Artificial Organ Fabrication and Experiments

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Introduction

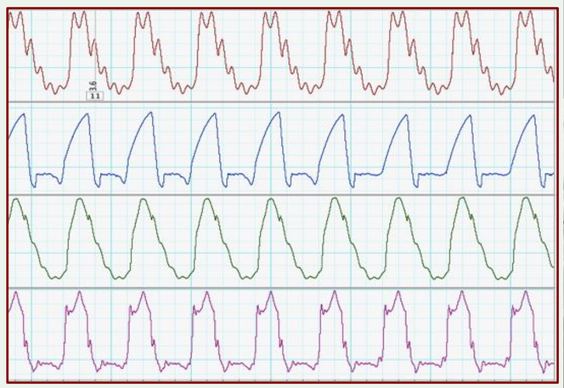
Artificial Organ Fabrication: When it comes to the Pahlevan lab, artificial organ fabrication is when we create and mold an organ with either latex or silicone. e.g., an aorta
Why do we do this? We use our fabricated organ to conduct experiments to observe and understand the cardiovascular system. The cardiovascular system is represented by a database created by the members of the Pahlevan Lab.

Objectives & Impact of Professor's Research

Professor Pahlevan's research is focused on understanding different conditions in the cardiovascular system, more specifically related to the left ventricle and aorta. Here, you can see a fabricated left ventricle. My PhD mentors, Soha and Coskun use fabricated organs for experimentation. They are used to model a functioning cardiovascular system. The fabricated organs plug into a mock cardiovascular setup designed by MFPL researchers. This setup re-enacts how the cardiovascular system works.

Artificial Left Ventricle

Waveforms



- Catheter added
- Healthy patient
- Consistent pumps

Skills and Lessons Learned

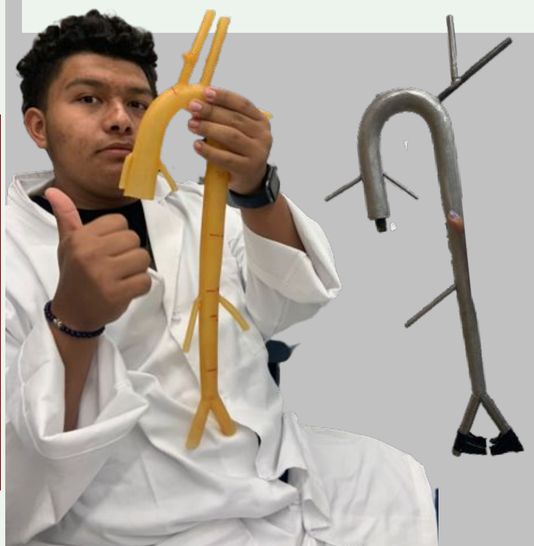
- Befriend many people
- Gathering weeks of new information
- Use the resources you have
- Artificial organ fabrication
- Accept mistakes
- Practice makes perfect

Artificial Aorta (Latex)

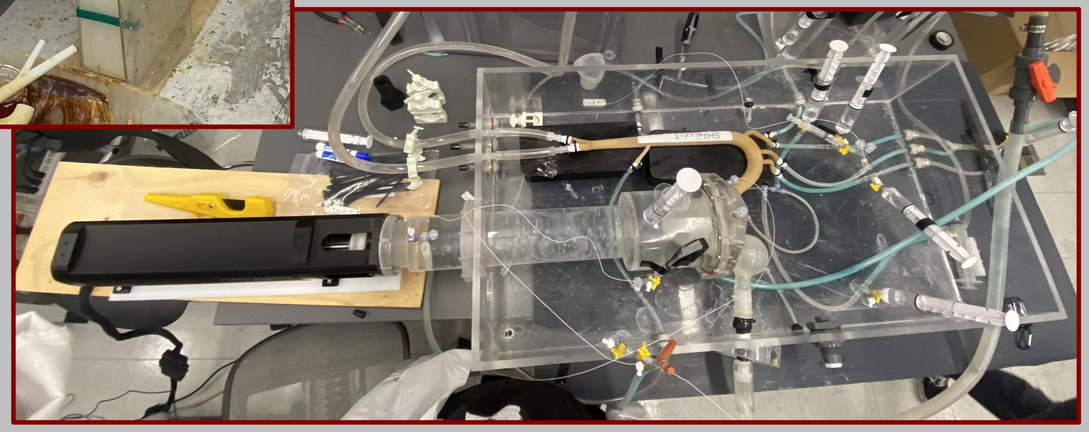
This aorta (pictured below) was fabricated using latex. The process is dipping the mold consistently of the aorta in a latex container, as you can see on the right.

- Aorta was dipped a total of 13 times.
- Two hour intervals between dips.
- Demolded with water.

PC: Christopher Lopez



Pictured below is the dipping process (latex).



LV-Aortic setup designed by MFPL researchers

My Advice for Future SHINE Students

The 7 weeks of SHINE is a great experience for anyone who has interest in anything relating to STEM learning. My advice for new SHINE students would be to stay on top of all the assignments as they help you discuss and learn more with the other students.

How This Relates to Your STEM Coursework

SHINE has a large influence on me because of the school I attend. I go to HPIAM, which focuses the human body and how various activities and diseases change any body systems. Learning about the functions of the cardiovascular system will benefit my learning in school.

Acknowledgement

I would like to thank Dr. Mills for the opportunity to come and join this program. I would also like to thank Professor Pahlevan for allowing some high schoolers be in his labs for seven weeks. I appreciate my PhD mentors Soha and Coskun because they were so helpful with any confusion I had. My labmates Justine, Vedika, and Chris were extremely nice and helpful as well. Finally, I would like to thank Marcus for being thoughtful of any situation I was in outside of SHINE.