Merging Scales: Nanoscale Principles, Additive Technologies

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Abstract

With the recent developments of computer-driven additive manufacturing technologies, novel ideas have emerged to apply these broad additive concepts to micro and nano-scale materials and components. This talk will explore projects at CS Draper Laboratory that exemplify this overlapping technology space and seeks to inspire a conversation about what might be next. A broad range of technology domains will be presented, some of which address advanced packaging challenges. Topics include fabrication and assembly of micron-scale coax and wires, materials advances in additive printed structures, miniaturized thermoelectric devices and microfluidic devices. Crossroads of nanoscale and additive manufacturing will be highlighted. For example, preparation of micro-coax wires has leveraged Draper Microfab capabilities that include electroplating, physical vapor deposition and additive conductor printing.

Bio

Dr. Meinhold is a Distinguished Member of the Technical Staff at CS Draper Laboratory where he leads research in the fields of electronics, advanced materials applications and unique packaging solutions. His interests include finding solutions to difficult fabrication problems through the development of novel processes. Some of his recent work has focused on the automated integration of micron-scale coax wires, fabrication of miniature thermo-electric devices and vertical electronics stacking. Dr. Meinhold spent his early career working to commercialize carbon nanotube memory at startup company Nantero. In 2008, he joined Lockheed Martin through acquisition of Nantero's government business unit. While at Lockheed Martin, he served as a site lead of a Boston-based R&D facility and continued to develop carbon-based non-volatile memories and a variety of additional nanomaterial-based technologies. Dr. Meinhold received his dual BS in Electrical Engineering and Engineering Physics from Lehigh University and his Masters and PhD in Electrical Engineering from MIT.