SPIE. SENSORS+ IMAGING

Conferences: 16 - 19 September 2024
Exhibition: 17–18 September 2024
Edinburgh International Conference Centre
Edinburgh, United Kingdom

Submit abstracts by
3 April 2024

Remote Sensing for Agriculture, Ecosystems, and Hydrology XXVI (RS101)

Conference Chairs: **Christopher M. U. Neale,** Univ. of Nebraska Lincoln (United States); **Antonino Maltese,** Univ. degli Studi di Palermo (Italy)

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Remote sensing technology plays a significant role in the understanding of our environment. It has evolved into an integral research tool for the natural sciences. Disciplines such as agriculture, hydrology, and ecosystems have all developed a strong remote sensing component, facilitating our understanding of the environment and its processes over a broad range of spatial and temporal scales. This is highly important in the management of land and water resources and for the detection of environmental change. However, despite significant progress in recent years, there are still many areas where the potential of remote sensing has not been fully realized, and these are areas of active research.

Remote sensing has recently been employed to enhance our comprehension of the climate system and its alterations. It provides the ability to observe the Earth's surface, oceans, and atmosphere across various spatiotemporal scales, thereby facilitating the study of the climate system, climate-related processes, and both long-term and short-term phenomena such as deforestation or teleconnections patterns. Moreover, remote sensing is instrumental in bolstering alert systems and readiness, making it a valuable tool in disaster risk management. It aids in the development of early warning and forecasting systems to mitigate and manage climate-related disaster risks, such as improving predictions of cyclone and flood paths, drought events, and fire incidents, and preparing for necessary actions. Post-disaster damage assessment can also benefit from remote sensing technology through the comparative analysis of pre and post-disaster images. Furthermore, remote sensing data and information prove to be beneficial for emergency responders."

Of unique importance are those efforts that are focused on gaining a better understanding of what sensors are measuring as well as new applications and inverse modelling techniques. For this Conference, contributions using visible, near- and thermal infrared, microwave and other wavebands are solicited, as well as applications using LiDAR or hyperspectral imaging. The conference is especially interested in papers, which emphasize the use of data from relatively new satellites, including Sentinel, hyperspectral satellites such as PRISMA, nanosatellites, airborne and Unmanned Aerial Systems (UAS) platforms.

Documents concerning the application and the validation of products and services provided by the Copernicus program are welcome too. Indeed, although the Copernicus program supplies satellite-borne earth observation and in-situ data, and a services component that integrates these useful to address precision agriculture purposes, the assessment of their contribution and reliability is at its early stage and more attention should be deserved.

Invited keynote speakers will present overviews of problems, progress and prospects in key areas. Supporting papers are requested that review the latest contributions of Earth Observations (EO) to the water cycle and soil-vegetation-atmosphere sciences from global to basin to field. Also assessing the advances and identifying the needs in physical modelling, including uncertainties and consistency quantification and data assimilation of EO-based observations to improve our knowledge of water, vegetation and ecosystems processes and our ability to assess future changes in the water cycle, extreme events and hydrological hazards.

In recent years, opportunities for big data analysis in food and agricultural production are arising. Technological advancements in remote sensing coupled with advances in IT, mobile/cloud computing, widespread adoption of GNSS, internet of things and all advanced digital technologies have created a unique opportunity for implementing smarter solutions for large and smallholder farmers globally, leading to increased productivity, reduced resource consumption, and improved food security. In addition, the application of this technology to support policy instruments for the monitoring of the environment and agriculture is rapidly growing.

Moreover, geomatic engineering is a rapidly developing discipline that focuses on principles of spatial information and incorporates land surveying for hydrological and agricultural remote sensing. These techniques allow for the delivery of high-tech agricultural services and precision agriculture based on remote sensing. Indeed, the combination of the new RS sensors with advanced geomatic techniques may be a powerful tool to detect changes over time and predict future scenarios. That information may provide the essential substrate to develop proper management and control strategies and, thus, to design and implement specific institutional services.

In addition, distributed networks provide the opportunity for setting up integrated processing for near real-time regional or global monitoring products for hydrology; agriculture; and ecosystems: e.g., HF radar networks, ground stations, GNSS networks, flux towers, etc.

Modern techniques for image processing and data analysis, with promising results and large potential, include deep learning and machine learning. These classes of algorithms have been successfully applied in various ecosystems.

Papers related to the above-mentioned and the following topics are solicited:

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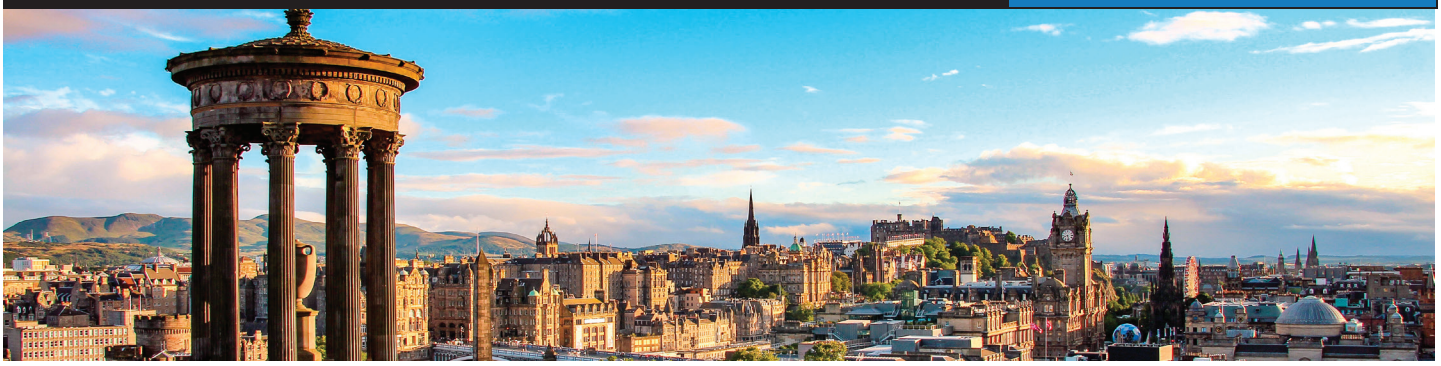

HYDROLOGICAL SCIENCES
- hydro-geomatics (surveying work carried out above the surface areas of water and for hydrological applications)
- hydrological modelling
- sensors for monitoring water resources in hydrology
- data scaling and assimilation in hydrology
- energy and water balance applications
- soil water content estimation and modeling
- satellite-based rainfall estimation and modelling (e.g., meteorological RADAR)
- water resources, precipitation, snow and ice hydrology
- GNSS reflectometry, gravimetry and magnetometry
- drought monitoring, analysis and prediction
- sedimentation and erosion
- radar applications in hydrology (interferometry for landslide detection; canopy, soil moisture and soil roughness characterization; flooding)
- lidar applications in hydrology
- remote sensing for groundwater detection (passive and active microwaves, thermal infrared, ground penetrating radar)
- remote sensing in surface water topography
- water quality
- estuarine and coastal applications
- flood mapping and modelling
- dams and hydraulic infrastructures monitoring via interferometry
- snow hydrology, glaciology.

AGRICULTURAL BIOSPHERE
- agro-geomatics (geomatics techniques application for precise management of agriculture)
- smarter solutions for farmers based on IT, cloud computing, mobile technology, GNSS
- institutional services for agriculture based on RS and IoT
- reliability and robustness of the products provided by Copernicus land monitoring service
- spectroradiometry for Earth remote sensing
- fluorescence applications in agriculture
- crop yield modelling, food production, energy and water nexus
- water securing for food
- agriculture disease detection
- vegetation indices, canopy and leaf optical models
- biomass monitoring
- evapotranspiration and energy balance (EB), eddy covariance, surface renewal, Bowen ratio systems, scintillometry etc.
- irrigation water management
- support of environmental and agricultural policies
- open data, crowd sensing, artificial intelligence and data analytics for agriculture.

ECOSYSTEMS AND CLIMATE CHANGE
- climate modelling, prediction and environmental change
- long-term shifts in temperatures
- weather patterns
- global or regional climate pattern
- extreme weather events: heatwaves, wildfires, cyclones, droughts, and floods
- large eddy simulations, turbulence and micrometeorology
- forestry dynamics and carbon cycle
- ecosystem and ecological management
- forecasting techniques
- long-term data records for water cycle and climate
- big data for sustainable development
- new trends in geospatial data analysis for change detection
- unmanned aerial systems (UAS) applications in hydrology, agriculture and ecosystems.

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Below are abstract submission instructions, the accompanying submission agreement, conference presentation guidelines, and guidelines for publishing in the Proceedings of SPIE on the SPIE Digital Library. Submissions subject to chair approval.

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Abstract submissions due	3 April 2024
Registration opens	3 June 2024
Author notified and programme posts online	10 June 2024
Submission system opens for manuscripts and poster PDFs*	3 July 2024
Poster PDFs due for spie.org preview and publication	21 August 2024
Manuscripts due	28 August 2024
Advance upload deadline for oral presentation slides**	13 September 2024

**Contact author or speaker must register prior to uploading*
***After this date slides must be uploaded onsite at Speaker Check-in*

What you will need to submit

- Title
- Author(s) information
- Speaker biography (1000-character max including spaces)
- Abstract for technical review (200-300 words; text only)
- Summary of abstract for display in the program (50-150 words; text only)
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (i.e., special abstract requirements or instructions for award competitions)

Note: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

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- Click the title of the conference to view the full description
- Sign in to the late submission system (now closed) or create an account if you do not already have one
- Follow the steps in the submission wizard until the submission process is completed

Submission agreement

All presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract

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- Email messaging for the conference series
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- Obtain funding for registration fees, travel, and accommodations
- Attend the meeting
- Present at the scheduled tim

Review and program placement

- To ensure a high-quality conference, all submissions will be assessed by the conference chair/editor for technical merit and suitability of content
- Conference chairs/editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations
- Final placement in an oral or poster session is subject to chair discretion

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