



ARCHITECTURE AND SYNTHESIS FOR EFFORT-LESS HARDWARE SPECIALIZATION

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ABSTRACT: Power and energy efficiency are now first-order design constraints across the entire computing spectrum. The recent trend towards multicore scaling is not a long-term solution as it is already infeasible to aggressively activate all transistors on a general-purpose die due to power constraints. Hardware specialization is a promising approach to improve both performance and energy efficiency, but comes at the expense of generality and agility of hardware/software development.

In this talk, I will introduce some of the ongoing projects in my group that attempt to address the following research challenge: "How can we transparently integrate hardware specialization into mainstream computing platforms without adding significant hardware/software design complexity?" Specifically, I will describe our recent work on HLS for software-programmable FPGAs and explicit loop specialization.

BIOGRAPHY: Dr. Zhiru Zhang is an assistant professor in the School of ECE at Cornell University and a member of the Computer Systems Laboratory. His current research focuses on high-level design automation for heterogeneous computing. His work has been recognized with a best paper award from TODAES and a best paper nomination at ICCAD. In 2006, he co-founded AutoESL Design Technologies, Inc. to commercialize his PhD dissertation research on high-level synthesis. AutoESL was acquired by Xilinx in 2011 and the AutoESL tool was rebranded as Vivado HLS after the acquisition.