Introduction to the Issue on Integrated Optics and Optoelectronics

THIS ISSUE of the IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS focuses on recent progress in the fields of guided-wave devices, photonic integrated circuits, and optoelectronic integrated circuits. Published jointly with the JOURNAL OF LIGHTWAVE TECHNOLOGY, the issue's invited and contributed papers summarize and highlight new developments in devices, circuits, modeling and related technologies. This issue includes both analytical and experimental results for passive and active structures in a variety of dielectric and semiconductor materials. With respect to semiconductor diode lasers, progress in laser arrays is covered in the issue, but discrete lasers are excluded.

Some of the most exciting developments in guided-wave optics in the past several years have been the widespread commercial deployment of integrated devices and circuits for both analog and digital fiber optic communication systems. Intensity modulators in $LiNbO_3$ are commonly used in trunking CATV transmitters and multigigabit dense wavelength-division-multiplexing (DWDM) transmitters for both long-haul terrestrial and submarine systems. Integrated distributed-feedback (DFB)/electroabsorption modulators are also widely used in DWDM transmitters. Arrayed waveguides in silica/silicon are used for wavelength mux/demux functions and similar glass guide structures are used for power splitting. Finally, optical switches and attenuators formed from polymer and silica guides are beginning to be deployed in fiber systems. In addition to these devices, commercial waveguide modeling capabilities are now available and finding much use. All of these commercial successes are based on the research of previous years, much of which has been reported in earlier journal issues. The papers presented in this Selected Topics Issue, some of which are highlighted below, will no doubt help strengthen the knowledge base for further applications of integrated optics.

The invited papers in this issue cover a broad range of topics and summarize much of the state of the art. They are complementary to the eighteen contributed papers in the issue. For silica/silicon guided-wave circuits, Kato and Tohmori of NTT summarize the status of hybrid silica circuits in which active/semiconductor devices are incorporated in the guided-wave structures, and Miya of NTT reviews the status of passive and thermooptically tuned devices, with emphasis on arrayed waveguides. Eldada and Shacklette of Allied Signal provide a review of polymer waveguides and circuits, including recent progress in very low loss devices and photosensitive materials. For $LiNbO_3$, Wooten *et al.* of JDS Uniphase summarize the status of high-performance devices with emphasis on manufacturability and reliability issues, and Becker *et al.* of the University of Paderborn review progress in Er-doped active devices that can be used in many applications. Finally, Scarmozzino, Gopinath, Pregla, and Helfert of RSoft, University of Minnesota, and Fern Universitat, respectively, review the status of the techniques and methodologies of waveguide modeling.

We hope that this issue will be a useful reference for some of the recent progress in integrated optics and that it will stimulate new ideas for further advances in the technology, performance, and applications integrated optical devices and circuits. We would like to especially thank the authors and reviewers of this issue for their invaluable contributions.

FRED J. LEONBERGER, *Guest Editor*
JDS Uniphase Corporation
Bloomfield, CT 06002 USA

HANS MELCHIOR, *Guest Editor*
Swiss Federal Institute of Technology
Institute of Quantum Electronics
CH-8093 Zurich, Switzerland

RICHARD M. OSGOOD, JR., *Guest Editor*
Columbia University
New York, NY 10027 USA

YUZO YOSHIKUNI, *Guest Editor*
NTT Photonics Laboratories
Kanagawa 243-0198, Japan

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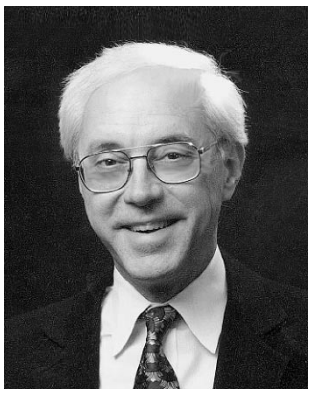


Fred J. Leonberger (S'69–M'69–SM'81–F'85) received the B.S.E. degree from the University of Michigan, Ann Arbor, and the S.M., E.E., and Ph.D. degrees from the Massachusetts Institute of Technology, Cambridge, all in electrical engineering.

He is Senior Vice President and Chief Technology Officer of JDS Uniphase Corporation. He previously held a similar position at Uniphase Corporation prior to its merger with JDS Fitel in July, 1999. He was a cofounder of UTP and served as its General Manager from 1992 to 1995. From 1984 to 1991, he was Manager of Photonics & Applied Physics at the United Technologies Research Center. From 1975 to 1984, he was with MIT Lincoln Laboratory, first as a Staff Member and later as a Group Leader. His past technical efforts have centered on the development and system applications of guided wave and optoelectronic devices. He has served as President of the IEEE Lasers and Electro-Optics Society, an Associate Editor of the JOURNAL OF QUANTUM ELECTRONICS and of *Optics Letters*, and as Chairman of several IEEE/OSA conferences.

Dr. Leonberger is a Fellow of the Optical Society of America and has been awarded the IEEE Quantum Electronics Award and the UTC George Meade Medal.

Hans Melchior (S'62–M'65–SM'80–F'95) was born in 1935 in Pontresina, Switzerland. He received the Dipl. Elec. Ing. and the Dr.Sc.Techn. degrees from the Swiss Federal Institute of Technology (ETH) , Zürich, Switzerland, in 1959 and 1965, respectively.

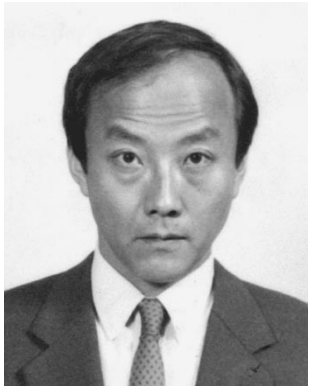
From 1965 to 1976, he was with Bell Telephone Laboratories, Murray Hill, NJ, where his research activities included the development of high-speed silicon and germanium photodetectors and the realization of avalanche photodiodes and optical receivers for the first field demonstrations of fiber optical communications. He is also the inventor of a laser-addressed liquid crystal flat panel display. Since 1976, he has been Professor of Electronics at the Swiss Federal Institute of Technology and from 1984 to 1986, he was Dean of the Department of Electrical Engineering. From 1988 to 1990 and 1994 to 1996, he was Head of the Institute of Quantum Electronics, Zurich, Switzerland, where he was responsible for the Microelectronics and Optoelectronics Laboratory, which he still leads. Since 1987, he has been active in photonics and optical communication projects in the European Union (EU). He is involved in several research projects and served many years as auditor and chairman of the concertation meetings of photonics and optical communication projects. He is author or co-author of over 200 scientific papers.

Prof. Dr. Melchior is a member of the Swiss Academy of Engineering Sciences. He was a recipient of the 1990 GEP Prize for efforts towards European research. He also has participated in organizing committees of numerous scientific conferences, including the European Conference on Optical Communication and the Semiconductor Laser and the Optical Amplifier Conferences. From 1984 to 1986, he was an Associate Editor of the JOURNAL OF LIGHTWAVE TECHNOLOGY. From 1992 to 1994, he served on the board of Governors, and in 1999 he was president of the IEEE Society of Lasers and Electro-Optics.

Richard M. Osgood, Jr. (SM'82–F'87) received the B.S. degree in engineering at the U.S. Military Academy, West Point, NY, the M.S. degree in physics at Ohio State University, Columbus, and the Ph.D. degree in physics at the Massachusetts Institute of Technology (M.I.T.), Cambridge.

He is currently a Higgins Professor of applied physics and of electrical engineering at Columbia University, New York, NY. Prior to this appointment, he served on the scientific staff of M.I.T., Lincoln Laboratory (Solid-State Physics Division), Lexington, MA, the U.S.A.F. Avionics Laboratory and the U.S.A.F. Materials Laboratory. Throughout his professional career, he has performed research in many areas of optical physics, chemical physics, and electrical engineering. His most extensive research has been in the development of new infrared and ultraviolet lasers, the applications of laser-induced chemistry to materials preparation and fundamental optical surface physics and chemistry. He was also appointed Distinguished Traveling Lecturer of the APS for 1991–1993 and of IEEE-CLEOS for 1986. Along with S. Brueck, he organized the first MRS Symposium on Laser Diagnostics and Photochemical Processing. In October of 1983, Dr. Osgood was elected to a three-year term as councilor of the Materials Research Society. In 1990, he was honored with the Japanese Optoelectronic Industry and Technology Development Association (OITDA) Lectureship. He was formerly the Codirector of the Columbia Radiation Laboratory and is currently Technical Director. He was also the Director of the Columbia Microelectronics Sciences Laboratories. He has served as a Consultant to numerous government and industrial organizations, including the DARPA Defense Sciences Research Council, DOE Basic Energy Sciences Advisory Board, and the Advisory Board for the Los Alamos National Laboratory Chemical Sciences Division. In 1998, he was appointed to the Advisory Board of Brookhaven National Laboratory.

Dr. Osgood is a member of the ACS and MRS. He is a Fellow of the Optical Society of America and the American Physical Society. In 1991, Dr. Osgood received the R.W. Wood Prize from the Optical Society of America.



Yuzo Yoshikuni was born in Tokyo, Japan, in 1954. He received the B.S. M.S., and Ph.D. degrees in applied chemistry from Tokyo University, Japan, in 1977, 1979, and 1983, respectively.

He joined the NTT Electrical Communication Laboratory in 1982. Since then, he has been engaged in research on single wavelength GaInAsP–InP lasers. His major works have been concentrated on device designing and its characteristics analysis including the relevant measurements and computation. He was with British Telecom Research Laboratories as a visiting Researcher, where he was engaged in research of semiconductor optical amplifiers. In 1990, he stayed in Research Center for Advanced Science and Technology (RCAST) of Tokyo University as an Associate Professor and is currently engaged in research on semiconductor integrated optical devices and tunable lasers as a Senior Research Engineer in NTT Photonics Laboratories.

Dr. Yoshikuni is a member of the Institute of Electronics, Communications Engineers of Japan and the Japan Society of Applied Physics, and the IEEE Lasers and Electro-Optics Society.