Faculty of Computer Science
2002-2003 Seminar Series

DOING LOGIC DESIGN IN TWO DIRECTIONS AT ONCE (AND WHY ONE WANTS TO)

By

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Wednesday October 30th, 2002
3:30 p.m.
ITC317

Refreshments will be served at 3:20 p.m.

A digital circuit is reversible if it maps each input vector into a unique output vector. Reversible circuits can lead to low-power CMOS implementations and are also of interest in optical and quantum computing. Non-reversible specifications can be implemented as reversible circuits at the cost of added constant inputs and added 'garbage' outputs.

This talk will discuss the basic theory of reversible logic with emphasis on the construction of reversible circuits composed of primitive reversible devices such as Feynman, Toffoli and Fredkin gates. A novel synthesis approach employing Rademacher-Walsh spectral techniques will be presented. This method develops the circuit from the inputs towards the outputs and from the outputs toward the inputs simultaneously and thus represents a significant departure from conventional logic design methods. The application of this new synthesis method to reversible and nonreversible (conventional) logic specifications will be shown.

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GRADUATE STUDENTS ARE ENCOURAGED TO ATTEND

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