

Definition

Scientific humility

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Scientific Humility (by Jong Bhak)

The Scientific Principle: The engine of science is the humility that **science itself, as an informational structure, can be totally wrong**. Unlike belief systems, science is not built on unquestionable truths but on the first principle of its own fallibility. This epistemic stance, that any scientific framework, no matter how successful or accepted by Nature or Science journals, remains completely provisional and subject to complete reconceptualization, is what distinguishes science from dogma. This is why Francis Crick's use of Dogma to explain the flow of information from DNA to RNA to Protein is completely wrong not because of its technicality but because it was a paradox from the start. Crick (I respect him so much and communicated with him in 1993) has gone arrogant as a young scientist by forgetting this epistemic/scientific humility. This is also the arrogance I myself have failed to guard off often.

Scientific humility, viewed through my covolution theory and broader theoretical work, operationalizes this foundation:

- 1. Complete Paradigm-Level Openness:** Recognizing that biology's dominant frameworks, even foundational ones like Darwinian evolution, may be incomplete or require fundamental reconceptualization through deeper computational principles. My covolution theory exemplifies this: challenging evolution itself is **not arrogance or promotion, but humility** about the limits of 19th-century conceptual tools.
- 2. Multi-Scale Epistemic Modesty:** Understanding that biological phenomena (aging, evolution, life) likely operate through informational and computational principles that transcend disciplinary boundaries. My work on entelenomy, purpose-like behavior from matter's intrinsic computation, suggests we should be humble, deeply in principle, about attributing causation at any single level.
- 3. Measurement Incompleteness Awareness (uncertainty):** My aging clock work as "cybernetic attractors" implies humility about what we are actually measuring. Are we observing aging itself or our

limited ability to capture regulatory state drift? Scientific humility means acknowledging this gap.

4. Theoretical Incompleteness: My "Informational Capital" theory and gerostasis frameworks suggest current biology lacks fundamental concepts. Humility means accepting that even successful theories (cell theory, evolutionary synthesis, Darwinism) may need integration into information-theoretic foundations we (including AI) are still discovering.

In essence: My **scientific humility** recognizes that: Science operates not as a belief system but as a self-correcting process where any framework, no matter how entrenched, can be fundamentally wrong. The universe computes at scales and through principles our current frameworks only partially capture, requiring "**perpetual openness**" to reconceptualization from first principles.

Declarations

Potential competing interests: No potential competing interests to declare.