

KIOS Distinguished Lecture Series



Prof. Nikil Dutt

University of California, Irvine, USA

Thursday, **29 September 2022**, at **12:00** | Amphitheatre **B108**

Or via Zoom: <https://ucy.zoom.us/meeting/register/tJYvc-qgrzliHdb2TDEC7cM6xBIDBSGeaxNZ>

Self-aware Memory Management for Emerging Energy-efficient Architectures

LECTURE ABSTRACT

The advent of GPUs and application-specific accelerators in embedded platforms for data-intensive applications have exacerbated the memory performance and energy bottleneck. Memory requirements and usage patterns vary widely in emerging architectures, and resource contention manifests differently based on the instance of the architecture. Due to the fast-evolving landscape of computer hardware as well as applications, workload-specific and system-specific optimizations for energy-efficient architectures is impractical. To systematically solve this challenge, we deploy computational self-awareness principles to enable adaptivity in the face of dynamic changes in the application, environment, and computational platforms. I discuss how self-awareness properties can be applied to design an energy-efficient memory subsystem through a cross-layer approach that straddles multiple abstraction levels. I outline two example case studies: end-to-end computational pipelines for autonomous systems, and optimizing data center memory behavior at-scale. I believe this is a rich area for research and outline some future opportunities for using self-awareness in emerging energy-efficient architectures.

BRIEF BIO

Nikil Dutt is a Distinguished Professor of CS, Cognitive Sciences, and EECS at the University of California, Irvine, and also a Distinguished Visiting Professor of CSE at IIT Bombay, India. He received a PhD from the University of Illinois at Urbana-Champaign (1989). His research interests are in embedded systems, EDA, computer architecture and compilers, distributed systems, healthcare IoT, and brain-inspired architectures and computing. He has received numerous best paper awards and is coauthor of 7 books. Professor Dutt has served as EiC of ACM TODAES and AE for ACM TECS and IEEE TVLSI. He is on the steering, organizing, and program committees of several premier EDA and Embedded System Design conferences and workshops, and has also been on the advisory boards of ACM SIGBED, ACM SIGDA, ACM TECS and IEEE ESL. He is an ACM Fellow, IEEE Fellow, and recipient of the IFIP Silver Core Award.

