

**ECE 8833 Fall 2009**  
**Polymorphic and Many-Core Computer Architecture**  
**COURSE SYLLABUS**

**Instructor:** Prof. Hsien-Hsin S. Lee

**Email:** leehs@gatech.edu

**Office Hours:** T Th 3:15-4:15pm or by appointment

**Office:** Klaus 2318 / **Phone:** 404-894-9483

**Course Prerequisite:** ECE 6100 or CS 6290 or equivalent (a must)

**Course Description:**

This new course is designed to cover classical work in computer architecture as well as the timely, emerging research topics in this field. The conventional definition of polymorphic computer architecture is a computing system capable of exploiting parallelism adaptively at different granularity including the instruction-level, the thread level, and the task level while maintaining high efficiency of resource utilization. My version of polymorphism further expands this concept into the emerging multi-core and future many-core systems which could contain specialized, heterogeneous components, and other supplementary on-chip resources required holistic, intelligent management to optimize performance, energy efficiency, thermal dissipation, reliability, availability, serviceability, security, etc. Such computing could be performed on your palm, on your desktop, in a data center, or in the cloud under different operational constraints. In addition to studying the architectural design trade-offs for different applications and different computing constraints, we will also discuss works that attempt to address multi-faceted implications resulted from different stack of a system such as innovative user interface, programming models, virtualization, dynamic runtime optimization, cyber-physical control, and technology limit. The class is expected to have intense interactions, discussions, debates, and confrontations among the students and the lecturer.

**Course Website:**

- Will be at T-Square <http://www.tsquare.gatech.edu>

**Class Meetings:** TTh 12:05pm — 1:25pm at Klaus 2456

**Materials:**

- Selected paper readings post on T-square.
- Lecture slides.
- Class handout.

**Grading:**

- Class participation, peer reviews (15%)
- Programming Assignments (30%)
- Midterm (15%)
- Term Project (40%)

**Honor Code:** Students are expected to abide by the Georgia Tech Honor Code and to avoid any instances of academic misconduct in homework assignments and exams. Any violation will be immediately and directly reported to the Dean of Students' Affairs for further action.