UNEARTHED LEGACY FOUNDATION

GLOBAL ARCHAEOLOGICAL LANDSCAPE PROJECT

GALP

Explaining Why Complex Societies Built Where They Built

A Five-Year International Comparative Archaeology and Open-Science Research Program

Lead Institution: Unearthed Legacy Foundation
Scientific Director: Ömer Tanyürek
Program Horizon: 5 years
Version: Final Project Concept and Scientific Framework - September 2026

1. Executive Summary

The Global Archaeological Landscape Project (GALP) is a five-year international comparative research program of the Unearthed Legacy Foundation. Its central question is deliberately simple and globally testable: why did past complex societies place settlements, fortresses, administrative centers, ceremonial places, ports and other strategic sites where they did?

GALP will move beyond descriptive site-location studies by developing and testing a theory-driven, cross-regional framework that evaluates how environmental opportunity, mobility, visibility, water, resources, hazard, connectivity, political strategy and culturally meaningful landscapes interacted in locational decisions. The project will begin with a rigorously bounded pilot in the Lake Van–Urartian landscape and will then test the same analytical framework in independently selected comparative regions.

The program is designed to generate peer-reviewed articles, an edited or authored scholarly synthesis volume, a curated comparative geospatial database, reproducible analytical workflows, interactive cartography, training outputs and public-facing scientific communication. Open outputs will follow FAIR principles where legally and ethically appropriate; sensitive archaeological coordinates, restricted excavation information and culturally sensitive data will not be released merely for the sake of openness.

2. Scientific Rationale and Gap

Archaeological GIS has long examined elevation, slope, water access, mobility, visibility and environmental suitability. Recent predictive studies increasingly combine multiple spatial scales, walking-cost measures and statistical or machine-learning methods. Yet a recurring weakness remains: predictive accuracy does not automatically explain human decision-making, and environmental correlations can become deterministic if political, cultural and historical mechanisms are not explicitly modeled.

GALP addresses this gap by separating prediction from explanation. It will ask not only whether a variable correlates with site location, but also what causal or historical mechanism could plausibly connect that variable to settlement choice, how that mechanism varies by site function and period, and whether it travels across independent cultural settings.

The project also responds to the current movement toward rigorous global comparison and open archaeological data infrastructures. A 2026 Antiquity project, URBank, demonstrates the value of structured global deep-time datasets for comparative research; GALP will adopt the same general commitment to transparent comparison while focusing specifically on landscape choice rather than urbanism.

3. Core Research Question

WHY HERE?

Which combinations of physical, social and cultural landscape variables best explain the location and organization of strategic places in past complex societies?

3.1 Secondary Questions

- Which locational variables are recurrent across regions, and which are historically specific?
- Does site function change the relative importance of water, mobility, visibility, defensibility, production, connectivity or sacred landscape?
- Do political centers occupy unusually advantageous combinations of variables compared with contemporary non-elite sites and suitable but unused locations?
- How do paleoenvironments, paleoshorelines and changing hydrology alter modern interpretations of ancient spatial organization?
- Can models trained in one region successfully explain or predict patterns in another, or do they fail in culturally informative ways?
- How should uncertainty, survey bias, chronological ambiguity and preservation bias be incorporated into global archaeological comparison?

4. Conceptual Framework: Landscape Choice Model (LCM)

GALP will develop the Landscape Choice Model (LCM) as a testable analytical framework rather than as a predetermined universal law. The model treats site placement as a constrained choice among alternatives. Different site types and historical contexts may assign different weights to the same landscape variables.

4.1 Variable Families

Variable family	Illustrative measures
Topography	elevation; local relief; slope; aspect; terrain position; defensibility
Hydrology	distance and travel cost to reliable water; watershed position; springs; rivers; lake access
Mobility and connectivity	least-cost movement; passes; route centrality; travel time; access to neighboring centers
Visibility	viewshed; intervisibility; visual control of routes, agricultural zones or landmarks
Production and resources	agricultural potential; pasture; stone; metals; timber; obsidian/basalt or other regionally relevant resources
Paleogeography	historical shorelines; river migration; erosion/deposition; reconstructed land cover where evidence permits
Risk and resilience	flood, earthquake, volcanic, drought or other hazards when demonstrably relevant

Political organization	site hierarchy; administrative function; territorial spacing; network position
Cultural landscape	ritual landmarks, mountains, water bodies, monuments and other historically supported meaningful features
Data quality	chronological confidence; survey intensity; preservation; coordinate precision; source reliability

4.2 What the Model Will Not Assume

- That environment mechanically determines human settlement.
- That modern hydrology or coastlines can automatically stand in for ancient conditions.
- That all archaeological sites are equivalent analytical units.
- That presence-only archaeological records provide unbiased samples.
- That a model with high predictive accuracy is necessarily a good historical explanation.
- That one civilization can serve as the template against which all others are measured.

5. Comparative Research Design

A major risk in global comparison is cherry-picking famous civilizations that happen to fit a proposed theory. GALP will therefore predefine inclusion criteria before final case selection. Comparative regions must have adequate chronological control, sufficient site-location data, accessible environmental datasets, a defensible sample of site functions, and legal/ethical feasibility.

5.1 Phase I - Pilot Laboratory

Lake Van and the Urartian landscape will serve as the methodological pilot because it combines high-relief terrain, major water bodies, fortified and administrative sites, visibility relationships, transport corridors and changing lake landscapes. The pilot is not intended to prove a uniquely Urartian theory; it is intended to calibrate data standards, test analytical workflows and identify variables that can subsequently be challenged in independent regions.

5.2 Candidate Comparative Macro-Regions

- Anatolia and the Armenian Highlands
- Iranian Plateau and South Caucasus
- Mesopotamian and adjacent highland systems
- Mediterranean fortified and administrative landscapes
- Andean state landscapes
- Mesoamerican state landscapes

Final regions and individual case studies will be selected only after a formal data audit and specialist consultation. The project will avoid implying direct cultural equivalence between societies separated by chronology, geography or political form.

6. Methodology

6.1 Data Architecture

- Standardized site gazetteer with persistent internal identifiers.
- Site-function ontology that distinguishes, where evidence permits, capitals/administrative centers, fortresses, settlements, ritual sites, production sites, ports and other functional categories.
- Chronological ranges with explicit confidence levels rather than forced single dates.
- Provenance field for every archaeological and environmental datum.
- Coordinate-precision and sensitivity fields for each spatial record.
- Version-controlled metadata, processing history and reproducible analysis scripts.

6.2 GIS and Spatial Analysis

- Digital elevation model derivatives at multiple spatial scales.
- Walking-time and least-cost accessibility rather than Euclidean distance alone where terrain matters.
- Viewshed and intervisibility analysis with documented observer/target assumptions.
- Hydrological modeling and, where evidence supports it, reconstructed paleohydrology.
- Paleoshoreline scenarios for lacustrine/coastal case studies.
- Network analysis of settlements and routes.
- Null/background or pseudo-absence sampling designed to reduce environmental availability bias.
- Spatial autocorrelation tests and region-aware cross-validation.

6.3 Statistical Strategy

The statistical plan will compare interpretable baseline models with more flexible methods. Candidate approaches include generalized linear/additive models, Bayesian hierarchical models and selected machine-learning algorithms. Model choice will depend on data structure rather than novelty. Predictive performance, calibration, uncertainty and interpretability will be reported separately.

Because archaeological datasets frequently lack true absence data and are affected by uneven survey and preservation, GALP will not treat unrecorded locations as straightforward absences. Sensitivity analyses will test alternative background sampling, survey masks and chronological assignments.

6.4 Cross-Regional Validation

The strongest test of a global framework is transferability. GALP will therefore reserve independent regions for out-of-region validation. A model developed in one region will be tested without silently retuning it to fit another. Failure to transfer will be treated as a scientific result that may reveal culturally or historically specific decision rules.

7. Work Packages

WP1 - Governance, Protocols and Data Standards: Research protocol; ethics and permissions matrix; ontology; data-management plan; reproducibility standards.

WP2 - Lake Van / Urartian Pilot: Pilot database; GIS layers; model calibration; first peer-reviewed articles.

WP3 - Old World Comparative Expansion: Independent datasets from selected Anatolian, Caucasian, Iranian, Mesopotamian and/or Mediterranean cases.

WP4 - Independent Global Tests: Selected Andean and Mesoamerican cases developed with regional specialists; transferability tests.

WP5 - Global Modeling and Synthesis: Hierarchical comparative analysis; robustness testing; theory refinement; synthesis papers.

WP6 - Open Data and Digital Platform: Public metadata, generalized/non-sensitive spatial data, documentation, code and interactive outputs.

WP7 - Publications, Book and Public Scholarship: Article series, scholarly book, visual atlas, lectures, short films/documentary materials and educational content.

8. Five-Year Timeline and Milestones

Period	Primary milestones
Year 1	Protocol, advisory network, Urartian/Lake Van pilot, data audit, preregistered analytical plan where appropriate, 1-2 manuscript submissions.
Year 2	Pilot validation; Old World comparative cases; platform prototype; 2 manuscript submissions.
Year 3	Expanded comparative datasets; specialist workshops; first cross-regional models; 2 manuscript submissions.
Year 4	Independent global tests; transferability analysis; synthesis framework; 2 manuscript submissions.
Year 5	Global synthesis; final database release at approved resolution; scholarly book manuscript; flagship synthesis article; public atlas/exhibition or documentary package.

9. Publication and Research Outputs

Publication targets are goals, not guaranteed acceptances. Journal selection will be made manuscript-by-manuscript according to scope, methods and regional expertise.

- Target: 8-10 peer-reviewed research articles across five years.
- One flagship comparative synthesis article presenting the tested final LCM framework.
- One scholarly monograph or edited synthesis volume provisionally titled Landscapes of Power: A Global Archaeology of Locational Choice.
- Global Archaeological Landscape Database (GALD), with public and restricted tiers.
- Reproducible GIS/statistical workflows and technical documentation.
- Digital atlas and selected interactive maps.
- Annual scientific reports and public summaries.
- Training materials for early-career researchers and partner institutions.
- Public-facing documentary/short-film package, clearly separated from peer-reviewed scientific claims.

9.1 Provisional Article Sequence

1. Protocol and theory: From site prediction to archaeological explanation.
2. Lake Van pilot: multi-scalar landscape choice in the Urartian world.
3. Paleoshorelines and the modern-geography bias in archaeological interpretation.
4. Visibility, mobility and political landscapes: a comparative test.
5. Water access, route cost and functional site differentiation.
6. Old World cross-regional comparison.
7. Independent New World transferability test.
8. Global hierarchical model of archaeological locational choice.
9. Bias, uncertainty and reproducibility in comparative archaeological GIS.
10. Final synthesis: what is global, what is local, and why?

10. Team and Governance

Scientific Director: Ömer Tanyürek. The Scientific Director will lead the scientific architecture of GALP, coordinate research questions and publication strategy, and chair the scientific steering process. Regional interpretation must nevertheless be co-developed with appropriately qualified specialists; no single investigator will be presented as authoritative for all world regions.

10.1 Recommended Core Team

- Scientific Director / Principal Scientific Lead
- Program Director or Project Manager
- Senior GIS and Remote Sensing Lead
- Quantitative Archaeology / Statistics Lead
- Data Steward / Research Software Specialist
- Paleoenvironmental specialist(s)
- Regional archaeological co-investigators for every comparative case

- Research assistants and doctoral/early-career fellows
- Ethics, heritage-law and data-governance adviser
- Scientific communication / documentary team

10.2 Scientific Advisory Board

An international advisory board should include specialists in archaeological theory, GIS, quantitative methods, paleoenvironment, heritage ethics and the principal comparative regions. Advisory membership should be confirmed before names are publicly listed.

11. Open Science, Ethics and Heritage Protection

GALP will align its open-science policy with UNESCO principles emphasizing transparency, reproducibility, equitable collaboration, FAIR data and responsible stewardship. Openness will not override archaeological protection, national heritage law, excavation agreements, Indigenous or local authority, intellectual-property obligations, or security concerns.

- Sensitive site coordinates may be generalized, embargoed or retained in a restricted tier.
- Permissions and licensing will be recorded at dataset level.
- Local and regional scholars will be involved as intellectual partners, not merely data providers.
- Authorship will follow documented contribution criteria.
- Data collected under excavation or institutional restrictions will not be republished without authorization.
- CARE principles will be considered where data concern Indigenous peoples or communities with legitimate authority over cultural knowledge.
- Public maps will undergo a looting-risk review before release.

12. Quality Assurance and Reproducibility

- Written analysis plan before confirmatory modeling.
- Separation of exploratory and confirmatory analyses.
- Version control for code and derived datasets.
- Documented coordinate reference systems, DEM resolution and resampling choices.
- Independent code/data review for flagship analyses.
- Spatially structured cross-validation to reduce inflated accuracy caused by spatial autocorrelation.
- Robustness tests for uncertain dates, uncertain site functions and alternative paleogeographic scenarios.
- Negative and null results reported rather than suppressed.
- Methods papers or supplements sufficient for qualified researchers to reproduce public analyses.

13. Risk Register

Risk	Scientific/operational consequence	Mitigation
Data comparability	Different regions use incompatible site typologies and chronologies.	Create ontology, preserve original classifications, harmonize only at defensible levels.
Sampling bias	Known sites reflect uneven survey intensity.	Survey masks, source-quality fields, sensitivity analyses and bias-aware sampling.
Environmental determinism	Correlations may be mistaken for historical causes.	Theory-driven hypotheses; political/cultural variables; regional specialist interpretation.
Overfitting	Complex models may fit one region but fail elsewhere.	Holdout regions, spatial cross-validation, simpler baselines and preregistered tests.
Sensitive coordinates	Open maps may increase looting risk.	Restricted tiers, coordinate generalization and heritage-risk review.
Scope inflation	A 'global' project can become unmanageable.	Stage-gated expansion; minimum data standards; fewer high-quality cases over superficial coverage.
Authorship/equity	Global projects can extract data without fair credit.	Contribution agreements, local co-leadership, transparent authorship and reciprocal capacity building.
Funding continuity	Five-year outputs depend on sustained resources.	Modular work packages with publishable outputs at each stage; diversified grants/sponsors.

14. Budget Framework

A credible final budget should be built only after partner regions, staffing levels, travel, data licensing and field components are confirmed. The project should therefore be presented initially with a modular cost structure rather than a fabricated single figure.

- Personnel and fellowships
- GIS/remote-sensing and computing
- Data acquisition, licensing and digitization
- Regional workshops and specialist collaboration

- Travel and field verification where permitted
- Open-science infrastructure, repository and web platform
- Publication and language editing
- Public communication and documentary production
- Legal, insurance, permissions and heritage compliance
- Contingency and independent scientific review

Funding strategy: combine foundation support, competitive research grants, institutional partnerships, philanthropic sponsorship and in-kind academic contributions. Sponsors will not receive authority to alter scientific results or suppress unfavorable findings.

15. Success Metrics

- Scientific: peer-reviewed outputs, successful independent validation tests, citations and methodological reuse.
- Data: documented, reusable and legally shareable datasets with persistent identifiers where feasible.
- Collaboration: number and depth of international co-investigator partnerships, including equitable regional leadership.
- Capacity: training workshops, fellows supported and reusable teaching materials.
- Public impact: scientifically accurate public outputs, platform engagement and museum/educational partnerships.
- Integrity: documented permissions, reproducibility audits, transparent corrections and no unauthorized disclosure of sensitive data.

16. Decision Gates

- Gate 1 - Month 6: approve protocol, ethics framework, ontology and pilot dataset.
- Gate 2 - Month 12: proceed to expansion only if pilot variables and workflows are demonstrably reproducible.
- Gate 3 - Month 24: approve comparative regions after data-quality and partnership review.
- Gate 4 - Month 36: lock independent validation datasets before final model testing.
- Gate 5 - Month 48: freeze synthesis protocol and book architecture.
- Gate 6 - Month 60: final scientific review, publication package and curated data release.

17. Scientific Positioning Statement

> *GALP does not seek a single deterministic formula for human settlement. It seeks to identify which locational pressures recur across complex societies, which are culturally contingent, how those pressures interact, and how confidently archaeology can distinguish general processes from historically specific choices.*

18. Proposed Public Identity

Program name: Global Archaeological Landscape Project (GALP)

Core question: Why Here?

Scientific framework: Landscape Choice Model (LCM)

Data infrastructure: Global Archaeological Landscape Database (GALD)

Provisional scholarly synthesis: Landscapes of Power: A Global Archaeology of Locational Choice

Public-facing synthesis option: Why Here? The Geography Behind Ancient Civilizations

19. Immediate First-Year Action Plan

11. Constitute a 5-8 member scientific advisory board.
12. Write the formal data-management, ethics and authorship policies.
13. Freeze pilot-site inclusion criteria and site-function ontology.
14. Build the Lake Van/Urartian pilot gazetteer and source audit.
15. Define paleogeographic scenarios and environmental datasets.
16. Run baseline mobility, hydrology, topography and visibility models.
17. Pre-register or internally freeze confirmatory hypotheses before final statistical testing.
18. Invite 2-3 independent regional partners for Phase II feasibility audits.
19. Prepare Article 1 (theory/protocol) and Article 2 (pilot analysis).
20. Prepare a funder/sponsor version derived from, but scientifically subordinate to, this master document.

20. Selected Methodological and Policy References

- UNESCO. 2021. Recommendation on Open Science. Principles of transparency, reproducibility, FAIR/CARE-aware stewardship and equitable international collaboration.
- URBank Project. 2026. 'Making comparative archaeological and historical urbanism rigorous and open access through the URBank data platform.' Antiquity 100(411), e28. DOI: 10.15184/aqy.2026.10287.
- Predictive Modeling for Targeted Archaeological Survey of Arsacid Period Sites in the Iranian Borderland Region of the Araxes River Valley. Journal of Archaeological Method and Theory (2025). Demonstrates multi-scale terrain variables and walking-distance approaches to water.
- Verhagen, P. et al. 'Integrating Archaeological Theory and Predictive Modeling: a Live Report from the Scene.' Journal of Archaeological Method and Theory. Highlights the need to connect predictive modeling with archaeological theory.
- Yaworsky, P. et al. 2020. 'Advancing predictive modeling in archaeology: An evaluation of regression and machine learning methods...' PLOS ONE 15(10): e0239424. Discusses absence-data, theory and validation limitations.
- Alders, W. 2023. 'Open-Access Archaeological Predictive Modeling Using Zonal Statistics: A Case Study from Zanzibar, Tanzania.' Journal of Computer Applications in Archaeology 6(1):117-142.

- 'Dots on the Map: Issues in the Archaeological Analysis of Site Locations.' Journal of Archaeological Method and Theory. Reviews conceptual and measurement problems in site-location analysis.
- 'A comparative approach to GIS modelling of terrestrial mobility in archaeological sites.' Journal of Archaeological Science (2024). Compares mobility/visibility modeling approaches.

21. Final Project Definition

GALP is defined as a comparative, hypothesis-driven and reproducible archaeological research program. Its scientific value will depend not on the number of civilizations named in promotional materials, but on the quality of its sampling logic, regional partnerships, data provenance, uncertainty treatment, independent validation and willingness to revise or reject its own proposed framework.

This master document is suitable as the scientific foundation for grant applications, institutional partnership discussions and the preparation of a shorter sponsor-facing prospectus. Before submission to any specific funder, the budget, eligible costs, partner commitments, data-access permissions and deliverable language must be tailored to that funder's rules.