

PROCEEDINGS OF SPIE

# ***Ocean Sensing and Monitoring IX***

**Weilin (Will) Hou**  
**Robert A. Arnone**  
*Editors*

**11–12 April 2017**  
**Anaheim, California, United States**

*Sponsored and Published by*  
SPIE

**Volume 10186**

Proceedings of SPIE 0277-786X, V. 10186

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

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at [SPIDigitalLibrary.org](http://SPIDigitalLibrary.org).

The papers 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 these proceedings:

Author(s), "Title of Paper," in *Ocean Sensing and Monitoring IX*, edited by Weilin (Will) Hou, Robert A. Arnone, Proceedings of SPIE Vol. 10186 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510608733

ISBN: 9781510608740 (electronic)

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](http://SPIE.org)

Copyright © 2017, 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](http://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/17/\$18.00.

Printed in the United States of America Vm7 i ffUb '5gg: WJUH q' bWzi bXYf' jW'bg' Zca 'GD-9.

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

**SPIE. DIGITAL  
LIBRARY**

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of 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 and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five 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.

# Contents

v	<i>Authors</i>
vii	<i>Conference Committee</i>

---

## ORBITAL ANGULAR MOMENTUM (OAM) BEAM PROPAGATION IN THE OCEAN

---

10186 03	<b>The detection of objects in a turbid underwater medium using Orbital Angular Momentum (OAM)</b> [10186-2]
----------	--

---

## OPTICAL COMMUNICATIONS

---

10186 06	<b>Undersea narrow-beam optical communications field demonstration</b> [10186-5]
10186 07	<b>Deployable wavelength optimizer for multi-laser sensing and communication undersea</b> [10186-6]
10186 09	<b>Environmental effects on underwater optical transmission</b> [10186-8]
10186 0A	<b>Biomimetic sentinel reef structures for optical sensing and communications</b> [10186-9]

---

## UNDERWATER IMAGING I

---

10186 0B	<b>Workbench for the computer simulation of underwater gated viewing systems</b> [10186-10]
10186 0D	<b>Statistical signal processing technique to reduce effects of forward scatter on underwater modulated pulse lidar</b> [10186-12]

---

## UNDERWATER IMAGING II

---

10186 0E	<b>Optimizing the performance of modulated pulse laser systems for imaging and ranging applications</b> [10186-13]
10186 0F	<b>Adaptive underwater channel estimation for hybrid lidar radar</b> [10186-14]
10186 0G	<b>The development of an underwater pulsed compressive line sensing imaging system</b> [10186-15]
10186 0J	<b>The impact of optical turbulence on particle image velocimetry</b> [10186-18]

---

#### ACTIVE AND PASSIVE REMOTE SENSING OF THE OCEAN I

---

- 10186 OK **Temporal monitoring of vessels activity using day/night band in Suomi NPP on South China Sea** [10186-19]
- 10186 OL **Neural network retrievals of phytoplankton absorption and *Karenia brevis* harmful algal blooms in the West Florida Shelf** [10186-20]
- 10186 OM **A study on bulk and skin temperature difference using observations from Atlantic and Pacific coastal regions of United States** [10186-21]
- 10186 ON **Mueller matrices of hydrosols and their impact on the polarized light fields from the ocean water** [10186-22]
- 10186 OO **Monitoring abnormal bio-optical and physical properties in the Gulf of Mexico** [10186-23]

---

#### OCEAN MODEL

---

- 10186 OS **Simulating biogeo-optical dynamics in the bottom boundary layer: northern Gulf of Mexico test case** [10186-27]
- 10186 OT **Recent warming in the San Francisco Bay and the California coastal ocean** [10186-28]
- 10186 OU **Effect of inter- and intra-annual thermohaline variability on acoustic propagation** [10186-29]
- 10186 OW **Three-dimensional model of hydroacoustic channel for MIMO systems research data** [10186-31]