Mechanical Fundamentals of Semiconductor Packaging: An Overview

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To form a microelectronics device, an active silicon chip requires mechanical and electrical connections to the surrounding components as well as protection from the environment. The technology dealing with these requirements is called SEMICONDCTOR PACKAGING. As the components and structures involved in high-end semiconductor packages are made smaller, the roles of mechanical and materials engineering become increasingly important.

The seminar presents an overview of semiconductor packaging for general engineering audience. The emphasis will be given to the functional requirements, the most recent developments, and the challenges in the future.

About the speaker: Dr. Bongtae Han is Keystone Professor and APT Chair of the Mechanical Engineering Department of the University of Maryland; and is currently directing the LOMSS (Laboratory for Optomechanics and Micro/nano Semiconductor/Photonics Systems) of CALCE (Center for Advanced Life Cycle Engineering).

Dr. Han has co-authored a text book entitled "High Sensitivity Moiré: Experimental Analysis for Mechanics and Materials", Springer-Verlag (1997) and edited two books. He has published 12 book chapters and over 250 journal and conference papers in the field of microelectronics, photonics and experimental mechanics. He holds 2 US patents and 4 invention disclosures.

Dr. Han received the IBM Excellence Award for Outstanding Technical Achievements in 1994. He was a recipient of the 2002 Society for Experimental Mechanics (SEM) Brewer Award for his contributions to development of photomechanics tools used in semiconductor packaging. Most recently, he was named the 2016 American Society of Mechanical Engineering (ASME) Mechanics Award winner in Electronic and Photonic Packaging Division for his contributions to structural mechanics of electronic systems. His publication awards include (1) the Year 2004 Best Paper Award of the IEEE Transactions on Components and Packaging Technologies, (2) the Gold Award (best paper in the Analysis and Simulation session) of the 1st Samsung Technical Conference in 2004 and (3) the Year 2015 Best Paper Award of the 16th International Conference on Electronic Packaging Technology (ICEPT 2015). His contributions to an innovative 1,500-face lumen LED luminaire, jointly developed with GE, have been recognized in a Press Release (Oct. 21, 2010, MarketWatch.com, The Wall Street Journal). He served as an Associate Technical Editor for Experimental Mechanics, from 1999 to 2001, and also served as an Associate Technical Editor for Journal of Electronic Packaging, Transaction of the ASME from 2003 to 2012.

He was elected a Fellow of the SEM and the ASME in 2006 and 2007, respectively.