Synthetic Aperture Radar (SAR) technology, particularly Polarimetric SAR (PolSAR) and Polarimetric Interferometric SAR (PolInSAR), provide powerful tools for monitoring agricultural crops due to its high-resolution, all-weather, and all-illumination imaging capabilities. With the base of the SAR scattering theory, some SAR descriptors such as scattering power, radar indices, interferometric phase, and coherence can be modeled as a function of crop structural and dielectric characteristics. Preliminary studies have explored the relationship between scattering responses and crop growth. However, scattering randomness and spatial-temporal heterogeneity in agricultural areas increase the difficulty of biophysical parameter inversion, especially with limited polarimetric channels, making it challenging for existing methods to capture complex scattering variations. This issue aims to guide researchers to further investigating the relationship between scattering mechanisms and crop growth. By integrating scattering physics with phenological knowledge and AI-based techniques, the goal is to develop novel theories, indicators, and algorithms that enhance understanding of scattering processes, improve the extraction of scattering features, and optimize the utilization of scattering characteristics. The innovations presented in this issue seek to advance the sensitivity and usefulness of PolSAR and PolInSAR data for describing crop morphological features and dielectric properties, inverting crop biophysical variables, mapping spatial distributions of agricultural land, and monitoring temporal evolution of crop growth.

The broad topics include (but are not limited to):
- Advanced PolSAR/PolInSAR decomposition models, algorithms, and their application in crop monitoring.
- AI-based scattering decomposition feature learning and crop scattering response understanding.
- Advanced data assimilation methods for crop models and PolSAR/PolInSAR data.
- Effective radar indices (vegetation index, soil index, drought index) and their applications in crop monitoring.
- Innovative algorithms for land use mapping using PolSAR/PolInSAR data, including crop type and phenological stage identification, agricultural field segmentation and area estimation, crop rotation, and change detection.
- Advanced methods for inverting crop biophysical parameters using PolSAR/PolInSAR data, including techniques for estimating soil moisture, vegetation water content, crop height, above-ground biomass, crop yield, and leaf area index.
- Fusion of multi-source data (PolSAR/PolInSAR, optical, Lidar and GNSS-R data), multi-platform data (Spaceborne, Airborne and Ground-based platform), multi-angle data, multi-frequency data, and their applications in crop monitoring.

Schedule
Jan 1, 2025, Submission system opening
Oct 31, 2025, Submission system closing

Format
All submissions will be peer reviewed according to the IEEE Geoscience and Remote Sensing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Submit your manuscript on http://mc.manuscriptcentral.com/jstars, using the Manuscript Central interface and select the "**Recent Advances in PolSAR and PolInSAR Scattering Interpretation and Its Application in Agricultural Crop Monitoring**" special issue manuscript type. Prospective authors should consult the site https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768 for guidelines and information on paper submission. All submissions must be formatted using the IEEE standard format (double column, single spaced). Please visit http://www.ieee.org/publications_standards/publications/authors/author_templates.html to download a template for transactions. Please note that since Jan. 1, 2024, IEEE J-STARS, as a fully open-access journal, is charging a flat publication fee $1,496 per paper.

Guest Editors
Hong Zhang, Chinese Academy of Sciences, China. (zhanghong@radi.ac.cn)
Juan Manuel Lopez-Sanchez, University of Alicante, Spain. (Juanma.Lopez@ua.es)
Shangrong Wu, Chinese Academy of Agricultural Sciences, China. (wushangrong@caas.cn)
Lingli Zhao, Wuhan University, China. (zhaolingli@whu.edu.cn)
Qinghua Xie, China University of Geosciences (Wuhan), China. (xieqh@cug.edu.cn)
Han Gao, China University of Petroleum (East China), China. (gaohangeo@upc.edu.cn)