Electrical & Computer Engineering

S E M I N A R

Louisiana State University

Architecture Comparisons between Nvidia and ATI GPUs: Computation Parallelism and Data Communications

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Abstract—In recent years, modern graphics processing units have been widely adopted in high performance computing areas to solve large scale computation problems. The leading GPU manufacturers Nvidia and ATI have introduced series of products to the market. While sharing many similar design concepts, GPUs from these two manufacturers differ in several aspects on processor cores and the memory subsystem. In this paper, we conduct a comprehensive study to characterize the architectural differences between Nvidia's Fermi and ATI's Cypress and demonstrate their impact on performance. Our results indicate that these two products have diverse advantages that are reflected in their performance for different sets of applications. In addition, we also compare the energy efficiencies of these two platforms since power/energy consumption is a major concern in the high performance computing.

Bio—Ying Zhang received the bachelor's and master's degree in electronics and information engineering from Huazhong University of Science and Technology, China, in June 2006 and June 2008, respectively. He joined the the Department of Electrical and Computer Engineering, Louisiana State University as a PhD student in Fall 2008. His research interests include GPU performance characterization, energy-efficient computing, and reliable processor design.

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