

Faculty of Computer Science
2002-2003 Seminar Series

Research Challenges in Reversible Logic Synthesis

By

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3:30 p.m.

ITC317

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

Reversible logic is an emerging research area. Interest in reversible logic is sparked by its applications in quantum computing, low-power CMOS, nanotechnology, and optical computing. The synthesis of reversible circuits differs significantly from synthesis using traditional irreversible gates. Two restrictions are added to reversible networks, namely fan-outs and back-feeds are not allowed. The only possible structure for a reversible network is a cascade of reversible gates. The most frequently used gates are the Toffoli gate and the Fredkin gate. The Toffoli gate inverts a single bit if the specified condition is met. The Fredkin gates interchanges two bits if a given condition is met. The gates are easily understood. However, designing compact networks is a challenge.

In this talk I will report on the advances in reversible logic synthesis. The focus will be on the tools and the approach used to develop the algorithms. The remaining challenges (and there are many) will be explained. One purpose of this talk is to entice graduate students to work in this area.

STUDENTS ARE ENCOURAGED TO ATTEND
