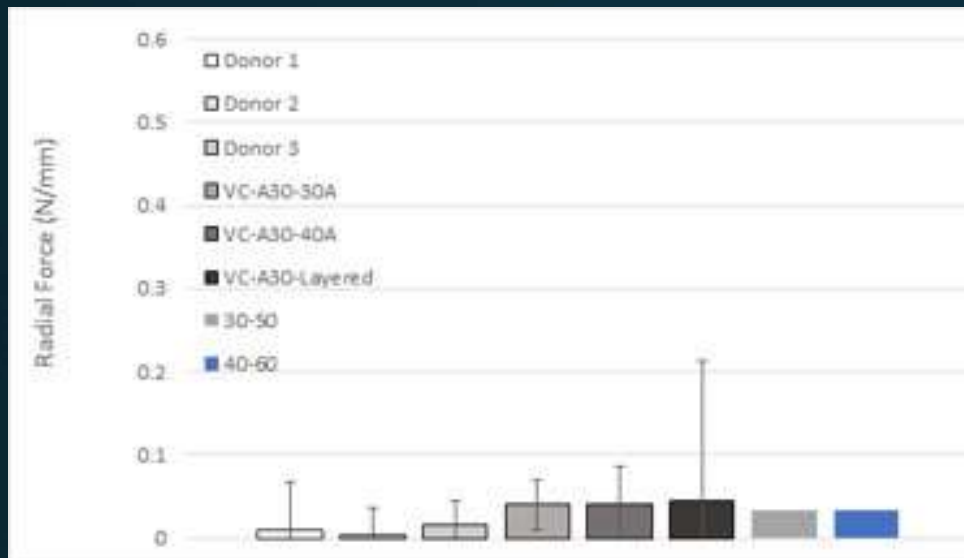
- Uses small metallic ball to compress, creating an indentation into the material
 - The amount of force applied and the distance between plates is measured
- Donor samples resulted in 800-1200 μm at roughly 7.5N of force

Hardness Test (30-50): Force vs. Distance



Hardness Test (40-60): Force vs. Distance





Radial Forces of Previous and Current Samples

Radial Force

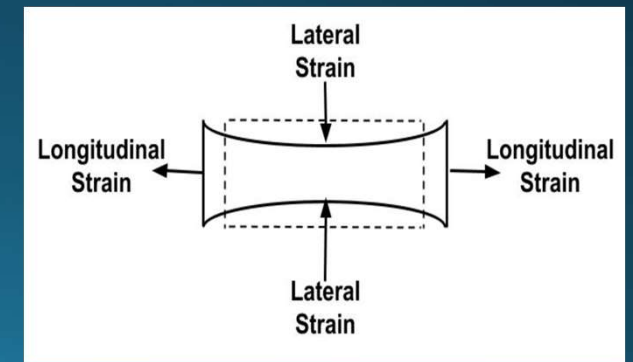
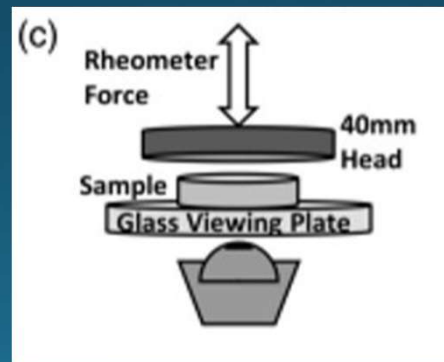
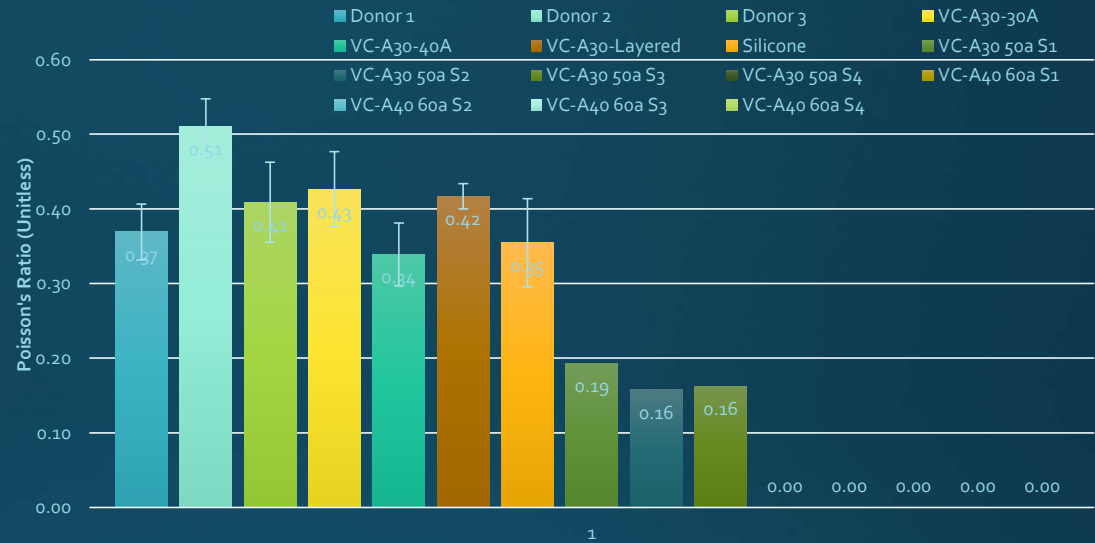
- A hollow cylinder is placed on its side and compressed between two plates
 - The amount of force applied and the distance between plates is measured
- 8 samples are shown, the last two are our capstone's samples
- Donor samples ranged from 0.003-0.01 (N/mm)
- Current samples average at 0.03 (N/mm)

Poisson's Ratio Test and Results

Donor samples ranged from 0.37 – 0.51

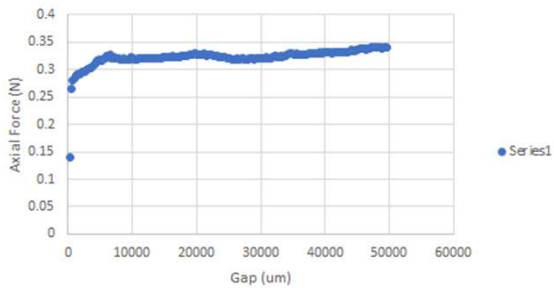
Our samples range from 0.16 to 0.19

A change in mechanical properties is validated through this analysis



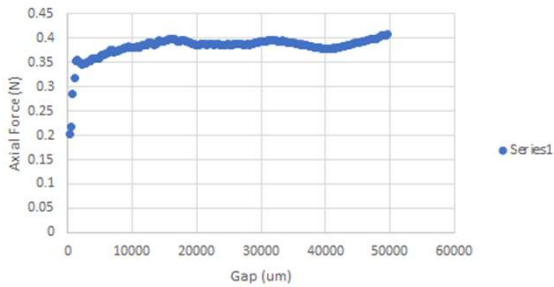
Lubricity

Lubricity 40-60 & 30-50 Baseline



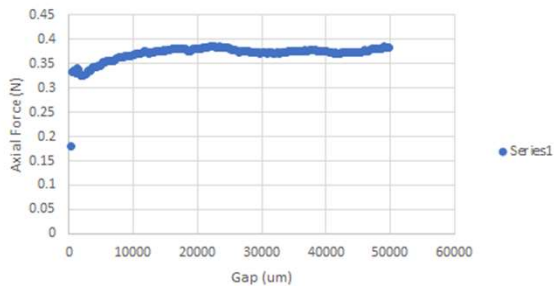
5.33% Error (up)

Lubricity 40-60 4 Day



5.99% Error (up) , 5.10 % Error (down)

Lubricity 30-50 4 Day



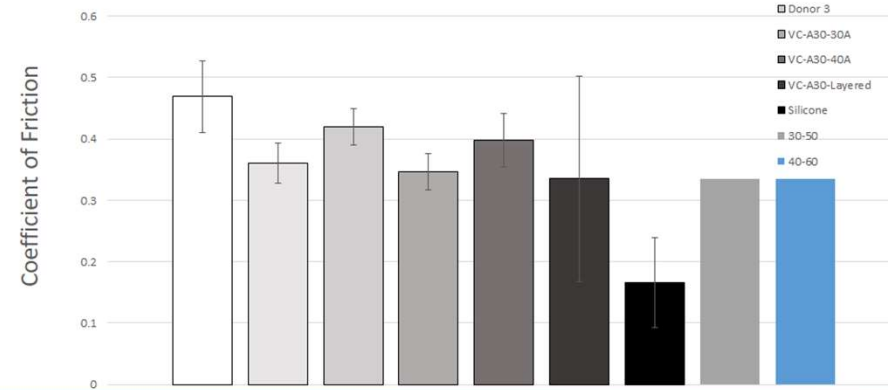
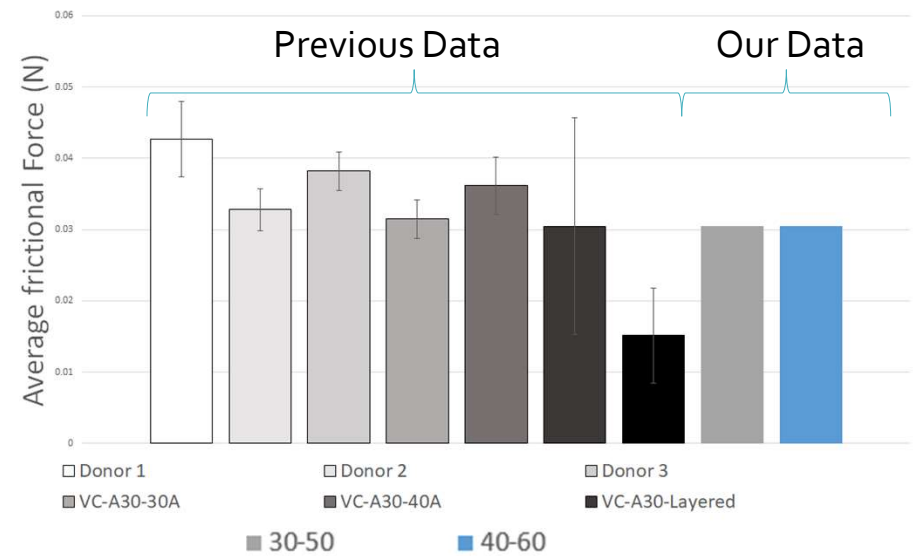
Average Coefficient of friction

Patients: 0.4164

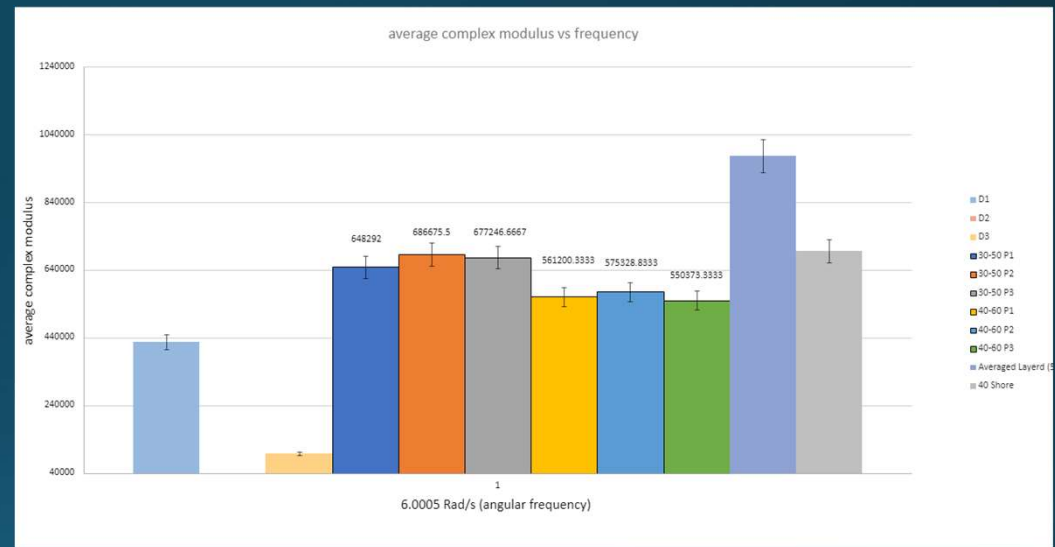
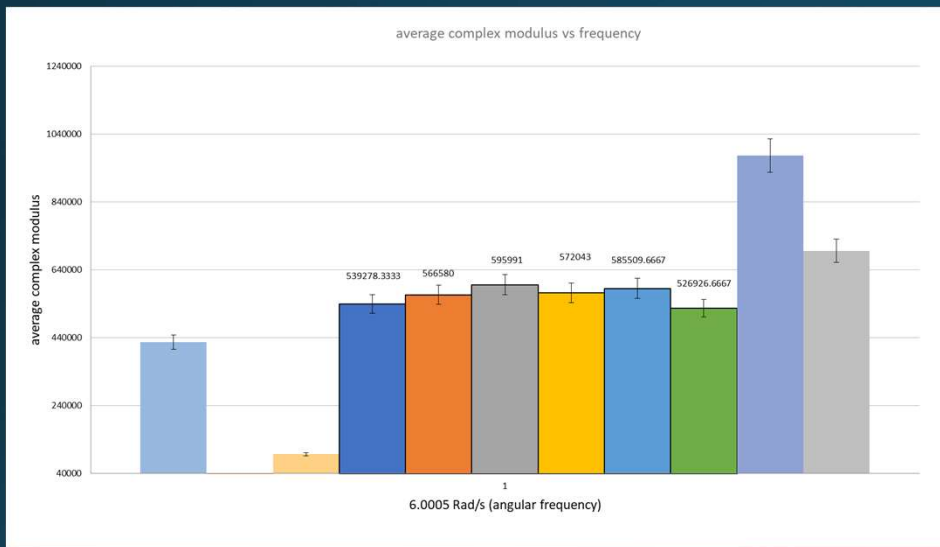
Average 30-50: 0.3351

Average 40-60: 0.3353

Lubricity of Patient and Capstone Samples



Compression

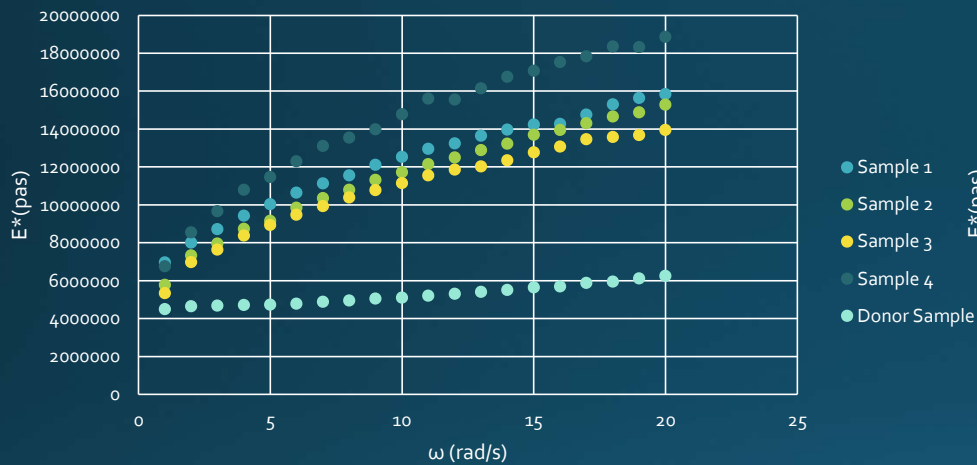


- Most recent testing with a 4-day soak

- Previous testing with a 24-day soak

Tension

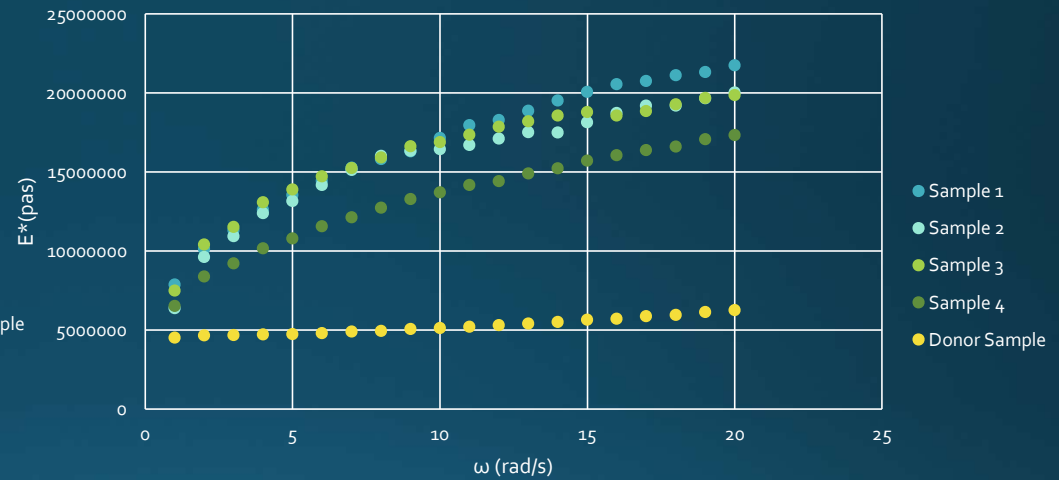
Tension Tests at 100mmHg Equivalent Tension (30-50)



30-50

Donor sample reaches plastic deformation around 6 kPa
Our material reaches plastic deformation around 14,000 kPa

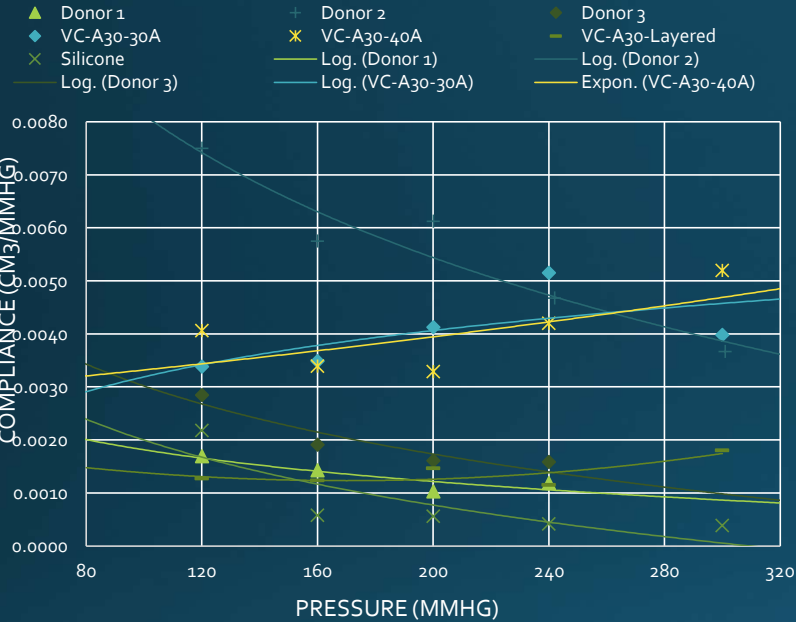
Tension Tests at 100mmHg Equivalent Tension (40-60)



40-60

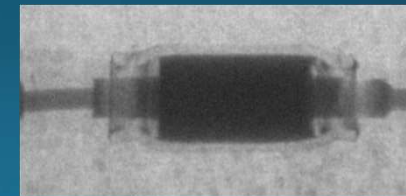
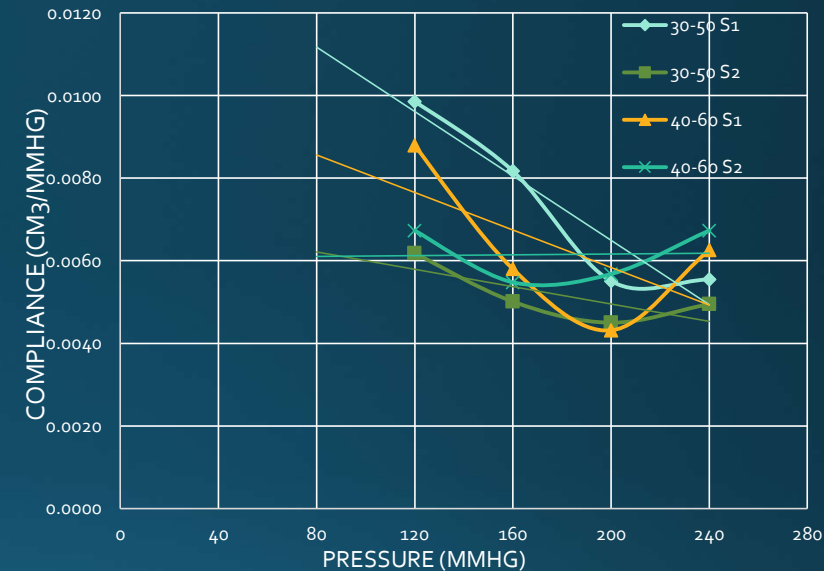
Donor sample reaches plastic deformation around 6 kPa
Our material reaches plastic deformation around 22,000 kPa

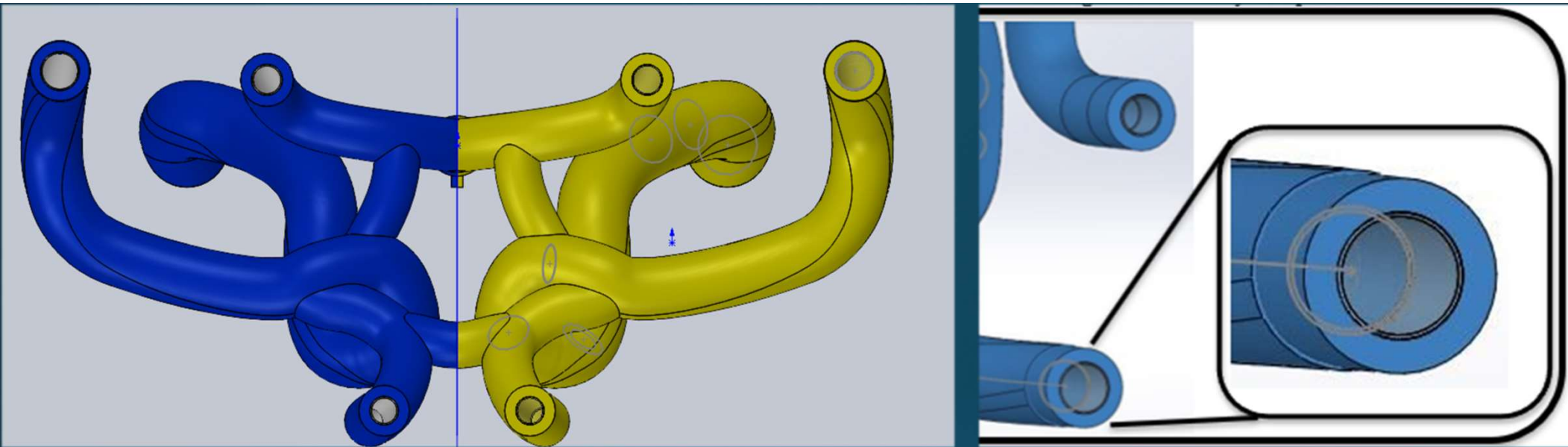
Compliance Testing



- 5 different pressures induced into the vessel:
- 80, 120, 160, 200, 240 mmHg
- 30-50 | 40-60 samples compliance values ranged from 0.004 - 0.01
- Donor samples ranged from 0.001 - 0.009

30-50 | 40-60 SAMPLE 1 AND 2





Updated Model

- Full Model (Left)
- Layered highlighted (Right)
- Printing plan for second week of March.
- Cleaning up to 1 week.

Isaac, 2/7/2022, BDL/Aneuvras, 21F05

Budget & Manufacturing

<i>Total Budget</i>	-----	-----	-----	\$1000
Rheometer (20/hr)	Status: <i>On hand</i>	\$20/hr	25 hours	\$500
Material	Status: <i>On hand</i>	\$0.15-\$0.25 per gram	260 grams	\$46.10
	<i>Total Remaining</i>	\$453.90	<i>Total Spent</i>	\$546.10

- ⦿ All samples have been printed and all tests have been completed
- ⦿ Currently 30 hours of testing have been done
 - 5 of the testing hours were for the compliance testing which didn't use rheometer

Compliance and Compression Test day	All	2/19/2022	2/19/2022
<i>Compliance and compression Test sample prep</i>	AP	2/15/2022	2/15/2022
Analytical Analysis	All	2/13/2022	2/27/2022
Compression analysis redo	Kathryn	2/13/2022	2/27/2022
Tension analysis	Luke	2/13/2022	2/27/2022
Compliance analysis	AP	2/13/2022	2/27/2022
Lubricity analysis	Isaac	2/13/2022	2/27/2022
<u>Hardware Status Update 67%</u>	All	2/28/2022	2/28/2022
Finalized Testing Plan	All	2/21/2022	3/25/2022
Poisson's Ratio Analysis Update	AP	2/21/2022	3/11/2022
Print and Clean in-vitro flow model	Isaac, someone else?	3/14/2022	3/18/2022
<u>Hardware Status Update 100%</u>	All	3/21/2022	3/21/2022

Gantt Chart



Questions?