Computational Cardiovascular Bioengineering Lab (C^2BL)

BIOMEDICAL ENGINEERING
TEXAS A&M UNIVERSITY

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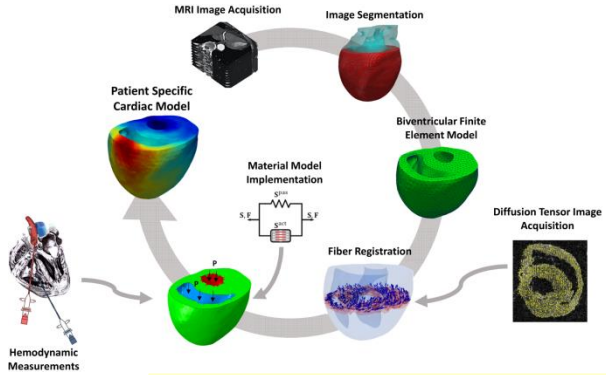
Overview— Structural heart diseases (SHDs) are the leading cause of death worldwide. Cardiovascular modeling and simulation are emerging tools that promise to

(i) Advance our understanding of remodeling mechanisms that underlie SHDs, and
(ii) Assist in the optimal design of existing and novel regenerative interventions.

The goal of C^2BL is to integrate computational cardiovascular models with biomechanical data collected at cellular, tissue and organ levels, to develop and provide clinicians with advanced simulation tools that enable optimal *patient-specific* treatments of SHDs.

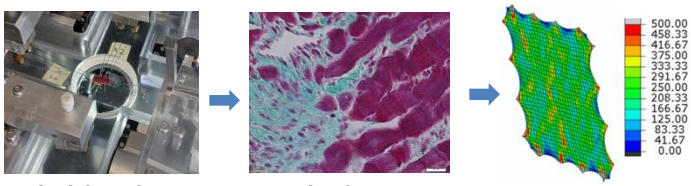
Three ongoing projects at C^2BL

Project 1: Computational Cardiac Modeling of Myocardial Infarction (MI)



- ***Developing finite element (FE) heart model to simulate MI***
- ***Collecting and using rodent data to calibrate the model***
- ***Using the model to individualize and optimize novel therapies for MI***

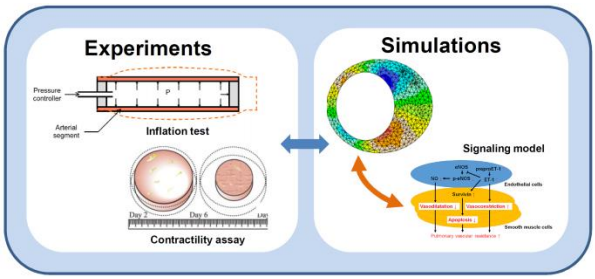
Project 2: Biomechanical Characterization of Infarcted and Treated Myocardium



Biaxial testing | Histology | FE model

- ***Building and customizing a biaxial mechanical testing device***
- ***Performing biaxial tests and histology of rodent myocardial tissues***
- ***Using computational model to quantify remodeling in infarcted & treated tissues***

Project 3: Arterial Mechanobiology in Pulmonary Hypertension



- ***Mechanical testing of pulmonary arterial tissues***
- ***Characterizing contractile behavior of arterial smooth muscle cells***
- ***Using computational model to couple arterial remodeling to ventricular function***

Please contact Dr. Avaz if you are interested in contributing to any of these projects.