

IOANNIS (GIANNIS) GALLIOS

ENVIRONMENTAL SCIENTIST & AGRICULTURAL ENGINEER | GEOSPATIAL EVIDENCE, ENVIRONMENTAL AI & DECISION SUPPORT

gforgeoscience.com | igallios@ufl.edu | Florida, USA | Remote / international collaboration | [LinkedIn](#) | [GitHub](#)

Professional profile

Environmental scientist, agricultural engineer and Ph.D. candidate at the University of Florida with five years of research and technical-delivery experience across soil and water management, Earth observation, geospatial analysis, soil carbon, environmental AI, spectroscopy and producer-facing decision support. Converts field, satellite, sensor, spectral and institutional data into validation plans, monitoring maps, sampling strategies, reproducible analyses, dashboards, reports and stakeholder-ready technical material. Experience includes farm-scale work across Brazil, global soil-data collaboration, U.S. grower and Extension systems, industry-facing proof-of-concepts, international workshops and proposal/pilot support through GforGeoscience and university programmes.

Core consultancy capabilities

Monitoring, EO & validation Sentinel-2; Google Earth Engine; spatial/temporal validation; change analysis; uncertainty; transfer testing; dashboard-ready monitoring layers.	Soil carbon, MRV & sampling SOC and soil-property mapping; field-reference design; QA/QC; cost-aware sampling; uncertainty; monitoring evidence; digital soil mapping.
Environmental AI & data governance Python/R; ML and deep learning; federated/transfer/active learning; model benchmarking; privacy-preserving workflows; reproducible data pipelines.	Spectroscopy & sensing VNIR-SWIR/NIR preprocessing; spectral harmonization; cross-instrument evaluation; soil-moisture sensing; sensor/API integration; field-data alignment.
Project & knowledge support Technical scoping; proposal sections; work-plan inputs; validation plans; methods notes; reporting; workshop/training material; technical handover.	Stakeholder-facing delivery Grower/Extension engagement; partner coordination; concise technical summaries; maps; dashboards; presentations; assumptions/limitations communication.

Professional experience

Graduate Research Assistant - Environmental AI, Geospatial Modelling & Decision Support

Soil Artificial Intelligence Lab, University of Florida | Florida, USA | Aug 2023 - Present

- Led a published farm-scale Earth-observation framework across 50 farms and 7,831 georeferenced observations in five Brazilian regions, integrating field-data harmonization, multi-temporal Sentinel-2 analysis, farm-level validation, uncertainty and SOC/clay mapping.
- Designed data-efficient sampling experiments combining predictive uncertainty, spatial coverage, environmental diversity and constrained budgets to assess where additional field observations create practical monitoring value.
- Lead technical development of TerraFed, a privacy-governed soil-intelligence workflow connecting field samples, EO covariates, local model updates, uncertainty, sampling priorities, dashboard-ready layers and technical reports; support pilot, proposal and commercialization activities.
- Coordinated harmonization and modelling of 100,000+ soil spectral observations across six institutional libraries with collaborators spanning five continents, including QA/QC, cross-domain transfer, reproducible cloud/HPC workflows and partner-facing technical outputs.
- Co-developed GaiaBot using GeoServer, APIs, document retrieval, RAG and agent workflows to connect geospatial layers and expert resources with user questions; first-authored the associated IEEE publication.
- Support field campaigns, analytical scoping, equipment/data planning, proposal development, external-validation planning, partner coordination, technical documentation and supervision of junior researchers.

Environmental AI & Geospatial Consultant - Part-time, project-based

GforGeoscience / Independent Consulting | Remote | Jul 2023 - Present

- Deliver defined environmental and agricultural analytical support across GIS/EO, statistics, machine learning, spectral analytics, reproducible notebooks, maps, dashboards, technical notes and proposal-ready material, adapting methods to the operational question and available evidence.
- Support U.S. and European university and industry collaborations through problem framing, technical documentation, framework integration, cross-instrument analysis, external-validation planning and clear communication of assumptions, limitations and deployment requirements.
- Translate research methods into client/collaborator-ready code, lightweight tools and decision-support outputs for soil, remote sensing, horticulture, environmental sensing, postharvest and agricultural-technology applications.

Assistant Researcher - Precision Irrigation & Decision Support

Irrigation Scheduling Lab, University of Georgia | Georgia, USA | May 2021 - Jul 2023

- Developed and field-tested agricultural water-management workflows integrating soil-moisture sensors, APIs, weather and crop variables, automated data checks, irrigation logic and multi-season validation for producer-facing decisions.
- Contributed to IrrigatorPro algorithms and automated data-entry workflows supporting irrigation recommendations across more than 15,000 hectares; the broader platform has been associated with approximately 15% improvement in water-use efficiency.
- Worked directly with growers, county Extension agents, researchers and technical staff to translate field evidence into management guidance, workshops, software improvements and technical publications; also analysed flash-drought and saturated-soil conditions.

Research Intern - Hydrology, Drought & Catchment Analysis

Faculty of Engineering, University of Porto | Porto, Portugal | Mar 2020 - Jun 2020

- Processed hydrological, climatic and geospatial records for the transboundary Guadiana River basin and evaluated drought and water-scarcity indicators relevant to Mediterranean agriculture and catchment management.
- Assessed conservation and water-management strategies in a Spain-Portugal basin context, building experience in temporal environmental analysis and evidence for natural-resource decisions.

Selected applied projects & collaboration evidence

Brazil farm-scale EO soil mapping

50 FARMS | 7,831 OBSERVATIONS | PUBLISHED

End-to-end EO processing, farm-level validation, uncertainty, SOC/clay maps and local adaptation. Median error reductions of 42% for clay and 31% for SOC relative to a centralized baseline. [Project evidence](#)

Global soil-data collaboration

100,000+ OBSERVATIONS | SIX LIBRARIES

Spectral QA/QC, harmonization, distributed/federated modelling, cross-domain transfer, zero-shot/external evaluation and reproducible multi-institutional runs. [Project evidence](#)

GaiaBot & extreme-weather intelligence

GEOSPATIAL AI INTERFACE

GeoServer, APIs, expert-document retrieval and conversational access to geospatial evidence; contributed geospatial components relevant to event baselines, flooding and pre/post-hurricane assessment. [Project evidence](#)

TerraFed

PRIVACY-GOVERNED MONITORING WORKFLOW

Field/EO integration, local model adaptation, uncertainty, sampling priorities, dashboards and partner-facing reports; supported pilot, funding and technology-commercialization activities. [Project evidence](#)

BÜCHI / cross-instrument soil spectroscopy

INDUSTRY-FACING PROOF-OF-CONCEPT

Privacy-preserving cross-device soil spectral modelling, 1350-2500 nm harmonization, external-validation planning and model-governance considerations.

IrrigatorPro sensor-to-decision workflows

OPERATIONAL AGRICULTURAL DECISION SUPPORT

Sensor/API integration, data QA, multi-season field validation, grower-facing visualization and Extension communication for producer irrigation management. [Project evidence](#)

Selected coordination & capacity evidence

- Co-Principal Investigator on the 2025 GFSI Joint Linkage Call; contributed technical analyses, prototype demonstrations, coordination and proposal material for a U.S.-Europe university collaboration.
- Delivered invited technical sessions for the IEEE Standards Association P4005 initiative and the University of São Paulo on decentralized soil analytics; also supported county Extension workshops and university GIS instruction.
- Prepared pilot briefs, validation plans, partner presentations, technical methods notes and proposal/report material while coordinating inputs across researchers, students and institutional collaborators.

EDUCATION

Ph.D. Candidate, Soil, Water & Ecosystem Sciences

University of Florida | Expected Sep 2026 | GPA 4.00

Dissertation: Addressing Soil Data Sovereignty and Scarcity Limitations Using Decentralized AI Techniques. Focus on data-efficient and privacy-preserving soil intelligence, EO, soil carbon, sampling and environmental data governance.

M.S., Crop & Soil Sciences

University of Georgia | 2023 | GPA 3.80

Thesis: Decision Support Tools for Irrigation Scheduling in Peanuts.

Graduate Certificate, Agricultural Data Science & Machine Learning Applications

University of Georgia | 2022

Applied data science, ML and agricultural analytics.

Integrated M.S./B.S., Natural Resources Development & Agricultural Engineering

Agricultural University of Athens | 2021

Thesis: Prolonged Drought and Scarcity Indicators on the Guadiana River, Spain/Portugal.

SELECTED PUBLICATIONS & TECHNICAL OUTPUTS

- Gallios et al. (2026). Federated earth-observation models for collaborative farm-scale soil mapping. International Journal of Applied Earth Observation and Geoinformation, 146, 105067. [DOI](#)
- Bartsch et al. (2026). Soil laboratory and satellite spectral data filtering: A Spectral Quality Protocol (SQuaP). Remote Sensing of Environment, 333, 115144. [DOI](#)
- Gallios, Tsakiridis & Tziolas (2025). Federated learning applications in soil spectroscopy. Geoderma, 456, 117259. [DOI](#)
- Gallios, Kritharoula & Tziolas (2025). GaiaBot: Simplifying Access to Soil Data. IEEE IGARSS 2025. [DOI](#)
- Gallios et al. (2024). Incorporating volumetric water-content sensors as an automated data-entry solution for IrrigatorPro. Journal of the ASABE, 67, 1561-1574. [DOI](#)

INTERNATIONAL COMMUNICATION & SERVICE

- Presented technical work at the FAO Global Symposium on Soil Information and Data (2024), IEEE IGARSS, AGU, ESA and agronomy forums.
- Experience working with farm, university, laboratory, industry and institutional collaborators across Europe, North America, South America and globally distributed soil-data networks.
- Peer reviewer for international journals and volunteer in soil-science outreach for children and families; earlier Erasmus+/European Solidarity Corps activities included sustainable-agriculture and rural-community exposure in Europe.

TECHNICAL TOOLKIT

Earth observation & GIS: Google Earth Engine, Sentinel-2, ArcGIS Pro, QGIS, GeoPandas, Rasterio/GDAL, GeoServer, raster/vector workflows.

Modelling & statistics: Python, R, PyTorch, scikit-learn, XGBoost, random/quantile forests, CNNs, transfer/federated/active learning, uncertainty and calibration.

Data & systems: Git/GitHub, REST APIs, Flower/FLWR, cloud/HPC, reproducible pipelines, dashboards, RAG/agent workflows.

Field & sensing: VNIR-SWIR/NIR spectroscopy, spectral harmonization, soil sampling, soil-moisture sensors, GPS/metadata, QA/QC.

PROJECT DELIVERY

Support: Technical scoping; validation plans; work-plan inputs; proposal/report sections; pilot briefs; methods notes; handover material.

Standards: Documented assumptions, data provenance, QA/QC, validation logic, uncertainty, limitations and reproducibility where appropriate.

LANGUAGES

Greek: Native

English: C2

Spanish: B2

German: B1

Portuguese: A2

SELECTED RECOGNITION

2025: Victor W. Carlisle Scholarship; GFSI Joint Linkage Call, Co-PI.

2024: Spectral Evolution Research Partnership Program.

2022: Gerondelis Foundation Scholarship for Excellence in Graduate Studies.

PROFESSIONAL LINKS

Portfolio

TerraFed

GaiaBot

Google Scholar

GitHub

ORCID

REFERENCES

Professional references from the University of Florida, University of Georgia and USDA are available upon request.

COLLABORATION SCOPE

Remote-first technical/project support, short-term assignments, validation and monitoring plans, analytical delivery, proposal/report support and research-to-implementation collaborations. Public contact details are intentionally limited; latest version at gforgeoscience.com.