Advanced Packaging Solutions for High Performance Memory and Compute

Jaesik Lee, SK Hynix USA

Jaesik Lee is a Vice President at SK Hynix USA, leading package engineering team where he is leading a team for future HBM package technology development and pathfinding in advanced packaging technologies. His current interests include 2.5D and 3D advanced packaging technology and High bandwidth memory (HBM) packaging. Prior to joining SK Hynix, he had been with META, GOOGLE, NVIDIA, working on 2.5D packaging technologies developments and manufacturing for High Performance Computing (HPC) and AR devices. Jaesik received his PhD degree in mechanical engineering at University of Waterloo, Waterloo, Canada. He has also served as a technical committee member for IEEE Electronic Component and Technology Conference (ECTC).

Abstract: Generative AI such as ChatGPT and Bard, which are based on Large language models capable of producing human like text and images, have becomes mainstream for artificial intelligence technology industries. In order to run the increased model sizes without performance degradation, a large amount of memory needs to be integrated in a system. High bandwidth memory (HBM) is a perfect solution to meet the system requirements like high bandwidth and low power consumption together with concurrent integrations of the logic chips in 2.5D and 3D advanced packaging technologies. 5th generation HBM, HBM3E, has been developed since HBM1 produced in 2013. The continued scaling of HBM to increase memory capacity and to enhance thermal performance necessitates the evolutions of 3D stacking technologies. In this short course, we will talk on the HBM stacking innovations and their challenges associated with advance packaging technologies. In addition, how to ensure that HBM is compatible to packaging processes and reliability in advanced packaging technologies such as CoWoS-S and CoWoS-L will be presented. HBM challenges associated with system level cooling integration will be also presented.