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

1. Innovative Applications and Technology Pivots - A Perfect Storm in Computing

Wen-Mei Hwu
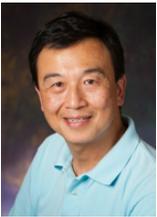
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Abstract

Since 2006, we have been experiencing two very important developments in computing. One is that tremendous amounts 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.

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.

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