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Thursday, November 4, 2010

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» Med Students Enter Primary Care 11/02/2010 Arizona Daily Wildcat View Clip

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» SynCardia Science Advisory Board Experts Awarded $7.5 Million Grant to Optimize Designs of Cardiovascular Devices 11/04/2010 Business Wire Text Below

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» Harvard honors Dr. Dalen 11/04/2010 Sombrero Magazine

Dr. Alberts' research recognized

How Common is Valley Fever? Article by John N. Galgiani, MD

The Modern HIV/AIDS outlook – Dr. Kevin Carmichael

Study finds gene associated with aggressive skin cancer – Dr. David Alberts
Danny Bluestein (photo), PhD, Principal Investigator and Professor of Biomedical Engineering at Stony Brook University, in collaboration with Co-Investigators Professor Shmuel Einav of the Stony Brook College of Engineering and Applied Science, and Marvin J. Slepian, M.D., Professor of Medicine (Cardiology and Biomedical Engineering) at the University of Arizona, will use the Phase II Quantum Grant, provided by the National Institute of Biomedical Imaging and Engineering (NIBIB), a division of the NIH, to optimize the design of cardiovascular devices.

“During Phase I, we developed a Device Thrombogenicity Emulator (DTE) that measures the potential for blood clotting in cardiovascular devices by mimicking the conditions in the device, based on sophisticated numerical simulations,” said Dr. Bluestein. “During Phase II, we will use the DTE to tweak the geometry of the devices to optimize the design and minimize or eliminate ‘hot spot’ trajectories where clots can form. The ultimate goal is to eliminate the need for anticoagulation in patients supported by these devices.”

Dr. Bluestein is working with several companies to test and optimize the designs of various cardiovascular devices including prosthetic heart valves, left ventricular assist devices (LVADs), biventricular assist devices (BiVADs) and the SynCardia temporary Total Artificial Heart.

“This methodology may lead to enhanced devices that demonstrate a lower likelihood of clot formation, bleeding and stroke,” said Dr. Slepian. “Ultimately, we envision that our methodology has the potential for advancing testing for cardiovascular devices that may be of use to the industry and the FDA.”

The design optimization process includes:

Tweaking the geometry of the original device design and conducting numerical simulations in the new design for studying “hot spot” blood flow trajectories that may activate platelets.

Programming the new design with these flow conditions into the DTE and measuring the resultant platelet activity to see if it has been reduced.

Iterating the process and freezing the new design once satisfactory results (device optimization) have been achieved.

Fabricating the prototype.

Testing the optimized design in animal and human studies.

Collaborators on Dr. Bluestein’s project include Dr. Slepian and the Sarver Heart Center at the University of Arizona, Stony Brook University collaborators and four industrial partners: SynCardia Systems, Inc., MicroMed Cardiovascular, Innovia LLC and Medtronic-ATS Medical Inc. Each group will receive a sub-award of the grant for their contributions to the project.
SynCardia Systems, Inc. is the Tucson-based manufacturer of the world’s only FDA, Health Canada and CE approved Total Artificial Heart: the SynCardia temporary Total Artificial Heart. There have been more than 850 implants of the Total Artificial Heart, accounting for more than 200 patient years of life on the device.

Originally used as a permanent replacement heart, the Total Artificial Heart is currently approved as a bridge to human heart transplant for people dying from end-stage biventricular failure. The Total Artificial Heart is the only device that provides immediate, safe blood flow of up to 9.5 L/min through both ventricles.