Prof. Jing Wang

Professor Wang Receives URAD Award from Draper Laboratory to Develop Injection-Moldable Polymer Nanocomposites for Ultra-High Density Interconnects

Tampa, Fla. (October 13, 2010) —Jing Wang, assistant professor of electrical engineering and the Principal Investigator (PI); Ryan Toomey, assistant professor of chemical engineering and co-PI; Hariharan Srikanth, associate professor of physics and co-PI, recently received a $130,000 one-year research award from Draper Laboratory by participating in the University R&D (URAD) Program. In addition, $65,000 of matching grant was awarded by Florida High Tech Corridor to strengthen the impact of this program on regional economic and workforce development.

As a result of the ever growing number of on-chip passives and interconnects and the limited real-state available, there is an impending need for miniaturization, ease of integration and multi-functionality. The proposed work partners the University of South Florida with Draper Lab to demonstrate the employment of injection-moldable polymer nanocomposites in the multi-chip module (MCM) assembly currently being pursued by Draper Lab through the ongoing integrated ultra-high-density interconnect (i-UHD) program. The research proposed would involve synthesis of dielectric/magnetic nanoparticles with tight size distribution, polymer processing with uniformly dispersed nanoparticles of desired concentration, and production of injection-moldable polymer nanocomposites with tailored coefficient of thermal expansion (CTE) for minimum cure shrinkage.

“I am honored and excited to have received this URAD award from Draper Laboratory,” said Prof. Wang. “Of the 80 proposals submitted under the URAD program for Draper Fiscal Year 2011, our proposed work was chosen for funding along with 14 other university projects after rigorous cycle of reviews at four different levels.”

Through strategic selection or synthesis of polymer medium, low-CTE composites with monodispersed particles and minimal cure shrinkage will be pursued to result in a new class of injection-moldable nanocomposites for development of integrated ultra-high density interconnects for the MCM assembly. Low CTE dielectric polymer nanocomposites could be synthesized by mixing a low permittivity polymer with inorganic dielectric particles. The dielectric properties of the composites can be studied and tuned by varying a set of parameters of the nanoparticles including size, shape, compositions and fabrication technique. Besides the primary goal of the proposed work, we will also implement and explore on-chip RF passives (such as high-Q inductor, etc.) equipped

with high-permeability and low-loss magnetic nanocomposites. For this purpose, we will develop a series of polymer nanocomposites by exploring a wide variety of polymers and for magnetic nanoparticles.

The University of South Florida System is one of the nation's top 63 public research universities and one of 39 community-engaged, four-year public universities as designated by the Carnegie Foundation for the Advancement of Teaching. The University of South Florida placed among the nation's top 20 "up and coming universities" in the 2009 U.S. News & World Report annual college rankings. USF was awarded $380.4 million in research contracts and grants in FY 2008/2009. The system offers 232 degree programs at the undergraduate, graduate, specialist and doctoral levels, including the doctor of medicine. It has a $1.8 billion annual budget, an annual economic impact of $3.2 billion, and serves more than 47,000 students on institutions/campuses in Tampa, St. Petersburg, Sarasota-Manatee and Lakeland. USF is a member of the Big East Athletic Conference.

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