Team BDL/Aneuvas

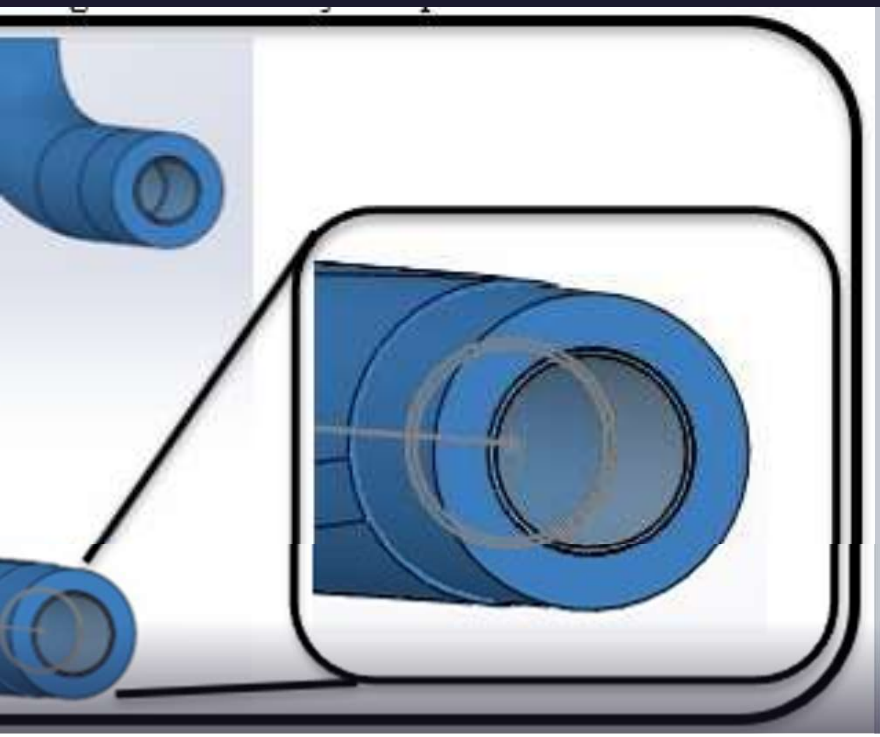
Isaac Smith - Project Manager

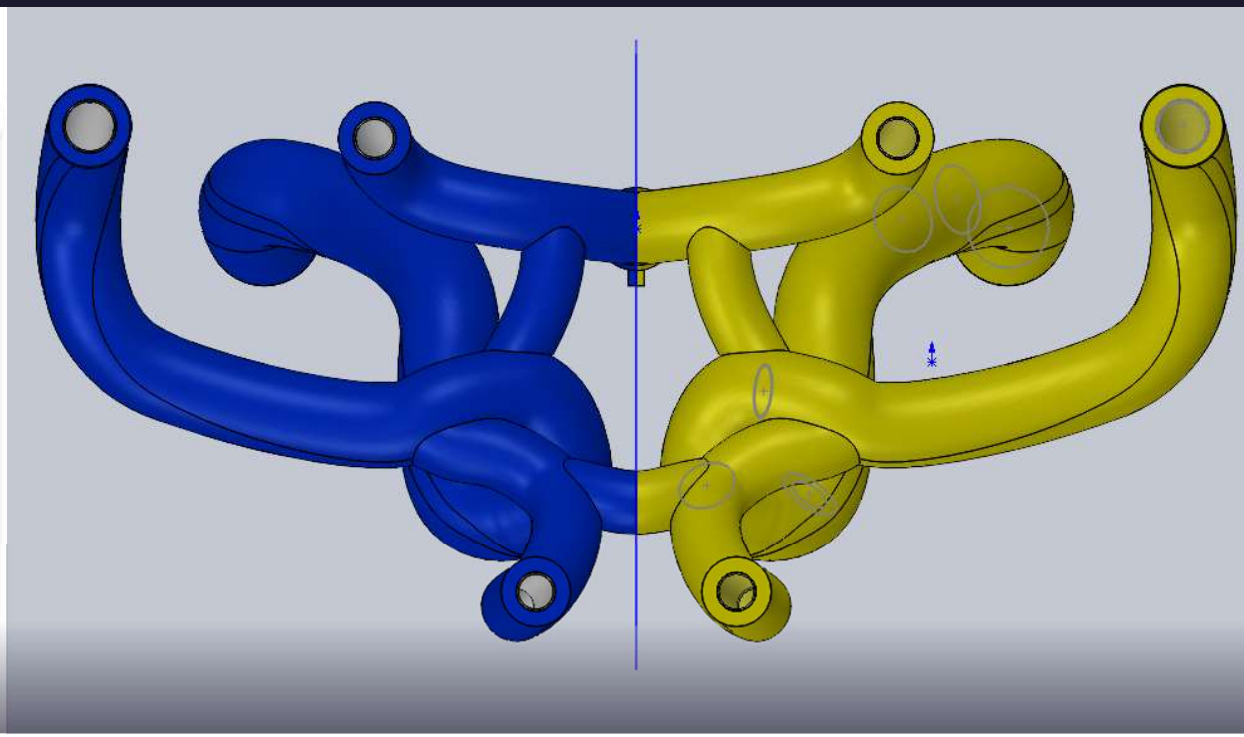
Luke Nelson – Website/Data Manager

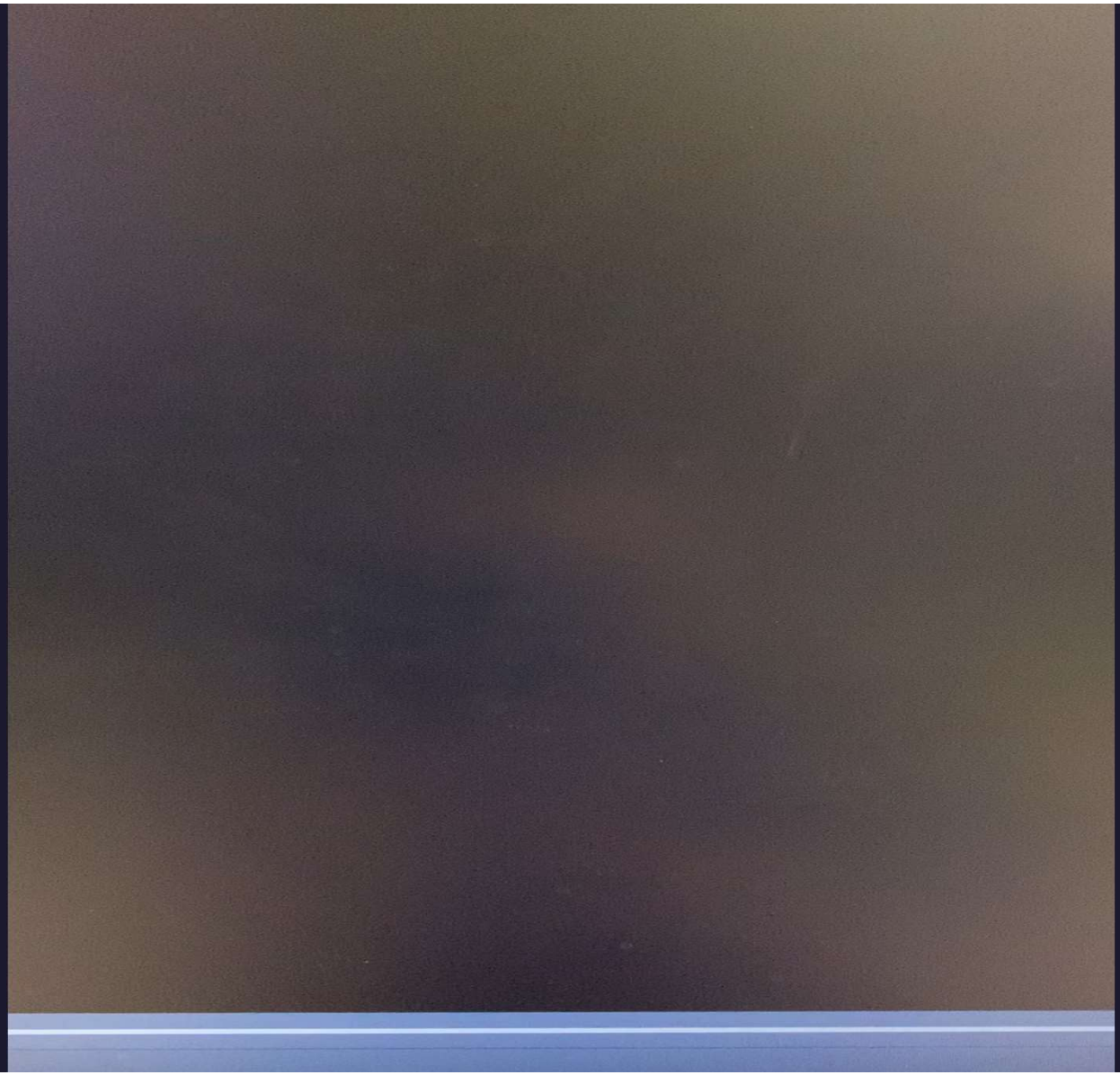
Aditya Ponugupaty -Testing Manager

Kathryn Nelson - Budget Manager

CAD: Final Model



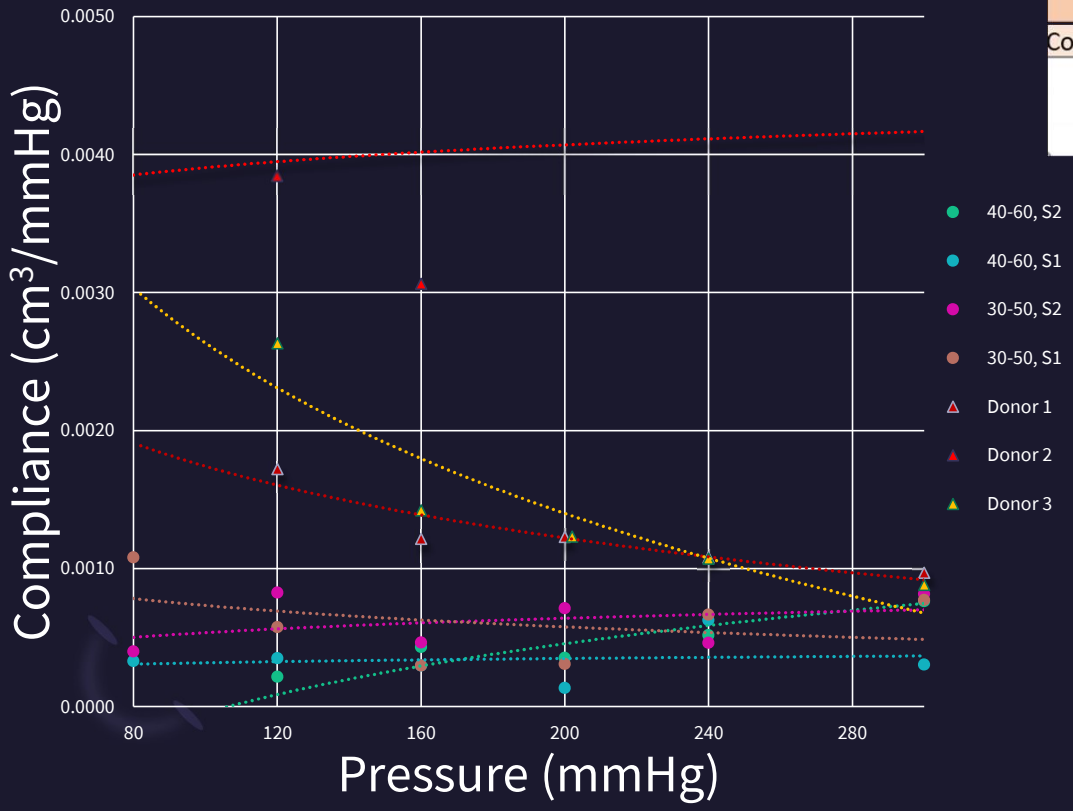




Final Vessel Model – short clip!!!

Compliance

Cumulative Compliance

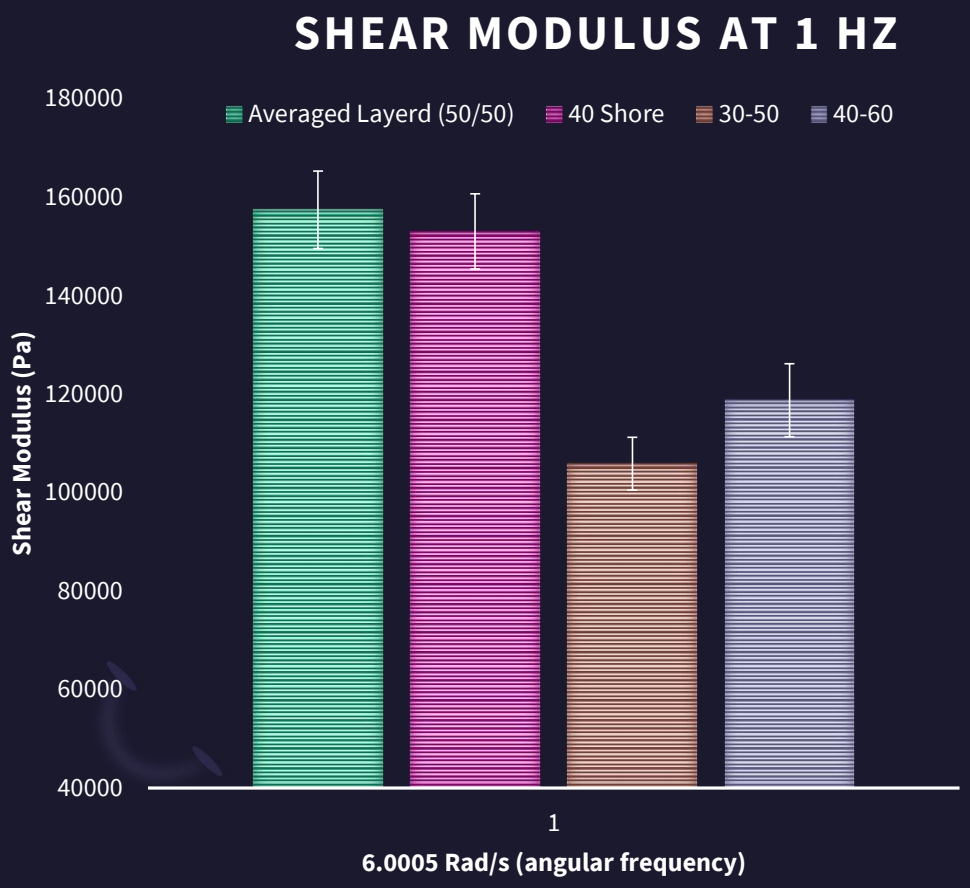


Donor	30-50: 80/20%		40-60: 80/20%		50% Layered	
	% diff.	p value	% diff.	p value	% diff.	p value
Compliance						
Donor 1	55.76	<.001	70.03	<.001	-202	<.001
Donor 2	90.18	<.001	93.35	<.001	27.3	.070
Donor 3	70.32	<.001	79.89	<.001	-102	.002

- Our values were closer to common silicone models
- Compliance % differences were smaller than previous designs

AP

Shear Modulus

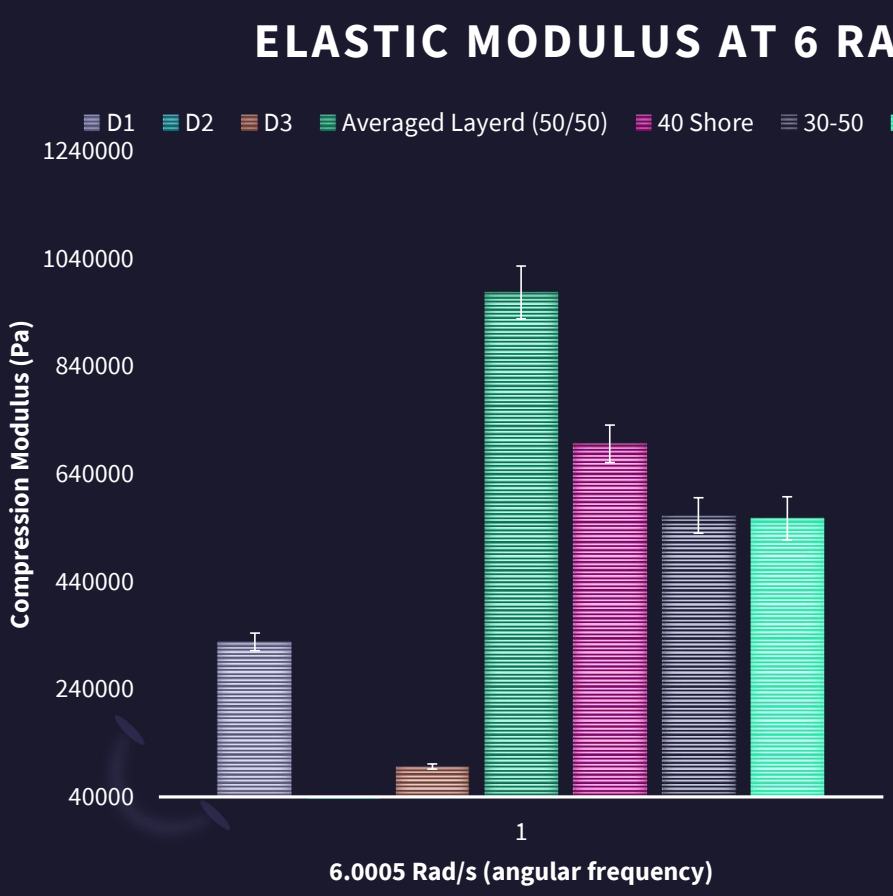


Donor	30-50: 80/20%		40-60: 80/20%		50% Layered	
	% diff.	p value	% diff.	p value	% diff.	p value
Shear moduli						
Donor 1	-84.75	<.001	-86.41	<.001	-841	<.001
Donor 2	-95.88	<.001	-96.33	<.001	-2900	<.001
Donor 3	-95.22	<.001	-95.74	<.001	-1680	<.001

- Our values were closer to common silicone models
- Compliance % differences were smaller than previous designs

Luke

Elastic Modulus

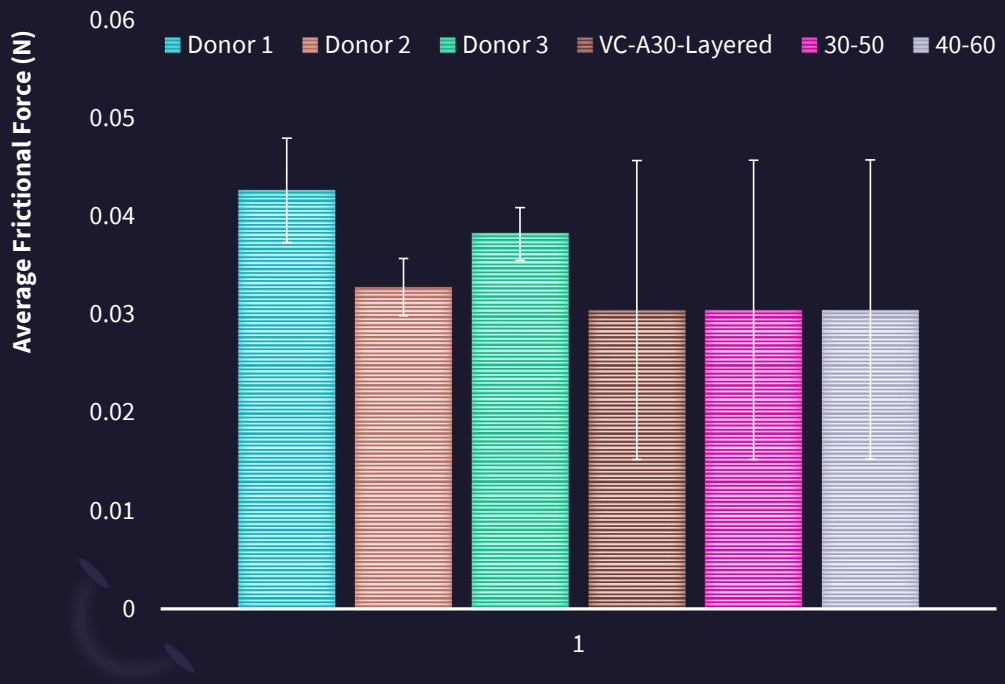


Donor	30-50: 80/20%		40-60: 80/20%		50% Layered	
	% diff.	p value	% diff.	p value	% diff.	p value
Compressive moduli						
Donor 1	-22.30	<.001	-23.59	<.001	-20.5	<.001
Donor 2	-76.71	<.001	-77.10	<.001	-328	<.001
Donor 3	-82.82	<.001	-83.10	<.001	-303	0.005

Kathryn

Lubricity

PATIENT AND SAMPLE LUBRICITY



Donor	30-50: 80/20%		40-60: 80/20%		50% Layered	
	% diff.	p value	% diff.	p value	% diff.	p value
Lubricity						
Donor 1	27.33	<.001	27.39	<.001	28.6	<.001
Donor 2	33.39	<.001	33.45	<.001	7.05	<.001
Donor 3	31.33	<.001	31.39	<.001	20.2	<.001

Isaac

Engineering Requirements		Units	Target Range	Tolerance	Measured / Calculated Value	ER Met (Y/N)	Client Acceptable (Y/N)	Test / Method Associated
ER -1	Stiffness/ E	Kpa	100 to 20,000	100	30-50: 70,000 to 120,000; 40-60: 90,000 to 160,000	N	Y	Tension
ER -2	Thickness	mm	1.2	0.05	CAD: 1.2mm; Capiler: 1.2mm	Y	Y	N/A
ER -3	Compressive Moduless	KPa	90,000 to 500,000	50	30-50:500,000 to 680,000; 40-60: 590,000 to 810,000	N		Compression
ER -4	Frequency	rad/s	0 to 20	0.01	Rheometer controlled	Y	Y	Most
ER -5	Poisson's ratio	unitless	0.30 to 0.50	0.05	30-50:0.18 to 0.29| 40-60: 0.21 to 0.30	N	Y	Poison's Ratio
ER -6	Compliance	cm^3/mmHg	0 to 0.006	0.0001	30-50: 0.00052 to 0.00066 40-60: 0.00034 to 0.00046		Y	Compliance
ER -7	Angular Acceleration	rad/s	0 to 20	0.01	Rheometer controlled	Y	Y	Most
ER -8	Radial Force	N/mm	.003 to .01	0.001	30-50: 0.03 ; 40-60: 0.03	N	Y	Radial Force
ER -9	Layering	mm	0.96, 0.24	0.01	CAD measured; printer tolerance	Y	Y	N/A
ER -10	Pressure	mmHg	80 to 320	5 mmHg	Pressure Gauge; Pressure Transducer (readings varied)	Y	Y	Compliance
ER -11	Shear Modulus, E	KPa	5 to 30	5	60-50:70,000 to 145,000; 40-60: 90,000 to 150,000	N	Y	Shear
ER -12	Hardness, Modulus	KPa	1,000 to 5000	100	30-50: 5478.26 40-60: 829041.9	Y/N	Y	Hardness
ER -13	Strain	%	55 to 90	1	Rheometer controlled	Y	Y	Hardness
ER -14	Coefficient of Friction	unitless	0.15 to 0.5	0.01	30-50: 0.3351 40-60: 0.3353	Y	Y	Lubricity

Gantt Chart

Deliverable	Assigned to	Progress	Start Date	End Date
Finalized Testing Plan	All	100%	2/21/2022	3/25/2022
Poisson's Ratio Analysis Update	AP	100%	2/21/2022	3/11/2022
Compliance REDO	Isaac	100%	3/15/2022	3/18/2022
Get Approval from Dr. Becker	All	100%	3/14/2022	3/14/2022
Print and Clean in-vitro flow model	Isaac	100%	3/14/2022	3/28/2022
UGRADS Poster draft	All	100%	3/18/2022	3/22/2022
UGRADS Poster submission	All	100%	3/18/2022	3/25/2022
Analytical Analysis Data Gathering	All	100%	3/18/2022	3/25/2022
Hardware status Update 100%	All	100%	3/28/2022	3/28/2022
Final UGRAD Poster submission	All	100%	4/1/2022	4/1/2022
UGRAD Presentation	All	100%	4/8/2022	4/8/2022
Initial Testing Results	All	-	4/8/2022	4/8/2022
Actual UGRADS Symposium	All	-	4/15/2022	4/15/2022
Final CAD Packet	All	-	4/15/2022	4/15/2022
Product Demo and Final Testing Results	All	-	4/29/2022	4/29/2022
Final Report	All	-	4/29/2022	4/29/2022
Final Website Check	All	-	4/29/2022	4/29/2022
Client Handoff	All	-	5/5/2022	5/5/2022

BDL/ANEUVAS CAPSTONE Semester 2

NAU ME Capstone
Project Lead: Isaac Smith

Project Start: Mon, 1/10/2022
Display Week: 7

** As of date of making

TASK	ASSIGNED TO	PROGRESS	START	END	DAYS
Finalized Testing Plan	All		2/21/2022	3/25/2022	
Possion's Ratio Analysis Update	AP		2/21/2022	3/11/2022	
Compliance REDO	Isaac		3/15/2022	3/18/2022	
Get Aproval from Dr. Becker	All		3/14/2022	3/14/2022	
Print and Clean in-vitro flow model	Isaac		3/14/2022	3/28/2022	
UGRADS Poster draft	All		3/18/2022	3/22/2022	
UGRADS Poster submission	All		3/18/2022	3/25/2022	
Analytical Analysis Data Gathering	All		3/18/2022	3/25/2022	
Hardware status Update 100%	All		3/28/2022	3/28/2022	1
Final UGRAD Poster submission	All		4/1/2022	4/1/2022	
UGRAD Presentation	All		4/8/2022	4/8/2022	
Initial Testing Results	All		4/8/2022	4/8/2022	
Actual UGRADS Symposium	All		4/15/2022	4/15/2022	
Final CAD Packet	All		4/15/2022	4/15/2022	
Product Demo and Final Testing Results	All		4/29/2022	4/29/2022	
Final Report	All		4/29/2022	4/29/2022	
Final Website Check	All		4/29/2022	4/29/2022	
Client Handoff	All		5/5/2022	5/5/2022	

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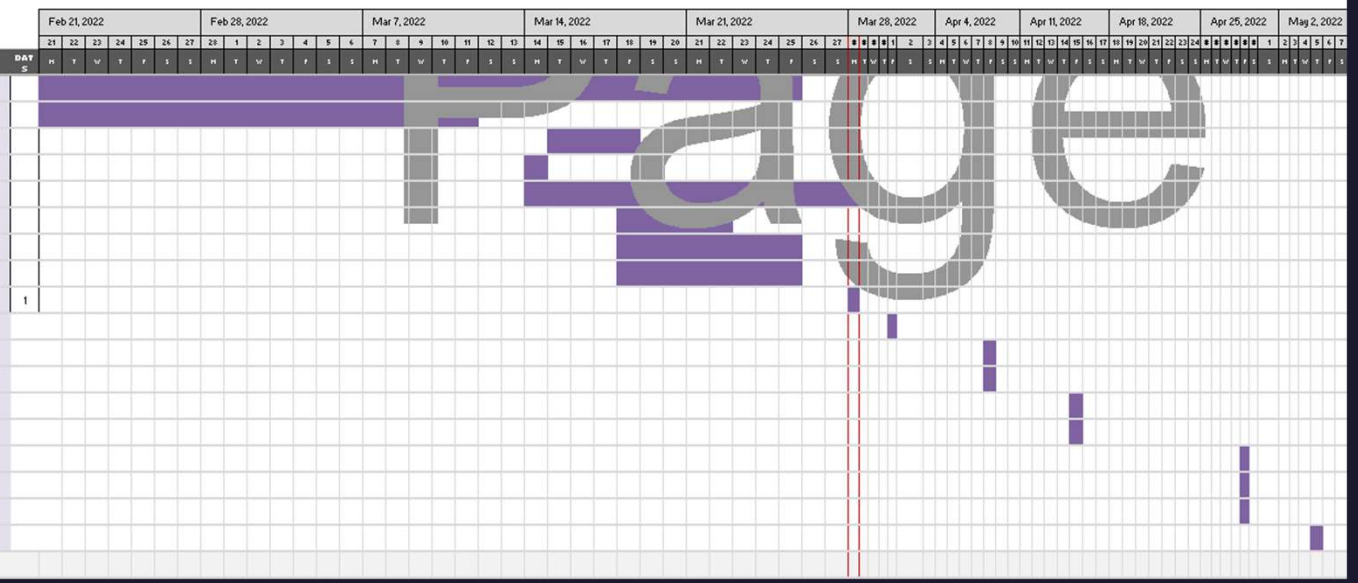

Budget

Total Budget	____	____	____	**$1000**
Rheometer (20/hr)	Status: ***On hand***	$20/hr	25 hours	$500
Material	Status: ***On hand***	$0.15-$0.25per gram	588 grams	$381.60
	Total Remaining	***$118.40***	***Total Spent***	***$881.60***

- No more testing /printing is needed!
- One model was printed but ripped during cleaning, so another was made

The end

Questions?