

OPTICAL COMMUNICATIONS

Session Organizers:
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Optical communications systems have revolutionized the global communications infrastructure. Originally deployed in a few long haul networks, optical transport systems have delivered on the promise of supporting extremely high data rate communications at greatly reduced costs compared to their electronic counterparts. Major technology innovations such as low loss optical fiber, broadband fiber amplifiers, and wavelength division multiplexing (WDM) have fueled explosive growth in the deployment of optical transport systems in both long-haul backbone applications and in more cost sensitive applications closer to the edge of the network. These optical communication systems have enabled the so-called IT revolution, and the connection of increasing numbers of more complex and more diverse networks.

Despite the tremendous growth in technology development and deployment, and the recent downturn in the telecommunications industry, optical communications systems are still evolving and progressing. New technologies for these large optical networks are being sought at every layer, from application software to optoelectronic devices, with a premium placed on technologies that are cost-effective and robust. At the same time, entirely new applications and architectures are being proposed that will make the network more transparent, flexible and reconfigurable, and may enable a whole new class of services. Currently there is a great deal of discussion in the industry about what types of new technologies should be developed and how these technologies should be applied to solve users' needs properly.

The Optical Communications sessions are organized to give a view of current optical networks, and to discuss innovations that will impact network design in the future. In the first session, presentations by Dr. Wataru Imajuku of NTT and Dr. Jeffrey Livas of Ciena, will consider problems and solutions for optical communications networks as a whole, providing a high level view of these networks. Dr. Imajuku will present "Photonic IP Network Technology-The State-of-the-Art and Challenging Issues," describing a successful combination of advanced photonic devices and IP control software. Dr. Livas will present "An Overview of Fiber Optic Communications Systems," describing transport technologies that support high capacity, long distance communication over optical fibers. He will discuss the possible performance of optical communication systems and the strategy for dealing with their limitations.

In the second session, presentations by Dr. Connie Chang-Hasnain of the University of California, Berkeley, and Dr. Shigeru Nakamura of NEC will focus on devices and components enabling faster and more cost-effective next generation networks. In "Progress and Prospects of Enabling Optoelectronic Devices for Broadband Communications," Dr. Chang-Hasnain will discuss some of the key optoelectronic devices that enable high capacity WDM optical networking. Dr. Nakamura will present "Photonic and Signal Processing Technology Based on Compact Semiconductor Devices for Future Optical Communication Networks," to describe fast and cost-effective optical-optical switching technologies, and compare them to the more traditional optical-electrical technologies used in information processing.