

Abstract Submitted  
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**Is the human left ventricle partially a fractal pump?** BRANDON MOORE, LAKSHMI DAS, Colorado State University, Fort Collins CO — Ventricular systolic and diastolic dysfunctions represent a large portion of healthcare problems in the United States. Many of these problems are caused and/or characterized by their altered fluid-structure mechanics. The structure of the left ventricle in particular is complex with time dependent multi-scale geometric complexity. At relatively small scales, one facet that is still not well understood is the role of trabeculae in the pumping function of the left ventricle. We utilize fractal geometry tools to help characterize the complexity of the inner surface of the left ventricle at different times during the cardiac cycle. A high-resolution three dimensional model of the time dependent ventricular geometry was constructed from computed tomography (CT) images in a human. The scale dependent fractal dimension of the ventricle was determined using the box-counting algorithm over the cardiac cycle. It is shown that the trabeculae may indeed play an integral role in the biomechanics of pumping by regulating the mechanical leverage available to the cardiac muscle fibers.

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