



## SEMINAR

DATE: Thursday, October 10, 1985

TIME: 2:00 - 3:00 p.m.

PLACE: NE43 - 512A

### " RANDOMIZED ROUTING ON FAT-TREES "

Speaker:

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ABSTRACT:

Fat-trees are a class of routing networks for hardware-efficient parallel computation. This talk will present a randomized algorithm for routing messages on a fat-tree. The quality of the algorithm is measured in terms of the load factor of a set of messages to be routed, which is a lower bound on the time required to deliver the messages. We show that if a set of messages has load factor  $\lambda = \Omega(\lg n \lg \lg n)$  on a fat-tree with  $n$  processors, the number of delivery cycles (routing attempts) that the algorithm requires is  $O(\lambda)$  with probability  $1 - O(1/n)$ . The best previous bound was  $O(\lambda \lg n)$  for the off-line problem where switch settings can be determined in advance. In a VLSI-like model where hardware cost is equated with physical volume, we use the routing algorithm to demonstrate that fat-trees are universal routing networks in the sense that any routing network can be efficiently simulated by a fat-tree of comparable hardware cost. This is joint work with Charles Leiserson.

HOST: David Shmoys