

PROCEEDINGS OF SPIE

# ***Geospatial Informatics, Fusion, and Motion Video Analytics VII***

**Kannappan Palaniappan**  
**Peter J. Doucette**  
**Gunasekaran Seetharaman**  
**Anthony Stefanidis**  
*Editors*

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

*Sponsored and Published by*  
SPIE

**Volume 10199**

Proceedings of SPIE 0277-786X, V. 10199

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

Geospatial Informatics, Fusion, and Motion Video Analytics VII, edited by Kannappan Palaniappan,  
Peter J. Doucette, Gunasekaran Seetharaman, Anthony Stefanidis, Proc. of SPIE Vol. 10199,  
1019901 · © 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2270666

Proc. of SPIE Vol. 10199 1019901-1

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 *Geospatial Informatics, Fusion, and Motion Video Analytics VII*, edited by Kannappan Palaniappan, Peter J. Doucette, Gunasekaran Seetharaman, Anthony Stefanidis, Proceedings of SPIE Vol. 10199 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510608993

ISBN: 9781510609006 (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.

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>

<b>SESSION 1</b>	<b>VIDEO ANALYSIS</b>
10199 03	<b>Pilot study on real-time motion detection in UAS video data by human observer and image exploitation algorithm [10199-3]</b>
10199 04	<b>Data transpositioning with content-based image retrieval [10199-4]</b>
10199 05	<b>An analysis of optical flow on real and simulated data with degradations [10199-5]</b>
10199 06	<b>Geopositioning with a quadcopter: Extracted feature locations and predicted accuracy without <i>a priori</i> sensor attitude information [10199-6]</b>
<b>SESSION 2</b>	<b>PHOTOGRAMMETRY AND UNCERTAINTY PROPAGATION</b>
10199 07	<b>Using image quality metrics to identify adversarial imagery for deep learning networks [10199-7]</b>
10199 08	<b>Methods for the specification and validation of geolocation accuracy and predicted accuracy [10199-8]</b>
10199 09	<b>Three-dimensional scene reconstruction from a two-dimensional image [10199-9]</b>
10199 0A	<b>Correlation-agnostic fusion for improved uncertainty estimation in multi-view geo-location from UAVs [10199-10]</b>
<b>SESSION 3</b>	<b>GEOSPATIAL ANALYSIS</b>
10199 0C	<b>Geoparsing text for characterizing urban operational environments through machine learning techniques [10199-12]</b>
10199 0D	<b>A machine learning pipeline for automated registration and classification of 3D lidar data [10199-13]</b>
10199 0H	<b>Standardized acquisition, storing and provision of 3D enabled spatial data [10199-17]</b>
10199 0I	<b>Concept for a common operational picture in a guidance vehicle [10199-18]</b>



# Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Barngrover, Chris, 05  
Beyerer, Jürgen, 03  
Braun, Aaron, 06  
Brown, Andrew P., 0A  
Brüstle, Stefan, 03  
Calfas, George W., 08  
Carr, Jacqueline, 09  
Chandrasekaran, Shivkumar, 0A  
Chellappan, Karthik, 0A  
Doloff, John, 06, 09  
Eck, Ralf, 0I  
Edwards, David, 06  
Garfinkle, Noah W., 08  
Harguess, Josh, 05, 07  
Heinze, Norbert, 03  
Hild, Jutta, 03  
Hottel, Bryant, 06  
Hou, Daqing, 04  
Jacobs, Eddie, 0B  
Krüger, Wolfgang, 03  
Maier, Sebastian, 0H, 0I  
Manno, Michael J., 04  
Miclat, Jeremy, 07  
Parkins, Franz, 0B  
Peinsipp-Byma, Elisabeth, 03, 0H  
Perkins, Timothy K., 08  
Raheema, Julian, 07  
Rahimi, Amin, 05  
Rajagopal, Abhejit, 0A  
Selig, Lucas, 08  
Sundlie, Paul O., 0D  
Taylor, Clark N., 0D  
Theiss, Henry, 06  
Trantelle, Patrick, 03  
Unmüßig, Gabriel, 03  
Voit, Michael, 03  
Wagner, Boris, 0H, 0I



# Conference Committee

## *Symposium Chair*

**Donald A. Reago Jr.**, U.S. Army Night Vision & Electronic Sensors  
Directorate (United States)

## *Symposium Co-chair*

**Arthur A. Morrish** Raytheon Space and Airborne Systems  
(United States)

## *Conference Chairs*

**Kannappan Palaniappan**, University of Missouri-Columbia  
(United States)

**Peter J. Doucette**, U.S. Geological Survey (United States)

**Gunasekaran Seetharaman**, U.S. Naval Research Laboratory  
(United States)

**Anthony Stefanidis**, George Mason University (United States)

## *Conference Program Committee*

**Alex Aved**, Air Force Research Laboratory (United States)

**John A. Berger**, Toyon Research Corporation (United States)

**Erik P. Blasch**, Air Force Research Laboratory (United States)

**Subhasis Chaudhuri**, Indian Institute of Technology Bombay (India)

**Ananda Shankar Chowdhury**, Jadavpur University (India)

**Shiloh L. Dockstader**, Harris Corporation (United States)

**Joshua D. Harguess**, SPAWAR Systems Center Pacific (United States)

**Jutta E. Hild**, Fraunhofer-Institut für Optronik, Systemtechnik und  
Bildauswertung (Germany)

**Stefan R. Jaeger**, National Library of Medicine (United States)

**Simon J. Julier**, University College London (United Kingdom)

**Chandra Kambhamettu**, University of Delaware (United States)

**Ross Maciejewski**, Arizona State University (United States)

**Richard J. Maude**, University of Oxford (United Kingdom)

**Upesh Patel**, U.S. Army Communications-Electronics Command  
(United States)

**Matthew F. Pellechia**, Harris Corporation (United States)

**V. B. Surya Prasath**, University of Missouri-Columbia (United States)

**Sartaj Sahni**, University of Florida (United States)

**Carl Salvaggio**, Rochester Institute of Technology (United States)

**Stefano Soatto**, University of California, Los Angeles (United States)

**William R. Thissell**, Chenega Technical Innovations, LLC  
(United States)

**Jonathan D. Tucker**, Lockheed Martin Corporation (United States)

**Zhuoting Wu**, U.S. Geological Survey (United States)

**Alina Zare**, University of Florida (United States)