Proceedings of the 5th International Conference on Optical Communications and Networks & the 2nd International Symposium on Advances and Trends in Fiber Optics and Applications

饶云江 主编

ICOCN/ATFO 2006

September 18～22，2006，Chengdu and Jiuzhaigou，China

General Chair: Prof. Y. J. Rao
Co-Chair: Prof. K. Qiu
Prof. K. S. Chiang
A/Prof. G. D. Peng
A/Prof. P. Shum
Dr. K. Hsu

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内容简介

“第5届国际光通信与网络年会暨第2届纤维光学发展现状与未来趋势国际学术研讨会”论文集包含了反映近年来光纤通信和传感领域最新进展的120余篇论文。其主要内容包括：光有源器件及模块、光纤传感技术、光网络技术、光无源器件、光交换和网络单元、光传输技术等。本次国际会议邀请到了数十位光通信及光传感领域的知名专家到会做特邀报告，其中包括Tingye Li院士、Pak L. Chu院士、Ray T. Chen教授、Ken-ichi Kitayama教授、Kin S. Chiang教授、Xiaoyi Bao教授、Reinhardt Willsch教授、Yunjiang Rao教授等。

本论文集对光通信与网络技术以及光纤传感技术的未来发展具有较大的参考价值。

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University of Electronic Science & Technology of China

Chongqing University

September 18～22, 2006, Chengdu and Jiuzhaigou, China

General Chair:

Prof. Yunjiang Rao, University of Electronic Science & Technology of China

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Chongqing University

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Conference Welcome

We are very glad to host the 5th International Conference on Optical Communications and Networks (ICOCN2006) and the 2nd International Symposium on Advances and Trends in Fiber Optics and Applications (ATFO2006) here in Chengdu.

The first International Conferences on Optical Communications and Networks (ICOCN) begins in Singapore in 2002 and thereafter it was held in Bangalore, India, in 2003, in Hong Kong in 2004, and in Bangkok, Thailand, in 2005, respectively. The International Symposium on Advances and Trends in Fiber Optics and Applications (ATFO) was originated in Chongqing, China in 2004. This year conference (ICOCN/ATFO2006) puts the two meetings together and covers a number of key issues concerning recent progress in optical fiber communications and sensing, such as optical active components and modules, optical networking technologies, optical passive components, optical switching, optical fiber sensors, *et al.* This conference includes contributed 121 papers in total from 13 countries, among them there are 36 invited papers.

We would like to thank all the members and chairs of both the Advisory Committee and the Technical Program Committee for their strong support. We would also like to thank local organizing committee members from University of Electronic Science & Technology of China (UESTC) and Chongqing University for their hard work to make this conference successful. In addition, special thanks must go to Prof. Ting-Ye Li, Prof. Pak Chu, Prof. Ray Chen, Prof. Ken-Ichi Kitayama, and Dr. Cedric F. Lam, the plenary speakers, for their world-class presentations.

Finally, thank you for your participation in ICOCN/ATFO2006 and welcome to Chengdu, a fascinating city that you wouldn't wish to leave once you come.

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Foreword

Welcome to the joint conference of the 5th International Conference on Optical Communications and Networks (ICOCN) and the 2nd International Symposium on Advances and Trends in Fibre Optics and Applications (ATFO). The feature of this conference is that it is held in two places consecutively, first two days in Chengdu and the second two days in Jiu Zhai Gou. The first place is famous for its historical significance, being the capital of Shu during the Three Kingdoms Period of China. Of course, it is also the seat of the famous University of Electronic Science Technology of China. The second place is well-known for its natural beauty.

ICOCN has a feature in that it has been held annually in different countries throughout the Asia-Pacific region. The first one was in Singapore, the second one in India, the third one in Hong Kong, and the fourth one in Thailand. The 6th ICOCN will be held in Pakistan in 2007. The reason for this venue rotation is to facilitate the researchers in that country to attend the conference and to get to know the world famous scientists without undue difficulties.

On the other hand, ATFO also has an unusual feature. The 1st ATFO was held in a boat sailing from Chongqing down the Yangtze River to Yichang. We passed the Three Gorges and also had an opportunity to visit the world's largest hydroelectric power station. This year, the 2nd ATFO will be held in the beautiful Jiu Zhai Gou.

This year's combined conference is organized by Professor Yun Jiang Rao and his committee and has so far attracted 120 presentations from many parts of the world, of which 5 are plenary papers and 32 invited papers. The main sponsors are the University of Electronic Science Technology of China and the Chongqing University. The co-sponsors are: Ministry of Education, China; National Nature Science Foundation of China (NSFC); Chinese Optics Society (COS); China Institute of Communications (CIS); The Institute of Electrical and Electronic Engineering (IEEE); Optical Society of American (OSA); and Micron Optics Inc., USA. On behalf of the Advisory Committee, I would like to thank Professor Rao, his committee and all these organizations in making this conference a resounding success.

Prof. Pak L Chu

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Revolution and Evolution in Optical Fiber Communications

(Invited Plenary Session Paper)

Tingye Li
AT&T Labs-Research (Retired)
Boulder, Colorado 80304, USA

SUMMARY

Innovations in lightwave technologies have not only led to evolutionary advances in optical fiber communications, but have also brought about revolutionary changes in the telecommunications industry, ranging from network infrastructures and operations, to the management and economics of supplying bandwidth. An example is amplified WDM technology, which enabled cost-effective massive capacity upgrades that could more than meet the large growing traffic demand of the Internet. Furthermore, optical networking promised cost savings in network management and operation, as well as flexibility and scalability in service provisioning. The rampant exuberance that prevailed in the telecom industry in the late 1990s led to indiscriminate entrepreneurial investments, fervent over-production of components and equipment, and unprecedented over-deployment of network facilities. Concomitant with a general economic downturn in the year 2000, the telecom industry lapsed into a torpor, especially in the US and Europe

After an extended period of lethargy, lightwave communications is now poised for renewed rational growth. Innovating for the next-generation network will require knowledge of the physics of devices and components, understanding of the economic tradeoffs of competing systems and architectures, as well as appreciation for future applications that will generate increased revenue for the service providers and ultimately drive network upgrades and new constructions. IPTV (video streaming) and FTTx (fiber in the last mile) represent compelling examples of application and construction, respectively, which are presently driving the industry.

This talk will present a perspective on innovations in lightwave communications, tracing the role played by fiber amplifiers and WDM technology; discuss paradigm shifts due to the exponential growth of the Internet and the business dilemmas of service providers; examine technological advances that provide strategic, economic and operational solutions; and consider exciting areas of research that offer potential impact. Recent advances to be highlighted in these research areas will include those in photonic integrated circuits, silicon photonics, photonic crystals, nano-technology, spectral-efficient modulation formats, electronic and optical signal processing for alleviating system impairment, optical packet switching and routing, networking monitoring and management, etc.

Prof. Tingye Li retired from AT&T in 1998 after a 41-year research career at Bell Labs and AT&T Labs, working in the fields of microwaves, millimeter waves, lasers, and lightwave communications. He is presently a consultant in lightwave technologies and systems. His early work on laser resonator modes is fundamental to the theory and practice of lasers. Since the late 1960s,he and his groups have been engaged in pioneering research on lightwave technologies and systems, and in the 1990s, led the seminal work on WDM transmission systems and networks, which revolutionized lightwave communications.

Prof. Li holds a PhD degree from Northwestern University, Evanston, Illinois. He is a fellow of OSA, IEEE, and AAAS, and is a member of NAE, CAE and Academia Sinica. He received the 1975 IEEE W. R. G. Baker Prize, the 1979 IEEE David Sarnoff Award, the 1995 OSA/IEEE John Tyndall Award, the 1997 OSA Frederic Ives Medal/Jarus Quinn Endowment, the 1997 AT&T Science and Technology Medal, and the 2004 IEEE Photonics Award. He has been named an honorary professor at many universities in China, and was President of OSA in 1995.

Silicon Photonic Crystal Waveguide Modulators and Applications in Board-Level Optical Interconnect

Invited Plenary Session Paper

Ray T. Chen[1], Lanlan Gu[1] and Wei Jiang[2]
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Prof. Ray Chen holds the Cullen Trust for Higher Education Endowed Professorship at UT Austin. He received his BS degree in Physics from National Tsing-Hua University in 1980 in Taiwan and his MS degree in physics in 1983 and his PhD degree in Electrical Engineering in 1988, both from the University of California. He joined UT Austin as a faculty to start optical interconnect research program in the ECE Department in 1992.Prior to his UT's professorship, Chen was working as a research scientist, manager and director of the Department of Electrooptic Engineering in Physical Optics Corporation in Torrance, California from 1988 to 1992.

Chen also served as the CTO/founder and chairman of the board of Radiant Research from 2000 to 2001 where he raised 18 million dollars A-Round funding to commercialize polymer-based photonic devices. He also serves as the founder and Chairman of the board of Omega Optics Inc. since its initiation in 2001. His research work has been awarded with 84 research grants and contracts from such sponsors as DOD, NSF, DOE, NASA, the State of Texas, and private industry. The research topics are focused on three main subjects: 1. Nano-photonic passive and active devices for optical interconnect applications, 2.Polymer-based guided-wave optical interconnection and packaging, and 3. True time delay (TTD) wide band phased array antenna (PAA). Experiences garnered through these programs in polymeric material processing and device integration are pivotal elements for the research work conducted by Chen's group.

Chen's group at UT Austin has reported its research findings in more than 420 published papers including over 55 invited papers. He holds 12 issued patents. He has chaired or been a program-committee member for more than 50 domestic and international conferences organized by IEEE, SPIE (The International Society of Optical Engineering), OSA, and PSC. He has served as an editor or co-editor for eighteen conference proceedings. Chen has also served as a consultant for various federal agencies and private companies and delivered numerous invited talks to professional societies. Dr. Chen is a Fellow of IEEE, OSA and SPIE. He was the recipient 1987 UC Regent's dissertation fellowship and of 1999 UT Engineering Foundation Faculty Award for his contributions in research, teaching and services. Back to his undergraduate years in National Tsing-Hua University, he led a university debate team in 1979 which received the national championship of national debate contest in Taiwan.