



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

**Multi- and Single-Carrier Optical Communication Systems
using Electronic Signal Processing**

by

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The Chinese University of Hong Kong

Abstract

The development of optical communications has been greatly accelerated by recent rapid advances in high-speed microelectronics, such as 30-56Gsamples/s analogue-to-digital converter. The use of electronic signal processing in optical communications overcomes the current limits in all-optical signal processing, optical buffer, and large scale integrated planar lightwave circuit, and increases the practicality and/or flexibility of impairment compensation, implementation of start-of-the-art modulation/detection and multiplexing/demultiplexing techniques. In this presentation, I will discuss multi- and single-carrier optical systems using electronic signal processing. The presentation comprises three parts. Firstly, optically multiplexed multi-carrier systems with channel spacing equal to the symbol rate per carrier are investigated for ultra-high capacity applications, where the electronic signal processing is used to mitigate the impairments, in particular, inter-channel crosstalk, to maximize the information throughput. Secondly, multi-carrier systems with channel spacing reduced to half symbol rate per carrier are discussed. In this section, I will focus on electrical multiplexed techniques for potentially adaptive and dynamic short- and medium-distance applications, and study the implementation of multiplexing and demultiplexing, phase estimation, symbol synchronization etc. Finally, single-channel system based on non-coherent optical receiver and electronic full-field reconstruction and dispersion compensation is investigated. This technique balances the complexity and performance of direct- and coherent-detection based systems.

Biography

J. Zhao received the M.Phil. and Ph.D. degrees from the Chinese University of Hong Kong in 2004 and 2007, respectively. He is with the Photonic Systems Group at the Tyndall National Institute, Ireland since Sep. 2007, and an Enterprise Ireland principal investigator since Dec. 2008. His current main research interests include electronic signal processing in optical communications and spectrally-efficient multi-carrier optical transmission systems. He has published 50+ technical papers in peer-reviewed international journals and conferences, 2 patents, and 1 book chapter.

**** ALL ARE WELCOME ****

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