

Ian Todd
Sydney Medical School
University of Sydney
Sydney, NSW, Australia
itod2305@uni.sydney.edu.au

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Dr. Abir Igamberdiev
Editor-in-Chief
BioSystems

Dear Dr. Igamberdiev,

I am pleased to submit for publication in *BioSystems* the manuscript titled “**Intelligence as High-Dimensional Coherence: Energy Landscapes, Phase Space, and the Physical Basis of Computation.**” This theoretical work extends the framework established in my recent *BioSystems* article on falsifiability limits in sub-Landauer domains, demonstrating how unmeasurability is not merely an epistemological constraint but an enabling mechanism for biological computation.

The manuscript addresses a fundamental puzzle: vector addition system (VAS) reachability is computationally intractable through discrete enumeration, yet biological systems routinely solve such problems efficiently. We propose that intelligence emerges from maintaining high-dimensional coherent dynamics in sub-Landauer regimes where temporal structure is fundamentally inaccessible to measurement. This prevents the temporal decomposition that would revert to combinatorial explosion, enabling continuous relaxation solutions in high-dimensional phase space.

The framework unifies several previously disconnected domains: (1) thermodynamic measurement limits and biological epistemology, (2) computational complexity theory and neural dynamics, (3) quantum-inspired formalisms and classical field biophysics. We derive testable predictions for coherence times, dimensional collapse signatures, and metabolic efficiency scaling, while explicitly acknowledging what remains unmeasurable in principle.

The work connects naturally to ongoing discussions in *BioSystems* regarding natural computation, relational thermodynamics, and the physical foundations of biological organization. It suggests that the computational substrate of intelligence operates at the edge of what physics permits us to know—a perspective that complements recent contributions on computational irreducibility, bioelectric signaling, and the limits of reductionist approaches in biology.

I confirm that this manuscript has not been published elsewhere and is not under consideration by any other journal. I have no competing interests to declare.

Thank you for your consideration of this manuscript. I look forward to your decision.

Sincerely,

Ian Todd
Sydney Medical School
University of Sydney