Datorien L. Anderson

Independent Research Scientist | Systems Designer | AI/ML Researcher
datorien@occybyte.com | Louisville, KY | occybyte.com | ORCID: 0009-0004-7688-6829
Google Scholar | LinkedIn | Game Dev Corner | itch.io: thyarcanist | HuggingFace: niltheory

RESEARCH IDENTITY

Independent ML researcher and systems designer operating under Occybyte. Six preprints spanning ML theory, dynamical systems, game theory, signal processing, and thermodynamics — all converging on a common thesis: structural identity preservation under entropic pressure. Research demonstrates that discrete-valued neural architectures, 1/f noise processes, and constructive game-theoretic interaction laws all instantiate the same underlying principle of coherence maintenance through constraint. BS Human-Computer Interaction (Game Design concentration); MS Computer Science (AI/Data Science) in progress.

PUBLICATIONS & PREPRINTS

Submitted

Invariant-Governed Learning: Phase Transitions to Generalization via Discrete Potentials

Submitted — International Conference on Machine Learning (ICML) 2026

Novel neural architecture achieving early generalization via set-valued operations. Demonstrates validation-leading accuracy (Platonic Spike) through geometric invariant preservation.

Endogenous 1/f Noise in Constructive Game Theory: Why Optimal Agents Must Preserve Non-Stationarity

Submitted — LOFT 2026 (Logic and Foundations of Game and Decision Theory); preprint submitted to SSRN

Demonstrates structural bifurcation under constructive mixing parameter λ across PD, Stag Hunt, and Chicken (ordered critical thresholds $\lambda^*SH \approx 0.20 < \lambda^*C \approx 0.35 < \lambda^*PD \approx 0.50$). Trivalent agents with zero branch outperform forced scalar commitment by +46.97 wealth at high noise.

Published Preprints

Certainty-Validity: A Diagnostic Framework for Discrete Commitment Systems

arXiv:2603.00070 | February 2026

Introduces CVS framework decomposing model performance into certainty × validity matrix. Demonstrates 83% Ambiguity Ceiling in discrete architectures and shows that CI (Confident-Incorrect) migration represents a structural failure mode distinct from standard accuracy metrics.

Diagnostic Benchmarks for Invariant Learning Dynamics: Empirical Validation of the Eidos Architecture

arXiv:2602.13322 | February 2026

Introduces PolyShapes-Ideal (PSI) dataset isolating topological invariance from textural correlations. Eidos achieves >99% on PSI and 81.67% zero-shot transfer across 30 unseen typefaces without pre-training.

Phase Coherence, Not Spectral Slope, Determines Recovery in Noise-Driven Bistable Systems

Research Square (Computational Physics) | February 2026 — 124 views, 85 downloads

Introduces Pink-to-White Noise Ratio (PWNR) as quantitative metric of systemic integrity. Demonstrates phase transition from entropic decay to structural rejuvenation above critical PWNR threshold using novel endogenous 1/f noise generation method.

Tiered Risk Preferences under Environmental Phase Transitions: A Game-Theoretic Framework for Regime-Switching Agents

SSRN:5907584 | 2025

Establishes that hysteresis-based switching strategy (Tier 7) achieves strictly superior long-run wealth accumulation in oscillating environments. Formal foundation for optimal timing in regime-switching decision problems.

EXPERIENCE

Lead AI Architect & LLM Technical Advisor — True-Bots

August 2025 – January 2026 | Independent Research & Technical Consultant

- Created GOAM Framework — concurrent Macro/Micro agent system separating strategic planning (long-term reasoning) from tactical execution (real-time decision-making), addressing fundamental limitations of the Thespian Model approach to game AI
- Developed information certainty routing model preventing meta-gaming by dynamically routing decisions between Quick Play (low ambiguity) and Long Play (high ambiguity) based on available game state information — direct application of CVS framework principles
- Reduced per-game inference costs from $0.36 (Claude Sonnet) to projected $0.056 (Gemini 2.5 Flash) via quantization and cost-reduction pathways while maintaining strategic performance benchmarks
- Framework deployed to client (Project O) for card game AI; validated through chess gameplay against Stockfish

AI Advanced Ops — Advanced RLHF & Multimodal Cognition — Invisible Tech

October 2024 – Present | Multimodal & LLM | Contractor

- Ramped across multiple frontier accounts; transitioned from an initial vision-language evaluation track into RLHF/SFT and cognition-focused evaluation for frontier LLM/VLM systems
- Mid-engagement program reassignment; quickly reached top performance metrics and was promoted to QA/QC Reviewer within ~12 months, with cross-team recommendations
- Selected as Reviewer on an additional Frontier account; helped drive a 3× delivery volume increase while maintaining QA acceptance standards

Technical Game Designer — GRX Immersive Labs

December 2023 – August 2024 | C#, Unity, LLM | Contractor

- Led end-to-end design on POV 3.0 – a gamified AI/ML learning experience featuring a data-collection economy, drone AI progression, and faction alignment system; authored full GDD, ML learning modules, pitch documentation, and items database. 400+ Hours of manual and agentic IDE development.
- Architected a flexible Unity prototype using scriptable objects + unique IDs enabling rapid mini-game (activity) deployment; implementing target shooting and time trial minigames to demonstrate side-interaction loops.
- Designed core stealth mechanic, USB injection/extraction as a loop teaching data collection through gameplay, with quota-based progression driving session structure.
- Mentored internal employee from zero game design experience to production-ready contributor

Simulation Designer — Interplay Learning

August 2021 – January 2023 | C#, Oculus VR, Unity

- Primary designer-developer for Carrier HVAC training program accounting for ≈15% of Interplay Learning's $8–25M annual revenue; shipped 30+ immersive simulations across two project waves despite ad-hoc deadlines
- Architected 36+-state LED-diagnostic framework (state-machine library + dynamic asset loader) cutting new-feature setup ≈40% and enabling instant fault injection for client demos
- Reverse-engineered legacy mobile diagnostics app (no docs, obfuscated logic), rebuilt transition map, and added missing functionality

Additional Research Contracts

- AI Safety Evaluation Specialist — Auk Research Study (via Scale AI), January 2025: systematic AI safety assessments, model vulnerability analysis in coordination methods

- Adversarial Prompting SME — Pareto.AI, December 2024–January 2025: selected via headhunting to design adversarial prompts stress-testing LLMs and identify weaknesses in model safety mechanisms

SELECTED PROJECTS

NOMOS (Invariant Engine for World Simulation)

November 2023 – Present | C++, Python, ImGui

- General-purpose agent-based modeling engine for worldbuilding across Bronze Age, modern, and sci-fi settings; stochastic core powered by SpectralFlux (endogenous 1/f noise generator)
- Full economic simulation: 55-element material layer, closed-loop monetary system, vendor lifecycle, production pipelines, governance policies, cross-realm FX rates
- PICK+E agent attribute model with Attractor Engine (layered motivational drivers) and Aspects (data-driven vice/virtue system)
- Interactive C++ simulation workbench with ImGui: planet viewer, economy dashboard, household inspector, monetary controls, materials editor

Eidos Neural Architecture

December 2025 | AI & Data Science | Basis for ICML submission & arXiv preprint

- First-principles architecture via discrete potential selection; early generalization / "test > train" dynamics (Platonic Spike Isolation)
- Benchmarks: 97% MNIST by end of epoch 1 (random init); ~80% EMNIST; 83% IMDB — cross-modal design (text + image) with invariant-preserving learning mechanics

pathfindn.occybyte.com — ML Dataset Generation via Gameplay

2025 – Present | Python, SymPy, CAS verification

- Mathematical reasoning game generating labeled training data for ML: players find expressions evaluating to target integers across geometric dimensional regimes ($IRn = 5 \times 11^{n-1}$)
- Reasoning requirement (not just expression) is the valuable dataset output — natural language mathematical justification at scale
- CAS-based verification via SymPy with symbolic equivalence checking and numeric fallback; canonical hash-based uniqueness detection

DESIGN FRAMEWORKS & CREATIVE WORK

- RPG Scoring Framework (Definitive RPG Checklist) with Action Physicality Index (August 2025) — formal rubric defining RPG-ness via six pillars + gender multiplier; separate action-physicality axis
- Extraction Shooter Design Rubric: Core Mechanics + UX/Mitigation (August 2025) — 10-point evaluation model with scoring formulas, bands, and audit worksheet
- Helldivers 2 Game Loop Primer — stakeholder memo disambiguating core/progression/meta/player-defined loops; frames time as primary antagonist
- Xibirisms — Experimental poetry-prose epic; Honorable Mention, SF Poetry Long Form Contest (judge: Prof. David Kirby, Florida State University). 35+ pages.
- A Fourth Axis: Modern Blood Composition — White Wolf / Storytellers Vault VtM 5E supplement; 120+ units sold in first 3 months
- Anchor & Void System (A/V-S) — original zero-gravity movement system for PnP, The Expanse-inspired orbital mechanics

EDUCATION

Eastern Kentucky University — Richmond, KY

Master of Science in Computer Science (Artificial Intelligence in Data Science)

Expected Summer 2026 – Spring 2028 | Accepted; scholarship decision pending

Full Sail University — Winter Park, FL

Bachelor of Science — Human-Computer Interaction (Game Design Concentration) | GPA: 3.3

August 2018 – February 2021 | Federally classified as Human-Computer Interaction (studentaid.gov)

CORE SKILLS

AI/ML Research: neural architecture design, set-valued networks, dynamical systems ML, RLHF, SFT, evaluation/benchmarking, agent-based modeling, CVS framework, NLP

Dynamical Systems: phase transitions, bifurcation analysis, 1/f noise generation, nonequilibrium thermodynamics, structural stability, game theory

Game & Systems Design: technical game design, systems design, simulation modeling, Unity (VR/Oculus), GDD production, procedural learning loops

Programming: C++ (primary research engine), Python, C#, FastAPI, WebSocket, SymPy

Data & Visualization: mathematical modeling, economic simulation, population dynamics, Matplotlib, Jupyter

Writing & Communication: 6 mod-approved preprints, technical documentation, interdisciplinary essay, published poetry-prose, game design rubrics