

Photonics Society of Chinese-Americans

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Content

President's Message	Bob Lin	Page 2
1999 PSC Officers	C.C. Shih	Page 3
Scholarship Announcement	C.C. Shih	Page 4
Scholarship Form	C.C. Shih	Page 6
Photonics Laboratory	Shun-Lien Chuang	Page 7
PSC Member File	Haifeng Li	Page 9

President's Message

Dear PSC Members,

I am pleased to announce that Northern Chapter of PSC has the monthly speaker videotapes available with a donation fee of \$15 for members and \$30 for non-members (to recoup the cost) in addition to shipment cost. Please check the web page (www.psc-eoa.org) for the titles and speakers. The subjects range from fiber optic communication, laser and applications, computer peripheral (display, storage etc) to venture and investments.

From the new IPOs (initial public offer), I noticed that fiber optic companies for broadband communication have become new super stars in the Wall Street. If you have good products, even in its infancy, the Wall Street rewarded you with billions of dollars. I hope some of you who have started or like to start a new business can use PSC for networking because our members have a wide spectrum of disciplines.

Regarding to PSC, we still face two major issues: communication and finance. PSC seems still not a cohesive organization due to the geographic locations and wide variety of disciplines of members. I would like to hear any suggestions in this matter. We have sought additional income by promoting advertisements in our directory. The progress is slower than my expectation; we should try hard to move forward. I still have not heard any similar efforts. Any who would like to help, please contact the president of your chapter.

I would like all of you to participate in at least one of the sub-groups which would focus on specific areas or topics matching your interest. Some of the proposed groups include lasers and their applications, opto-electronics and communications, peripherals (display, digital image, storage, printers, etc.), and instrumentation. I am still looking for volunteers who would like to lead special interest group and contribute their expertise to our members. The group leaders will coordinate and support PSC activities, schedule group meetings, facilitate communication among members, and serve as a mentor or advisor to our members.

Finally, I welcome any suggestions that would make PSC more useful to you and other members. I can be reached by e-mail: blin@hplabsz.hpl.hp.com or by phone: 650-857-7218 (O), 408-253-7388 (H).

Sincerely,

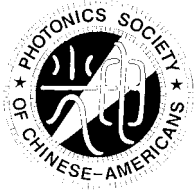
Bob Lin

1999 PSC Officers:

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The Photonics Society of Chinese-Americans

Announcement

The Sixth Bor-Uei Chen Memorial Scholarship Award

by *Chun Ching Shih*, Chair

On behalf of the Bor-Uei Chen Memorial Scholarship Committee, I am pleased to announce that the sixth scholarship will be awarded in the 2000 PSC Annual Meeting in the Bay Area, California. This year, the committee would like to move up the announcement date, so that the prospect candidates have more time to prepare their application. The Committee is now accepting nominations of qualified candidates from any **sponsoring PSC members**. You can copy the nomination form on the next page for your own use and attach any supporting document to demonstrate candidate's achievements in academics and research. Form is also available on PSC web sites: (www.psc-a.org) (www.psc-sc.org) or (www.brigadoon.com), or send your request directly to me at cc.shih@trw.com. The nomination deadline is **February 28, 2000**. Any nominations received after this date will not be considered. Here are some highlights about this memorial scholarship:

1. The purpose of this scholarship is 1) to honor Dr. Bor-Uei Chen for his contributions in photonics and his services to the photonics community; 2) to recognize outstanding graduate students in the field of **optical communications** and **photonic devices**.

2. A scholarship committee, appointed by the PSC Board of Directors, is responsible for making announcements, conducting fund drive, and overseeing the selection process. The members of the first Scholarship Committee include

Chun-Ching Shih (Chair)
Tingye Li
Pochi Yeh

Chinlon Lin
J.Y. Ray Chen
Bob Lin

Hsing Kung
Arthur Chiou
Shui-Lin Chao

3. Each year, the Committee will issue a call for nomination on the October or January issue of *Photonics Link*. The committee will oversee the review process of applications and make recommendations to the PSC Board of Directors for final approval. The winner or winners will be announced on the April issue of *Photonics Link*.

4. The selection of scholarship winners will be based on the merit of candidate's research work, which must be documented by publications on technical journals or conference presentations and supported by strong recommendation from the candidate's sponsor or advisor.

5. The scholarship award consists of an award certificate and a check of \$1,000. The amount of scholarship and the number of winners may vary, and the Committee reserves the right to make any changes as necessary. The winners in past years include:

1995: Lih-Yuan Lin (UCLA) Jerry Chen (MIT) Yan Sun (Stanford)
1996: Li-Ping Chen (UCLA) Yongan Wu (Stanford) Wei-Chiao Fang (UIUC)
1997: Wenhua Lin (UMBC)
1998: Xiaonong Shen (UCSB) Jianhua Zhao (UCSB)
1999: Ming Li (Rensselaer) Alan Yuan-Chun Hsu (UIUC)

In 2000, the Committee plans to select one or two award winners.

6. The scholarship will be awarded annually and presented at the PSC Annual Meeting. The winners will be invited to give a short presentation about his/her research. They should make every effort to attend the Annual Meeting.

7. Key dates:	December 1, 1999	Announcement on <i>Photonics Link</i> and web sites
	February 28, 2000	Deadline for receiving nomination materials
	March 21, 2000	Review by the PSC Scholarship Committee
	April 1, 2000	Announcement of winner on <i>Photonics Link</i>
	May, 2000	Scholarship awarded at the Annual Meeting

The Photonics Society of Chinese-Americans

Dr. Bor-Uei Chen Memorial Scholarship Award Nomination Form

(Attaching a brief resume to this form is recommended)

Full name of nominee _____

Date of birth _____ Place of birth _____

Address _____

Tel _____ Fax _____ e-mail _____

School attending _____

Department _____

Major research areas _____

Degree program _____ Year expected to receive the degree _____

Thesis title (if any) _____

Thesis advisor (if applicable) _____

School of undergraduate _____

Major in undergraduate _____ Graduation year _____

Papers & Patents* _____

Honors & Awards* _____

* Attach a separate sheet if necessary

Other comment (such as special projects, outstanding research achievements, etc.)

Sponsor's name _____ Tel _____

Address _____

Sponsor's signature _____ Date _____

Return this nomination form, together with supporting information, no later than February 28, 2000,
to: Chun-Ching Shih, PSC, 1517 Via Fernandez, Palos Verdes Estates, CA 90274, USA

Photonics Laboratory File

We are pleased to present to you an inside view of a distinguished photonics laboratory under the supervision of Prof. Shun-Lien Chuang in University of Illinois at Urbana-Champaign

Professor Chuang has been conducting research on the physics of optoelectronic devices since he joined the University of Illinois at Urbana-Champaign in 1983. He has developed theoretical models for strained quantum-well lasers including the electronic band structures and optical gain, and terahertz generation from semiconductors using femtosecond lasers. After taking a sabbatical leave from the University of Illinois to visit Bell Laboratories in 1989, he established a laboratory to conduct experiments on quantum-well device physics including high-speed modulation of lasers. The purpose of the lab is to confirm theoretical results with experimental results directly.

His major research topics are as follows.

1) Semiconductor strained quantum-well lasers [1]-[3]

The goal is to develop band structure models for materials systems including InGaAsP and InAlGaAs for 1.30 and 1.55 micron wavelength applications, GaN- and ZnSe-based crystals for blue-green lasers, and Sb-based materials for type-II mid-infrared lasers. These materials systems contain interesting physics due to strain effects on the band-edge effective masses, optical polarization selection rules, and semiconductor laser characteristics. For example, GaN-based heterostructures have new effects such as piezoelectric and spontaneous polarizations, which affect their electronic and optical properties.

2) High-speed quantum-well lasers and electroabsorption modulators [4]

Direct microwave modulation of quantum-well lasers is being investigated to understand the carrier transport effects. Carrier injection by an external optical pump laser is compared with the direct electrical injection. External modulation using an electroabsorption modulator (Figure 1) is also studied to reduce chirp. Prof. Chuang and his graduate assistants also developed theoretical models for understanding the spatial hole burning in these coupled-cavity structures with a distributed-feedback laser section. A reversed coating structure (high-reflection in the modulator side and anti-reflection in the laser side) of the device in Fig. 1 has also been investigated for tunable laser applications [4]. They have also demonstrated successful wavelength conversion including four-wave mixing, cross-gain and cross-absorption modulation using DFB laser and integrated laser-modulator devices.

3) Modeling and experiment on vertical-cavity surface-emitting lasers (VCSELs)

Theoretical models based on beam-propagation method (BPM) [5] and finite-difference time-domain (FDTD) method have been used to understand the performance of VCSELs. The goal is to model the cavity loss in different optical confinement structures such as the selectively

oxidized aperture VCSELs. Also, the high-speed modulation response has been investigated in VCSELs from his collaborators at HP Labs (Agilent Technologies) and Sandia National Laboratories.

In addition, Professor Chuang's group conducts research on terahertz generation from semiconductor quantum wells [6] and fiber-optic sensors. For more information on his group activities and publications, please visit his website at: <http://www.staff.uiuc.edu/~s-chuang/>

References:

- [1] J. Minch, S. H. Park, J. Minch, and S. L. Chuang, "Theory and Experiment of InGaAsP and InGaAlAs long-wavelength strained quantum-well lasers," *IEEE J. Quantum Electron.*, vol. 35, pp. 771-782, 1999.
- [2] S. H. Park, S. L. Chuang, and D. Ahn, "Piezoelectric effects on many-body optical gain of zinc-blende and wurtzite GaN/AlGaN quantum-well lasers", *Appl. Phys. Lett.*, vol. 75, pp. 1354-1356, 1999.
- [3] T. Keating, S. H. Park, J. Minch, X. Jin, S. L. Chuang, and T. Tanbun-Ek, "Optical gain measurements based on fundamental properties and comparison with many-body theory," *J. Appl. Phys.* Sept. 1999.
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- [5] J.-F. P. Seurin and S. L. Chuang, "Discrete Bessel transform and beam propagation method for modeling of vertical-cavity surface-emitting lasers," *J. Appl. Phys.*, vol. 82, pp. 2007-2016, 1997.
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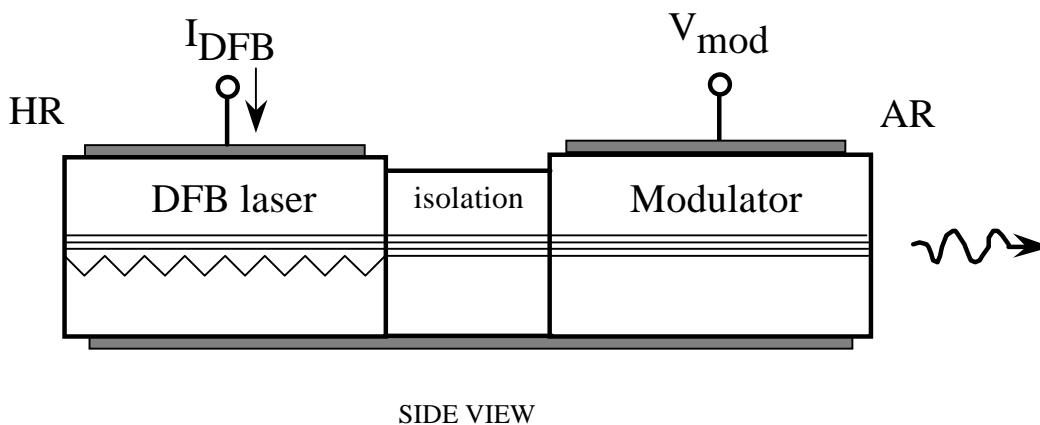


Figure 1. Schematic of a distributed-feedback laser integrated with an electro-absorption modulator separated by an isolation region. A dc current drives the laser section. The output light is modulated by the reverse-biased modulator section.

PSC Member File

G-K Chang Named Telcordia (Formerly Bellcore) Fellow

By Haifeng Li

Gee-Kung Chang, best known as G-K in the Chinese Photonics Society, was elected Telcordia Fellow. For many of us, the new generation in this field including myself, G-K is not only a kind supervisor, a good mentor, but also a best friend.

A brief description of his accomplishments is provided below according to Richard S. Wolff, Vice President, Advanced Network Systems Research Lab, Telcordia Technologies

Gee-Kung Chang is the Director of Optical Internetworking Research Group in Telcordia Technologies. He is currently the principal investigator of IP directly over WDM using Optical-Label Switching techniques for DARPA sponsored NGI project. He is also in charge of system testing, integration, and interoperability of multi-vendors network rings for the MONET Washington DC Network Testbed. He led a team to deliver a wide variety of software controlled and managed WDM network elements in LEC network testbed and provided high bandwidth real-time services and applications for the MONET New Jersey Area Network which demonstrated a national-scale reconfigurable transport network. He led a team that designed and demonstrated the first reconfigurable, multiwavelength all-optical network testbed for the ONTC consortium in 1994.

G-K Chang received his Ph. D. degree in Physics from the University of California, Riverside and a B. S. degree from National Tsing Hua University in Hsinchu, Taiwan. G-K joined Bell Laboratories as a Member of Technical Staff in Murray Hill, New Jersey in 1979. He has been granted twelve patents and six more are pending in the area of opto-electronic devices and circuits, and multiwavelength optical networks. He has co-authored over 110 Journal and Conference papers. G-K is a co-chair of IEEE LEOS Topical Conference on Broadband Optical Networks, and the chair of Networks Committee of 2000 Optical Fiber Communications Conference (OFC'00) for Network Switching, Access, and Routing. G-K is also a guest editor for the IEEE Journal of Lightwave Technologies.