

The University of Chicago Computer Science Department

PRESENTS:

“Locality and Parallelism in Emerging Heterogeneous Architectures”



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Abstract: Problems in computational finance, life-sciences, machine learning, scientific computing etc are being studied on parallel architectures, which have become increasingly complex both in terms of memory subsystems and execution units. The increasing complexity causes substantial programming challenges to all application software developers since computing devices ranging from \$100M supercomputers to \$100 tablets are all equipped with homogeneous or heterogeneous multicore architectures. Applications must be optimized to fully utilize a diverse pool of resources; and they must be programmed under a simple and elegant representation that permits easy code migration on the next generation computers. My research revolves around the central topic of parallel, multicore and heterogeneous computing on state-of-the-art parallel architectures. I believe data locality abstractions and asynchronous execution are among the most promising solutions for alleviating the programming and scalability challenges. While programming abstractions provide performance portability and programmer’s productivity, asynchronous execution facilitates efficient use of available resources. In this talk, I will present software solutions that I and my collaborators are developing to facilitate application development through (1) programming model and programming abstractions with TiDA, (2) runtime system with Perilla, and (3) performance modeling and analysis with ExaSAT.

Bio: Didem Unat joined [Koç University](#) in September 2014 as a full time faculty. She is the head of Parallel and Multicore Computing Laboratory with eight members at Koç and principle investigator in four EU and nationally funded projects. Previously she was at the [Lawrence Berkeley National Laboratory](#) and worked at the Exascale Combustion Co-design center. She is the recipient of the prestigious [Luis Alvarez Fellowship](#) in 2012 at the Berkeley Lab. Her research interests are primarily in the areas of high performance computing, parallel programming models, compiler analysis, runtime systems, and performance modeling. She is currently working on designing and evaluating programming models for state-of-the-art computer architectures and leading the programming abstractions for data locality effort internationally through [PADAL workshop series](#) . She received her Ph.D under Prof. Scott B. Baden's research group at [University of California-San Diego](#) . In her thesis, she developed the Mint programming model and its source-to-source compiler to facilitate GPU programming. She holds a B.S in computer engineering from [Boğaziçi University](#) . In her spare time, she enjoys biking, hiking, and making mosaics.

Monday, August 7, 2017
10:00 am
Ryerson 251
(Refreshments to follow in Ry 255)
Host: Andrew A. Chien