



# *Master Lectures on Photonics Integration*

## **Specialty Optical Fibers for Advanced Sensing Applications**

Gerd Keiser

Research Professor, Boston University

Department of Electrical and Computer Engineering

Boston, MA USA

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**Abstract:** Optical fiber technology has significantly bolstered the growth of photonic applications in numerous areas such as the telecom infrastructure, a wide range of sensors, vehicle and airplane control, life sciences research, and biomedical diagnosis, therapy, monitoring, and imaging. This talk gives an overview of recent developments in diverse configurations of specialty optical fibers and their sensing applications. First the fundamental principles for light guiding in conventional solid-core fibers are presented in order to show how optical fibers function in general. Next, using this background material, various specialty optical fibers with expanded optical, electrical, acoustic, or optoelectronic functionalities are reviewed based on innovations in their unique structures, the use of special combinations of materials, and implementations of light-manipulation technologies. Then an overview of sensing applications in various fields is presented.

**Biography:** Dr. Gerd Keiser is a research professor at Boston University specializing in developing educational materials for telecom optical networks and biomedical photonics. Formerly he was a chair professor of electronic engineering at the National Taiwan University of Science and Technology, worked in the telecom industry on optical communication systems and digital switching, and founded a firm specializing in consulting and education for the telecom and biophotonics communities. He is an IEEE Life Fellow, an Optica Fellow, a SPIE Fellow, and the author of five graduate-level books including the widely used text *Optical Fiber Communications* and the recently published book *Biophotonics*.