Welcome to SRL

Welcome to Systems Research Laboratory (SRL)'s web page!

Systems Research Laboratory (SRL)'s mission is to advance state-of-the-art networking and networked systems through design, analysis, and hardware system prototyping. System prototyping is an indispensable part of an effective research system that facilitates testing of hypotheses in real-world settings.

Fall 2017 ECE6372 Advanced Hardware Design Permission Form:

Due to high demands for the course, there will be a wait list. Please enroll in a backup course immediately.

Sub-Millisecond Dynamic Optical Path Setup in DWDM Multi-Mode Switching Networks

We present a sub-millisecond dynamic optical path set up scheme for the multi-mode switching router. In particular, we have implemented the proposed integrated multi-mode scheduler in FPGA hardware in an optical switching testbed, and have demonstrated application triggered real-time sub-millisecond optical path setup. Another key contribution is that the proposed approach brings out the practical value of optical burst switching (OBS), which has stayed mostly in the theoretical regime in the past decade. We show that a truly dynamic optical network can be built with off-the-shelf optical components.

Packetized Reconfigurable Asymmetric Optical Burst Switching - A Consolidated Approach to DWDM-based Communication

We position Packetized Reconfigurable Asymmetric Optical Burst Switching (RA-OBS) network as a consolidated approach to DWDM-based communication. More specifically, we propose an enabling technology, namely, packetized multi-mode virtual burst assembly scheme which tackles the problem from a new perspective by forming virtual bursts with no physical attachment.
to packets until transmission time. Regardless of the switching mode used in the wavelength channel, the proposed scheme enables full controllability of packets in DWDM networks. This realizes packet level services in optical networks in a truly dynamic sense.

**Dr. Chen Established Systems Research and Education Consortium (SREC)**[4]

Halliburton, the founding member of the Systems and Research and Education Consortium (SREC), has signed the consortium agreement with Titanium Level membership. The goal of the Systems Research and Education Consortium (SREC) is to facilitate industry and university collaborations to address the critical need of educating the next-generation highly qualified engineers and researchers. Founded and led by a woman faculty member, SREC will work actively on providing special training and research opportunities for future women engineers, contributing to a more diversified next-generation engineering workforce.

**Put a Patent on it: Professors Train Students in Patent Protection**[5]

The Cullen College of Engineering has devised a training series to teach its faculty, students and staff how to handle intellectual property and how to become an entrepreneur. Kicking off March 8, the series will include topics such as liability, inventions, license agreements and more, according to the event’s website. Yuhua Chen, an associate professor for the college, holds five patents and was one of the consultants for the series. She has developed a course module to teach her students the basics about patents, as well as how to draft patents.

**SRL Researchers Successfully Routed Network Traffic Through Optical Switches with Sub-Millisecond Configuration Time Via Fujitsu Flashwave 9500**[6]

Internal network traffic from Fujitsu Flashwave 9500 packet optical networking platform has been successfully routed through low-power optical switches with sub-millisecond configuration time. The experiments were part of the NSF funded effort in prototyping DWDM multi-mode switching routers.

**Multi-Photon Secure Quantum Communication - From Theory to Practice**[7]

We address the major shortcomings of quantum cryptography as practiced today—the limitation of requiring a single photon to be used in communication. The paper discusses the innate nature of multi-photon communication protocols as a surrogate for quantum communication while giving it a cryptographic strength that would closely match that of a pure quantum communication system.

**Multi-Photon Implementation of Three-Stage Quantum Cryptography Protocol**[8]

The three-stage protocol, whose implementation is described in this paper, is a departure from conventional practice and it obviates some of the known vulnerabilities of the current implementations of quantum cryptography. This paper presents an implementation of the three-stage quantum communication protocol in free-space. To the best of the authors’ knowledge, this is the first implementation of a quantum protocol where multiple photons can be used for
secure communication.

**Multi-Photon Quantum Cryptography Implementation Featured in Science Daily**

University of Oklahoma electrical and computer engineering professor Pramode Verma and his colleagues Professor Subhash Kak from Oklahoma State University and Professor Yuhua Chen from the University of Houston have, at the OU-Tulsa College of Engineering labs, demonstrated a novel technique for cryptography that offers the potential of unconditional security.

**Dr. Chen Gave Two Talks at NASA Innovation Conference**

Dr. Chen attended NASA Innovation 2012 on Oct 12, 2012. She served as the session chair for the Telecom session, and gave two talks on quantum cryptography and DWDM multi-mode switching, respectively. Both talks were well received. Dr. Chen's work on telesurgery was cited by a separate talk from researchers at UT Austin and UH Clear Lake. NASA Innovation 2012 provided a platform for facilitating interdisciplinary collaborations.

**Fujitsu Network Communications Visited SRL**

Jeana Cunningham, VP of Strategic Sales for Federal, R&E, and Craig Healey, sales manager, of Fujitsu Network Communications, Inc, visited the Systems Research Lab (SRL) on October 9th, 2012. Director and principal investigator, Dr. Yuhua Chen provided an overview of the research conducted at the SRL and gave a sneak peek into future plans. She pointed out the benefits of implementing the technologies developed at the SRL on Fujitsu's equipment. It would be of mutual interests of the University of Houston and Fujitsu Network Communications, if a strong research partnership is forged.

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