

Monday, February 24, 2014

11:00 AM – 12:00 PM

E323-D3

“Emerging Technology and Architecture for Thousand-core On-chip”

Dr. Hao Yu

Faculty Host: Dr. Yuhua Chen

Abstract:

Big-data analytics has scaled up to Exa-scale (10^{18} bytes or flops) that is already beyond the scalability of the present technology and architecture. It has thereby raised many new research opportunities to deploy emerging technology and architecture towards building a data-centre on single chip with integrated 1000-core microprocessors and main memory. One fundamental challenge is how to overcome dark silicon dilemma of big-data server with energy-efficient I/O communication. The first part of this talk will focus on memory-logic-integration, including GHz I/O by 3D TSV/TSI as well as THz I/O by CMOS metamaterial transmission line. Designs and results of CMOS metamaterial 60GHz/140GHz/280GHz interconnect are discussed from in-phase signal generation to in-phase signal transmission. The remaining part will briefly address the next generation big-data server with logic-in-memory architecture by nano-scale non-volatile memory devices without the use of I/Os.

Short Bio: Dr. Hao YU obtained B.S. degree from Fudan University (Shanghai, China) in 1999, and Ph. D degree from electrical engineering department at UCLA in 2007. Since 2010, he has been an assistant professor at school of electrical and electronic engineering and area director at VIRTUS IC design centre of excellence, Nanyang Technological University (NTU), Singapore. His primary research interest is in CMOS emerging technology and architecture for big-data computing and communication, which has attracted more than 2M USD funding from agency and industry. He has 115 peer-reviewed IEEE/ACM publications, 3 books, 1 best paper award in ACM Transactions, 3 best paper award nominations (DAC'06, ICCAD'06, ASP-DAC'12), 2 student paper competition (advisor) finalist (SiRF'13, RFIC'13), 1 inventor award from semiconductor research cooperation (SRC), and 5 pending patents. He is associate editor and technical program committee member of many IEEE/ACM international journals and conferences such as ISLPED, ICCD, ICCAD, ASPDAC, ASSCC, IWS, etc. He is a senior member of IEEE and member of ACM.