CO 781 Topics in Quantum Information (Quantum Algorithms)
QIC 823 Quantum Algorithms
CS 867-2 Advanced Topics in Quantum Computing

Class Times: Tuesday & Thursday, 1:30--2:45 pm in QNC 1201

URL: http://www.math.uwaterloo.ca/~anayak/Site/Quantum_Algorithms.html

Through this course, we will study quantum algorithms in greater depth. Our emphasis will be on general techniques for quantum algorithm design and the underlying mathematical tools. We will also investigate what makes certain problem hard, even for quantum computers.

Tentative list of topics:

- Hidden subgroup problem
- Quantum walk
- Span programs and learning graphs
- Adversary bound
- Quantum Merlin Arthur games
- Local Hamiltonian problem

Time permitting, we will explore recent developments in the area.

Prerequisites for the course include an introductory course in quantum information processing. In particular, we assume knowledge of the topics covered in the Fall 2016 offering of QIC 710 / CO 681, except possibly Lectures 15, 19, and 20: http://cleve.iqc.uwaterloo.ca/qic710.html. Familiarity with theoretical computer science will be helpful, but may be substituted by sufficient enthusiasm for the subject.

Evaluation will be based on three assignments (20% each) and a project (40%). The assignments are intended to supplement the lectures and help the students get a more complete appreciation of the topics covered. The project consists of reading one or more recent articles related to the course, making a presentation to the class, and writing a report.