

## Guest-editorial

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# Optical Networking

The rapid pace at which optical technologies are being introduced in the network infrastructure has created many new avenues and challenges. Nowadays, for any path longer than 10 m, people probably will choose to use fibers instead of coppers as the solution for both near and long term bandwidth needs. The emerging wavelength-division-multiplexing (WDM) technology has greatly enhanced the transmission capacity to the THz range. The paradigm shifted from 'IP over ATM', 'IP over SONET' to, recently, 'IP over WDM'. The concepts and technologies of reconfigurable optical networks and photonic switching are getting closer to applications.

In this special issue, we would like to address the next-step directions and technology development of optical networking. The concept of burst switching was proposed to solve the problem of the long reconfiguration delay of optical switches.

The paper from Professor J.S. Turner, Washington University, describes a DARPA NGI (next generation Internet) project on the terabit burst switching. We believe readers will enjoy this paper very much.

The paper from AT&T Laboratories by Dr. L.Y. Lin et al. summarizes the recent technology development in the area of optical crossconnects. The most recent work on reconfigurable optical switches using the MEM (Micro-Electro-Mechanical) technology is also described there. This paper may help readers to gain a picture about the development of optical circuit-switch technologies, which probably will be in the mainstream of optical networking development in the next 2 to 3 years.

The followed two papers focus on the packet-switch based optical networking technologies. In an all-optical network, the edge switches/routers will be a powerful layer-3 switch with a large electronic buffer memory to help to regulate the traffic passing through the all-optical network. However, to take the advantage of the large bandwidth provided by photonics, an optical cross-connect network is utilized inside a switch to replace the electronic fabric. For backbone switches, all signals and data have to be kept in the optical domain to take the advantage of optical transparency. All optical switching and buffering technologies are required. The papers from Professor H.J. Chao et al., Polytechnic University, and Dr. L.S. Tamil et al., Alcatel, describe the edge and the backbone switches/routers in an optical packet network, respectively.

The paper from Professor C. Qiao and Dr. M. Yoo, SUNY Buffalo, describes a recently funded NSF project on future Internet technology using the just-in-time-switching concept. We also expect readers will enjoy reading this work.

I would like to thank Professor Sidhu to give me the opportunity to serve on this special issue. I also appreciate all the assistance from Prof. C. Qiao to make this special issue possible.

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