

## **WiDS abstract**

**keywords:** machine learning, earth observation, remote sensing, ecological applications, climate change, resilient agriculture, resources optimization, pest control, transparent ML, ecosystem services

The usage of machine learning (ML) has been growing exponentially. Its significant power in generalization and the large amount of available data make machine learning indispensable. In parallel, humanity is focused more than ever on space exploration, developing cutting-edge Earth Observation (EO) technology. Have you ever wondered how these two can be combined?

One domain that can be greatly benefited from this coalition is agriculture. With climate change and population rise, maintaining natural ecosystems while enhancing agricultural productivity and supporting farmers is of primary importance. In this sense, ML and EO technologies are the key enablers in developing actionable recommendations for farmers and policymakers to achieve resilient agriculture. In this workshop, we discuss the usage of ML for EO-related applications, focusing on agriculture and ecosystem services. We will present two applications of how ML bridges the gap between scientific knowledge and actionable advice for farmers and policymakers. The first application will consist of a predictive ML model related to the occurrence of pests in cotton fields. The second application will showcase the combination of a geographical model and a ML algorithm to identify the local-specific contribution of agricultural management to ecosystem services. For both applications, there will be live demonstrations using Python and R. By the end of this workshop, we hope you will be acquainted with establishing the link between machine learning, earth observation and sustainable agriculture. Wishing you a fruitful exploration of this field having provided you with the necessary tools to start your journey!