

# PROCEEDINGS OF SPIE

## ***Seventh International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2019)***

**Kyriacos Themistocleous**  
**Giorgos Papadavid**  
**Silas Michaelides**  
**Vincent Ambrosia**  
**Diofantos G. Hadjimitsis**  
*Editors*

**18–21 March 2019**  
**Paphos, Cyprus**

*Organized by*  
Cyprus Remote Sensing Society (Cyprus)

*Co-organized by*  
ESA—European Space Agency (France) • NASA (United States) • GEO—Group on Earth Observations (Switzerland) • Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) • Department of Electronic Communications of the Ministry of Communications and Works (Cyprus) • Copernicus/Copernicus Relays/Copernicus Academy (Belgium) • ETEK—Cyprus Scientific and Technical Chamber (Cyprus) • Agricultural Research Institute (Cyprus) • Department of Meteorology (Cyprus) • International Society for Photogrammetry and Remote Sensing • ICOMOS Cyprus (Cyprus) • Cyprus University of Technology (Cyprus) • Neapolis University Pafos (Cyprus) • Cyprus Tourism Organization (Cyprus) • Geosystems Hellas (Greece) • CyRIC (Cyprus)

*Published by*  
SPIE

**Volume 11174**

Proceedings of SPIE 0277-786X, V. 11174

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

Seventh International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2019), K. Themistocleous, G. Papadavid, S. Michaelides, V. Ambrosia, D. G. Hadjimitsis, Eds., Proc. of SPIE Vol. 11174, 1117401 · © 2019 SPIE · CCC code: 0277-786X/19/\$21 · doi: 10.1117/12.2539722

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 *Seventh International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2019)*, edited by Kyriacos Themistocleous, Giorgos Papadavid, Silas Michaelides, Vincent Ambrosia, Diofantos G. Hadjimitsis, Proceedings of SPIE Vol. 11174 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

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

ISBN: 9781510630611  
ISBN: 9781510630628 (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 © 2019, 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 \$21.00 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/19/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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

ix	<i>Authors</i>
xi	<i>Conference Committee</i>
xv	<i>Introduction</i>

---

## FORESTS

---

11174 02	<b>Geospatial information for assessment of climate change impact on forest phenology</b> [11174-12]
11174 03	<b>Forest disturbance assessment with Landsat data in Middle Volga region</b> [11174-18]
11174 04	<b>Integrated model of application of remote sensing and field investigations for sanitary status assessment of forest stands in two reserves in West Balkan Range, Bulgaria</b> [11174-15]
11174 05	<b>Towards a fully automatic processing chain for operationally mapping burned areas countrywide exploiting Sentinel-2 imagery</b> [11174-65]
11174 06	<b>Satellite remote sensing for monitoring of the forest resources of Kazakhstan</b> [11174-37]
11174 07	<b>Forest diversity estimation using Sentinel-2 and RapidEye imagery: a case study of the Northern Pindos National Park</b> [11174-50]
11174 08	<b>Tree species classification for clarification of forest inventory data using Sentinel-2 images</b> [11174-3]
11174 09	<b>Development of automated workflows (spatial models) for forest monitoring with the use of time-series of multispectral optical and SAR data</b> [11174-60]

---

## REMOTE SENSING

---

11174 0A	<b>Spectral and petrophysical data for filling in thematic database in Earth observation over test site</b> [11174-35]
11174 0B	<b>Plant species concentration estimation using multispectral remote sensing images</b> [11174-4]
11174 0C	<b>Essential variables: describing the context, progress, and opportunities for the remote sensing community</b> [11174-40]
11174 0D	<b>Demonstrating the potential of remote sensing to support sustainable development goals implementation: case studies over Greece</b> [11174-42]

- 11174 OE **Dynamic geovisualization of population expected at points of interest over daily timescales: an application at Latsia, Nicosia, Cyprus** [11174-63]
- 11174 OF **Accuracy of remote sensing-derived SST values compared with in-situ measurements in Eastern Mediterranean (Cyprus)** [11174-39]
- 11174 OG **Comparison of classification algorithms on optical satellite imagery for mapping Posidonia Oceanica meadows: the case study of Limassol, Cyprus** [11174-33]

---

#### AGRICULTURE

- 11174 OH **Estimation of irrigation water requirements at irrigation district level using MODIS evapotranspiration product** [11174-34]
- 11174 OI **Study of plant communities of ecotopes formed by denudation at cliff** [11174-1]
- 11174 OJ **Applicability of parametric and nonparametric regression models for retrieval of crop canopy parameters for winter rapeseed and wheat crops using Sentinel-2 multispectral data** [11174-44]

---

#### LAND COVER/USE

- 11174 OK **A semi-automatic approach for roof-top extraction and classification from airborne lidar** [11174-7]
- 11174 OL **Mapping Ausangate glacier changes using clustering techniques on cloud computing infrastructure** [11174-54]

---

#### ATMOSPHERIC

- 11174 OM **Quantifying the impact of trees on land surface temperature: a downscaling algorithm at city-scale** [11174-8]
- 11174 ON **Geospatial and in-situ information for assessment of urban climate** [11174-10]
- 11174 OO **Modeling of air temperatures by multiple linear regressions in the Rhône-Alpes region (France): enhancement of topographic and meteorological variables by remote sensing data** [11174-16]

---

#### GIS

- 11174 OP **EastMedAtlas: online data access system** [11174-28]
- 11174 OQ **Remote monitoring of the main types of soil in Northern Kazakhstan** [11174-25]

- 11174 OR **GIS applications in marine research in the Black Sea** [11174-27]
- 11174 OS **Impact of suicide bombings in Pakistan using spatial and temporal analysis** [11174-38]

---

#### NATURAL HAZARDS

---

- 11174 OT **Prioritisation of watersheds using TOPSIS and VIKOR method** [11174-6]
- 11174 OU **Investigation of satellite thermal IR and atmospheric radon anomalies recorded for some moderate earthquakes in Vrancea geotectonic active area** [11174-11]
- 11174 OV **On the use of SAR and optical data in assessment of flooded areas** [11174-49]

---

#### COASTAL WATERS, OCEANS, AND LARGE WATER BODIES

---

- 11174 OW **The LEVECO project bio-optics experiment in the northwestern Levantine Sea: preliminary results** [11174-47]
- 11174 OX **Monitoring the changes of the coastal areas using remote sensing data and geographic information systems** [11174-48]
- 11174 OY **Monitoring spatial and temporal variation of water quality parameters using time series of open multispectral data** [11174-55]
- 11174 OZ **Hydrological modelling using remote sensing techniques in Bulgaria** [11174-26]

---

#### SATELLITES

---

- 11174 10 **Downscaling MODIS land surface temperature to Sentinel-2 spatial resolution in the Barrax test site** [11174-30]
- 11174 11 **Ground LST measurements in the Barrax test site for the assessment of the SBAC atmospheric correction technique applied to Landsat 8-TIRS** [11174-31]
- 11174 12 **An open source approach for oil spill detection using Sentinel-1 SAR images** [11174-70]
- 11174 13 **Assessment of chlorophyll-a concentration derived from Sentinel-3 satellite images using open source data** [11174-64]
- 11174 14 **Assessment of wet snow dynamics on the territory of Urupema, Brazil based on SAR and optical satellite data** [11174-51]

---

**URBAN**

---

- 11174 15 **Automatic classification of point clouds obtained with different airborne sensors in UAV** [11174-59]
- 11174 16 **Deriving leafless trees and urban structures from the DLR 3K airborne camera system for the city of Braunschweig** [11174-61]
- 11174 17 **Monitoring and analysis of China's integrated city development based on remote sensing: a case study of Guangfo city** [11174-24]
- 11174 18 **The application of lidar data for the solar potential analysis based on urban 3D model** [11174-5]
- 11174 19 **Factors affecting the price of industrial land in the district of Nicosia, Cyprus** [11174-66]
- 11174 1A **Artificial intelligence for mass appraisals of residential properties in Nicosia: mathematical modelling and algorithmic implementation** [11174-69]

---

**POSTER SESSION**

---

- 11174 1B **Revision of the coastline length of the Azov Sea according to remote sensing data** [11174-20]
- 11174 1C **Correcting the BRDF effects on Sentinel-2 ocean images** [11174-45]
- 11174 1D **Improvements of the Black Sea oceanographic GIS** [11174-29]
- 11174 1E **Application of remote sensing techniques for monitoring of the climatic parameters in forest fire vulnerable regions in Bulgaria** [11174-46]
- 11174 1F **Identification and assessment of pine forest areas affected by snowfalls through satellite data** [11174-57]
- 11174 1G **Post-fire forest disturbance monitoring using remote sensing data and spectral indices** [11174-56]
- 11174 1H **Land-based or landless dairy farms? Preliminary insights from Greece** [11174-17]
- 11174 1I **Application of remote sensing and GIS for determination of predicted status of the ecosystem/landscape services in changing environmental conditions** [11174-19]
- 11174 1J **DEM modeling using RGB-based vegetation indices from UAV images** [11174-21]
- 11174 1K **Mudflow danger of periglacial lakes in the Elbrus region** [11174-9]
- 11174 1L **Evaluating ten spectral vegetation indices for the identification of military underground structures** [11174-22]

- 11174 1M **Open source software DASOS: efficient accumulation, analysis, and visualisation of full-waveform lidar** [11174-68]
- 11174 1N **Mapping of the dune-aquatic landscapes of the Vityazevskaya Bay-Bar by remote sensing data** [11174-2]
- 11174 1O **Fractal presentation of space images during waste disposal sites monitoring** [11174-23]
- 11174 1P **Possibility of the underwater topography studying of large accumulative forms according to Sentinel-2 data** [11174-14]
- 11174 1Q **Evaluation of temperature changes in waste disposal sites according to satellite data** [11174-41]
- 11174 1R **Permanent scatterer radar interferometry as an effective structure deformation monitoring tool over undermined areas** [11174-58]
- 11174 1S **Web-based EMF monitoring in urban environment** [11174-36]



# 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.

Agapiou, Athos, 1L  
Agioutantis, Zach, 1R  
Aimbetov, Aidyn, 06, 0Q  
Aleinikov, Alexander, 1B, 1P  
Aleinikova, Anna, 1K  
Aleinikova, Elena, 1K  
Aligazhiyeva, Linara, 06  
Alonso, Lucille, 0O  
Avetisyan, Daniela, 0A, 1E, 1I, 1O  
Ayma, Victor, 0L  
Bakas, Nikolaos, 1A  
Baktybekov, Kazbek, 06, 0Q  
Balabanova, Snezhanka, 0Z  
Banov, Marin, 0J  
Barbierato, Elena, 0M  
Barragán Zaque, William Benigno, 15  
Baschir, Laurentiu A., 0N  
Beliaeva, Nadezhda, 1P  
Belokopytov, Vladimir, 0R  
Beltrán, César, 0L  
Bencheva, Sonja, 04  
Bernetti, Iacopo, 0M  
Borisova, Denitsa, 0A, 1O, 1Q, 1S  
Calera, Alfonso, 10, 11  
Campbell, N. D. F., 1M  
Capecchi, Irene, 0M  
Chaikalis, S., 0W  
Chalova, Ekaterina, 1N  
Charalampopoulou, Vasiliki (Betty), 09  
Chrysafis, Irene, 07  
Chrysoulidis, Savvas, 0E  
Clewley, D., 1M  
Coll, César, 11  
Costa, Gilson, 0L  
Dancheva, Adlin, 1Q  
Denisova, Anna Y., 08, 0B  
Dimitrov, Stelian, 04  
Dimopoulos, Thomas, 19, 1A  
Dolotov, Vyacheslav, 0R  
Doychev, Danail, 04  
Dragozi, Eleni, 07  
Drakopoulos, P. G., 0W  
Dwarakish, G. S., 0T  
Egorova, Anna A., 0B  
Fedoseev, Victor A., 08  
Feitosa, Raul, 0L  
Fernandez, Wilmar Dario, 15  
Filchev, Lachezar, 1S  
Fratino, Umberto, 0H  
Galve, Joan M., 10, 11  
Ganeva, Dessislava, 0J  
Georgiadis, Charalampos, 0C  
Georgiadis, H., 0D  
Georgiev, Georgi, 04  
Georgiev, Nikolai, 1E, 1F, 1G  
Georgieva, Margarita, 04  
Georgiou, A., 0F  
Gigova, Iliyana, 1E, 1G  
Gitas, Ioannis Z., 05, 09  
Godin, Eugeny, 0R  
Gollaher, Greg, 1R  
González-Piqueras, José, 10, 11  
Goranova, Margarita, 0A  
Govedarica, Miro, 0Y  
Grammalidis, Nikolaos, 09  
Grant, Michael G., 1M  
Hadjimitsis, Diofantos G., 0G, 1L, 1M  
Hadjioannou, L., 0F  
Happ, Patrick, 0L  
Hassan, Junaid, 0S  
Hristova, Valentina, 0A  
Iliev, Iliia, 1S  
Iliev, Martin, 04  
Ingerov, Andrey, 0R  
Izkara, J. L., 18  
Jakovljević, Gordana, 0Y  
Jeleu, Georgi, 0J  
Jimenez, C., 0F  
Kabdulova, Gulzhiyan, 06, 0Q  
Kabzhanova, Gulnara, 06, 0Q  
Kaimaris, Dimitris, 0C, 0D  
Karageorgis, A. P., 0W  
Karathanassi, Vassilia, 1C  
Katagis, Thomas, 05, 09  
Kavelenova, Ludmila M., 08  
Kazaryan, Maretta, 1O  
Kehayov, Boyan, 1S  
Kisyov, Atanas, 0A  
Kolchakov, Victor, 0J  
Kolokoussis, Polychronis, 12  
Konstantinidou, Evangelia Efi, 12, 13  
Korakis, Georgios, 07  
Korchikov, Evgeniy S., 08  
Koshinchanov, Georgy, 0Z  
Koutouzidou, G., 1H  
Krassakis, Pavlos, 0X  
Krusteva, Veneta, 0J  
Krauß, Thomas, 16

Kravtsova, Valentina, 1N  
 Kremezi, Maria, 1C  
 Krylenko, Marina, 0I, 1B, 1P  
 Krylenko, Sergey, 0I  
 Krylenko, Viacheslav, 0I, 1B, 1N, 1P  
 Kurmasheva, Aisulu, 0Q  
 Kushwaha, S. K. P., 0K  
 Kyriakidis, Phaedon, 0E  
 Lagaria, A., 0W  
 Lamaddalena, Nicola, 0H  
 López-Urrea, Ramón, 10  
 Makhdumi, W., 0T  
 Mallinis, Giorgos, 07, 0D  
 Maltezos, Evangelos, 09  
 Marinello, Francesco, 17  
 Marsheva, Nataliya, 1K  
 Melillos, George, 1L  
 Miltiadou, M., 1M  
 Minakou, Chara, 05  
 Mirchev, Plamen, 04  
 Moiseeva, Nina, 1P  
 Moutzouris- Sidiris, Ioannis, 12, 13  
 Nedkov, Roumen, 0V, 14, 1E, 1F, 1I, 1O, 1S  
 Niclòs, Raquel, 10  
 Partsinevelos, Panagiotis, 1R  
 Patias, Petros, 0C, 0D  
 Peschechera, Giuseppe, 0H  
 Polevshchikova, lu., 03  
 Prieto, I., 18  
 Prokhorova, Nataly V., 08  
 Protopapas, Polyvios, 19  
 Psarra, S., 0W  
 Radeva, Kameliya, 1E, 1G  
 Ragia, Lemonia, 0X  
 Ragkos, A., 1H  
 Renard, Florent, 0O  
 Robertson, Joe, 1R  
 Rondón Quintana, Hugo Alexander, 15  
 Roumenina, Eugenia, 0J  
 S., Raghavendra, 0K  
 Sánchez, Juan M., 10, 11  
 Saragosa, Claudio, 0M  
 Savastru, Dan M., 02, 0N, 0U  
 Savastru, Roxana S., 02, 0N, 0U  
 Schaefer, Nathaniel, 1R  
 Sergeev, Vladislav V., 0B  
 Shahzad Sarfraz, Muhammad, 0S  
 Shakhramanyan, Mikhail, 1O  
 Silva, Jhon, 1R  
 Spasova, Temenuzhka, 0V, 14, 1Q  
 Spyridakis, N., 0W  
 Stavrakoudis, Dimitris, 05  
 Stoyanov, Andrey, 1E, 1G  
 Tassopoulou, Maria, 0C, 0D  
 Tautan, Marina N., 0N  
 Teodosiev, Dimitar, 1S  
 Terentyeva, Daria A., 08  
 Themistocleous, Kyriacos, 1J, 1L  
 Theodoridis, A., 1H  
 Topouzelis, Konstantinos, 12, 13  
 Tripolitsiotis, Achilles, 1R  
 Tsvetkov, Todor, 1S  
 Usobiaga, E., 18  
 Velizarova, Emiliya, 1E, 1F, 1G  
 Verde, Natalia, 0C, 0D  
 Villodre, Julio, 11  
 Warren, M., 1M  
 Wu, Zhifeng, 17  
 Yang, Zhiwei, 17  
 Yfantidou, Anastasia, 0G  
 Yogender, 0K  
 Zaemdzhikova, Gergana, 04  
 Zaphirov, Nikolay, 04  
 Zheng, Zihao, 17  
 Zhuk, Elena, 0P, 0R, 1D  
 Zodiatis, G., 0P  
 Zoran, Maria A., 02, 0N, 0U

# Conference Committee

## *Conference Chairs*

**Kyriacos Themistocleous**, Cyprus University of Technology (Cyprus)  
**Giorgos Papadauid**, Agricultural Research Institute (Cyprus)  
**Silas Michaelides**, Cyprus University of Technology (Cyprus)  
**Vincent Ambrosia**, NASA (United States)  
**Diofantos G. Hadjimitsis**, Cyprus University of Technology (Cyprus)

## *Scientific Committee*

**Vincent Ambrosia**, NASA (United States)  
**Upendra N. Singh**, NASA (United States)  
**Anthony Stefanides**, George Mason University (United States)  
**Qian Yu**, University of Massachusetts (United States)  
**Qihao Weng**, Indiana State University (United States)  
**Jon Mills**, Newcastle University (United Kingdom)  
**Kevin Tansey**, University of Leicester (United Kingdom)  
**Jocelyn Chanussot**, Grenoble Institute of Technology (France)  
**Hesham El-Askary**, Chapman University (United States)  
**Lena Halounova**, Czech Technical University in Prague (Czech Republic)  
**Susana Bautista**, Universidad de Alicante (Spain)  
**Miro Govedarica**, University of Novi Sad (Serbia)  
**Ulrich Michel**, Jade Hochschule (Germany)  
**Peter Penev**, University of Architecture, Civil Engineering and Geodesy (Bulgaria)  
**Nilanchal Patel**, Bit-Step (India)  
**Yerach Doytsher**, Israel Institute of Technology (Israel)  
**Ammatzia Peled**, University of Haifa (Israel)  
**Demetre Argialas**, National Technical University of Athens (Greece)  
**Vassilia Karathanassi**, National Technical University of Athens (Greece)  
**Efi Dimopoulou**, National Technical University of Athens (Greece)  
**Andreas Georgopoulos**, National Technical University of Athens (Greece)  
**Charalabos Ioannides**, National Technical University of Athens (Greece)  
**Alexandros Papayannis**, National Technical University of Athens (Greece)  
**Athanasios Loukas**, University of Thessaly (Greece)  
**Petros Patias**, Aristotle University of Thessaloniki (Greece)  
**Ioannis Gitas**, Aristotle University of Thessaloniki (Greece)  
**Vasileios Drosos**, Democritus University of Thrace (Greece)  
**Albert Ansmann**, Leibniz Institute for Tropospheric Research (Germany)  
**Athanassios Ganas**, National Observatory of Athens (Greece)  
**Jesus San Miguel-Ayanz**, Joint Research Center - Institute for Environment and Sustainability (Belgium)

**Gunter Schreier**, Deutsches Zentrum für Luft- und Raumfahrt e.V.  
(Germany)

**Rosa Lasaponara**, Consiglio Nazionale Ricerche (Italy)

**Nicola Masini**, Consiglio Nazionale Ricerche (Italy)

**Marco Gianinetto**, Politecnico di Milano (Italy)

**Alessio Di Iorio**, Alma Sistemi (Italy)

**Armin Schmidt**, GeodataWIZ Ltd. (United Kingdom)

**Alexandra Chudnovsky**, Tel-Aviv University (Israel)

**Maria A. Zoran**, National Institute for Research and Development for  
Optoelectronics (Romania)

**Ignacio Merendez-Pastor**, Universidad Miguel Hernández of Elche (Spain)

**Artur Gil**, Universidade dos Açores (Portugal)

**A.P. Krishna**, Birla Institute of Technology, Mesra (India)

**Denitsa Borisova**, Space Research and Technology Institute (Bulgaria)

**Apostolos Sarris**, Foundation for Research and Technology – Hellas  
(Greece)

**Nektarios Chrysoulakis**, Foundation for Research and Technology – Hellas  
(Greece)

**Zina Mitraka**, Foundation for Research and Technology – Hellas (Greece)

**Konstantinos Nikolakopoulos**, University of Patras (Greece)

**Marios Anagnostou**, National Technical University of Athens (Greece),  
National Observatory of Athens (Greece)

**Adrianos Retalis**, National Observatory of Athens (Greece)

**Chris Danezis**, Cyprus University of Technology (Cyprus)

#### *Keynote Speakers*

**Gordon Campbell**, ESA—European Space Agency (France)

**Garik Gutman**, NASA (United States)

**Oriana Grasso**, European Commission (Belgium)

**Annakatrien Debien**, Copernicus (Belgium)

#### *Session Chairs*

- 1 Forests  
**Vincent Ambrosia**, NASA (United States)
- 2 Remote Sensing  
**Phaedon Kyriakides**, Cyprus University of Technology (Cyprus)
- 3 Forests  
**Vincent Ambrosia**, NASA (United States)
- 4 Remote Sensing  
**Denitsa Borisova**, Space Research and Technology Institute (Bulgaria)

- 5 Agriculture  
**Umberto Fratino**, Università di Bari (Italy)
- 6 Land Cover/Use  
**Vincent Ambrosia**, NASA (United States)
- 7 Atmospheric  
**Iacopo Bernetti**, Università di Florence (Germany)
- 8 GIS  
**Silas Michaelides**, Cyprus University of Technology (Cyprus)
- 9 Natural Hazards  
**Maria A. Zoran**, National Institute for Research and Development for Optoelectronics (Romania)
- 10 Coastal Waters, Oceans, and Large Water Bodies  
**Lemonia Ragia**, Technical University of Crete (Greece)
- 11 Cultural Heritage  
**Athos Agapiou**, Cyprus University of Technology (Cyprus)
- 12 Satellites  
**Ioannis Manakos**, Information Technologies Institute (Greece)
- 13 Urban  
**Denitsa Borisova**, Space Research and Technology Institute (Bulgaria)



## Introduction

The organizing committee, scientific committee, and editors would like to thank the authors and participants who attended the Seventh International Conference on Remote Sensing and Geoinformation of Environment (RSCy2019), which was held 18–21 March 2019 in Paphos, Cyprus. The RSCy2019 conference focused on emerging issues in remote sensing and geoinformation of environment. The keynote speakers and thought-provoking technical program encouraged the exchange of ideas and provided the foundation for future collaboration and innovation.

The conference was organized by the Cyprus Remote Sensing Society in cooperation with and support from: ESA—European Space Agency (France), GEO—Group on Earth Observations (Switzerland), NASA (United States), Copernicus (Belgium), Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany), ETEK—Cyprus Scientific and Technical Chamber (Cyprus), the Department of Meteorology (Cyprus), the Department of Electronic Communications of the Ministry of Transport, Communications and Works (Cyprus), the Agricultural Research Institute, the Cyprus Tourism Organization (Cyprus), Cyprus University of Technology (Cyprus), Neapolis University Pafos (Cyprus), the International Society for Photogrammetry and Remote Sensing, Geosystems Hellas S.A. (Greece), ICOMOS Cyprus, CyRIC (Cyprus), and Copernicus Relays/Copernicus Academy (Belgium). In addition, the conference was supported by the European Commission, the European Cooperation in Science and Technology (COST), Olyseus Innovations Ltd. (Cyprus), Cyprus Press and Information Office, CopHub.AC (Austria), and MedRIN—Mediterranean Regional Information Network, as well as our media partners, Remote Sensing, Sensors, Geosciences and Sustainability.

The manuscripts in this volume, reviewed for presentation and accepted for publication by the scientific committee, represent continued advancements in the field of remote sensing and geoinformation. The program, which included both oral and poster presentations, was organized around ten major themes: Agriculture, Atmospheric, Coastal Waters-Ocean-Large Water Regions, Remote Sensing for Cultural Heritage, Forests, Land Cover, Natural Hazards, Remote Sensing, Satellites and Urban Environment. The abstracts and subsequent papers make important contributions to the open scientific literature on remote sensing and geoinformation.

We thank the authors for sharing their knowledge and enthusiasm. Experts from over 40 countries presented their scientific findings in the conference program. At the conference closing ceremony, awards were given for the Best Paper and Best Poster, following peer-review. In order to be eligible for the Best Paper and Best Poster Award, it was necessary for the authors to have submitted a manuscript for

the SPIE Conference Proceedings, to have registered for the conference, and present their paper or poster.

The conference was enhanced by the inclusion of the CopHub workshop, the LiDAR workshop at Paphos Castle, and the MedRIN meeting. We are honored that so many experts from all over the world specializing in so many diverse areas of remote sensing and geoinformation attended this conference. The conference was an excellent opportunity for colleagues to share their knowledge, network, and collaborate on future research. We encourage you to take this opportunity to learn about the latest, most state-of-the-art findings and applications in the field of remote sensing and geoinformation.

Special thanks are due to the session chairs who provided invaluable assistance during the event. We thank the SPIE staff for following the proceedings through the publication process, and we thank the organizations who have supported the conference.

We also thank the Minister of Communication and Works for opening the RSCy2019 conference and for supporting the conference over the past seven years.

**Kyriacos Themistocleous  
Giorgos Papadavid  
Silas Michaelides  
Vincent Ambrosia  
Diofantos G. Hadjimitsis**