**Impromptu Updating in a Distributed Dynamic Network**

Valerie King, University of Victoria

In this talk we consider the problem of repairing a MST in a distributed network when an edge is added or deleted, in a manner which is "impromptu", i.e., requiring no preprocessing or auxillary memory except during the processing of the update. Each node knows its neighbors and the weights of its incident edges .The problem is for each node to also keep track of those of its incident edges which are in the MST.

The algorithm is based on a simple observation: the sum of the degrees of a maximally connected component of a graph is even, while the sum of the degrees of a random subgraph of a non-maximally connected component has a 1/2 chance of being odd. The challenge is to devise a communication-efficient method of sampling the edges of the graph. We show a method which uses O(n) expected messages where each message has O(log n) bits, for maintaining a spanning forest, and O(log n) messages per processor for maintaing an MST. We also demonstrate the first o(m) communication method to construct an MST, sidestepping known Omega(m) lower bounds.

This is joint work with Shay Kutten, Ben Mountjoy and Mikkel Thorup.