

FLORIAN TESTE

Senior Geospatial Machine Learning Scientist

Ph.D. in Machine Learning Applied to Remote
Sensing



PROFESSIONAL EXPERIENCE

March 2025 – Present **Senior Geospatial Machine Learning Scientist** **Promethee Earth Intelligence**

Focus: Machine learning for satellite data analysis and geospatial intelligence.

Key responsibilities and achievements:

- Led the design and deployment of AI models for maritime vessel detection and identification from satellite imagery (computer vision).
- Developed advanced algorithms for detecting suspicious or illegal activities using satellite data and pattern recognition.
- Built AI-based tools for automated analysis, indexing, and summarization of large-scale documents to support GEOINT and thematic experts (NLP).
- Created AI-driven models to estimate environmental variables (e.g., snow height, soil moisture, surface runoff) by integrating satellite data and physical modeling.
- Provided strategic AI expertise for the development of geospatial intelligence solutions.

Python, PyTorch, Scikit-learn, Pandas, NumPy, Rioxarray, GDAL, Docker, Transformers

2022 – February 2025 **Ph.D. Candidate in Applied Mathematics** **University Paris-Saclay**

Topic: "Forecasting Agricultural Commodity Prices & Yield from Satellite Data using Machine Learning", MIA-PS lab, Palaiseau, France

Supervisors: Dr. David Makowski & Dr. Philippe Ciais.

Developed and validated a novel framework using machine learning to predict global agricultural commodity prices and yields directly from satellite data. This approach eliminates the need for unreliable regional production and demand estimates, contributing to enhanced global food security through more accurate and timely forecasts months before harvest.

Objectives:

- Developed a methodology to predict global commodity price variations directly from freely available satellite data.
- Designed machine learning and deep learning algorithms to extract key features from satellite images for accurate predictions.
- Validated the framework on key crops (maize, soybean, rice, wheat) across diverse production regions and under varying environmental and social factors.
- Achieved real-time forecasting capabilities for both price and yield variations.

PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy, Rioxarray, Bash, R, Git, Julia, Python, QGIS

2022 – February 2025	Data Scientist Provided expertise in key areas developed during my PhD, including: <ul style="list-style-type: none"> • Supervised a Master's-level intern in designing and implementing a recurrent neural network (LSTM) to predict soybean prices using satellite-derived indicators. • Developed machine learning methods for the identification and delineation of agricultural plots from satellite imagery. • Estimated Gross Primary Production (GPP) through the integration of satellite data and machine learning techniques. PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy, Rioxarray, Bash, R, Git, Julia, Python	Atos
Apr 2021 – Sep 2021	Deep Learning Scientist Topic: "Characterization of Forests by Coupling Sentinel-1 & Sentinel-2 and LIDAR Data using Deep Learning Methods," TETIS lab, Montpellier, France Supervisors: Dr. Sylvie Durrieu & Dr. Dino Ienco. Main objectives: <ul style="list-style-type: none"> • Evaluated the potential of Sentinel-1 and Sentinel-2 data for characterizing and mapping forest composition (coniferous, deciduous, mixed). • Assessed the value of data fusion (LiDAR and Sentinel-1/Sentinel-2) using deep learning methods to improve the mapping of various stand types and to characterize specific forest attributes initially estimated using only LiDAR data, such as total volume and basal area at the stand level. TensorFlow, Scikit-learn, Pandas, NumPy, Rioxarray, R, Git, Python	INRAE

EDUCATION

2022 – February 2025	Ph.D. in Mathematics Topic: "Forecasting Agricultural Commodity Prices & Yield from Satellite Data using Machine Learning," UMR MIA-Paris. Supervised by: Dr. David Makowski & Dr. Philippe Ciais.	Paris-Saclay University
2020 – 2021	Master's (2nd Year) Geomatics & Environment	Aix-Marseille University
2019 – 2020	Master's (1st Year) MSc Geomatics with Remote Sensing and GIS	Stockholm University

PUBLICATIONS

1. **Teste, F., Makowski, D., Ciais, P. (2025).** Quantitative Predictions of Crop Yields and Prices from Satellite-Based Machine Learning: Applications to Soybean and Corn. Available at SSRN: <https://ssrn.com/abstract=5107698>.
2. **Teste, F., Ciais, P., Makowski, D. (2024).** Forecasting crop yield and price variations with machine learning from satellite-derived gross primary production maps. Available at: <https://doi.org/10.13140/RG.2.2.31718.23362>.
3. **Teste, F., Gangloff, H., Chen, M., Ciais, P., Makowski, D. (2024).** Leveraging satellite data with machine and deep learning techniques for corn yield and price forecasting. *IEEE Transactions on Geoscience and Remote Sensing*. doi: 10.1109/TGRS.2024.3448205.
4. **Teste, F., Makowski, D., Bazzi, H., Ciais, P. (2023).** Early Forecasting of Corn Yield and Price Variations Using Satellite Vegetation Products. *Computers and Electronics in Agriculture*, 221:108962. doi: 10.1016/j.compag.2024.108962.
5. **Lahssini, K., Teste, F., Dayal, K., Durrieu, S., Ienco, D., Monnet, J-M. (2022).** Combining LiDAR Metrics and Sentinel-2 Imagery to Estimate Basal Area and Wood Volume in Complex Forest Environment via Neural Networks. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*. doi: 10.1109/JSTARS.2022.3175609.

CONFERENCES & WORKSHOPS

- **April 15, 2024:** Presented ongoing research on *Improving Early Crop Yield and Price Predictions Using Satellite Imagery with Machine and Deep Learning Techniques* at the EGU General Assembly 2024, Vienna, Austria.
- **October 4, 2023:** Presented ongoing research on *Early Forecasting of Corn Yield and Price Variations Using Satellite Vegetation Products* at the MIA-PS Lab Workshop.
- **November 18, 2022:** Presented the first chapter of my Ph.D. thesis, *Using Satellite Products to Predict Agricultural Commodity Price Changes from Production Shocks*, at the "Data Analysis Methods for Monitoring Vegetation Characteristics from Satellite Products" workshop, organized by CLAND.

LANGUAGES

English - C1
French - Native
Spanish - B2
Swedish - B1

INTERESTS

Boxing (~12 years of practice)
Hiking
Photography

RELEVANT SKILLS

Core Competencies: Machine (Deep) Learning, Statistics, Remote Sensing
Programming Languages: Python, R, Julia, Bash
ML Frameworks/Libraries: TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy, Rioxarray
Tools & Technologies: Git, LaTeX, QGIS