

# STRONG CHILDREN'S RESEARCH CENTER

## Summer 2013 Research Scholar

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### ABSTRACT

#### **Title: Investigation of Cardiac Morphology in a Mouse Model with a Congenital Defect**

**Background:** Congenital defects of the developing heart are a major cause of mortality in newborn babies. One of the genes involved in heart development is FoxJ1. It regulates the transcription of genes that control the production and function of motile cilia as well as abnormal nodal cilia. Nodal cilia are responsible for the leftward movement of the extracellular fluid, which then establishes left-right asymmetry. While the exact mechanism is unknown, mutations in this gene have led to abnormal nodal cilia. This leads to improper left-right asymmetry, which eventually causes several heart defects.

**Objective:** With an organ as complex as the heart and its vasculatures, it is very difficult to understand its structure using the traditional, histological approach. In order to gain a better understanding of these developmental abnormalities, we used 3D reconstruction.

**Results:** The 3D models of the wild type and the mutant hearts were used to characterize the alterations caused by the mutation.

**Conclusion:** 3D Reconstruction is beneficial because it will help us better understand the spatial relationship between different structures.