

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**Proper Orthogonal Decomposition and Dynamic Mode Decomposition in the Right Ventricle after Repair of Tetralogy of Fallot**  
AMANDA MIKHAIL, LYES KADEM, GIUSEPPE DI LABBIO, Concordia University — Tetralogy of Fallot accounts for 5% of all cyanotic congenital heart defects, making it the most predominant today. Approximately 1660 cases per year are seen in the United States alone. Once repaired at a very young age, symptoms such as pulmonary valve regurgitation seem to arise two to three decades after the initial operation. Currently, not much is understood about the blood flow in the right ventricle of the heart when regurgitation is present. In this study, the interaction between the diastolic interventricular flow and the regurgitating pulmonary valve are investigated. This experimental work aims to simulate and characterize this detrimental flow in a right heart simulator using time-resolved particle image velocimetry. Seven severities of regurgitation were simulated. Proper Orthogonal Decomposition (POD) and Dynamic Mode Decomposition (DMD) revealed intricate coherent flow structures. With regurgitation severity, the modal energies from POD are more distributed among the modes while DMD reveals more unstable modes. This study can contribute to the further investigation of the detrimental effects of right ventricle regurgitation.

Amanda Mikhail  
Concordia University

Date submitted: 31 Jul 2017

Electronic form version 1.4