PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7783

, "Front Matter: Volume 7783," Proc. SPIE 7783, Optics Education and Outreach, 778301 (9 October 2010); doi: 10.1117/12.878977

SPIE.

Event: SPIE Optical Engineering + Applications, 2010, San Diego, California, United States

PROCEEDINGS OF SPIE

Optics Education and Outreach

G. Groot Gregory

Editor

1 August 2010

San Diego, California, United States

Sponsored and published by
SPIE

Volume 7783

Proceedings of SPIE, 0277-786X, v. 7783

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

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 *Optics Education and Outreach*, edited by G. Groot Gregory, Proceedings of SPIE Vol. 7783 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X

ISBN 9780819482792

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

Copyright © 2010, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/10/\$18.00.

Printed in the United States of America.

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

SPIDigitalLibrary.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 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

vii	Conference Committee
ix	Introduction

SESSION 1 PROFESSIONAL DEVELOPMENT

- 7783 03 **Active learning in optics and photonics (ALOP): a model for teacher training and professional development** [7783-02]
M. Alarcon, United Nations Educational, Scientific and Cultural Organization (France); Z. Ben Lakhdar, Univ. El Manar (Tunisia); I. Culaba, Ateneo de Manila Univ. (Philippines); S. Lahmar, Institut Preparatoire aux Etudes Scientifiques et Techniques (Tunisia); V. Lakshminarayanan, Univ. of Waterloo (Canada); A. P. Mazzolini, Swinburne Univ. of Technology (Australia); J. Maquiling, Ateneo de Manila Univ. (Philippines); J. Niemela, The Abdus Salam International Ctr. for Theoretical Physics (Italy)
- 7783 04 **Optics professional development in North Carolina** [7783-03]
P. O. Gilchrist, J. Hilliard-Clark, T. Bowles, North Carolina State Univ. (United States)
- 7783 05 **Implementation stories from the PHOTON PBL project** [7783-04]
J. Donnelly, Three Rivers Community College (United States); N. M. Massa, Springfield Technical Community College (United States); M. Dischino, Central Connecticut State Univ. (United States); F. Hanes, New England Board of Higher Education (United States)
- 7783 06 **Piloting photonics curriculum in staff development** [7783-05]
P. O. Gilchrist, B. Conover, T. Bowles, C. deDeugd, J. Hilliard-Clark, North Carolina State Univ. (United States)

SESSION 2 ASSESSMENT

- 7783 07 **Light: connecting to the Connecticut science standards** [7783-06]
N. Magnani, M. L. Blanchette Smith, EASTCONN (United States)
- 7783 08 **Development of a biophotonics concept inventory for program evaluation** [7783-07]
J. A. Galosy, M. Molinaro, M. McCombs, A. Corbacho, Ctr. for Biophotonics Science and Technology, Univ. of California, Davis (United States)
- 7783 09 **The development of formative assessment probes for optics education** [7783-08]
E. F. C. Dokter, The Univ. of Arizona (United States); S. M. Pompea, R. T. Sparks, C. E. Walker, National Optical Astronomy Observatory (United States)

SESSION 3 K-12 PROGRAMS

- 7783 0A **Photonic games: hands-on challenges to spark teenagers' interest in light** [7783-09]
A.-S. Poulin-Girard, G. Thériault, A. April, S. Bassene, H. Dehez, A. Desbiens, G. Goubert, H. Lemieux, J. Lévesque, B. Roy, V. Zambon, Ctr. d'Optique, Photonique et Laser, Univ. Laval (Canada)
- 7783 0B **Lighting Up Science: novel education kits for grades 5-8** [7783-10]
S. J. Davis, A. J. R. Bauer, Physical Sciences Inc. (United States)
- 7783 0C **Teaching adaptive optics concepts in the high school classroom using an active engagement, experimental approach** [7783-11]
R. T. Sparks, S. M. Pompea, C. E. Walker, National Optical Astronomy Observatory (United States); E. F. C. Dokter, The Univ. of Arizona (United States)

SESSION 4 INFORMAL EDUCATION

- 7783 0E **Learning by playing: how to create the perfect learning game for and with optics** [7783-13]
T. Haist, A. Burla, Univ. Stuttgart (Germany)
- 7783 0F **Experience the magic of light and color: outreach activity by Universidad del Valle student chapter** [7783-14]
C. Valdes, C. Reyes, A. Osorio, E. Solarte, Univ. del Valle (Colombia)
- 7783 0G **An optics education program designed around experiments with small telescopes** [7783-15]
S. M. Pompea, R. T. Sparks, C. E. Walker, National Optical Astronomy Observatory (United States); E. F. C. Dokter, The Univ. of Arizona (United States)
- 7783 0H **Teaching illumination engineering using light pollution education kits** [7783-16]
C. E. Walker, S. M. Pompea, R. T. Sparks, National Optical Astronomy Observatory (United States); E. Dokter, The Univ. of Arizona (United States)
- 7783 0I **Magic of Light** [7783-17]
D. Curticapean, Univ. of Applied Sciences Offenburg (Germany)
- 7783 0J **Informal optics education and outreach programs in Southern California** [7783-18]
D. M. Silberman, PI (Physik Instrumente) L.P. (United States); R. Cartland, Raytheon Space & Airborne Systems (United States); B. Monacelli, The Optical Sciences Co. (United States); D. Whitmore, Univ. of California, Irvine (United States)
- 7783 0K **Optical demonstrations though science fairs** [7783-19]
G. G. Gregory, Optical Research Associates (United States) and New England Section of the Optical Society of America (United States); D. P. Biss, Physical Sciences Inc. (United States) and New England Section of the Optical Society of America (United States); B. Darnell, ScinTech (United States) and New England Section of the Optical Society of America (United States)
- 7783 0L **Stories from Laser Camp: outreach activities for kids** [7783-20]
D. Tourangeau, J. Simoneau, Three Rivers Community College (United States)

SESSION 5 COLLEGE PROGRAMS

- 7783 0M **An inquiry-based course in nano-photonics** [7783-21]
C. Broadbridge, Ctr. for Research on Interface Structures and Phenomena (United States); J. Calvert, J. Donnelly, Three Rivers Community College (United States); J. Garofano, Ctr. for Research on Interface Structures and Phenomena (United States); N. Massa, Springfield Technical Community College (United States)
- 7783 0N **New optical engineering and instrument design programs at the University of California, Irvine Extension** [7783-22]
D. M. Silberman, Optics Institute of Southern California (United States), PI (Physik Instrumente) L.P. (United States), and Univ. of California, Irvine (United States); V. V. Doushkina, Optics Institute of Southern California (United States), Qioptiq Polymer, Inc. (United States), and Univ. of California, Irvine (United States)
- 7783 0O **Rethinking optical engineering capstone design experience** [7783-23]
R. M. Bunch, R. S. Lepkowitz, S. C. Granieri, Rose-Hulman Institute of Technology (United States)
- 7783 0P **Ten years of photonics education at the college level in Ontario: results and by-products** [7783-24]
M. Nantel, Ontario Ctrs. of Excellence (Canada)
- 7783 0Q **Introducing biophotonics to first year undergraduates in science and non-science majors: approaches and lessons learned** [7783-25]
M. Molinaro, J. Shackelford, Ctr. for Biophotonics Science and Technology, Univ. of California, Davis (United States)
- 7783 0R **Perspectives of mobile learning in optics and photonics** [7783-26]
D. Curticapean, A. Christ, M. Feit, Univ. of Applied Sciences Offenburg (Germany)

Author Index

Conference Committee

Conference Chair

G. Groot Gregory, Optical Research Associates (United States)

Program Committee

Barbara A. Darnell, ScinTech (United States)

Judith Donnelly, Three Rivers Community College (United States)

Nancy J. Magnani, Eastconn (United States)

Marc Nantel, Ontario Centres of Excellence (Canada)

Kathleen B. Robinson, SPIE (United States)

Donn M. Silberman, PI (Physik Instrumente) L.P. (United States)

Session Chairs

- 1 Professional Development
Donn M. Silberman, PI (Physik Instrumente) L.P. (United States)
- 2 Assessment
Kathleen B. Robinson, SPIE (United States)
- 3 K-12 Programs
Judith Donnelly, Three Rivers Community College (United States)
- 4 Informal Education
Marc Nantel, Ontario Centres of Excellence (Canada)
- 5 College Programs
Barbara A. Darnell, ScinTech (United States)

Introduction

This year in San Diego, California, we held the first conference of Optics Education and Outreach. This conference focused on activities to share the wonder of science and optics to the formal processes used to educate the next generation of scientists and engineers.

The conference was well attended and included five oral sessions. The oral sessions had titles of: Professional Development, Assessment, K-12 Programs, Informal Education and College Programs. These sessions were held over one day of the entire Optics and Photonics 2010 meeting.

The professional development session covered programs to educate teachers who are beginning to bring optics to their institutions. The assessment session presented talks on methods to measure learning outcomes. The K-12 programs session shared experiences in introducing optics to pre-college aged students while the informal education session gave talks showing programs aimed at audiences outside of any formal structure. The final session on college programs covered undergraduate education in optical sciences.

For the previous four years, a session on optics education was included in the Novel Optical System Design and Optimization conference. The past interest led to the separate conference for 2010. The large number of submissions from a broad range of participants confirmed the need for a forum in this area for community interchange. The speakers included students presenting their first talks to educators reporting new successes to scientists sharing projects reaching out to students directly.

My thanks go to those who helped make this conference a success, especially the authors, audience, SPIE staff, and program committee. The authors share the credit for making this conference an unqualified success. The audience built upon this success by being active and asking engaging questions. The program committee provided excellent assistance to ensure the quality of the content while also presiding over a number of the sessions.

The conference will return in two years. If you would like to assist with the 2012 or later conference please contact me. We look forward to seeing you in 2012!

G. Groot Gregory