



*Photonics Society of Chinese-Americans*

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## *President's Message*

**Dear PSC members:**

The Photonics Society of Chinese-Americans (PSC) has set a solid basis for its role in supporting the rapid growth of photonics and liquid crystal display technologies. These two high-flying industrial sectors in last twenty years are influencing both our quality of lives as well as being an economic stimulus for the twenty- first century. Through decades of hard works of its founding members, all former presidents, board directors, and our royal members, PSC has increasingly gained visibility in North America and several Asian countries and economic regions. This year, it is my great honor to serve the president role and have the opportunity to work with PSC staff and members. My inspiration of the year is to maintain PSC's momentum and further expand its influence to all over the world.

As fiberoptics enabled the optical networking technology area, photonics has a wider enabling influence and opportunities on the development of new technical areas. In addition to passive devices, components and subsystems, photonics is also involving in the active components and subsystems as well as the burgeoning nano-technologies. For instance, in the field of modern quantum wave devices where fabricated semiconductor devices will be able to act and function on integrated circuits and exhibit unique performances through its photonically produced tiny dimensions. This is one but obvious example of the continuing significant role photonics plays in the development of new initiatives in which miniaturized, low cost devices will enhance our ability to access information upon which to make decisions and take actions.

In order to broaden the participation and communication with the global information technology community, PSC is establishing a relationship with Monte Jade by posting each other's seminars and events. We will expand our ring of collaboration with other neighboring associations this year. PSC has held annual conferences every year consecutively for the last 15 years. The information of these conferences has been archived. Besides, each local chapter holds either monthly seminar or bimonthly event as an important on-going activity to enhance the learning, networking, and employment opportunities for our members. Our web sites will be continuously updated and improved to the state-of-the-art status with more informative contents and easy linkage to every local chapter. We will keep developing new members, new corporate sponsors and encourage them actively supporting and participating in PSC local and annual events. PSC will continue its role of bridging between different countries and economic regions through coordination of job fair, trade show, and business seminars.

Given the fact that the Internet usage is growing, there is no question that the future of photonics is bright. The PSC president role will be stimulating and rewarding and I appreciate the opportunity affords me to contribute. I urge you become more involved, and enjoy PSC activities.

Gordon Li

May 13, 2002  
PSC President

# **PSC-SC Dinner Meeting**

*Raymond Wang*

## **The New Opto-Electronics Industry**

A dinner meeting co-sponsored by  
Southern California Monte-Jade Science and Technology Association  
and Photonics Society of Chinese-Americans

**Date: 5/22/02      Time: 6PM - 10PM**

**Place: Renaissance Long Beach Hotel**

**(Next to Long Beach Convention Center)**

**111 E. Ocean Blvd., Long Beach, CA 90802      (562) 437-5900**

### **Agenda**

**6:00 - 6:30      Registration & Welcome**

**6:30 – 7:30      Dinner**

**7:30 - 8:00      Dr. Milton Chang**

**Managing Director of iNCUBiC**

**“Making High-Tech Investments”**

**8:00 - 8:30      Dr. Chin.C. Lee**

**Professor of Electrical and Computer Engineering, U.C. Irvine**

**“Fluxless Soldering Technology for MEMS and Photonics”**

**8:30 – 9:00      Dr. Golden Shu'**

**“Challenges in Photonic Packaging.”**

**9:00 - 9:30      Open discussions on the new opto-electronics industry**

**9:30 - 10:00      Experience sharing**

## **Making High-Tech Investments**

Milton Chang  
Managing Director  
iNCUBiC

Milton Chang is Managing Director of Incubic, and is the Chairman of Arcturus Engineering and OEpic. He also sits on the Boards of Lightwave Electronics, OpVista, Rockwell Scientific, and YesVideo. He earned BS with Highest Honors from the University of Illinois, and MS and Ph.D. from the California Institute of Technology all in Electrical Engineering. Milton worked briefly as a research engineer before joining Newport, then a startup company. He was with the company for seventeen years, became its president and CEO and took the company public. After being an angel investor for two years he co-founded New Focus and is now retired from the company. He has incubated more than a dozen companies without a single failure and this effort continues at Incubic Entrepreneurs Fund. He is a Fellow of the Optical Society of America and the Laser Institute of America, and is currently the President of the IEEE Laser Electro-Optical Society. He writes monthly business columns for the Laser Focus World and the Photonics Spectra to share his entrepreneurial business experience.

### **Abstract**

The speaker will share his insights in making investments in the optical space as well as high-tech in general. He will challenge conventional thinking in selecting the opportunities as well as in working with the management. He will also speculate what the recovery in the optical space might be like. If you are serious about being an investor or an entrepreneur, you wouldn't want to miss this meeting.

## **Fluxless Soldering Technology for MEMS and Photonics**

Chin C. Lee

Electrical and Computer Engineering

Materials Science and Engineering

University of California, Irvine, CA 92697-2625

cclee@uci.edu tel: 949-824-7462 fax: 949-824-3732

Chin C. Lee was born in Taiwan. He received B.E. and M.S. degrees in electronics from National Chiao-Tung University, and PhD in electrical engineering from Carnegie-Mellon University.

From 1980 to 1983, he was with the EE Department of the University of California, Irvine, as a specialist. In 1984, he joined the same department as an assistant professor and became professor of Electrical and Computer Engineering in July 1994. From 1990/91 to 93/94, he served as the Graduate Advisor of ECE and has once again served as the Graduate Advisor since 1999/2000. He is the Director of Operations of INRF (Integrated Nanosystems Research Facility). His research interests include integrated optics devices, semiconductor devices, microwave devices, electronic packaging, thermal design, bonding technology, electromagnetic theory, scanning acoustic microscopy.

Chin C. Lee is an IEEE Fellow and a member of Tau Beta Pi. He is an associate editor of IEEE Trans. Components and Packaging Technologies, and since 1998 have served on the Program Committee of the IEEE Electronic Components and Technology Conference (ECTC). He is the chair of the ECTC Materials and Processing subcommittee. He received the Best Paper Award bestowed by IEEE Reliability and Electron Devices Group in 1979 for a paper "Diagnosis of Hybrid Microelectronics Using Transmission Acoustic Microscopy" (C.S. Tsai, C.C. Lee, J.K. Wang). He has co-authored three book chapters and more than 150 papers. He has also given numerous presentations to industries, universities, and professional societies.

### **Abstract**

In electronic packaging, conventional soldering methods use reflow solder, solder preforms, or paste as the bonding medium. During the assembly process, the oxidation of solder produces a solid oxide film adhering on the molten solder, thus preventing the liquid solder from achieving chemical bonds with parts to be joined. To remove the oxides, flux is commonly used in the soldering process. In some applications, flux simply cannot be used.

In this presentation, we begin with the fundamental reasons of why materials can join together. Soldering principle is reviewed. Flux action to remove oxides during the soldering process is explained. A fluxless soldering technology is then reported. It is based on the concept of removing the origin of the problem, i.e., the formation of oxides. Oxides and oxidation are prevented right in the beginning by depositing the solder materials in one high vacuum cycle and by further protecting the materials against oxidation with a stable intermetallic layer that is formed *in situ* in high vacuum. A process based on Au-Sn system will be presented to illustrate the fluxless principle. High quality joints are achieved without the use of flux. The quality is examined using a scanning acoustic microscope (SAM). Compositions and microstructure are studied using an SEM and EDX. The research also enhances scientific knowledge on intermetallic compound growth, microstructure, and interdiffusion in alloys that are important in microelectronics.

The technology has the following potential advantages: fluxless, inherently oxidation-free, control of joint thickness and composition, production of high temperature joints at low process temperature, possible control on the strength and plastic strain of the joint by material composition, lithographic patterning of the composite for selective bonding.



## **EOA March Seminar Announcement**

*Yalan Mao*

**Title:** New developments in optical amplifiers

**Speaker:** Shou-Jong Sheih, IOA Corporation

**Time:** 10:00 am, Saturday, 3/9/02

**Place:** Stanford University CIS Building (Center for Integrated Systems), Room 101 (Cypress auditorium)

**Fee:** Member free, \$10 for non-member

**Abstract:**

In this presentation, we will review the optical amplifiers development and discuss new trends in amplifier technologies. Focus will be given to EDFA and Raman OA. New advances in related component innovations will also be discussed.

**Speaker Biography:**

Shou-Jong Sheih, Ph.D., Chief Technology Officer/Founder, IOA Corporation. Dr. Sheih is a pioneer in the design and development of high-power wide-band optical amplifiers for both long haul and metro applications. Prior to founding IOA Corporation, Dr. Sheih served as Principal Engineer at ONI Systems where he led the next-generation optical amplifier design efforts. As a key member of the Advanced WDM (AWDM) group at Lucent Technologies, he created the WaveStar 800G L-band EDFA. As a project lead at Corning, he was responsible for the first commercial wide-band WaveStar-class EDFA. Dr. Sheih holds a Ph.D. in physics from the University of Colorado at Boulder.

## **EOA April Seminar Announcement**

*Yalan Mao*

**Title:** Optoelectronic Packaging Explorations into the Low-Cost/High-performance Zone

**Date:** April 13, 2002

**Speaker:** Stanford Crane, CTO, Silicon Bandwidth

**Biography:** Stanford has been awarded more than 100 patents in the fields of semiconductor technology, interconnect technology, advanced systems architecture, robotics, printed circuit board technology and substrate technology. He is widely regarded as a fiber-optics industry pioneer, and is the co-author of a number of scientific papers concerned with issues of electrical performance in advanced interconnect designs. Stanford has been a leader in producing bandwidth-enhancing technologies at break-through price points. Stanford's designs for high I/O connectors, among them the Compass™ and its related pluggable technologies, the CGA and WGA, have set new standards within the industry for both performance and cost. He has won numerous achievement awards from groups as diverse as The International Design Yearbook, ID Magazine, Comdex, CeBit and PC Expo. Several of his product designs have been exhibited in museums here and abroad for the melding of art and technology.

A Virginia Military Institute EE, his 25-year-plus career includes senior posts at both AMP, Inc. and Molex, and has worked on strategic product development with customers, including: Xerox, HP, AT&T, Raytheon, Lockheed-Martin and General Motors. Stanford has founded three companies and developed numerous defense-related products and technologies. He has personally designed and licensed products to 3M, Litton and LG.

Stanford leads a multidisciplinary team of engineers, scientists and designers at SBI who are focused on the most critical performance and cost related needs in today's technology space.

### **Abstract:**

Are We All Insane? Optoelectronic Packaging Explorations into the Low-Cost/High-performance Zone

The optical industry depends upon innovation to drive the next generation of systems for two reasons: they need to operate at increased performance, but more importantly they must do so at radically lower prices. Additionally, the support infrastructures (i.e., the electronics systems) are also under significant pressure to innovate. The goals are very ambitious to the optoelectronics industry. Technical change is often slow, while expectations accelerate every day. Has everyone gone insane? Insanity is continuing the same old thing and expecting different results. We shall explore the modern versions of the 14-pin butterfly, TO can and Mini DIL component products, electrical subsystems, our Asian partners and finally standards which may have to change in order to achieve the stated goals.

## **EOA May Seminar Announcement**

*Yalan Mao*

**Title:** Korean Photonics Industry

**Speaker:** Chuck Kim, President of Opendream

**Time:** 10:00 am, Saturday, 05/11/02

**Place:** Stanford University CIS Building (Center for Integrated Systems), Room 101 (Cypress auditorium)

**Fee:** Member free, \$10 for non-member

**Abstract:** We will briefly review Korean Photonics History and describe on the Business Interface of Government vs Optic companies. The role of Opendream in Korean Photonics Industry will be stated, with its consortium mission and profile. We will also present on Korean Photonics projection at phase 2 up to 2007, the Alignment and Synergy between PSC and Korean Photonics Industry.

**Speaker Biography:** Chuck Kim is currently President of Opendream.

- Business: Representing & consulting business for Semiconductor & Fiber Optics
- International Business Planning: Consulting for Korean and US market
- M & A: \$20mil M&A under processing with Multi-Chip mounting with INTEL.
- Product Development for In-situ tool: Under processing for Fiber Optic vendor in US
- Consulting team management: 4 members (Lawyer, CPA, Treasurer, HR specialist)
- Financing network: US, Taiwan, Singapore including Korean capitalist.
- President of CNH Mobile, located in Sunnyvale, CA.

Apr 1994 – Dec.1999      GM (General Manager) of Samsung at KLA-Tencor

- Organization: 40 persons (3 sales, 10 Applications, 25 Services, 2 Administrators)
- Revenue: \$100mil dollars per year.
- Product : All KLA-Tencor products
- KLA4th ranked equipment company out of 500 vendors at Semiconductor equipment.

# 2002 PSC Annual Meeting Report

*Raymond Wang*

The 2002 PSC Annual Meeting was held on March 17 at the campus of University of California, Irvine. The meeting was a great success for its excellent program arrangement and attending rate. Enclose you will find the program agenda and the abstract for the each invited speaker. There are over 150 members attending the meeting and 120 members attending the dinner banquet. The participating members came from Canada, USA, Taiwan, China, Korea, Japan, and other places. Next year the meeting will be held at Atlanta. Hope to see you there. The Annual Meeting presentations (in PowerPoint) will be posted on our web page at [psc-a.org](http://psc-a.org). Members are welcome to visit our web page and view the presentations. Thank you for your participation.





# *PSC 2002 Annual Meeting*

## **Business Opportunities and Challenges for Photonics Industry**

UCI, Beckman Center, March 17, 2002

### AGENDA

*12:30 PM - 1:00 PM*

**Registration**

**Dr. James Yeh of OptoIC Technology  
Dr. Bill Wuang of Accra Technology  
Professor C. C. Lee, UCI**

*1:00 PM - 1:10 PM*

**Welcome and Introduction: PSC President - Raymond Wang**

*1:10 PM – 2:10 PM*

**Session I: The Challenges for the Fiber Optics Communication Industry  
Session Chair: Professor Ray Chen**

1:10 – 1:40      Crouching Technologies and Hidden Profits:  
"If winter comes, can spring be far behind?"  
Speaker: Dr. Tingye Li, AT&T

1:40 – 2:10      TBD  
Speaker: Dr. Milton Chang, New Focus

*2:10 PM – 2:50 PM*

**Session II: Opportunities for the New Startup in OFC Industry  
Session Chair: Dr. Gordon Li**

2:10 – 2:30      Silicon Based Photonic Integrated Optical Circuits: A Paradigm Shift of  
Fiber Technology for Future Low Cost Optical Communication Networks  
Speaker: Dr. Chi Wu, LightCross

2:30 – 2:50      Status of Optical Amplifier System Applications and Component  
Requirements  
Speaker: Dr Yan Sun, Onetta Inc.

*2:50 PM – 3:05 PM*

**Session III: PSC 2002 Bor-Uei Chen Memorial Scholarship Award  
Session Chair: Dr. C. C. Shih, TRW  
Award Recipient: Ms. Shuo Tang, UCLA  
Talk Title:**

'Chaotic Optical Communication with Chaotic Pulsing Semiconductor Lasers'

3:05 PM – 3:10 PM      **Break**

3:10 PM – 4:10 PM

**Session IV: Opportunities of Photonics Industry In Far-East**

**Session Chair: Dr. Raymond Wang**

- 3:10 – 3:30 Cooperative - Create a New Era in Chinese Photonics World  
Speaker: Dr. Peter T.C. Shih, EOSTC, NSC, ROC
- 3:30 – 3:50      Optical Component Industry In China Market and Vendor Profile  
Speaker: Zheng Liu, China Fiber Online
- 3:50 – 4:10      Optical Component Industry In Taiwan Market and Vendor Profile  
Speaker: Mr. Kaofeng Tsai, RiteKom Photonics Corp.

4:10 PM – 6:00 PM

**Session V – Panel Session –**

**New Photonics Business Opportunity in today' s Downturn Economics**

**Session Chair: Dr. Owen Wu, GCS Communication**

*Presentations by:*

- 4:10 – 4:30      TBD; Dr. Y.S. Liu, ITRI, ROC.
- 4:30 – 4:50 The Challenge and Opportunity of ULH DWDM System in China  
Speaker: Mr. Ping-An Zhang, Huawei Technologies Corp.
- 4:50 – 5:10 Metro and Access Networks in China  
Speaker: Dr. John Yu, ZTE Communications USA
- 5:10 – 5:20 TBD; VC base in USA
- 5:20 - 5:30 TBD; VC base in USA
- 5:30 – 6:00      Panel Discussion and Q&A

6:00 PM – 9:00 PM

**Networking      and Dinner – 5 minutes for each attendant to introduce their company and products during Dinner Session. (If you like to present, please register with Dr. Raymond Wang)**

**Location: UCI Beckman Center of the National Academies of Sciences and Engineering Auditorium**

# **Crouching Technologies and Hidden Profits: “If Winter Comes, Can Spring be far behind?”**

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

## **ABSTRACT**

Amplified WDM transmission has revolutionized optical fiber communications by creating “virtual fibers” for massive capacity upgrades that can meet the large traffic demand of the Internet. Optical networking offers potential cost savings in network management and operation, as well as in service provisioning. The abundance of new technologies, systems innovations, and investment funding has created unprecedented opportunities and enthusiasm in the telecom industry. Unfortunately, the irrational exuberance and the economic downturn have led to bankruptcies of new-entrant companies and reductions in capital expenditures of incumbent service providers, thus casting a wintry pall over the landscape. When spring returns and rationality prevails, will the crouching technologies be effectively deployed to realize the hidden profits?

## **BIOGRAPHY**

**Tingye Li** retired from AT&T on December 1, 1998. Until then, he has been a Division Manager in the Communications Infrastructure Research Laboratory of AT&T Laboratories at Red Bank, New Jersey. He is now an independent consultant in the field of lightwave communications. Since joining AT&T Bell Laboratories in 1957, he has worked in the areas of antennas, microwave propagation, lasers and optical communications, in which he has contributed more than 100 journal papers, patents, books and book chapters. His early work on laser resonator modes established the basis for the understanding of laser operation. Since the late 1960s, he and his groups have been engaged in pioneering research on lightwave technologies and systems, which are now ubiquitously deployed in all arenas of telecommunications. His latest work with his colleagues on amplified wavelength-division-multiplexed transmission systems, which they were the first to advocate for upgrading the transmission capacity of long-distance telecommunications networks, has revolutionized lightwave communications.

He holds a Ph.D. degree from Northwestern University, Evanston, Illinois. He is a Fellow of the Optical Society of America, the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, the Photonic Society of Chinese-Americans, and the International Engineering Consortium. He is also a member of the National Academy of Engineering, the Academia Sinica (Taiwan) and the Chinese Academy of Engineering. Among the many awards he has received are the IEEE 1975 W. R. G. Baker Prize, the IEEE 1979 David Sarnoff Award, the OSA/IEEE 1995 John Tyndall Award, the OSA 1997 Frederic Ives Medal/Jarus Quinn Endowment, the 1997 AT&T Science and Technology Medal, the 1981 Alumni Merit Award from Northwestern University, and Achievement Awards from the Chinese Institute of Engineers/USA in 1978, the Chinese-American Academic and Professional Society in 1983, and the Photonics Society of Chinese-Americans in 1998. He was named an honorary professor at many universities in China (including Tsinghua Univ., Shanghai Jiaotong Univ., Beijing Univ. of Posts and Telecommunications, Northern Jiaotong Univ., Fudan Univ., Nankai Univ., Tianjin, Univ., Univ. of Electronic Science and Technology of China, and Qufu Normal Univ.), and was granted an honorary Doctor of Engineering degree by National Chiao Tung University in Taiwan. He has been active in various professional societies, and was President of the Optical Society of America in 1995.

# **Rebooting Photonics**

**Milton Chang**  
**Managing Director, Incubic**

## **ABSTRACT**

What worked during the bubble economy no longer works. The speaker will address how one can cope with the current downturn in photonics: the business models to follow in starting a company, the right strategies for existing companies, and also how to prepare one's career in order to have open-ended opportunities.

## **BIOGRAPHY**

**Milton Chang** is Managing Director of Incubic, and Chairman of Arcturus Engineering, and OEpic. He also sits on the Boards of Lightwave Electronics, OpVista, Rockwell Scientific, and YesVideo. Prior, he was President/CEO of Newport and New Focus. He has incubated more than a dozen companies without a single failure and this effort continues at Incubic Entrepreneurs Fund ([www.incubic.com](http://www.incubic.com)). He earned BS with highest honors from the University of Illinois, and MS and Ph.D. from the California Institute of Technology all in Electrical Engineering. He is a Fellow of the Optical Society of America and the Laser Institute of America, and is currently the President of the IEEE Laser Electro-Optical Society. He writes monthly business columns for the Laser Focus World and the Photonics Spectra.

# **Silicon Based Integrated Photonic Circuits: A Paradigm shift of Fiber Optical Technology Toward Low Cost Optical Communication Systems**

Chi Wu  
Founder of LightCross Inc.  
(626) 255-5857

## **ABSTRACT**

Data traffic, with the growth rate of 90% per year, has exceeded the voice traffic in year 2001, which has a growth rate of 10% per year. However, the capital cost and operating cost for transmitting data traffic rise much quicker than its revenue and profit. This is one of the major challenges for carriers.

Integrated photonic circuits, just like Moore's Law, are about getting more for less. It offers more functionality, better performance, and better reliability, for the smaller size, lower power consumption, lower cost and simple logistics. It addresses exactly the most critical need for the reduction of network capital and operating cost.

In this presentation, different materials of fabricating integrated photonic circuits will be compared. The challenge, advantages, and future perspectives of Silicon based integrated optical circuits will be discussed. It concludes that silicon based Integrated optical circuits riding on the back of the success of silicon IC technology, which is now being commercially implemented in 12 inch wafers, will provide future solution for the lowest cost and large volume optical components for optical communication systems.

## **BIOGRAPHY**

**Dr. Chi Wu** is the founder of LightCross Inc., a developer of integrated optical circuits based on silicon waveguide technology and Fabry-Pérot model. He has been the founding CEO and President of LightCross from 2000-2001 and Chief Technical Officer and Executive Vice President from 2001-2002. For the first time, LightCross has developed, transferred and demonstrated that integrated optical components, such as AWG and VOA can be fabricated at a traditional IC foundry. He was employed at the Jet Propulsion Laboratories affiliated with the California Institute of Technology from 1997 to 2000. At JPL, Dr. Wu was the task manager and principal investigator on revolutionary optical component projects. His research resulted in a proprietary fabrication technology that permits the manufacture of passive and tunable optical networking components based on well-developed silicon IC fabrication facilities. Dr. Wu has also demonstrated and patented a high-speed, fully non-blocking optical cross-point switch.

Dr. Wu began his research into optical components in 1986 as a visiting research scholar at the University of California at Santa Barbara, and later at the University of Toronto, where he received his Ph.D. as part of a fellowship from Nortel. In 1992, he initiated and developed Nortel's first tunable filter project, achieving a record-setting tuning range of 80nm. In 1994, Dr. Wu initiated and served as project leader for the development of Nortel's first optical switch. For his pioneering research on tunable WDMs at Nortel and the University of Toronto, Dr. Wu received the 1996 Natural Sciences and Engineering Research Council (NSERC) National Silver Medal Award. In addition, Dr. Wu was the founding president of the Canadian Chapter of the Photonics Society of Chinese Americans, the first vice president of PSC Southern California Chapter, and the Chairman of the Toronto chapter and Treasurer of the Ottawa chapter of IEEE LEOS. Dr. Wu holds a total of 11 U.S. patents and has over 45 U.S. patent applications pending.

## **Metro and Access Networks in China**

**John Yu**

**ZTE Communications USA, Inc.**  
**Dallas, TX USA**

**Abstract**

When Northern American optical market slows down and continues to consolidate this year, eyes have been watching outside of US market, especially on China. We will first analyze overall optical market in China with a detail look of why China optical market is booming, from technology selections to the government regulations. Secondly, we will present China metro/access market situation and special requirements with a real metro network as an example. Then we will look at the metro/access system technologies, such as SDH/SONET, Ethernet, etc, and component technologies such as MUX/DMUX, OADM, etc. We will also briefly discuss how to enter China market as small or big component vendors. Finally, we will introduce ZTE optical communication technologies, especially the metro optical solution.

**Biography**

**Jun (John) Yu** received the B.Sc. and M. Eng. degrees in Applied Physics from Nanjing University of Science and Technology, China in 1982 and 1985 respectively, and Ph.D. degree in EE with a major in Optoelectronics from Queen' s University, Canada in 1994. From 1992 to 1998, he was a senior member of Scientific Staff at the Advanced Technology Lab, Nortel Networks, Ottawa, Canada, where he was a designer of 10Gb/s InP optical modulator and high speed GaAs IC. From 1998 to 2000, he was a staff technical team leader in the lightwave transmission department of Alcatel USA, Dallas, working on 10Gb/s high-speed line-card hardware development. From 2000 to 2001, he joined Avanex Corporation, Dallas, as a director of product marketing, responsible for subsystem product development, OEM projects as well as sales in China. Since October 2001, he has become a general manager in ZTE Communications USA, Inc. at Dallas, a subsidiary company of ZTE Corporation, China. Dr. Yu has been awarded four US patents and published more than 10 papers in IEEE journals and conferences.

# Status of Optical Amplifiers: System Applications and Component Requirements

*Yan Sun, Simon Chen, and Yongan Wu*

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## Abstract

The recent progress in optical amplifiers is reviewed in this talk. To meet the traffic demands and to cut the equipment and operation costs, fiber-optic communication systems are focused on four areas: longer reaches, wider bandwidths, higher speeds and the intelligence of the system. Several types of optical fiber amplifiers will be reviewed with the emphasis on the attributes that support system requirements in these four areas. The associated components will also be discussed.

## Biography

**Dr. Yan Sun** is the chief technical officer and vice president of engineering at Onetta, Inc. A co-founder of Onetta, Sun leads a team that focuses on the R&D of intelligent optical modules. Prior to Onetta, he worked from 1995 to 2000 on optical amplifiers and WDM optical communication systems at Bell Laboratories and optical networking group, Lucent Technologies, as a member of technical staff and then a senior manager. At Bell Labs, he and his colleagues pioneered multiple revolutionary discoveries in the area of WDM optical communications, including ultra wide band optical amplifiers, long haul transmission at terabits levels, and DWDM system transmission with semiconductor optical amplifiers. They discovered, modeled and studied the control schemes of fast power transients in optically amplified networks, and developed ultra wide band optical amplifiers for dense WDM optical communication systems.

Dr. Sun earned a Bachelors of Science in Physics from Shandong Normal University and a Masters of Science in Electrical Engineering from the University of Electronic Science and Technology of China. In 1995, he received a Ph.D. in Electrical Engineering from Stanford University. Dr. Yan was the recipient of several prestigious awards, including the Bell Labs President Gold Award from Lucent Technologies and the Innovator of the Year Trophy in Paris, France. He is the author and co-author of more than 100 publications and presentations. Dr. Sun is a senior member of IEEE and a member of OSA.

# Chaotic Optical Communication with Chaotic Pulsing Semiconductor Lasers

*Shuo Tang and Jia-ming Liu*  
*UCLA*

## Abstract

Chaotic optical communication is of great interests recently because of potential applications in secure communications and spread spectrum communications. Chaotic communication is a communication scheme that uses chaotic waveform as carrier to transmit messages. In a chaotic communication system, a chaos generator is used to generate the chaotic waveform. Chaotic waveform has the characteristics of noise-like time series and broadband spectrum, which are characteristics desired for hiding messages in both time and frequency domains. Messages are encoded onto and hidden within the chaotic waveform and further transmitted to a receiver through a communication channel. At the receiver, an identical chaos generator is used to duplicate the chaotic waveform. Message decoding is achieved through subtracting the chaotic waveform from the received signal.

Chaotic dynamics exists in many nonlinear systems. The chaotic waveform in our experiment is generated by a semiconductor laser system with delayed optoelectronic feedback. The feedback delay time, feedback strength, and DC bias current of the semiconductor laser are adjustable operating parameters. The laser system generates fast chaotic pulse stream under certain operating conditions through a route of quasi-periodicity, in which the laser dynamics develops from CW, to regular pulsing, to quasi-periodic pulsing, and finally to chaotic pulsing. The chaotic pulse stream has noise-like fluctuation in both pulse intensity and pulse interval on a sub-nanosecond time scale. The chaotic pulse stream is used to encode and decode high-speed digital messages for chaotic optical communications.

Our chaotic optical communication system is composed of two chaotic pulsing semiconductor lasers that serve as transmitter and receiver respectively. The two lasers are coupled together through a communication channel. To ensure reliable message recovery, the output of the receiver laser needs to synchronize with the chaotic pulsing waveform from the transmitter laser. The transmitter and receiver lasers are carefully chosen identical lasers and their operating conditions are fine-tuned for parameter match that is very crucial in chaotic communications. In the experiment, high quality of chaotic synchronization is achieved between the transmitter and the receiver lasers. The receiver laser nicely reproduces the chaotic waveform from the transmitter laser. In the chaotic optical communication experiment, digital messages are encoded onto the chaotic pulsing carrier through additive chaos modulation. At the receiver, the chaotic pulse waveform is subtracted from the received signal for decoding. Message encoding and decoding of pseudo-random NRZ signals at 2.5 Gbit/s bit-rate is demonstrated and good quality of message recovery is achieved. This is the first demonstration of 2.5 Gbit/s chaotic communication experiment. The success of this experiment shows that chaotic optical communication is applicable at high bit rate that matches with commercial optical communication standards.

## Cooperative- Create a new era in Chinese Photonics World

*Dr. Peter T. C. Shih*  
*Professor, Taiwan University, ROC*

## Abstract

Following last year's speech, Dr. Shih elaborates more on the subject of Optoelectronics in China, Taiwan and Chinese in North America. With the cooperative scheme in mind: cultivate and combine the value chain of the human resource, market, innovation, dynamic, finance, the strength of the tri-party. Together we can create a new era of Photonic world and eventually a Chinese Photonic World.

### **Biography**

The optoelectronic industry in Taiwan is seen as a new avenue of growth today when the development of Taiwan's Industry has reached turning point to move into higher-value-added industry. Dr. Peter T. C. Shih is among the first to recognize that optoelectronics is the key technology for developing Taiwan's high-tech industry and economy.

Dr. Shih was invited to be a technological consultant for Taiwan, Republic of China in 1982, after years of service at Rockwell SRL in the U. S. A. Owing to his suggestion, optoelectronics was approved by the government to be included as one of the major thrust area in science and technology development policy of the government. In 1984, Executive Yuan, Republic of China, appointed Dr. Shih as the executive director of Electro-optics Science & Technology Committee, National Science Council (EOC). During his tenure, he made accomplishments to the EOC's missions. He coordinated six departments to implement the 8 years program of Electro-optic Technology and Industry Development (1986-1994) with the total budget of NT\$10 billion, and additional 4 years program. (1996 – 1999). The program also created two organizations, ITRI's Optoelectronic Institute and PIDA, which geared up the development of optoelectronic industry in Taiwan.

In addition, Dr. Shih showed his insights into the cooperation among industry, government, and academy. He is the first person who proposed on the cooperation between industry and academy to the National Science Council. As a result, four optoelectronic programs of the cooperation were implemented successfully. Two of the programs achieved world record. Furthermore, he initiated the International Electro-Optic Exposition held every other year since 1987. The exposition brought great interaction between industry and academy for optoelectronic technology, product, and international image. In 1993, Photonics Industry and Technology Development Association (PIDA) was founded, under the effort of Dr. Shih, by the funding and donation of government and industry.

The other contribution from Dr. Shih is the promotion for the optoelectronic industry. He helped and led the traditional industry such as cement, textile, steel, paper, cable, etc. to re-direct their investment to optoelectronics and inspired overseas experts to invest optoelectronic product in Taiwan. He also developed international cooperation. For example, he signed agreements with Japan's OITDA for information sharing, staff visiting, report translation; co-sponsored conference with SPIE and held 4 nations Opto's meeting. Besides this, he helped form the Photonics Society of Chinese - Americans (PSC) in North America for overseas Chinese and he also helped promote the relationship between France and Taiwan in different sectors. Dr. Shih's foresight in the importance of mass media and communication channel for promotion of optoelectronics enable him to take charge of publications successfully; for example, the Opto News magazine is well received and circulated among Chinese readers around the globe. To date, Taiwan's opto industry has reached a production value total 11 billion US dollars, products such as LED, LCD, CD-R, CD-ROM, scanner emerge as number one producer in the world. Last year's investment is a record high 6 billion US dollars.

Dr. Shih's passion for the optoelectronics drives him to devote himself to develop optoelectronics for Taiwan. Meanwhile, Dr. Shih points out the "ecological society" will be the new direction for human's endeavor after the "information society". Therefore, he think that the next phase of work is again to promote optoelectronics & laser applied in ecology, environment protection, energy, bio-medicine, agriculture, and ocean for the sustainable resources and improving human's life quality for the coming 21st century.

Dr. Shih studied his Ph.D. in France, Grenoble in the 70's, he was born in August 5 1949. He is presently with the National Science Council, head of the Electro-optics Committee and also the adjunct professor at the National Taiwan University, Taipei, Taiwan. He has received numerous awards, honors from different societies, agencies & countries including UK, USA, Singapore & Japan.

# Optical Component Industry in China Market and Vendor Profile

*Zheng Liu*

*Chief Editor, China Fiber Online*

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## Abstract

In this presentation, I will introduce the whole fiberoptics components industry in China. First I will show the basic business data and main technical achievements in the year of 2001. Then from product and geography point of view, I'll introduce the total components industry in China. At the end, I will give my opinion to China's fiberoptics market and the potential hurdles.

## Biography

**Zheng Liu** was with Nanjing Fujitsu Tele-communication System Co., LTD. And worked as system engineer for Working on SDH system design from 1995-1996. From 1996 to 2001 work with Shenzhen Photon Technology Co., Ltd., as R&D engineer, Market Developing manager. Photon Technology Co. Ltd. Is a Sino-American joint venture. With Nortel (Now Agere), located in California, which is a leading company on designing and manufacturing semiconductor laser diodes and CATV systems. Liu received Technology Progress Award for the work on Sonnet OC-12 module in 1998 from Shenzhen government. His working scopes are as following: (1) Design and production of the EDFA, especially on the selecting and testing of erbium fiber, (2) Design and production of Sonet OC-12 Module at the general level of the same products from Lucent. (3) Designing and producing 2.5 Gb/s DFB modules, mainly about the matching circuit between the driving circuit and the LD. (4) Pre-research work on integrated optic circuits, DWDM passive components, like filter, switch etc. (5) Marketing of CATV system, especially 1550nm system. (6) Marketing of IP network. The work mainly helps to satisfy the request of our customers. In detail, my work is about the network design, choosing suitable gigabyte Ethernet equipment, and developing the equipment. (7) Creating personal Chinese fiberoptics homepage [Http://www.c-fol.net](http://www.c-fol.net), which is a website about fiber optics product, figure, manufacture, technology in China. From July 2001–now, he worked as a chief editor of CFOL.

Mr. Liu has B.S. degree on 1992 from Physical Electronics of Southeast University located in Nanjing, Jiangsu Province. The graduate work covered the coupling between the laser diode and the fiber, electronic tunable liquid crystal filter. The coupling efficient reaches 30% and the filter shows the basic characteristics. He received Master Sc. on Lightwave communication on 1995 from Southeast University, Nanjing Jiangsu Province. His thesis topic is "The Experimental and Research Work on Fiber Ring Laser". The final output power reaches 10dBm and the noise figure reaches 4dB. In 1994, He worked in the E.E. department of the Chinese University of Hong Kong and assisted Dr. K. T. Chan. His fiber ring laser produced ultra-short (~20 pico-seconds) pulses. Mr. Liu has been published over seven papers and also won a couple of Certificates. Mr. Liu is interested in reading, arts, history, running, swimming, and computers etc.

# Optical Component Industry In Taiwan Market and Vendor Profile

*Kaofeng Tsai*

*President, RiteKom Photonics Corp*

*Tel: 886-35-828270, Fax:886-35-828455*

## Abstract

This presentation will cover the Opto-electronics industry development status in Taiwan and also address the strength and the opportunity for attacking global market. In particular, models for cooperation between Taiwan and China in optical communication market will be presented. A brief introduction of Ritekorn Photonics Corp will also be given.

## Biography

**Mr. Kaofeng Tsai** (President of RiteKom Photonics Corp.)

He received BS degree from National Tsing-Hua University, Taiwan in 1979 in Nuclear Engineering. And later he received MS degrees of Chemical and Electrical Engineering majored in III-V Phase-Modulator in Optical Communication, from University of California at Santa Barbara in 1984.

From 1984 to 1988, he worked in Siemens Research Corp on designing and characterizing III-V phase modulators for high-speed optical communication systems.

He joined Telecommunication Laboratory of Chung-Hua Telecom, Taiwan on optical active/passive devices and systems in 1988 at the same time he was a visiting lecturer of Chung-Hua University on optical fiber sensing.

In 1990 he founded Baycom Opto-Electronics Technology in Hsinchu Science Park. The company produced optical fiber cables, passive components and optical transceiver. During his President period from 1996 to 2000, Baycom was recognized as the most successful company in optical fiber and component.

In 2001 he founded RiteKom Photonics Corp for developing & marketing (1) optical fiber pre-form, fiber and cable; (2) optical transceivers/transponders from 100Mbps to 10Gbps for Ethernet, Fiber Channel, ATM and other protocols.

Due to his long-term involvement in the opto-electronics and optical communication industry, Mr. Tsai was frequently invited by Institutes of China and Taiwan to give talks on industry analysis, optical technology trend, globalization, corporate management and investments advisor.

In 2000 and 2002, Mr. Tsai served as the Chairman of Taiwan Optical Fiber Communication Forum, one of Forums of PIDA.

## Status and Future Opportunities in the Optoelectronics Business in Taiwan

**Dr. Y.S. Liu**  
**VP of ITRI, ROC**



**Biography**

**Dr. Yung S. Liu** is Fellow and VP of Industrial Technology Research Institute (ITRI) and currently serves as General Director of the Opto-Electronics and Systems Labs (OES) in charge of the optoelectronic R&D program of ITRI in Hsinchu, Taiwan. He received his Ph.D. in Applied and Engineering Physics from Cornell University and BS in Physics from National Taiwan University.

Before returning to Taiwan in 1998, he was with GE Corporate R&D Center in Schenectady, New York, and had managed various R&D programs on advanced technology development in interconnect, optoelectronic packaging, micro-fabrication and processing, and solid state laser and nonlinear optical materials and devices. He received many awards and honors including GE Managerial Award for his leadership role in development of slab laser technology and business, GE Outstanding Achievement Award for his major contribution to the solid-state slab laser technology, GE Patent Awards, and Publication Awards. In 1998, Dr. Liu was selected by Industry Week's as one of the "50 R&D Stars to Watch" for his pioneering effort in the development of advanced optical interconnect technology for advanced digital systems.

Dr. Liu is Fellow of the Optical Society of America (OSA), Fellow of PSC, a Senior Member of IEEE, and a member of American Physical Society, and SPIE. He was also active in the community services. In 1996-97, he was President of the Chinese Community Center of the Capital District, New York—a non-profit organization that serves the Chinese community in the Capital district of New York with 300 family members. He was also the publisher of CCC News, a monthly publication that has over 400 copies in circulation. While in college at National Taiwan University, he was the founder and publisher of the "New Hope Magazine", a publication that advocated the student movement.

# **The Challenge and Opportunity of ULH DWDM System in China**

*Ping An Zhang*

*V.P. of Huawei Technologies Cop*

## **Abstract**

As it is well known that, after restructuring of the China telecom industry, there will be four huge carriers. At the same time, all the infrastructure networks will face new challenges and more opportunities to adapt to this change. For ULH DWDM transmission system, the four carriers have different requirements and considerations based on their traffic and different regional economic conditions. ULH DWDM trial systems beyond 1000km and over 40chs without regenerator will be possibly built this year. To help further understanding the optical network market in China, a brief introduction to Huawei, which is the biggest optical network equipment vendor in China, will be given.

## **Biography**

**Ping An Zhang**, received his B.E. from XiDian University in 1993, M.E from Zhejiang University in 1996, P. R. China, all majored in EE. He joined the R&D department of Huawei Technologies Co. Ltd. in 1996 to develop the series SDH and DWDM systems. Now, Mr. Zhang, as the vice president of R&D, is responsible for the R&D activities in Optical Networking Department which cover all optical networking systems including NG SDH/SONET, metro DWDM, LH/ULH DWDM and other optical systems in access application.

**Fund Raising for Opto-electronics Company under Current Economic Situation**

*Mike Feng*  
*Partner at InveStar Capital, Inc*

### **Abstract**

Fund raising for high-tech startups has undergone tremendous changes in the past two years. Valuation is lower, terms are tougher, closing cycle is longer, and the number of funded financing rounds is fewer. To address some of the challenges facing start-ups when raising funds, Mr. Mike Feng will speak on the topic, “fund raising for opto- electronics company under current economic situation”, which consists of:

- (1) A Review of the Equity Financing Situations between 1998-2001
- (2) A Current Outlook on Venture Trends for 2002
- (3) Some Key Aspects VCs Look for When Funding a Financing Round
- (4) A Look at Some Alternative Funding Sources

### **Biography**

**Mr. Mike Feng** is a Partner at InveStar Capital, Inc. Since joining the company in January 2001, Mr. Feng is responsible for InveStar's Irvine Office. Mr. Feng has nearly 20 years of experience in the document scanning, electronic imaging and software industries. Before joining InveStar, Mr. Feng has spent more than 9 years as the President of Mustek (USA), a leading scanner, DVD and digital camera company with annual revenue over \$100 million. Prior to that, Mr. Feng worked for U-Lead Systems, Microtek Lab, and FileNet in various technical and management positions. Mr. Feng currently sits on the Board of Directors of several hi-tech companies including Mustek, Match Lab, Newport Opticom, and OmegaBand. Mr. Feng is also a member of the Advisory Board of Asia Optical. Mr. Feng holds a Master of Science degree in Electrical Engineering from the University of Southern California and a Bachelor of Science degree in Communication Engineering from National Chiao-Tung University.

# A VC's Perspective on Photonics Investment

*Ron Cao*

*Investment Manager, KLM Capital Group*

## Abstract

Both 2000 and 2001 were very difficult years for venture investments. For venture capitalists, those two years were the worst years ever on record in terms of returns. According to Venture Economics, the average median net IRR to LPs for vintage year funds between 1981 and 1998 were over 20%, while the 1999 and 2000 vintage year funds have significantly under-performed with negative double-digits returns so far. These numbers will get worst as more startups file for bankruptcy and fund manager continue to re-value their portfolios.

At the heart of the telecom meltdown lies fiber optics. VCs poured a record amount of dollars into photonics from 1999 to 2001. Some of the early investments paid off, while most VCs are scrambling today to find any liquidity for their portfolio. As the photonics market continue to stabilize and consolidate, a couple of things are clear.

1) The first generation of technology is relative mature

2) Market is small. The most dominant player in this market, JDSU, only generated 286M in revenue this last quarter.

Currently, VCs are spending most of their time/money "rescuing" their current portfolio companies. Most of the new deals closed today are second and third round opportunities at first round prices. Only a few first round deals are being done, because of funding risk and lack of visibility to revenue. VCs are going to school to learn the basics. Business plans with incremental technology are simply not going to be funded. Technology itself is not enough. Revenue, cost and road to profitability are pretty important things too. Experienced management team is a must. Valuations will continue to be low/or/back to "normal".

Going forward, many VCs will all-together stop investing in fiber optics. Other VCs who might have longer horizon or more balanced portfolios will continue to look for innovations in this space. Unlike the .com bubble, technology innovation will continue to generate value in photonics. Some of the interesting areas of development include planar integration, low cost amplifiers, reconfigurable/tunable devices, and high-speed electronics. For entrepreneurs who truly have something unique, this is absolutely the perfect time to start your business. Large companies are forced to focus on short-term revenue. As they cut down their R&D efforts, this is the perfect opportunity for startups to charge ahead. Find patient investors with experience and knowledge in your space and start your business today!

## Biography

**Ron Cao** is an Investment Manager at KLM Capital Group focusing on communications related investments. Prior to joining KLM in 1999, Ron was a technical marketing manager at Intel responsible for the launch of its mobile Pentium III processor. Prior to that, Ron was an operation supervisor involved with the development and ramp of Intel's 0.25u manufacturing process. The portfolio companies that Ron is actively involved with include Umachines, Wavestream Photonics, Novera Optics, and

Amplify.net. Ron received both his M.Eng. & B.S. in Electrical Engineering from the Massachusetts Institute of Technology.

KLM Capita Group, a global technology venture partner, focuses on early stage investments in the communications, information technology and semiconductor industries and maintains offices in Silicon Valley, Austin and Hong Kong. For more information, visit KLM's website at [www.klmtech.com](http://www.klmtech.com).