

GEOSPATIAL AI AND ENVIRONMENTAL INTELLIGENCE

From environmental data to defensible project evidence.

GforGeoscience helps technical and institutional teams turn satellite, field, soil, sensor and research data into maps, monitoring evidence, validation plans, sampling strategies, dashboards, reports and project-ready workflows for agriculture, soil, climate and land systems.

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50 farms Brazil farm-scale EO study	7,831 Georeferenced field observations	100,000+ Spectral observations harmonized	15,000+ ha IrrigatorPro platform context
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Where GforGeoscience can support a project

Remote sensing monitoring & validation EO covariate development, validation design, spatial/temporal benchmarking, change analysis, uncertainty interpretation, dashboard-ready monitoring layers.	Soil carbon, MRV & digital soil mapping SOC and soil-property mapping, QA/QC, cost-aware sampling, uncertainty, ground-reference design and monitoring briefs for land-sector evidence.
Environmental AI, spectroscopy & data governance Model benchmarking, transferability, federated/privacy-preserving workflows, spectral harmonization, reproducible pipelines and clear governance assumptions.	Project design, reporting & technical documentation Technical scoping, work-plan inputs, proposal sections, methods/indicator logic, validation notes, report sections, slide outlines and handover material.
Field sampling & ground-reference design Sampling plans, metadata structures, QA/QC, field-reference alignment, model-ready datasets, SOP inputs and practical monitoring documentation.	Decision-support systems & applied analytics Sensor/API integration, environmental data pipelines, lightweight dashboards, user-oriented interpretation and research-to-delivery workflow design.

Typical deliverables

Validation plans Reproducible notebooks	Maps & monitoring layers Dashboards & lightweight tools	Sampling strategies & SOP inputs Technical notes & report sections	QA/QC & model benchmarks Training & handover material
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Selected evidence of delivery

Farm-scale Earth observation for collaborative soil mapping **PUBLISHED | BRAZIL**

Role / approach: Led a farm-scale geospatial modelling and validation framework integrating 7,831 field observations from 50 farms across five Brazilian regions with multi-temporal Sentinel-2 data, farm-level evaluation, uncertainty analysis and local adaptation.

Deliverables / evidence: Published validation study, SOC/clay maps, repeatable EO processing, transfer tests and monitoring/sampling evidence. Local adaptation reduced median error by 42% for clay and 31% for SOC relative to a centralized baseline.

Institutional relevance: Demonstrates rigorous validation, transferability testing and conversion of heterogeneous field/EO data into defensible farm-level monitoring products. [View publication](#)

TerraFed - privacy-governed soil intelligence **UF-LICENSED WORKFLOW**

Role / approach: Lead technical development of a workflow connecting field samples, EO covariates, local model updates, uncertainty, sampling priorities and partner-facing delivery while keeping sensitive local data under controlled governance.

Deliverables / evidence: Prototype/pilot workflow, dashboard-ready layers, reports, sampling planner components and proposal/pilot material developed through University of Florida research and technology-commercialization activities.

Institutional relevance: Relevant to soil-carbon/MRV programmes, distributed institutional data, data-scarce settings and projects where privacy, local control and transparent uncertainty matter. [Open TerraFed](#)

Global soil spectroscopy and model transfer **MULTI-INSTITUTIONAL**

Role / approach: Coordinated harmonization and privacy-governed modelling across 100,000+ observations from six institutional soil libraries, with spectral QA/QC, reproducible training/evaluation and transfer across heterogeneous sensors and regions.

Deliverables / evidence: Harmonized modelling workflows, external/zero-shot evaluation, technical documentation and peer-reviewed outputs, including federated learning applications in soil spectroscopy.

Institutional relevance: Shows ability to work across institutional boundaries, heterogeneous data and model-transfer constraints without treating centralization as the only solution. [Representative publication](#)

Sensor-to-decision irrigation support **OPERATIONAL AGRICULTURE**

Role / approach: At the University of Georgia, integrated soil-moisture sensing, APIs, weather and crop variables with IrrigatorPro workflows; supported QA checks, multi-season validation, software testing, grower communication and Extension workshops.

Deliverables / evidence: Automated data-entry workflow, field-validation evidence, user-facing outputs and a peer-reviewed technical publication. The broader IrrigatorPro platform has been used across more than 15,000 hectares and associated with approximately 15% improvement in water-use efficiency.

Institutional relevance: Demonstrates field-to-decision delivery, operational validation and communication with producers and Extension users rather than model development in isolation. [View publication](#)

COLLABORATION MODEL

1. Scope the decision, data and output.
2. Review evidence, assumptions and constraints.
3. Deliver defined analysis and documentation.
4. Review, revise and hand over reproducible outputs.

QUALITY STANDARD

Data provenance and QA/QC documented.
Validation matched to the intended decision.
Assumptions, uncertainty and limitations explicit.
Reproducible workflows and clear handover where appropriate.

Technical lead

Giannis Gallios is an environmental scientist and agricultural engineer completing a Ph.D. in Soil, Water and Ecosystem Sciences at the University of Florida (expected September 2026). His work spans Earth observation, soil carbon, irrigation and drought, soil spectroscopy, environmental AI, uncertainty-aware sampling, data governance, decision support and technical communication. GforGeoscience is a professional platform for defined technical/project support and collaboration - not a claim to be a large consulting firm.

Specialist boundaries are made explicit: assignments requiring crop-specific physiological authority, certified carbon-accounting/verification responsibility, legal advice, or local regulatory expertise should include the appropriate domain or country specialists.

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