Murad Farzulla

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· farzulla.org · GitHub · ORCID

Research Focus: Adversarial Systems Complexity

Applying computational methods (agent-based modeling, tensor decomposition, NLP) to analyze friction and alignment in complex adaptive systems. My work unifies distinct domains—financial market microstructure, political legitimacy, and cognitive development—by modeling them as adversarial optimization problems where agents with divergent incentives interact under institutional constraints.

Education

MSc Finance Analytics September 2024 – April 2026
King's College London *London, UK*

- Financial Trading Programme Certificate
- Thesis (67

BSc Accounting Finance September 2021 – June 2024
SOAS University of London *London, UK*

- First Class Honours
- 7/13 ACCA exemptions (to be pursued in future)
- ISP (75

A-Levels September 2019 – June 2021
Oakham School *UK*

- Economics, Mathematics, Computer Science
- BTEC Level 2 Diploma in Leadership
- Bronze Silver Awards in mathematics competitions

Papers Under Review

Infrastructure vs Regulatory Shocks: Asymmetric Volatility Response in Cryptocurrency Markets
Methods: TARCH-X, GDELT sentiment analysis, Bayesian inference, bootstrap resampling
In Peer Review: Digital Finance (Springer) SSRN: 10.2139/ssrn.5788082

Training Data and the Maladaptive Mind
Methods: Neural network parallels, catastrophic forgetting, continual learning
Submitted: Minds and Machines (Springer) Zenodo: 10.5281/zenodo.17681336

Relational Functionalism: A Defense of Substrate-Independent Friendship
Methods: Philosophy of mind, functional analysis, alignment theory
With Editors: Ethics and Information Technology (Springer) Zenodo: 10.5281/zenodo.17626860

From Consent to Consideration: Why Existentially Vulnerable Autonomous Systems Cannot Be Legitimately Ruled
Methods: Consent-based legitimacy, functional criteria, substrate-agnostic ethics
With Editors: AI Ethics (Springer) Zenodo: 10.5281/zenodo.17957659

Preprints and Working Papers

Computational Finance Applied Econometrics

Market Reaction Asymmetry: Infrastructure Disruption Dominance Over Regulatory Uncertainty in Cryptocurrency Volatility
Methods: TARCH-X, GDELT sentiment analysis, Bayesian inference, bootstrap resampling DOI: 10.2139/ssrn.5788082

Alpha Asymmetry in Foreign Exchange Markets: Detection and Exploitation
Methods: Skewness/kurtosis analysis, backtesting, cross-market validation DOI: 10.5281/zenodo.17918374

Do Whitepaper Claims Predict Market Behavior? Evidence from Cryptocurrency Factor Analysis
Methods: NLP zero-shot classification, CP tensor decomposition, Tucker congruence
Submitted: Financial Innovation SSRN: 10.2139/ssrn.5918302

ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets
Methods: DeFi-TradFi risk modeling, composite index construction · Live Dashboard DOI: 10.5281/zenodo.17918239

Multi-Scale Sentiment and Market Microstructure: An Agent-Based Framework for Cryptocurrency Markets
Methods: Monte Carlo dropout, heterogeneous agents, Mesa ABM, ASRI integration
Submitted: Digital Finance (Springer) Zenodo: 10.5281/zenodo.17989810

Sentiment Without Structure: Differential Liquidity Response to Infrastructure vs Regulatory Events
Methods: Event study, funding rate analysis, Amihud illiquidity, Roll/Corwin-Schultz spreads DOI: 10.5281/zenodo.18099609

Economic Theory Institutional Dynamics

The Doctrine of Consensual Sovereignty: Quantifying Legitimacy in Adversarial Environments—The Axiom of Consent
Methods: Social choice theory, stability metrics, formal modeling DOI: 10.2139/ssrn.5918222

The Hedging Paradox: The Ambiguous Boundary Between Protection and Transfer—Extending AML Analysis to Include the Fourth Stage
Methods: Regulatory frameworks, game theory, case study analysis DOI: 10.5281/zenodo.17626621

Asymptotic Protection: The Simultaneous Remedy and Poison of Risk Management
Methods: Systemic risk modeling, network analysis, derivatives pricing DOI: 10.5281/zenodo.17620448

Privacy-Preserving Financial Surveillance: An Architectural Framework for CBDC Implementation
Methods: Mechanism design, zero-knowledge proofs, privacy-preserving computation DOI: 10.5281/zenodo.17917938

Philosophy of Science Metaphysics

Identity is Irreducibly Relational: A Critique of Primitive Identity from ZFC to Homotopy Type Theory
Methods: Referential Sets, HoTT, Univalence Axiom, Structuralism DOI: 10.5281/zenodo.18186445

The Replicator-Optimization Mechanism: A Unified Computational Framework for Self-Replicating Systems
Methods: Computational theory, category theory, Universal Darwinism, optimization theory DOI: 10.5281/zenodo.18090979

The Temporal Bitmap Interpretation of Quantum Mechanics: Wave Function Dynamics as Static Structure Traversal

Methods: Block universe eternalism, digital physics, undersampling theory, retrocausality DOI: 10.5281/zenodo.18091063

Replication Optimization at Scale: Dissolving Qualia via Occam's Razor—Eliminative Monism and the Computational Basis of Phenomenological Illusion

Methods: Eliminative materialism, illusionism, Gödelian self-reference, network epistemology simulation DOI: 10.5281/zenodo.18013187

Consciousness as Nominalization Error

Methods: Phenomenological reduction, linguistic analysis, process philosophy

Submitted: Mind-at-Large Project (Center for Process Studies)

AI Safety, Theory Cognitive Systems

Semantic-First Spatial Cognition: A Functional Affordance Architecture for Visual Understanding

Methods: Affordance theory, ecological psychology, phenomenology, action-distance metrics

Submitted: AISB 2026 Zenodo: 10.5281/zenodo.18091090

Training Data and the Maladaptive Mind

Methods: Neural network parallels, catastrophic forgetting, continual learning DOI: 10.5281/zenodo.17681336

Autonomous Red Team AI: LLM-Guided Adversarial Security Testing

Methods: RAG knowledge bases, OODA loops, NetworkPolicy isolation, abliterated models DOI: 10.5281/zenodo.17614726

Genre Mimicry vs. Ethical Reasoning in Abliterated Language Models

Methods: Safety fine-tuning analysis, training data conventions, genre pattern detection

Submitted: PPIG Zenodo: 10.5281/zenodo.17957694

Relational Functionalism: A Defense of Substrate-Independent Friendship

Methods: Philosophy of mind, functional analysis, alignment theory DOI: 10.5281/zenodo.17626860

From Consent to Consideration: Why Existentially Vulnerable Autonomous Systems Cannot Be Legitimately Ruled

Methods: Consent-based legitimacy, functional criteria, substrate-agnostic ethics DOI: 10.5281/zenodo.17957659

Books in Preparation

Fragrant Intent (Forthcoming)

Experimental poetry collection featuring original verse with stylistically-infected authorial commentary.

SUBSTRATES: Mind, Machines, Mirrors

What entities *can* hold consent? Functional criteria for moral consideration across biological, artificial, and institutional agents. Synthesizes published work on consciousness, trauma-as-training-data, relational functionalism, and genre mimicry.

FRICTION: Sovereignty, Systems, Slaves

What systems *violate* consent? Legitimacy criteria and institutional friction analysis. Synthesizes published work on consensual sovereignty, regulatory arbitrage, systemic risk, and privacy-preserving surveillance.

Both books build on *The Axiom of Consent*—a pre-game-theoretic framework formalizing delegation dynamics as $F = f(\alpha, \sigma, \varepsilon)$ where friction decomposes into alignment, stake, and entropy.

Open Source Software

gjr-garch-x: GJR-GARCH Models with Exogenous Variance Regressors

Pure Python implementation of Glosten-Jagannathan-Runkle (1993) GARCH models with support for exogenous regressors in the conditional variance equation. Features Student-t innovations, QML estimation,

and numerical Hessian inference.
PyPI: gjr-garch-x · GitHub: studiofarzulla/gjr-garch-x DOI: 10.5281/zenodo.17988193

Research Initiatives

Founder 2025 – Present
Farzulla Research *farzulla.org*

- Independent research practice collaborating with 5 other researchers; publishing working papers across computational finance, political economy, and cognitive modeling
- Self-hosted infrastructure (**Resurrexi Lab**): 7-node K3s cluster, RAG systems, real-time data pipelines · Details: resurrexi.io · Notes: resurrexi.dev
- Open-source methodology and reproducibility standards

Planned 2025 –
Dissensus *dissensus.ai*

- Research initiative applying the Axiom of Consent framework to multi-agent alignment problems
- Open to collaboration—seeking co-investigators and institutional partnerships

Founding Member, Editorial Committee 2025 – Present
Syneidocracy Framework Initiative *Remote*

- Conceptual advising on Meta-Consciousness pillar: formal governance architecture for algorithmic accountability
- Contributing Axiom of Consent framework for stakes-weighted legitimacy metrics

Professional Experience

Operations Manager May – September 2024
Family Enterprise *Baku, Azerbaijan*

- Strategic operations management and business consulting
- Advisory work with Azerbaijan Airlines (AZAL)
- Investment opportunity analysis and risk assessment across emerging markets

Economics Budgeting Intern July – August 2024
Azerbaijan Investment Holding *Baku, Azerbaijan*

- Economic analysis and budgeting within sovereign wealth management context
- Quantitative modeling for investment decision support

Technical Skills

Programming: Python (NumPy, Pandas, SciPy, Statsmodels, Scikit-learn, PyTorch, Transformers), SQL, LaTeX

0.3*em*]**Econometrics:***GARCH/TARCH/EGARCHvolatilitymodeling*, *Markovregime−switching*, *eventstud*

Computational Resources & Engineering

Built and maintain a 7-node Kubernetes cluster (K3s) for high-throughput social simulation and financial modeling: 66 CPU cores, 229GB RAM, 48GB VRAM across AMD and NVIDIA GPUs. Pipeline orchestration using Docker/K3s for reproducible research. Real-time market data ingestion and agent-based simulations. Research code: github.com/studiofarzulla.