STEPHEN WEBER

Independent Researcher | Palimpsestus Open Spec | Provenance-Faithful Autonomous Systems

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RESEARCH PROFILE

Independent systems researcher investigating how autonomous systems can change what they believe and do without losing the provenance and warrant that justify the change. Creator of Palimpsestus, a public Open Spec for provenance-faithful reasoning, accountable state transition, verification, and autonomous world learning. Research combines first-principles specification, formal/conformance methods, controlled experiments, adversarial testing, and reproducible evidence. Background spans more than two decades of systems engineering, model-based architecture, enterprise architecture, data lineage, and governance.

INDEPENDENT RESEARCH

Founder & Principal Researcher, Palimpsestus / 1791 Technologies LLC | Los Angeles, CA | Mar 2025–Present

- Developed the Palimpsestus Open Spec, a public versioned specification deriving an executable systems architecture from a compact set of first principles with explicit ancestry, provenance, and warrant requirements.
- Built an independent conformance framework with machine-verifiable provenance, adversarial Crucibles, corpus freezing, cryptographic sealing, mutation testing, and reproducible evaluation artifacts.
- ARC-AGI-2: produced a frozen conformant implementation of Palimpsestus Open Spec v1.1.3; exhaustive conformance passed 192/192 semantic obligations and 160/160 derivation edges. Confirmatory work preserved mixed results: predictive geometry replicated, while controller endpoint efficacy was null and operational-horizon preservation remained unresolved.
- **ARC-AGI-3:** built a separate interactive autonomous-world-learning realization and matched learner. In a preregistered paired crucible on `ls20`, provenance-faithful recurrence reduced repeated disproven actions to 0% versus 14% for the matched baseline and produced a compact graduated rule basis. The effect did not translate into level progress, and goal-directed utility remained unresolved.
- Established experimental protocols that freeze architectural commitments before evaluation, separate substrate adaptation from the governing specification, use matched comparisons and explicit adjudication criteria, and preserve null, negative, superseded, and failed results rather than retrofitting conclusions to outcomes.
- Current work tests whether independently developed implementations converge on common substrate-independent control properties and where those properties fail.

Public artifacts: https://github.com/thepalimpsestus/palimpsestus-spec | https://github.com/thepalimpsestus/palimpsestus-conformance

RESEARCH AREAS & METHODS

Research areas	Methods
AI agents; autonomous/world-learning systems; provenance; formal methods; distributed systems; verification & validation; trustworthy AI; knowledge representation; accountability.	First-principles derivation; systems modeling; experimental design; preregistration; matched controls; adversarial testing; conformance validation; counterexample-driven inquiry; reproducibility.
Technical	**Research stance**
Python; TypeScript/JavaScript; SQL; Git; JSON/JSON Schema; graph/DAG models; model-based systems engineering; software/data/service architecture.	Treat failure as evidence. Preserve derivation ancestry, negative results, amendments, and unresolved frontiers. Distinguish implementation conformance from empirical utility.

SELECTED PROFESSIONAL EXPERIENCE

Senior Enterprise Data Architect, Commerce Bank | Nov 2023–Feb 2025

- Led enterprise data architecture for a multi-terabyte Teradata-to-Databricks modernization spanning logical/physical architecture, governance, security, retention, and enterprise standards.
- Reconstructed undocumented enterprise data lineage to preserve traceability and reduce migration risk; developed model-based architecture connecting conceptual business requirements to logical and physical implementations.

Systems Engineering, Architecture & Data Governance, The Boeing Company | 2004–2023

- Nineteen-year progression through engineering-scientist, systems-engineering, process/service architecture, enterprise architecture, and data-governance roles in a large-scale aerospace engineering environment.
- Recognized as a Boeing Designated Expert in Model-Based Architecture and Service Architecture. Work included model-based definition, engineering change/configuration control, service-oriented architecture, enterprise architecture, information governance, and global finance master-data governance.
- Earlier engineering work linked physical parts to digital definitions using CATIA/ENOVIA and used virtual/augmented simulation to evaluate assembly flows, physical-stress collisions, and manufacturing bottlenecks before factory-floor implementation.

PUBLICATIONS & RESEARCH OUTPUT

- *Palimpsestus: A Constitutional Architecture for Provenance-Faithful Distributed State Transformation*. Submitted to OPODIS 2026; manuscript under double-blind review.
- *Enabling IT Service Fulfillment with Service-Oriented Architecture*. GPDIS, 2016.

EDUCATION

M.S., Computer Science, Missouri University of Science and Technology, 2018

B.S., Computer Graphics, Purdue University, 2004

SELECTED RECOGNITION & CREDENTIALS

- Boeing Designated Expert in Model-Based Architecture
- Boeing Designated Expert in Service Architecture
- Silver Phantom Award, Boeing (2005)
- The Open Group Certified: TOGAF 9

SELECTED SKILLS

AI Agents • Formal Methods • Data Provenance • Systems Engineering • Experimental Design • Distributed Systems • Verification & Validation • Model-Based Systems Engineering • Knowledge Representation & Reasoning • Trustworthy AI • Agent Evaluation • Software Architecture