FIU Biomedical Engineering
FLORIDA INTERNATIONAL UNIVERSITY

Biomedical Engineering
Wallace H. Coulter Foundation
Lecture Series

WALLACE H. COULTER Foundation

"MITRAL VALVE DYNAMIC SIMULATIONS AND POTENTIAL CLINICAL APPLICATIONS"

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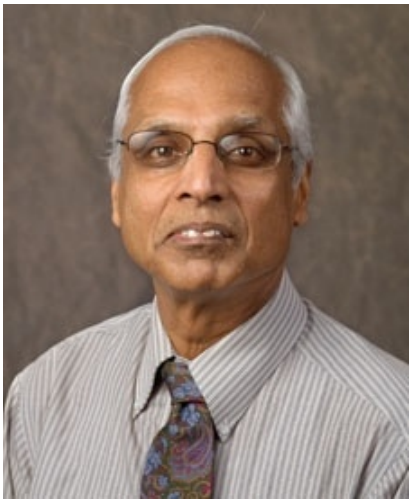
University of Iowa



Friday, March, 31 2017
9:00 AM-10:00 AM
ENGINEERING CENTER
ROOM 2300
10555 WEST FLAGLER STREET

Abstract:

Four heart valves in the human heart ensure that the blood flow in the human circulation is unidirectional. The aortic and mitral valves of the left heart are under high-pressure environment and more often subjected to development of valve diseases. The mitral valve apparatus has a complex anatomy consisting of a valve annulus, anterior and posterior leaflets, chordae tendinae, and papillary muscles working together. The normal valve dynamics results in complex three-dimensional leaflet motion and flow dynamics in the ventricular chamber during the filling and ejection phases of the left ventricle. Common diseases of the MV include stenosis and regurgitation and are treated either with valve repair or replacement with artificial valves. The advent of high-performance computers has enabled development of sophisticated computational techniques to study the dynamics of structures with complex geometries. Various imaging modalities have enabled the reconstruction of complex 3D geometry of the anatomical structures of the human body. Computational simulations are being increasingly employed to simulate the normal functioning of the various organs, assess disease development, and in planning of interventional procedures to treat the disease. In this presentation, application of computational simulations of the complex dynamics of the normal and diseased mitral valves will be presented. Potential applications of the simulations in the assessment of various valve repair techniques will be discussed.

Biography:

Krishnan B. Chandran, D.Sc. received his B. Tech. degree in Mechanical Engineering from Indian Institute of Technology, Madras, India in 1966. He pursued his higher studies in the US and received MS (1969) and D.Sc. (1972) degrees in Mechanical Engineering from Washington University in St. Louis. His research and teaching interests have been in the area of biological fluid dynamics applied to human circulation. He pursued an academic career in Biomedical Engineering serving as a faculty member at the University of Iowa for 36 years before retiring in 2014. He has supervised 19 doctoral and 19 masters degree students in his career at the University of Iowa. He has published two books including a textbook on Cardiovascular Biomechanics, 135 archival papers in leading journals in the area of the fluid mechanics in the arteries, and heart valve dynamics. He is internationally recognized for his research work in the area of cardiovascular fluid dynamics. He has presented the research results from his laboratory at national and international conferences (including keynote talks) and also invited presentations at universities in the US and internationally. He has served in the proposal review committees of funding agencies such as National Institutes of Health, as manuscript reviewers for leading medical and biomedical engineering journals, and as external reviewer for doctoral thesis in India, Australia, and Europe.