



**CECS**

**CENTER FOR EMBEDDED & CYBER-PHYSICAL SYSTEMS  
UNIVERSITY OF CALIFORNIA · IRVINE**

## CECS Seminar

*“Accelerated Computing for Edge-Centric IoT”*

**Tulika Mitra**

Professor, National University of Singapore (NUS)

Monday, November 5<sup>th</sup>  
2:00 p.m.- 3:00 p.m.  
Donald Bren Hall 3011



**Abstract:** Internet of Things (IoT), an ever-growing network of billions of devices embedded within physical objects, is revolutionizing our daily life. The IoT devices in the edge are primarily responsible only for collecting and communicating the data to the cloud, where the computationally intensive data analytics takes place. However, the data privacy and the connectivity issues—in conjunction with the fast real-time response requirement of certain IoT applications—call for smart edge devices that should be able to support privacy-preserving, time-sensitive computation for machine intelligence on-site. In this talk, I will present the computation challenges in edge-centric IoT and introduce hardware-software co-designed approaches to overcome these challenges. I will discuss the design of configurable, customizable accelerators that are completely software programmable and can be universally deployed across diverse domains to speed up computation and realize the edge analytics vision at ultra-low power budget. I will also demonstrate the potential to achieve low-power, real-time intelligence on the IoT edge devices via collaborating computing that engages all the on-chip heterogeneous compute elements (CPU, GPU, reconfigurable computing, and accelerators) in a synergistic fashion through sophisticated compile- and runtime strategies.

**Biography:** Tulika Mitra is a Professor of Computer Science at School of Computing, National University of Singapore (NUS). Her research interests span various aspects of the design automation of embedded real-time systems with particular emphasis on low-power computing, heterogeneous computing, application-specific processors, and software timing analysis/optimizations. She has authored over hundred and fifty scientific publications in leading international journals and conferences and holds multiple US patents. Her research has been recognized by best paper award and nominations in leading conferences. She is the recipient of the Indian Institute of Science Outstanding Woman Researcher Award and is an IEEE Distinguished Visitor. Prof. Mitra currently serves as Senior Associate Editor of the ACM Transactions on Embedded Computing Systems, Deputy Editor-in-Chief of IEEE Embedded Systems Letters, and Associate Editor of IEEE Design & Test Magazine. She has served as Associate Editor of IEEE TCAD and organizing/program committee member of almost all major conferences in embedded systems, real-time systems, and electronic design automation including program chair of EMOSFT and CASES.