

# POMONA COLLEGE

## COMPUTER SCIENCE COLLOQUIUM

\*\*\*\*\*

Dr. Leaf Petersen

Intel Corporation

### Ct and Pillar: Building a Foundation for Many-Core Programming

Abstract - Seemingly fundamental limitations in hardware manufacturing are driving an industry-wide move away from speedy but complex single core processors towards simpler but massively parallel many-core processors. The job of discovering parallelism (and hence achieving performance) on these new chips is left to software: that is, the programmers and their tools. Parallel programming has traditionally been a specialty area requiring extensive expertise, and non-deterministic concurrency introduces vast new classes of exceptionally difficult to eliminate bugs. In short, the job of programming becomes much harder on many-core processors. In order for programmers to cope successfully with these challenges, the software tools used to program many-core processors must take a giant leap forward. Specifically, programming abstractions and languages must be designed to allow programmers to easily express parallelism in a way that is scalable, performant, and most of all, correct. This talk discusses the problem in more detail, and describes two projects aimed at supporting this goal. The Pillar implementation language is a C-like high level compiler target language intended to provide the key sequential and concurrent constructs needed to efficiently implement task-parallel languages, while the Ct language is a system for exploiting the key area of data-parallelism using ideas from functional programming. Together, these two systems provide a foundation upon which a wide variety of abstractions and languages for expressing parallelism can be built.

\*\*\*\*\*

**Thursday, November 1<sup>st</sup> at 4:15**

Rose Hills Theater – Smith Campus Center

Pomona College

\*\*\*\*\*

Refreshments available at 4:00