

## Course Announcement

EE 599: Quantum Algorithms  
Fall 2012

### Description:

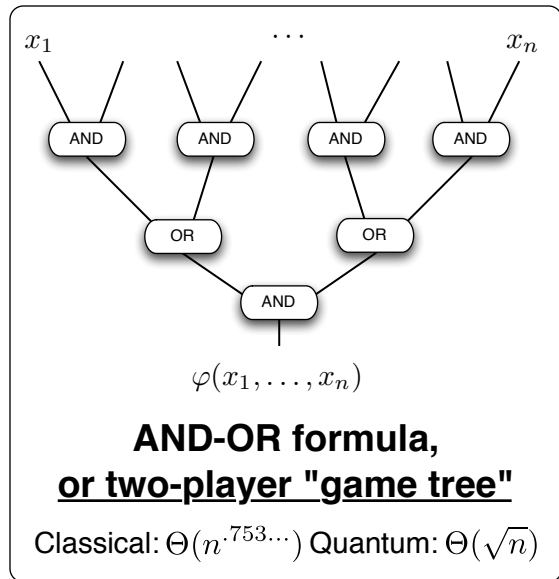
Quantum computers can be exponentially faster than classical computers. Designing fast quantum algorithms, however, requires melding ideas from both computer science and physics, in novel ways. This course covers the state-of-the-art in quantum algorithms research, which is evolving rapidly. Topics will include Shor's factoring and Grover's search algorithms, and their generalizations, quantum walks (extending classical random walks), learning graphs, and quantum simulations. Also covered will be limits on the power of quantum computers, in particular query complexity lower bounds.

A course outline is available at  
<http://www-bcf.usc.edu/~breichar/599>

### Time and Venue:

Monday and Wednesday, 2:00 - 3:20 PM  
Venue: TBD

Instructor: Prof. Ben Reichardt  
[ben.reichardt@usc.edu](mailto:ben.reichardt@usc.edu), EEB 528  
<http://www-bcf.usc.edu/~breichar>



$$15 = 3 \times 5$$

demonstrated experimentally by Vandersypen *et al.* (2001), and Lucero *et al.* (2012) :

### Factoring N

Classical:  $O(2^{\sqrt[3]{\log N}})$  Quantum:  $O(\log^3 N)$

