



TEXAS TECH UNIVERSITY
Department of Mechanical Engineering

ME SEMINAR SERIES IN FALL 2013

Problems in (Nano)Medical Mechanics

Mauro Ferrari, PhD

President and CEO, Houston Methodist Research Institute
Director, Institute for Academic Medicine at Houston Methodist Hospital
Executive Vice President, Houston Methodist Hospital System

Date: November 15, 2013 (Friday)

Time: 2:00pm-3:00pm

Venue: Livermore 101

Abstract: Nanotechnologies are of great interest in the context of the drive toward individualized medicine, and may prove to be the necessary catalyst for its large-scale implementation. In this talk I will present nanoporous-silicon-based approaches for the individualization of medical intervention: multistage vectors for the preferential localization of therapeutic agents; therapeutic monitoring nanotextured chips for the proteomic and peptidomic content profiling of biological samples; nanochannel delivery systems for intelligent time-release from implants, and bionanoscaffolds for post-traumatic osteoregeneration. While novel nanoplateforms engender direct clinical applications, at the same time they afford the formulation of novel frameworks and hypotheses for the basic understanding of pathological processes. In particular, multistage particulates are the probes that afford the exploration of a new perspective of cancer, that is, that the unifying aspect of the canonical 'hallmarks of cancers' all relate to dys-regulation of mass transport at scales including the molecular, cellular, microenvironmental, and systemic. These considerations are the starting point for "Transport OncoPhysics". In this talk I will present a series of fundamental problems in mechanics that not only underlie the entire field of nanomedicine, but actually offer yet unexplored opportunities for new approaches to understanding the very foundations of health and disease.

Speaker Bio: Dr. Mauro Ferrari serves as President and CEO of Houston Methodist Research Institute, where he holds the Ernest Cockrell Jr. Distinguished Endowed Chair. He is also Executive Vice President of Houston Methodist Hospital System and Director of the Houston Methodist Institute for Academic Medicine. He concurrently serves at Senior Associate Dean and Professor of Medicine at Weill Cornell Medical College, in New York; and holds Adjunct and Honorary Professorships at many universities around the world. Dr. Ferrari's degrees are in Mathematics (Padova, 1985, Italy), and Mechanical Engineering (U.C. Berkeley, M.S. 1987, & Ph.D. 1989). He attended medical school at the Ohio State University (2002-03). Dr. Mauro Ferrari is a founder of biomedical nano/micro-technology, especially in their applications to drug delivery, cell transplantation, implantable bioreactors, and other innovative therapeutic modalities. In these fields, he has published more than 250 peer-reviewed journal articles and six books. He is the inventor of more than 30 issued patents, with about thirty more pending in the US and internationally. He has received many prestigious honors, and research funding from NCI, NIH, DoD, NASA, NSF, DARPA, DoE, the State of Texas, and the State of Ohio, The Ohio State University, and several private enterprises. Dr. Ferrari served as Professor at Berkeley, Ohio State, and University of Texas, and served as Special Expert on Nanotechnology at the National Cancer Institute in 2003-2005, providing leadership into the formulation, refinement, and approval of the NCI's Alliance for Nanotechnology in Cancer, currently the world's largest program in medical nanotechnology. Dr. Ferrari is an academic- entrepreneur, with several companies that originated from his laboratory. He currently serves on the Board of Director three companies: Nanomedical Systems of Austin TX; Leonardo Biosystems of Houston TX, and NASDAQ-traded Arrowhead Research Corporation (NASDAQ:ARWR).

