2011-2012

Graduate Seminar Series

The Department of Mechanical Engineering – Engineering Mechanics

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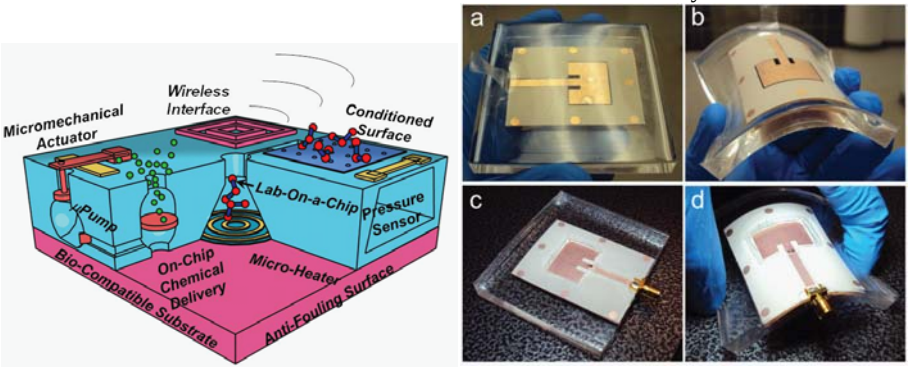
Jing Wang Ph.D.
Assistant Professor, Department of Electrical Engineering
University of South Florida

Dr. Jing Wang received the dual B.S. degrees in Electrical Engineering and Mechanical Engineering and from Tshinghua University in 1999. He received two M.S. degrees from the University of Michigan, one in electrical engineering (2000), the other in mechanical engineering (2002), and a Ph.D. degree from University of Michigan in 2006. Dr. Wang joined University of South Florida as an Assistant Professor and started the RF MEMS Transducers Laboratory in 2006. His research interests include micro/nanofabrication technologies, functional nanomaterials, micromachined sensors and actuators, RF/Microwave/THz devices. His research has been funded by grants from federal agencies (NSF, DTRA, US Army) and contracts from industries. He serves as the faculty advisor for Florida IMAPS and AVS student chapters and the chairperson for IEEE joint MTT/AP/ED Florida West Coast Section. Recently, he has joined the prestigious IEEE MTT Technical Coordinating Committee 21 (TCC-21) on RF MEMS.

Thursday, Apr. 19, 2012 **4:00 – 5:00 p.m.** **Room 112, ME-EM Bldg.**

Functional Nanocomposite Materials for RF/MW Device Applications

A wide variety of fuctional nanomaterials have attracted considerable attention from both academia and industries for their application in chemical, biomedical and microelectronic devices; however the successful implementation of such type of materials in RF and microwave device applications is relatively limited. In this talk, magneto-dielectric polymer nanocomposites will be introduced as a new class of functional materials well suited for RF device applications. Magnetite (Fe_3O_4) nanoparticles, with sub-8nm diameters and tight size distribution, are synthesized and homogeneously dispersed in Polydimethylsiloxane (PDMS) to enhance the microwave properties of the engineered RF substrate by increasing the relative permeability and relative permittivity. Moreover, these properties can be further improved by a dc magnetic field with strength achievable with regular permanent magnets. This work not only presents the first experimental implementation of magneto-dielectric nanocomposite engineered substrates for RF antennas with 3-5 GHz operational frequencies, but also correlates the unique magneto-dielectric properties to the key antenna performance metrics (e.g. bandwidth, efficiency and dimensions). Aside from RF antenna applications, a new type of injection-moldable polymer nanocomposites with tailored thermal, mechanical and electrical properties have also been explored to enable a unique approach for heterogeneous integration of multichip modules on a single silicon platform. The talk will be concluded with brief discussion of several other ongoing activities within the RF MEMS Transducers group at USF which focus on implementation of a variety of nanostructured materials in form of nanolaminated ultra-thin films or nanorod array in RF/MW/THz devices.



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