

# Welcome

## Seminar Series of the Department of Computer Science Electrical Engineering Presents

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### Hardness of Deadline Guaranteed Packet Scheduling for Input-Queued Switches

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#### Abstract

In order to guarantee quality of service, we consider how to schedule a set of packets buffered at input side of a switch such that maximum number of packets can be transmitted to their destined output ports before their deadlines. This problem has been proven NP-complete if three or more classes (distinct deadlines) are present in the set. Traditionally, the only way to deal with this problem is to use EDF (Earliest Deadline First) or similar methods. Recently, we proposed a non-EDF method that can produce a much better schedule by repeatedly applying an efficient algorithm that optimally schedules packets with two classes. However, this algorithm requires that the traffic matrices for the two classes be non-overloaded. An open question is, can we still find an efficient algorithm for two classes when their traffic matrices are overloaded? In this presentation, we prove that the two-class scheduling problem becomes NP-hard when the traffic matrices are overloaded. To cope with this NP-complete problem, we propose a preprocessing algorithm that reduces the traffic to non-overloaded traffic by dropping a minimum number of packets.

Dr. Xiaojun Shen received his bachelor degree in computer science in 1968 from Qinghua University, and master degree in computer science in 1982 from Nanjing University of Science and Technology, China. He came to USA and received his Ph.D degree in computer science in 1989 from University of Illinois, Urbana-Champaign. He became a faculty member in the School of Computing and Engineering at UMKC since 1989. He has done research work in the fields of Discrete Mathematics, Computational Geometry, Parallel Processing, and Computer Networking. He has published quite a few papers in good journals including SIAM J. Computing, Discrete Mathematics, Discrete Applied Mathematics, IEEE/ACM Transactions on Networking, IEEE Transactions on Computers, IEEE Transactions on Communications, IEEE Transactions on Circuits and systems, Journal of Parallel and Distributed Computing, etc. His current research focuses on packet scheduling.