**In-Vivo Strain Field Measurements of an Amphibian Heart after Artificially-Induced Myocardial Infarction**

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**Introduction**

It is currently estimated that 27% of the American population suffers from a form of heart disease, putting them at great risk of heart attack. As such, more research is needed into the mechanism by which myocardial infarction takes place. This project serves to refine techniques developed at Union College (2002-2009) into a single simplified testing procedure to quantify cardiac strain during a simulated heart attack.

**Methods and Materials**

The ARAMIS photogrammetry suite is used to track surface displacement in 3-D during a simulated heart attack. A speckle pattern overlaid onto the surface of the heart allows algorithms to iterate displacement vectors, which are used to calculate surface strain. A needle-tip pressure transducer (Millar PCU-2000) is used to measure changes in ventricular pressure during the simulated attack. A trigger-code is used to synchronize the data collection, and match the pressure and strain data over the appropriate times.

**Results**

New polarizing filters were added to the lighting system, and the pressure transducer catheter was resized to operate less intrusively with test specimens. The previous techniques developed at Union College over the last eight years were integrated into a single protocol. This protocol was written into a User Manual for the ARAMIS system such that future work on the project can utilize this reference. This manual includes literature with regard to writing experiment specific trigger-code to perform more specialized testing.

**Future Work**

With a completed User Manual, all that remains is for testing to be initiated. Analysis of ventricular pressure loss resulting as a result of heart attack needs to be investigated, as does the hypothesis that immediate strain changes post-infarction can further damage the cardiac tissue.

**References:**

1) American Heart Association – Heart Attack and Angina Statistics.

2) Adams, Matthew Tyler. “In-Vivo Measurements of Strain Field Gradients in an Amphibian Heart after Artificially-Induced Myocardial Infarction.” Union College, 2009

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