

Talk Title: Post-Moore Software Development Challenges

Date: 2nd January 2019

Time: 11 AM

Location: RM 101

Abstract

The end of Moore's Law scaling means that improved application performance on future generations of processors cannot depend on increased number of transistors on a chip. Instead, customization in hardware and more efficient use of hardware resources will likely be primary means of performance improvement. Hence, the already challenging task of software development will get even harder, raising the importance of software infrastructure that assists application developers in creating high-performance software with high productivity. High level frameworks are desirable that insulate application developers from having to understand low-level architectural details or use non-portable low-level mechanisms in order to achieve high performance.

Data movement costs dominate the cost of performing elementary arithmetic/logic operations on current processors and this trend is expected to continue. The minimization of data movement in implementations of algorithms is therefore of utmost importance. But unlike the well understood notion of computational complexity, the data-movement complexity of many algorithms is not known. There is a need for tools to assist application developers in optimizing data movement.

This talk will discuss multiple research directions pertinent to the goal of productive development of performance-portable software.

Speaker Bio

P. (Saday) Sadayappan is Professor of Computer Science and Engineering and a University Distinguished Scholar at the Ohio State University. His research interests include optimizing compilers, domain/pattern-specific performance optimization, and data-movement complexity of computations. He collaborates closely with computational scientists and data scientists in developing domain-specific frameworks and applications. He obtained his Bachelors degree from IIT Madras, and Masters and Ph.D. degrees from Stony Brook University. Sadayappan is a Fellow of the IEEE.
