PROCEEDINGS OF SPIE

Polarization Science and Remote Sensing VI

Joseph A. Shaw
Daniel A. LeMaster
Editors

26 and 28–29 August 2013
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 8873

Proceedings of SPIE 0277-786X, V. 8873

Polarization Science and Remote Sensing VI, edited by Joseph A. Shaw, Daniel A. LeMaster, Proc. of SPIE
Vol. 8873, 887301 · © 2013 SPIE · CCC code: 0277-786X/13/$18 · doi: 10.1117/12.2048634

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Polarization Science and Remote Sensing VI*, edited by Joseph A. Shaw, Daniel A. LeMaster, Proceedings of SPIE Vol. 8873 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 0277-786X
ISBN: 9780819497239

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE Digital Library
SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B … 0Z, followed by 10-1Z, 20-2Z, etc.

The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

Conference Committee

Program Track Chair

Allen H.-L. Huang, University of Wisconsin-Madison (United States)

Conference Chairs

Joseph A. Shaw, Montana State University (United States)
Daniel A. LeMaster, Air Force Research Laboratory (United States)

Conference Program Committee

Bruce E. Bernacki, Pacific Northwest National Laboratory (United States)
David B. Chenault, Polaris Sensor Technologies, Inc. (United States)
Russell A. Chipman, College of Optical Sciences, The University of Arizona (United States)
Julia M. Craven-Jones, Sandia National Laboratories (United States)
Aristide C. Dogariu, CREOL, The College of Optics and Photonics, University of Central Florida (United States)
Dennis H. Goldstein, Polaris Sensor Technologies Inc. (United States)
Brian G. Hoover, Advanced Optical Technologies (United States)
Michael W. Kudenov, North Carolina State University (United States)
Kazuhiko Oka, Hokkaido University (Japan)
Jean-Marc Thériault, Defence Research and Development Canada, Valcartier (Canada)
J. Scott Tyo, College of Optical Sciences, The University of Arizona (United States)
Yoav Y. Schechner, Technion-Israel Institute of Technology (Israel)

Session Chairs

1 Polarization Metrology and Instrumentation
Julia M. Craven-Jones, Sandia National Laboratories (United States)

2 Mathematics of Coherence, Polarization, and Scattering Polarization
Joseph A. Shaw, Montana State University (United States)

3 Polarization in Remote Sensing
Jean-Marc Thériault, Defence Research and Development Canada, Valcartier (Canada)

4 Polarization Applications I
Joseph A. Shaw, Montana State University (United States)

Introduction

The broad appeal of polarization science was highlighted once again in the sixth meeting of our conference, *Polarization Science and Remote Sensing VI*. This year, authors hailed from ten countries and the presentations included a mix of contributions from academia, industry, and government laboratories. These enthusiastic researchers presented on applications of polarimetry that included the characterization of materials, the atmosphere, the ocean, and biological systems; the calibration, optimization, and metrology of polarimeters and related components; and the diverse considerations that go into the collection, processing, and display of polarimetric imagery. Contributing technologies spanned the ultraviolet, optical, and infrared wavelengths and, for the first time this year, extended to the millimeter-wave regime. The organizers of this conference and our sister conference, *Polarization: Measurement, Analysis, and Remote Sensing*, which will be meeting for the eleventh time in the spring of 2014 in Baltimore, are delighted to be the venue of choice for so many talented and prolific research professionals.

We are especially pleased to present in this volume, an invited paper by the 2013 recipient of the SPIE G.G. Stokes Award, José Jorge Gil from the University of Zaragoza, Spain. His presentation entitled, "Mathematical tools for the analysis and exploitation of polarimetric measurements," reviews how Mueller matrices may be decomposed into physically significant invariant quantities. We are grateful to Professor Gil for both his contributions to our conference and to the study of optical polarization. With the intent of establishing a new tradition, a similar invitation will be extended to future Stokes award winners when this conference convenes again in 2015.

Joseph A. Shaw
Daniel A. LeMaster