BIO ENGINEERING SEMINAR

at 4:00 PM on September 29th, 2014 (Monday)
MMCR, Mechanical Engineering

THE MECHANICS OF RUPTURE IN AORTIC ANEURYSMS

Dr. Madhavan Lakshmi Raghavan

Professor of Biomedical Engineering
University of Iowa

Aortic aneurysms are abnormal dilations of the aorta—the large blood vessel of the chest and the abdomen. Left untreated, most will eventually rupture causing massive internal bleeding and often, death. Larger aneurysms tend to rupture more frequently than smaller ones. But size does not appear to be the only determinant because some small aneurysms rupture while many large ones do not. Treatment involves replacing the affected aortic segment with a synthetic implant and is itself complicated and requires long term monitoring. Why do they rupture? What are some of the proximate causes? Are there measurable clues for impending rupture? Questions like these are important because it would be worthwhile to identify and treat patients at a high rupture risk while avoiding complicated treatment for those who do not need it. Although biological mechanisms invariably underlie aneurysm pathogenesis, because the acute event of rupture is by definition a mechanical event. After all, a once intact biological fabric tore apart—the mechanics of this problem is thought to provide us important clues. This talk will cover research in aortic aneurysm biomechanics—overall hypotheses, experimental methods, computational modeling and results from clinical trials exploring the biomechanical hypotheses.

About the speaker:

Dr. Madhavan Lakshmi Raghavan is a Professor of Biomedical Engineering at University of Iowa. He teaches and performs research on the mechanics of soft tissue structures in the body and the design of devices used in treating their diseases. He has a BE (MechE) from Coimbatore Institute of Technology and a Ph.D. (Bioengineering) from University of Pittsburgh, USA. He worked as a research scientist in the Division of Vascular Surgery at Dartmouth Hitchcock Medical Center, Lebanon, NH before joining University of Iowa in 2000. Projects in his Biomechanics of Soft Tissues Laboratory include arterial aneurysms, lung motion, stent graft design and design of transcatheter prosthetic heart valves. Dr. Raghavan is the recipient of the Distinguished Alumni Award from University of Pittsburgh and is currently serving as a Fulbright Distinguished Chair