

JOINT EVENT

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&

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Nanomaterial reinforced polymers and composites: from design and manufacturing to high-end applications

This seminar presents current progress in the field of polymer nanocomposites and highlights the challenges that need to be addressed in order to fully utilize the unique properties of nanomaterials in polymer and polymer composite structures. First the nanomaterial characteristics including size, shape, intrinsic properties and surface chemistry are evaluated in terms of their effect on the properties of the composites. Then for a given nanomaterial-polymer system, the effect of manufacturing method (selective laser sintering vs. injection molding) and processing conditions (type of compounding, cooling rate during molding) on the composites properties is discussed. Among the current challenges, emphasis is given to the need for time efficient and cost effective deployment of composites and the role of materials data sciences in this deployment is discussed. Case studies that are discussed in detail are: i) Lightweight structures, ~10% lighter than current state of the art, for transportation industry, where the fiber/polymer interface is engineered using nanomaterials; ii) polymer composites with thermal conductivity up to 140 W/mK for microelectronics, achieved by engineering the architecture of the composite so that the filler/polymer interfacial contact resistance is minimized and the intrinsic polymer conductivity is maximized.

Biography

Kyriaki Kalaitzidou is an Associate Professor and Woodruff Faculty Fellow in the Woodruff School of Mechanical Engineering at Georgia Institute of Technology. She joined the Georgia Tech Faculty in 2007 after she worked as a Post-Doctoral Researcher in Polymer Science and Engineering Department at the University of Massachusetts at Amherst. She received her PhD from the Department of Chemical Engineering at Michigan State University in 2006. She has co-authored over 60 peer reviewed journal publications, one book chapter and two patents. She is currently the General Chair of the 34th American Society for Composites Conference to be hosted at Georgia Tech in 2019.

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