JOINT SEVERO OCHOA RESEARCH SEMINAR: Professors Wen-Mei Hwu and Avi Mendelson

Title 1: "Innovative Applications and Technology Pivots - A Perfect Storm in Computing" Wen-mei W. Hwu, Professor and Sanders-AMD Chair University of Illinois, Urbana-Champaign

Abstract: Since 2006, we have been experiencing two very important developments in computing. One is that a tremendous amount of resources have been invested into innovative applications such as first-principle based models, deep learning and cognitive computing. Many application domains are defying the conventional “it is too expensive” thinking that led to inaccuracies and missed opportunities. The other part is that the industry has been taking a technological path where application performance and power efficiency vary by more than two orders of magnitude depending on their parallelism, heterogeneity, and locality. Today, most of the top supercomputers in the world are heterogeneous parallel computing systems. New standards such as the Heterogeneous Systems Architecture (HSA) are emerging to facilitate software development. Much has been and needs to be learned about of algorithms, languages, compilers and hardware architecture in these movements. What are the applications that continue to drive the technology development? How will we program these systems? How will innovations in memory and storage devices present further opportunities and challenges? What is the impact on long-term software engineering cost on applications? In this talk, I will present some research opportunities and challenges that are brought about by this perfect storm.

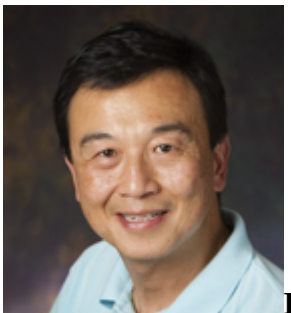
Title 2: "NVDRAM a new technological evolution of a new system revolution?" Avi Mendelson, Electrical Engineering and Computer Science Professor at the Technion.

Abstract: Nonvolatile memories are being used for quite long time in computer systems. So far, they successfully added another level of abstraction to the current memory hierarchy. The introduction of byte addressable nonvolatile memory may end-up serving the same purpose; i.e., yet another technology evolution, or may be used to carry on the next revolution in system architectures.

In his talk, he will give a short survey of what have been done so far in this area and will discuss few challenges that still need to be solved in order to enable NVDRAM to become the enabler of the next computer architecture revolution.

Speakers

SPEAKER 1



BIO: Wen-mei W. Hwu is a Professor and holds the Sanders-AMD Endowed Chair in

the Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign. He directs the IBM-Illinois Center for Cognitive Computing Systems Research Center, serves as the chief scientist of UIUC Parallel Computing Institute and directs the IMPACT research group (www.crhc.uiuc.edu/Impact). He also directs the UIUC CUDA Center of Excellence and serves as one of the principal investigators of the NSF Blue Waters leadership-class supercomputer. For his contributions, he received the ACM SigArch Maurice Wilkes Award, the ACM Grace Murray Hopper Award, the IEEE Computer Society Charles Babbage Award, the ISCA Influential Paper Award, the IEEE Computer Society B. R. Rau Award and the Distinguished Alumni Award in Computer Science of the University of California, Berkeley. He is a fellow of IEEE and ACM. Dr. Hwu received his Ph.D. degree in Computer Science from the University of California, Berkeley.

SPEAKER 2

BIO: Avi Mendelson is a professor in the departments of Electrical Engineering and Computer Science at the Technion. He earned his BSc and MSc degrees from the Computer Science department in the Technion and his PhD degree from the ECE department, University of Massachusetts at Amherst, USA. Prof. Avi Mendelson re-joined Technion recently after spending many years in industry. As part of his industry roles, he was in charge of the first CMP implementation Intel made (Core Due 2), he researched the impact of future SW technologies (such as GPGPU) of future processors and was involved with defining and implementing of many other related technologies such as power management, PCIe-3, memory management unit and more. Avi has more than 60 papers and 18 patents in the field of computer architecture and SW/HW interfaces. Avi has supervised more than 30 doctoral and master degree students, served as an editor of professional journals and was on the program committee of various top conferences. He also served as the program chair of two ICS conferences and the General chair of ISCA’2013 conference. He is member of the ACM Europe council board and serves in the advisory board of HiPEAC (European network of excellence) and has participated in several EU projects including FP7 FET Teraflux and FP7 IP Encore. His main research interests are in the areas of computer architectures, heterogeneous systems (including GPGPU), fault-tolerance systems and operating systems.


Example: Object Recognition Problem
This seems to be a combinational logic design problem.
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