

# The MIDAS Touch: Modeling Processor Physics for Extreme Scale Computing

Frontiers in Computational and Information Sciences  
Seminar Series

Presented by...

## Professor Sudhakar Yalamanchili

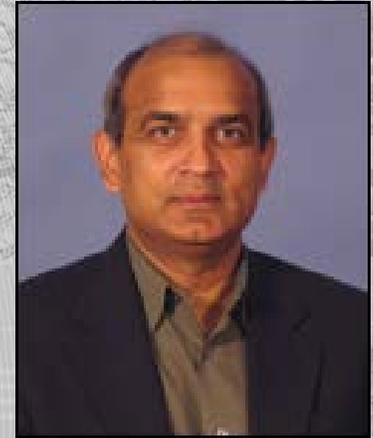
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**Abstract:** As industry moves to increasingly small feature sizes, performance scaling will become dominated by the physics of the computing environment. There are fundamental trade-offs to be made at the architectural level between performance, energy/power, and reliability. We refer to the body of knowledge addressing the impact of physics on such system level metrics as the processor physics. Relatively few efforts to date have targeted understanding, characterizing, and managing the multi-physics and multi-scale (nanoseconds to milliseconds) transient interactions between delivery, dissipation, and removal (cooling) of energy and their impact on system level performance. This talk will describe efforts at GT to construct scalable modeling, emulation, and simulation environments to i) understand how interacting physical phenomena affect architecture level tradeoffs, ii) apply this understanding to develop operational principles for reliable and scalable heterogeneous multicore architectures, and iii) demonstrate these principles with prototype implementations.

**Bio:** Sudhakar Yalamanchili earned his Ph.D in Electrical and Computer Engineering in 1984 from the University of Texas at Austin. He worked on embedded multiprocessor architectures at Honeywell's Systems and Research Center in Minneapolis from 1984 to 1989. He joined the ECE faculty at Georgia Tech in 1989 where he is now a Joseph M. Pettit Professor of Computer Engineering. He is the author of *VHDL Starters Guide*, 2nd edition, *VHDL: From Simulation to Synthesis*, Prentice Hall, 2000, and co-author of *Interconnection Networks: An Engineering Approach*. His current research foci lie in addressing the software challenges of heterogeneous architectures and solutions to power and thermal issues in many core architectures and systems. Since 2003 he has been a Co-Director of the *NSF Industry University Cooperative Research Center on Experimental Computer Systems* at Georgia Tech.

**More info:**

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Tuesday  
January 29

BSF 1007  
Darwin Room

10:00 am