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Editorial Office
BioSystems

Dear Editors,

I am pleased to submit “Simulated Geometry: Why Information Alone Cannot Be Alive” for consideration as a hypothesis/perspective article in *BioSystems*.

The central question: Large language models pass examinations and solve complex problems, yet something appears to be missing. The usual diagnoses—consciousness, understanding, grounding—remain philosophically contested. We propose a precise alternative grounded in mathematics rather than philosophy.

The proposal: Life instantiates geometry; AI simulates geometry using information. *Information* is what can be copied without loss (Shannon entropy, bits). *Geometry* is the constrained manifold within which a system operates—the dimensionality of knowing, not just the quantity of known. Current AI has vast information but minimal self-maintained geometry.

Key contributions:

- A mathematical framework distinguishing information from geometry, with implications for biological organization
- Formalization via *match error*: agreement among independent complexity estimators as the signature of genuine geometry
- Biology as existence proof: cross-scale coherence, constraint closure, and dormancy as geometry-without-dynamics
- Analysis of why current AI simulates but does not instantiate geometry (no intrinsic oscillations, no viability coupling)
- Testable predictions and experimental directions

Relevance to BioSystems: The paper addresses foundational questions about biological information and self-organization—core themes of the journal. The analysis connects to quantum-like formalisms in biological dynamics (contextuality, non-commuting operations) while remaining agnostic about specific microphysical mechanisms.

The manuscript has not been submitted elsewhere and presents original synthesis.

Sincerely,

Ian Todd
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