

NEW COURSE ENEE459P/ENEE699*: **Parallel Algorithms**, fall 2010. Instructor: Dr. U. Vishkin

What is clear? **Students need to learn how to think, program and reason about parallelism and they better do at least the parallel algorithms part while still in school.** Reasons: 1. Parallelism is where the world is going: (i) Commodity computers comprise multiple processor cores (ii) Parallel software is far behind: too little effective parallel software for them currently exists, and (iii). Despite this lack of parallel software to exercise the hardware, technology continues to practically enforce exponential increase in the number of cores during, at least, the 2010s. And 2. Parallel algorithms are based on first principles.

What is not clear? Will computer vendors make their many-cores much more amenable to parallel programming to lure programmers? Or, will programmers (and their employers) bite the bullet and embrace current hard-to-program many-cores? While it is unclear who will blink first and break this STANDOFF, programming for parallelism will still be important.

HOW DOES THE NEW COURSE ENEE459P/ENEE699 ADDRESS THESE NEED AND STANDOFF?

The course presents: (1) **Parallel algorithmic thinking** as understood by the theory of the field and is **necessary for all approaches to date**: the design and analysis of parallel algorithms is coupled with programming assignments on the Paraleap -- a **64-processor parallel computer built at UMD**; UMD Press release: <http://www.newsdesk.umd.edu/scitech/release.cfm?ArticleID=1459> . This UMD technology was shown to be **competitive on performance and programmer's productivity** relative to vendors' **CPUs and GPUs**, in papers published in ACM-SPAA09, ACM-SIGCSE-10, USENIX-HOTPAR-10. For more info: Google 'XMT' (for eXplicit Multi-Threading). (2) Salient examples of current approaches (e.g., **OpenMP or MPI**) and contrast approaches for better understanding

PARTNERSHIP WITH THE UNIVERSITY OF ILLINOIS

In a first-of-its-kind such partnership, the course will be taught jointly, using video conferencing with a similar course at the University of Illinois Urbana-Champaign, which is **top ranked in the field of parallel computing**.

NOTES

* To take the course as ENEE699, please contact the instructor at vishkin@umd.edu

Please be aware that the (more CS theory) course ENEE759K/CMSC751 Parallel Algorithms may not be offered before spring 2012.

Web page for the course: <http://www.umiacs.umd.edu/users/vishkin/TEACHING/enee459p-f10.html>