

PROCEEDINGS OF SPIE

# ***Remotely Sensed Data Compression, Communications, and Processing XII***

**Bormin Huang  
Chein-I Chang  
Chulhee Lee**  
*Editors*

**20–21 April 2016  
Baltimore, Maryland, United States**

*Sponsored and Published by*  
SPIE

**Volume 9874**

Proceedings of SPIE 0277-786X, V. 9874

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

Remotely Sensed Data Compression, Communications, and Processing XII, edited by Bormin Huang,  
Chein-I Chang, Chulhee Lee, Proc. of SPIE Vol. 9874, 987401 · © 2016 SPIE  
CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2246638

Proc. of SPIE Vol. 9874 987401-1

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 *Remotely Sensed Data Compression, Communications, and Processing XII*, edited by Bormin Huang, Chein-I Chang, Chulhee Lee, Proceedings of SPIE Vol. 9874 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X  
ISSN: 1996-756X (electronic)  
ISBN: 9781510601154

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 © 2016, 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/16/\$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 six-digit CID article numbering system structured as follows:

- 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.

# Contents

v *Authors*  
vii *Conference Committee*

---

## **SESSION 1 SIGNAL PROCESSING**

---

- 9874 03 **Geometric convex cone volume analysis** [9874-2]  
9874 04 **Spectral restoration for hyperspectral images** [9874-3]

---

## **SESSION 2 SPECTRAL UNMIXING**

---

- 9874 08 **Semi-supervised hyperspectral unmixing approach based on nonnegative matrix factorization** [9874-8]

---

## **SESSION 3 IMAGE COMPRESSION AND REGISTRATION**

---

- 9874 0A **Two-stage compression of hyperspectral images with enhanced classification performance** [9874-10]  
9874 0B **Spectral decorrelation of hyperspectral imagery using fractional wavelet transform** [9874-11]  
9874 0C **Compact high performance spectrometers using computational imaging** [9874-12]  
9874 0E **Compressed imagery detection rate through map seeking circuit (MSC) pattern recognition** [9874-14]  
9874 0F **An integral design strategy combining optical system and image processing to obtain high resolution images** [9874-15]

---

## **SESSION 4 TARGET DETECTION AND VIDEO CODING**

---

- 9874 0G **Progressive band processing of fast iterative pixel purity index** [9874-16]  
9874 0H **Real-time hyperspectral anomaly detection via band-interleaved by line** [9874-17]  
9874 0I **Progressive anomaly detection in medical data using vital sign signals** [9874-18]

---

**SESSION 5 DATA CLASSIFICATION AND FUSION**

---

- 9874 0K **Remote logo detection using angle-distance histograms** [9874-21]
- 9874 0L **Hyperspectral analysis approach to prioritizing vital sign signals for medical data** [9874-22]
- 9874 0M **Lesion detection in magnetic resonance brain images by hyperspectral imaging algorithms** [9874-23]
- 9874 0N **Imbalanced data classification using reduced multivariate polynomial** [9874-24]
- 9874 0O **Discriminant power analyses of non-linear dimension expansion methods** [9874-25]
- 9874 0P **An algorithm of remotely sensed hyperspectral image fusion based on spectral unmixing and feature reconstruction** [9874-26]

---

**INTERACTIVE POSTER SESSION**

---

- 9874 0S **Region-based collaborative sparse unmixing of hyperspectral imagery** [9874-7]
- 9874 0T **Separate texture and structure processing for image compression** [9874-20]
- 9874 0Z **A nonlinear spectral unmixing method for abundance retrieval of mineral mixtures** [9874-34]
- 9874 10 **Real-time progressive hyperspectral remote sensing detection methods for crop pest and diseases** [9874-35]

## Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Baek, Sangwook, 0K  
Cen, Yi, 0P, 0Z  
Chang, Chein-I, 03, 0G, 0H, 0I, 0L, 0M  
Chen, Hsian Min, 0M  
Chen, Zhengfu, 08, 10  
Creusere, Charles C., 0E  
Du, Qian, 0S  
Franc, V. A., 0T  
Gao, Cheng, 0I, 0L  
Gao, Min, 08, 10  
Gong, Rui, 0F  
Hu, Peter, 0I, 0L  
Jeong, Taeuk, 0A  
Jia, Guorui, 04  
Lee, Chulhee, 0A, 0K, 0N, 0O  
Lee, Eunjae, 0A  
Lee, Li-Chien, 0I, 0L  
Li, Hsiao-Chi, 03, 0H, 0M  
Li, Jiaojiao, 0S  
Li, Yao, 0G, 0I  
Li, Yunsong, 0S  
Liang, Chao, 0F  
Lin, Chien-Yu, 0L  
Lin, Honglei, 0Z  
Mackenzie, Colin, 0I, 0L  
Makov, S. V., 0T  
Marchuk, V. I., 0T  
Morton, Kenneth, 0C  
Newton, Kathy A., 0E  
Ok, Jiheon, 0K  
Peng, Bo, 10  
Serra-Sagristà, Joan, 0A  
Shao, Xiaopeng, 0F  
Sun, Xuejian, 0P  
Svirin, I. S., 0T  
Tan, Zihui, 04  
Töreyn, B. Uğur, 0B  
Voronin, V. V., 0T  
Wang, Jiaoyang, 0F  
Wang, Lin, 0F  
Wang, Lin, 0M  
Wang, Nan, 08  
Weisberg, Arel, 0C  
Woo, Seongyoun, 0K, 0N, 0O  
Wu, Taixia, 10  
Xu, Jun, 0F  
Xue, Bai, 0M  
Yang, Hang, 0Z  
Yang, Ying, 0F  
Youn, Sungwook, 0A, 0K  
Zhang, Hongming, 10  
Zhang, Lifu, 08, 0P, 10  
Zhang, Mingyue, 0P  
Zhang, Xia, 08, 0Z  
Zhao, Huijie, 04



# Conference Committee

## *Symposium Chair*

**Ming C. Wu**, University of California, Berkeley (United States)

## *Symposium Co-chair*

**Majid Rabbani**, Eastman Kodak Company (United States)

## *Conference Chairs*

**Bormin Huang**, University of Wisconsin-Madison (United States)

**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)

**Chulhee Lee**, Yonsei University (Korea, Republic of)

## *Conference Co-chairs*

**Yunsong Li**, Xidian University (China)

**Damon C. Bradley**, NASA Goddard Space Flight Center  
(United States)

**Lifu Zhang**, Institute of Remote Sensing and Digital Earth (China)

## *Conference Program Committee*

**Roberto Camarero**, Centre National d'Études Spatiales (France)

**Lena Chang**, National Taiwan Ocean University (Taiwan)

**Yang-Lang Chang**, National Taipei University of Technology (Taiwan)

**Mitchell D. Goldberg**, National Oceanic and Atmospheric  
Administration (United States)

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

**Wenjiang Huang**, Institute of Remote Sensing and Digital Earth  
(China)

**Roger L. King**, Mississippi State University (United States)

**José Fco. López**, Universidad de Las Palmas de Gran Canaria (Spain)

**Yakup Murat Mert**, TÜBİTAK BİLGEM İLTAREN (Turkey)

**Jarno Mielikainen**, University of Wisconsin-Madison (United States)

**Daniela I. Moody**, Los Alamos National Laboratory (United States)

**Antonio J. Plaza**, Universidad de Extremadura (Spain)

**Jordi Portell de Mora**, Institut d'Estudis Espacials de Catalunya (Spain)

**Jeffery J. Puschell**, Raytheon Space & Airborne Systems  
(United States)

**Shen-En Qian**, Canadian Space Agency (Canada)  
**Joan Serra-Sagrista**, Universidad Autònoma de Barcelona (Spain)  
**Xiaopeng Shao**, Xidian University (China)  
**Meiping Song**, Dalian Maritime University (China)  
**Carole Thiebaut**, Centre National d'Études Spatiales (France)  
**Behcet Ugur Töreyn**, Istanbul Technical University (Turkey)  
**Jiaji Wu**, Xidian University (China)

*Session Chairs*

- 1 Signal Processing  
**Bormin Huang**, University of Wisconsin-Madison (United States)  
**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)  
**Chulhee Lee**, Yonsei University (Korea, Republic of)
- 2 Spectral Unmixing  
**Bormin Huang**, University of Wisconsin-Madison (United States)  
**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)  
**Chulhee Lee**, Yonsei University (Korea, Republic of)
- 3 Image Compression and Registration  
**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)  
**Damon C. Bradley**, NASA Goddard Space Flight Center  
(United States)
- 4 Target Detection and Video Coding  
**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)  
**Chulhee Lee**, Yonsei University (Korea, Republic of)
- 5 Data Classification and Fusion  
**Chein-I Chang**, University of Maryland, Baltimore County  
(United States)  
**Chulhee Lee**, Yonsei University (Korea, Republic of)