Guest Editorial
Special Issue on Microwave Photonics

AS GUEST EDITORS, we are pleased to introduce this eighth Special Issue of the IEEE/OSA JOURNAL OF LIGHTWAVE TECHNOLOGY and the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES on Microwave Photonics. As with the previous seven special issues devoted to this subject, the papers will be made available to subscribers of both IEEE societies.

Microwave photonics can be defined as the research and development of photonic components operating at microwave to THz frequencies as well as their applications in systems such as broadband wireless communications, analog optical RF links or antenna remoting. Starting from early experiments in the late 1970s, the field has significantly expanded. It has created new technologies and applications of commercial interest. The growth of the field can also be seen from the exceptional response to our call for papers. We received a remarkable number of 96 papers from around the world, including 12 invited papers. Submissions were balanced across industry and academic contributions, with an application focus spanning short- and long-term. From the submitted manuscripts, and with the assistance of an international team of expert reviewers, we have selected 47 contributed papers to be published in this Special Issue together with the 12 invited manuscripts.

In general, the papers in this Special Issue focus on recent progress, including experimental work, theoretical developments, and applications across a broad spectrum of new technologies exemplifying this dynamic field of research. Invited papers address radio-over-fiber, optoelectronic generation and detection of terahertz radiation, waveform generation and pulse shaping, organic materials for optoelectronics, and microwave/millimeter wave links. These only partially frame the broad technical space spanned by accepted contributed papers. Categorized loosely, roughly 47 contributed papers are centered on radio-over-fiber systems (15 papers) and microwave-photonic links (11 papers), the perennial foci of microwave photonics. Techniques for generating millimeter waves are addressed in eight papers. Novel techniques for waveform generation and filtering, beamforming, and sensing are presented in six, five, and two papers, respectively.

This Special Issue was made possible through the leadership of Connie Chang-Hasnain, Editor-in-Chief of the JOURNAL OF LIGHTWAVE TECHNOLOGY, and the persistent organization of Douglas Hargis, the Publications Administrator. We would like to thank Connie Chang-Hasnain for inviting us as Guest Editors to prepare this Special Issue. Given the high number of submissions, we also thank the many, many reviewers who were called upon, often more than once, for timely and thorough evaluations. Many papers were strengthened substantially through this generous commitment of time. Their significant efforts in maintaining the high standard of this publication while adhering to the tight production schedule required for this Special Issue are appreciated.

We, the Guest Editors, hope that this Special Issue is educational and thought-provoking on the subject of microwave photonics. The work in these published papers is proof that the microwave photonics industry continues to thrive as a vital interdisciplinary research field with significant commercial opportunity.

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He is currently a Professor at the University of Victoria, Canada, where his research program focuses on microwave photonics, next-generation optical networks, low-latency networks and applications, and systems for imaging and sensor applications. A veteran of AT&T Bell Laboratories and AT&T Labs, he has been involved in a wide variety of technology development initiatives, including photonic telecommunication technologies, optical transmission and networks, and optical modulation and multiplexing techniques. He has been a lead figure in the development of lightwave systems for cable television and wireless networks.

Prof. Darcie is an AT&T Fellow and a Fellow of the IEEE, and he serves on the board or advisory board of several companies.

Andreas Stöhr (M'97–SM'08) received the Dipl.-Ing. and Dr.-Ing. degrees in electrical engineering from Gerhard-Mercator-University Duisburg, Germany.

Since 1995, he has been with ZHO/Optoelektronik at Universität Duisburg-Essen, Germany. In 1998 and 1999, he joined the Communications Research Laboratory, now the National Institute of Information and Communications Technology (NiCT), Japan. He has authored or coauthored over 150 papers on photonic and microwave devices and their systems applications. He served as Guest Editor for the IEEE/OSA JOURNAL OF LIGHTWAVE TECHNOLOGY–IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES special issues on microwave photonics in 2008. His current research interests include the design, fabrication, and packaging of high-speed semiconductor photodiodes and modulators and their application in low-phase noise millimeter-wave synthesizers as well as in broadband photonic-wireless access and THz systems.

Dr. Stöhr was the recipient of the 1997 Annual Award presented by the DUG. He was postchairman of the SPIE Photonics Europe—Millimeter Wave & THz Photonics Conference (2004, 2006). He has also served as a committee member for the IEEE LEOS Annual Meeting (2004–2007) and the IEEE LEOS Engineering Award Committee. He is currently a member of the IEEE 2009 LEOS Summer Topical Meeting Committee and is European Chairman of the International Microwave Photonics Conference Technical Committee, which he has belonged to for many years.

Paul K. L. Yu (F'08) received the B.S. degree in physics and the M.S. and Ph.D. degrees in applied physics from the California Institute of Technology, Pasadena.

He is a Professor in the Department of Electrical and Computer Engineering, University of California at San Diego (UCSD). At UCSD, he conducts research on semiconductor materials and devices for various photonics and microwave photonics applications. His research interests include semiconductor lasers in the near-infrared wavelength region for optical communication and optical interconnection; optical/RF modulation schemes for narrowband, high-center-frequency microwave transmission; high-speed, high-power optical detectors and high-speed waveguide modulator devices for both digital and analog modulations; and high power semiconductor optical switches for microwave generation.

Prof. Yu was Chair of the Technical Program Committee of the 2001 and 2007 IEEE Topical Meeting on Microwave Photonics. He is currently Vice President of Educational Activities for the IEEE Electron Devices Society and is an Editor of the IEEE ELECTRON DEVICES LETTERS. He is a Fellow of the IEEE, OSA, and SPIE.