DEPARTMENT OF RADIOLOGICAL SERVICES
UNIVERSITY of CALIFORNIA, IRVINE - SCHOOL OF MEDICINE

RESEARCH SEMINAR SERIES IN RADIOLOGICAL SCIENCES

WHEN: Wednesday May 20th, 2015

12:00 noon

WHERE: LIVE - Irvine Campus: Medical Education Bldg, Colloquium 3070

TELECAST - UC Irvine Medical Center: Radiology Conference Room 0117

NOTE: Guest Speaker, will be in Med Ed Colloquium 3070; video cast will be in UCIMC Radiology Conference Room 0117

Speaker: Julius M. Guccione, Ph.D.

Professor at UCSF in Surgery

Title: "Virtual Tools for Cardiac Ventricular Remodeling Surgery"

Abstract:

What if physicians and surgeons could virtually analyze their patients' health and plan therapies and surgeries using the same advanced simulation technology that the automotive, aerospace, energy and hi-tech industries rely on to test their product before they are built? What if medical devices could be designed and safely tested in the virtual world before ever being tested in the real world? Heart failure is a worldwide epidemic that contributes considerably to the overall cost of health care in developed nations. The number of people afflicted with this complex disease is increasing at an alarming pace; a trend likely to continue as the

population ages and life span expands. Left ventricular (LV) wall stress reduction is a cornerstone in treating heart failure. After using realistic simulation of regional LV mechanics for over 15 years to study the efficacy of several novel surgical procedures and medical devices for treating heart failure it now appears that a cure may exist. Specifically, a novel implantable hydrogel (Algisyl-LVR) treatment in combination with coronary artery bypass grafting leads to decreased wall stress, restores LV geometry and improves function in the failing human heart. Ischemic mitral regurgitation is a consequence of adverse LV remodeling after myocardial injury and is associated with a substantial risk of death. A recent randomized clinical trial found no significant difference in LV reverse remodeling or survival at 12 months between patients who underwent mitral-valve repair with ring annuloplasty and those who underwent mitral-valve replacement. Replacement provided a more durable correction however, with mitral regurgitation recurring less than $1/10^{th}$ as often at 12 months compared to outcomes of valve repair. Realistic simulation of whole human heart mechanics suggests that a novel annuloplasty ring with a sub-valvular element will provide durable correction of ischemic mitral regurgitation.

About the Presenter

Dr. Julius Guccione received his Ph.D. in Engineering Sciences (Bioengineering) from UCSD in 1990. He was a postdoctoral research fellow in the Department of Biomedical Engineering at The Johns Hopkins University for the next three years. In 1993, Dr. Guccione became an assistant professor of mechanical engineering and research assistant professor in the Division of Cardiothoracic Surgery at Washington University in St. Louis. His primary research interest there was to use cardiac MRI and mathematical (finite element) modeling to determine the mechanism underlying mechanical dysfunction in the border zone of LV aneurysm. In 1999, Dr. Guccione moved to the Department of Surgery at UCSF to use his finite element models to simulate different surgical procedures for repairing LV aneurysm. Currently, he is the sole PI on R01 HL077921 (Virtual Tools for Cardiac Ventricular Remodeling Surgery) and contact PI on R01 HL118627 (Minimally Invasive Ventricular Polymeric Injection for Treatment of Heart Failure) and on U01 HL119578 (Multi-Scale Laws of Myocardial Growth and Remodeling).