

**Distinguished Speaker Series**  
Friday, February 2 at 11:30am, NTDP F285

## **Managing Locality in Advanced Memory Systems**

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### **Abstract**

Pervasive, data-intensive applications place more demands on the capacity, performance, and cost of memory systems. Although memory bottlenecks are not a new challenge, incremental improvements to today's mainstream approaches are unlikely to fully address the requirements of emerging applications. Techniques such as near-memory computing and heterogeneous (or multi-level) memory systems have, therefore, been explored by the research community as aspects of potential solutions to future memory system needs. While research into these techniques have been promising, careful management of data locality is a key requirement for effectively utilizing them. This talk will highlight some important system-level challenges that must be addressed to enhance data locality in these emerging memory architectures and a few examples of potential solutions. First, I will discuss the need to use hardware and software collaborative techniques to control data placement across multiple memory modules. Next, I will discuss the practical challenges of identifying data-compute affinity in a manner that can be exploited to improve memory system performance. And, finally, I will present an example of how data structures could evolve to better suit future memory system characteristics.

### **Bio**

Nuwan Jayasena is a principal member of the technical staff at Advanced Micro Devices. His research interests include memory systems, heterogeneous computing, processor microarchitecture, and emerging technologies and applications. Nuwan has an MS and a PhD in electrical engineering from Stanford University and a BS from the University of Southern California. He is a senior member of the IEEE and has over 50 granted and pending US patents.