Seminar

Department of Electrical and Computer Engineering
Monday, November 24, 2008
3:30-4:30 PM, Place: ECE250
Open to Public

FPGA Based Sequence Alignment

Khaled Benkrid
School of Engineering and Electronics, University of Edinburgh

Biological sequence analysis is an important field of computational science with many real world applications e.g. in disease diagnosis and drug engineering. It is also a field of study that is characterized by an exponential increase in the size of databases to be processed which outpaces the increase in computational power of general purpose processors. As a result, a faster computer technology is needed.

Field Programmable Gate Arrays (FPGAs) have been proposed as a candidate technology to solve this problem as they promise the high performance and low power of a dedicated hardware solution while being reprogrammable. This talk will present Dr. Benkrid's experience in developing highly parameterisable and efficient FPGA architectures for a number of sequence alignment algorithms including: Smith-Waterman, Needleman-Wunsch, and the BLAST algorithm. Experimental results suggest that FPGAs can be the implementation platform of choice for biological sequence analysis, especially with the advent of next generation sequencing technology.

Bio: *Dr Khaled Benkrid has been a Lecturer in the School of Engineering and Electronics at the University of Edinburgh since 2007. Before that, he was a Lecturer in Computer Science at Queen's University Belfast. During the last ten years, Dr. Benkrid has been actively researching the areas of high performance computing using reconfigurable hardware and electronic design automation. Among his early achievements in this area was the development of a structured FPGA design environment, called HIDE, which provides more abstract and elegant hardware descriptions and compositions than are possible in traditional hardware description languages such as VHDL/Verilog. Dr. Benkrid also developed the pioneering concept of Hardware Skeletons as a way of satisfying the dual requirement of abstract high level design and hardware efficiency. The concept is being used successfully to develop highly parameterisable and efficient hardware architectures for high performance computing, with applications in digital signal processing, bioinformatics and computational biology, and scientific computing in general.*

Dr. Benkrid holds a PhD in Computer Science, a 1st Class "Ingénieur d'Etat" degree in Electronic Engineering, and an Executive MBA. He is Senior IEEE Member and a Chartered UK Engineer.

For further information, please contact: Dr. Ali Akoglu, akoglu@ece.arizona.edu, 520-626-5149