PROCEEDINGS OF SPIE

Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI

Christopher M. Neale
Antonino Maltese
Charles R. Bostater Jr.
Caroline Nichol
Editors

16–19 September 2024
Edinburgh, United Kingdom

Sponsored by
SPIE

Event Sponsor
Leonardo MW Ltd. (United Kingdom)

General Sponsors
HGH Infrared Systems (France) • Photon Lines Ltd. (United Kingdom) • Pro-Lite Technology Ltd. (United Kingdom)
Thales (United Kingdom)

Cooperating Organisations
Cranfield University (United Kingdom) • Quantum Security and Defense Working Group (United Kingdom)
CENSIS (United Kingdom) • Innovate UK (United Kingdom) • Optoelectronics Research Centre (United Kingdom)
Photonics21 (Germany) • Technology Scotland (United Kingdom) • Science and Technology Facilities Council (United Kingdom) • UKQuantum (United Kingdom) • Visit Britain (United Kingdom)

Published by
SPIE

Volume 13191

Proceedings of SPIE 0277-786X, V. 13191

Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI, edited by Christopher M. U. Neale, Antonino Maltese, Charles R. Bostater, Caroline Nichol, Proc. of SPIE Vol. 13191, 1319101
© 2024 SPIE · 0277-786X · doi: 10.1117/12.3057295

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 SPIEDigitalLibrary.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 *Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI*, edited by Christopher M. Neale, Antonino Maltese, Charles R. Bostater Jr., Caroline Nichol, Proc. of SPIE 13191, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510680906
ISBN: 9781510680913 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org

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
SPIEDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

Conference Committee

Symposium Chair

Lorenzo Bruzzone, Universitá degli Studi di Trento (Italy)

Symposium Co-chair

Claudia Notarnicola, Eurac Research (Italy)

Conference Chairs

Christopher M. U. Neale, University of Nebraska Lincoln (United States)
Antonino Maltese, Universitá degli Studi di Palermo (Italy)
Charles R. Bostater Jr., Florida Institute of Technology (United States)
Caroline Nichol, The University of Edinburgh (United Kingdom)

Conference Program Committee

Alessandra Capolupo, Politecnico di Bari (Italy)
José L. Chávez, Colorado State University (United States)
Monica Garcia, Consejo Superior de Investigaciones Científicas (Spain)
María Patrocinio González-Dugo, Instituto de Investigación y Formación Agraria y Pesquera (Spain)
Enrico B. Mondino, Universitá degli Studi di Torino (Italy)
Saleh Taghvaeian, Utah State University (United States)

Introduction

This proceedings volume contains papers presented during the "Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI conference chaired by Christopher M. U. Neale and Antonino Maltese, and those presented during the conference "Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2024" chaired by Charles R. Bostater Jr. and Caroline Nichol.

These conferences were part of the SPIE Sensors + Imaging symposium, which is a fusion of two of Europe's premier photonics conferences: SPIE Remote Sensing and SPIE Security + Defence.

The symposium took place at the Edinburgh International Conference Centre, Edinburgh, Scotland, United Kingdom, from the 16th to the 19th of September 2024.

The conferences this year featured approximately 45 presentations, encompassing a wide array of topics related to the application of remote sensing in environmental science and 31 of those will be published within the proceedings.

The conference was structured into 12 sessions, each focusing on a specific theme. These themes included, Marine Waters Sensing (3 sessions), Machine Learning and Artificial Intelligence, UAV Applications, Surface Energy Balance and Micrometeorology, SAR-based Flood and Vegetation Mapping (Joint Session), Monitoring Surface and Groundwater Hydrology, Hyperspectral Remote Sensing and Spectroscopy, Irrigation Monitoring and Yield Estimation, Monitoring Agriculture and Land-Use Change. There was also a Poster Session that included some of these topics. The Joint session was organized in cooperation with the "Microwave Remote Sensing: Data Processing and Applications II" conference.

The conference's Best Student Paper Award was given to the paper, "A comparative analysis of machine learning and vegetation index-based modelling approaches for durum wheat yield assessment using Sentinel-2 imagery", by Maria Bebie and Aris Kyparissis from the University of Thessaly (Greece).

We extend our heartfelt thanks to the presenters for sharing their research and to the attendees for their thought-provoking questions and discussions. We also express our gratitude to the SPIE for providing an exceptional venue, and to the SPIE Europe Manager, Program Coordinators and Proceedings Coordinator for their unwavering support before, during, and after the symposium.

We look forward to an even more successful conference in 2025 in Madrid, Spain.

Christopher M. U. Neale
Antonino Maltese
Charles R. Bostater Jr.
Caroline Nichol