

# FLORIAN TESTE

## Applied AI Scientist — Geospatial AI (Ph.D.)



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TesteFlorian



### PROFESSIONAL SUMMARY

Applied AI scientist (Ph.D.) combining data science and ML engineering for geospatial intelligence. I deliver end-to-end pipelines that fuse SAR/optical/LiDAR with EO foundation backbones (ViT/MAE, spatiotemporal transformers) for forecasting and detection. I build and evaluate LLM/agent systems (RAG, MCP/tool use, structured outputs) to operationalize analyst workflows. Grounded in statistical and causal/probabilistic modeling (Quantile/conformal uncertainty) and MLOps (FastAPI, Docker, CI/CD, GPUs/DDP) to take research to production.

### CORE SKILLS

- **Data Science & Statistical Learning:** Feature engineering, experiment design; causal inference (DAGs, diff-in-diff); Probabilistic modeling; probabilistic forecasting (quantile, conformal); calibration & uncertainty
- **ML/AI & Foundation Models:** Vision Transformers; masked autoencoding & contrastive SSL; spatiotemporal transformers; multimodal fusion; PEFT/LoRA, adapters & distillation; transfer & domain adaptation
- **LLMs & Agents:** Fine-tuning, RAG, tool use/MCP, structured outputs, evaluation harnesses, prompt engineering
- **Geospatial/EO:** SAR/Optical/LiDAR; Sentinel-1/2, Landsat; STAC; GDAL, Rasterio, GeoPandas, xarray/rioxarray
- **MLOps & Systems:** PyTorch, FastAPI, Docker, CI/CD; GPUs/DDP; data pipelines, logging/monitoring

### PROFESSIONAL EXPERIENCE

Mar 2025 – Present

#### Senior Geospatial Machine Learning Scientist

#### Promethee Earth Intelligence

**Focus:** Applied AI research and engineering in geospatial intelligence, remote sensing, LLMs, and autonomous agent systems.

##### Key Achievements:

- **GEOINT Prototyping:** Prototyped components for a GEOINT solution leveraging fine-tuned LLMs and agent workflows over multimodal remote sensing (SAR/Optical/LiDAR) and OSINT.
- **Agentic Integration:** Built prototype integrations of retrieval-augmented generation (RAG) and Model Context Protocol (MCP) tools, enabling API-driven, analyst-ready workflows.
- **Remote Sensing Foundation Models:** Leveraged/adapted EO foundation backbones (ViT/MAE-style) for downstream tasks (vessel detection, flood detection, crop monitoring, etc.), improving data efficiency and robustness.
- **Satellite Image Indexing:** Developed computer vision models for near real-time vessel detection/classification from multi-sensor (SAR/optical) imagery.
- **Data Fusion & Investigation:** Delivered cross-source entity correlation using AI agents across imagery, AIS, and text-based OSINT, improving situational awareness.
- **LLM Fine-Tuning:** Created domain-adapted language models for GEOINT reports, automating thematic summarization and decision support.

PyTorch, Transformers, LLM fine-tuning, Agents (MCP), RAG, Computer Vision, NLP, GeoPandas, Rasterio, rioxarray, GDAL, FastAPI, Docker, CI/CD

2022 – Feb 2025

#### Data Scientist & Technical Consultant

#### Atos

Directed AI/ML initiatives from research to production, focusing on satellite data and predictive modeling for industry and government clients.

##### Key Achievements:

- Led the development of LSTM models for financial forecasting with satellite indicators; improved forecasting accuracy versus baseline.
- Designed an agricultural plot delineation engine based on satellite data and neural networks.

2022 – Feb 2025

### Ph.D. Candidate in Applied Mathematics

Paris-Saclay University

**Dissertation:** "Forecasting Agricultural Commodity Prices & Yield from Satellite Data using Machine Learning", MIA-PS Lab, Palaiseau, France.

**Supervisors:** Dr. David Makowski, Dr. Philippe Ciais

#### Highlights:

- Built a production ML pipeline for real-time commodity price prediction, ingesting multi-terabyte satellite data streams.
- Developed spatiotemporal neural architectures (CNN, LSTM, Transformers) for forecasting from geospatial data.
- Created feature extraction methods based on VAE/self-supervised learning for crop monitoring.
- Achieved strong cross-market generalization (USA, Africa) on price/yield prediction tasks.
- Presented results at leading conferences (EGU), with 4+ peer-reviewed journal publications.

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

Apr 2021 – Sep 2021

### Deep Learning Scientist (Intern)

INRAE, TETIS Lab

**Project:** Characterization of forests via Sentinel-1/2 and LiDAR fusion.

**Impact:** Co-authored a high-impact IEEE publication; improved forest attribute estimation (basal area, volume) using neural models.

- Advanced fusion of LiDAR and SAR/Optical data for detailed stand-level mapping.
- Developed a deep learning framework for forest attribute estimation.

TensorFlow, Scikit-learn, Pandas, NumPy, rioxarray, R, Git, Python

## EDUCATION

2022 – Feb 2025

### Ph.D., Mathematics (AI, Remote Sensing)

Paris-Saclay University

Dissertation: "Forecasting Agricultural Commodity Prices & Yield from Satellite Data using Machine Learning".

2020 – 2021

### MSc, Geomatics & Environment

Aix-Marseille University

Key project: Automated land-cover change detection pipeline (Python, Sentinel-2, 10M+ pixels).

2019 – 2020

### MSc, Geomatics with Remote Sensing and GIS

Stockholm University

Key project: Satellite time-series modeling for snow depth retrieval.

## PUBLICATIONS

1. extbf{Teste, F.}, Makowski, D., Ciais, P. (2025). Quantitative Predictions of Crop Yields and Prices from Satellite-Based Machine Learning: Applications to Soybean and Corn. *SSRN Preprint*.
2. **Teste, F.**, Ciais, P., Makowski, D. (2024). Forecasting crop yield and price variations with machine learning from satellite-derived gross primary production maps. *SSRN Preprint*.
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*, 62, 1-16.
4. **Teste, F.**, Makowski, D., Bazzi, H., Ciais, P. (2024). Early Forecasting of Corn Yield and Price Variations Using Satellite Vegetation Products. *Computers and Electronics in Agriculture*, 221, 108962. (Impact Factor: 8.3)
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 Environments via Neural Networks. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 15, 4337-4348.

## CONFERENCES & WORKSHOPS

- **Apr 2024:** Oral presentation, EGU General Assembly (Vienna, Austria): Improving early predictions of crop yields and prices using satellite imagery and machine learning techniques.

- **Oct 2023:** Invited speaker, MIA-PS Lab Workshop: Early Forecasting of Corn Yield and Price Variations.
- **Nov 2022:** Featured speaker, CLAND Workshop: Using Satellite Products to Predict Agricultural Commodity Price Changes.

**LANGUAGES**

**English:** Fluent (C1)

**French:** Native

**Spanish:** Professional (B2)

**Swedish:** Basic (B1)

**INTERESTS**

**Boxing** (~12 years)

**Hiking**

**Photography**

**TECHNICAL SKILLS**

**Programming:** Python, R, Julia, Bash

**AI/ML:** PyTorch, TensorFlow, Transformers, Scikit-learn

**LLMs:** Fine-tuning, RAG, Agents (MCP), prompt engineering

**MLOps:** Docker, Git, CI/CD, FastAPI (production)

**Geospatial:** GDAL, Rasterio, GeoPandas, rioxarray; SAR/Optical/LiDAR, Sentinel-1/2