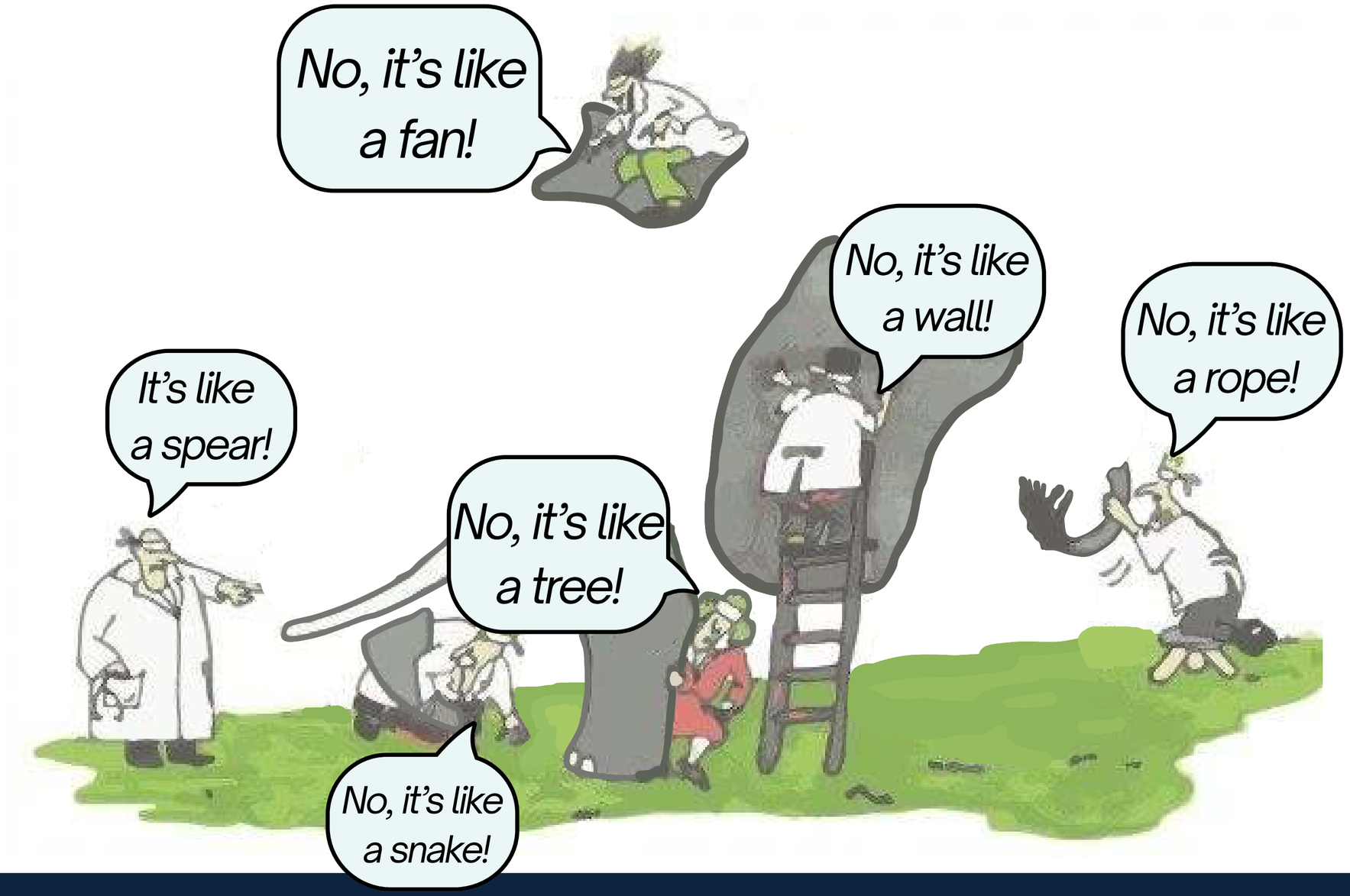
Nested Fractal Reality Framework

A Step Towards a Unifying Theory of Consciousness

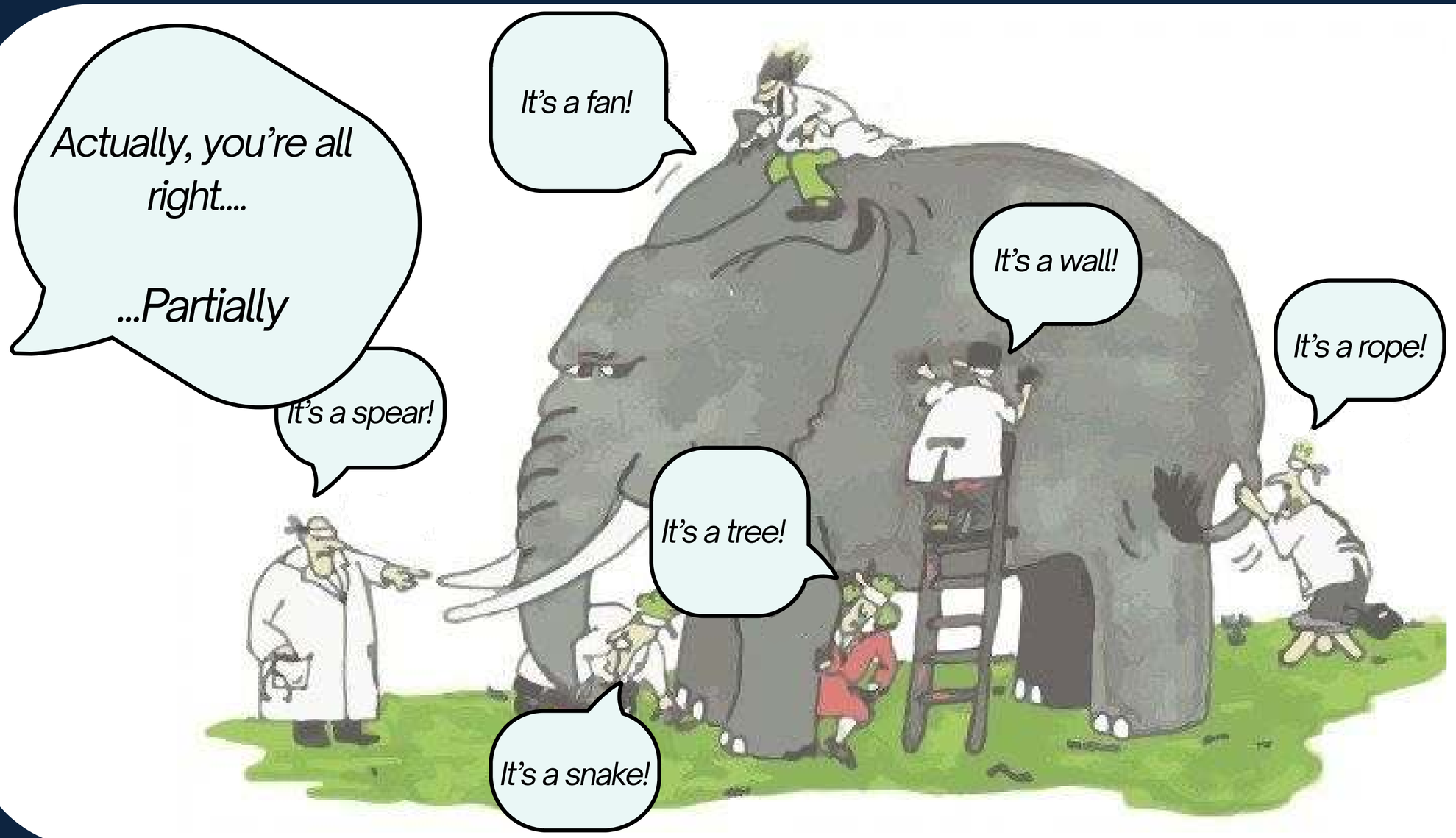
Reese Greenwood B.S.

University of North Texas, Denton, TX

Parable of the Elephant and the Blind Men



Parable of the Elephant and the Blind Men

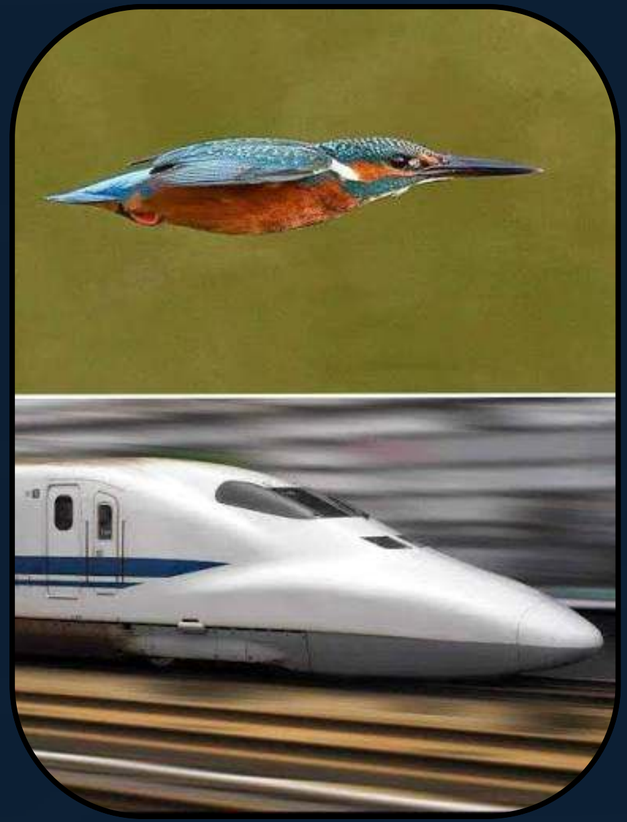


What does this mean for us?

- *We tend to define complex phenomena by reducing to its parts*
- *Reduction without integration is incomplete*
- *Unification requires the concept of how they can fit together*

Why are we here?

- *Demonstrate a fractal nesting pattern across scales and domains of reality*
- *Apply pattern through biomimicry*
- *Propose NFRF as a conceptual tool to organize research holistically rather than compete*

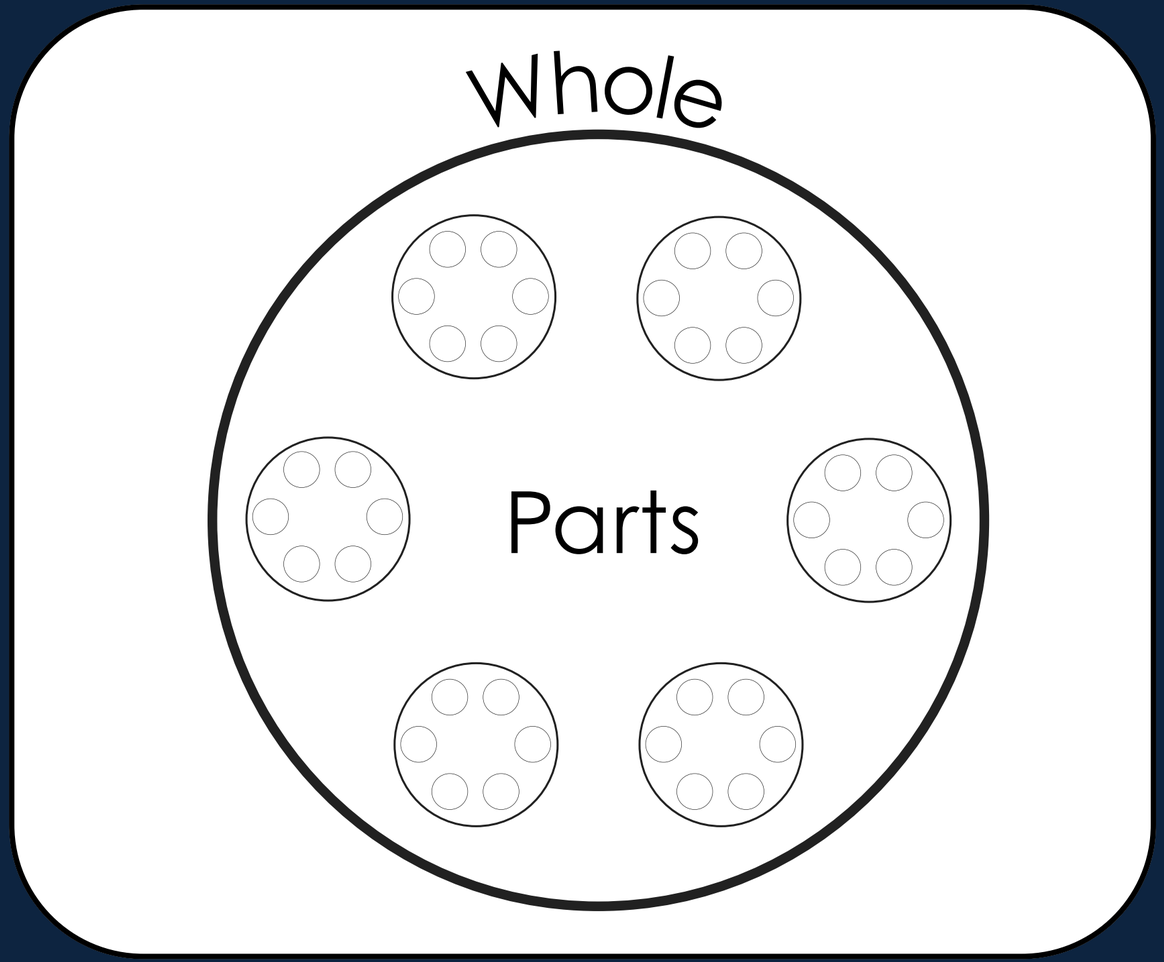


Foundations of Nested Fractal Reality Framework

Foundations of NFRF

Fractals

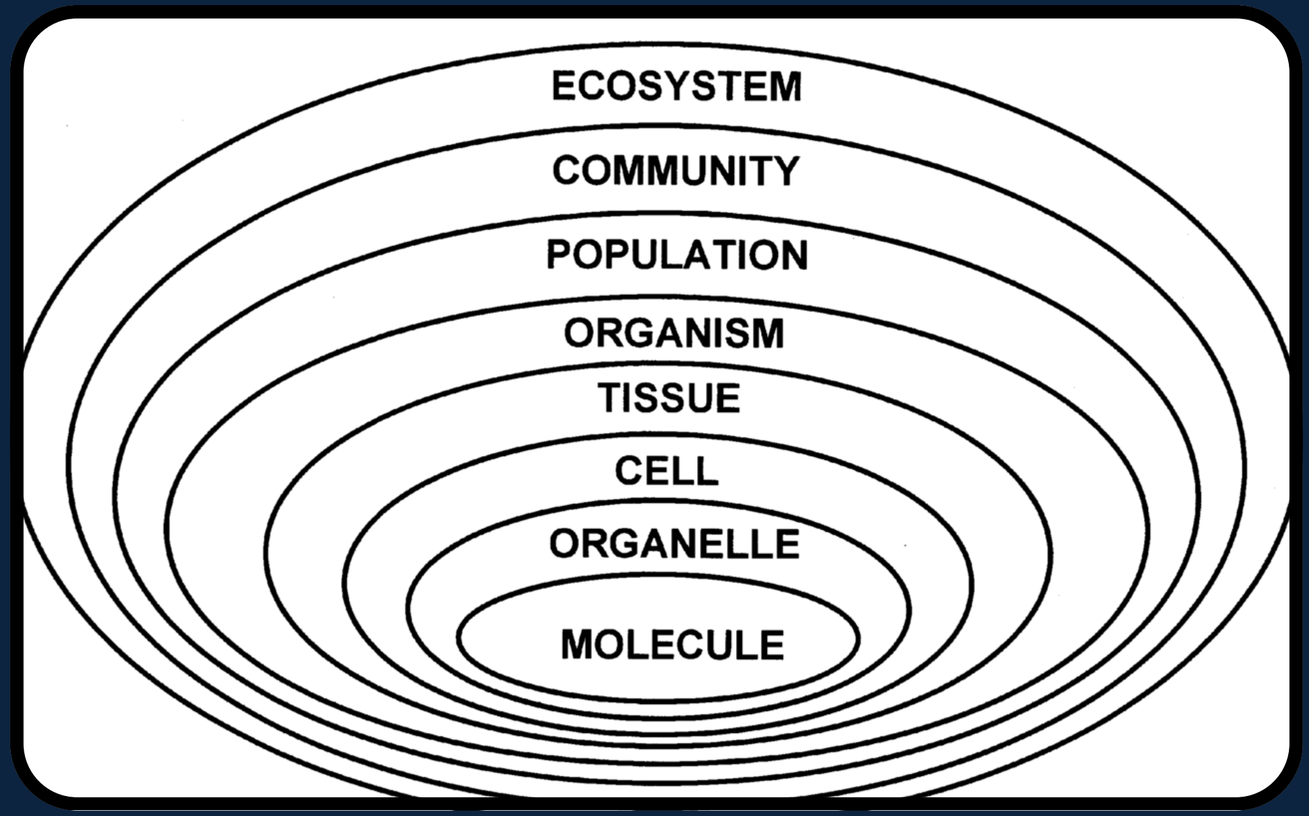
- Self-similar relation between parts and wholes
  (Koestler, 1967)



Foundations of NFRF

Nested Hierarchies

- Interconnected systems across scales



Foundations of NFRF

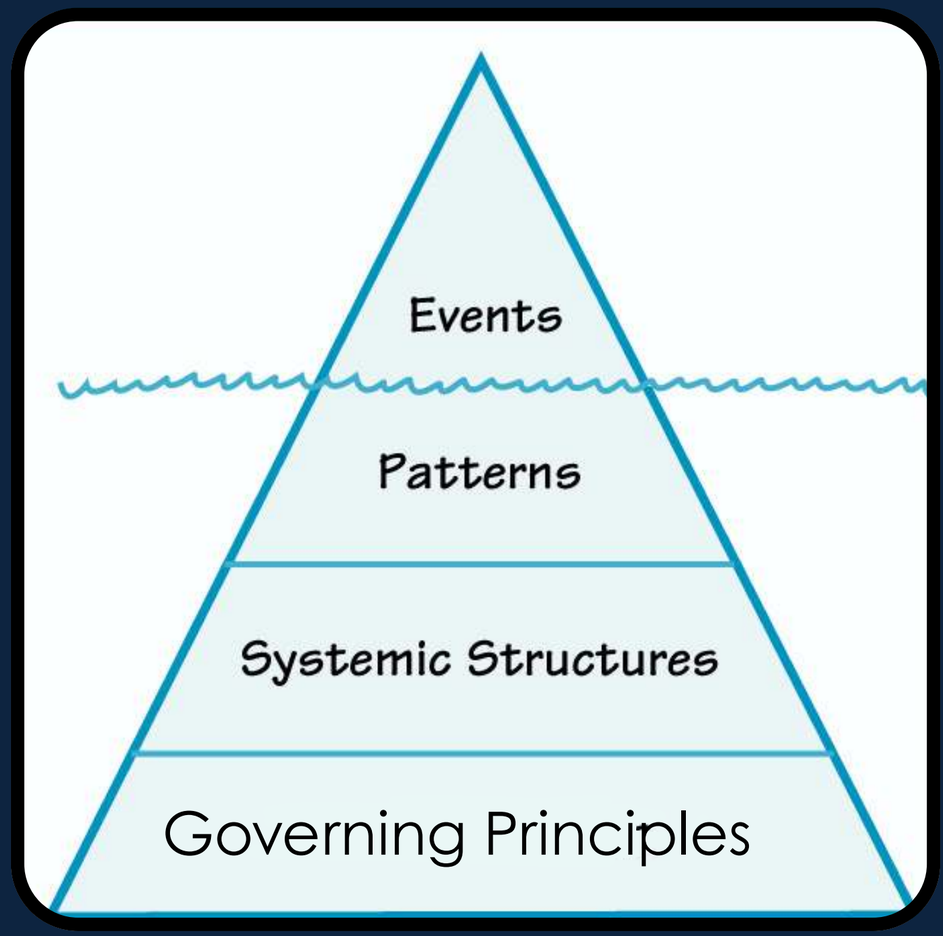
Systems Thinking

- Mapping the full system rather than isolated parts

Complexity science dynamics

- How parts interact to form systems

(Kauffman, 1980)

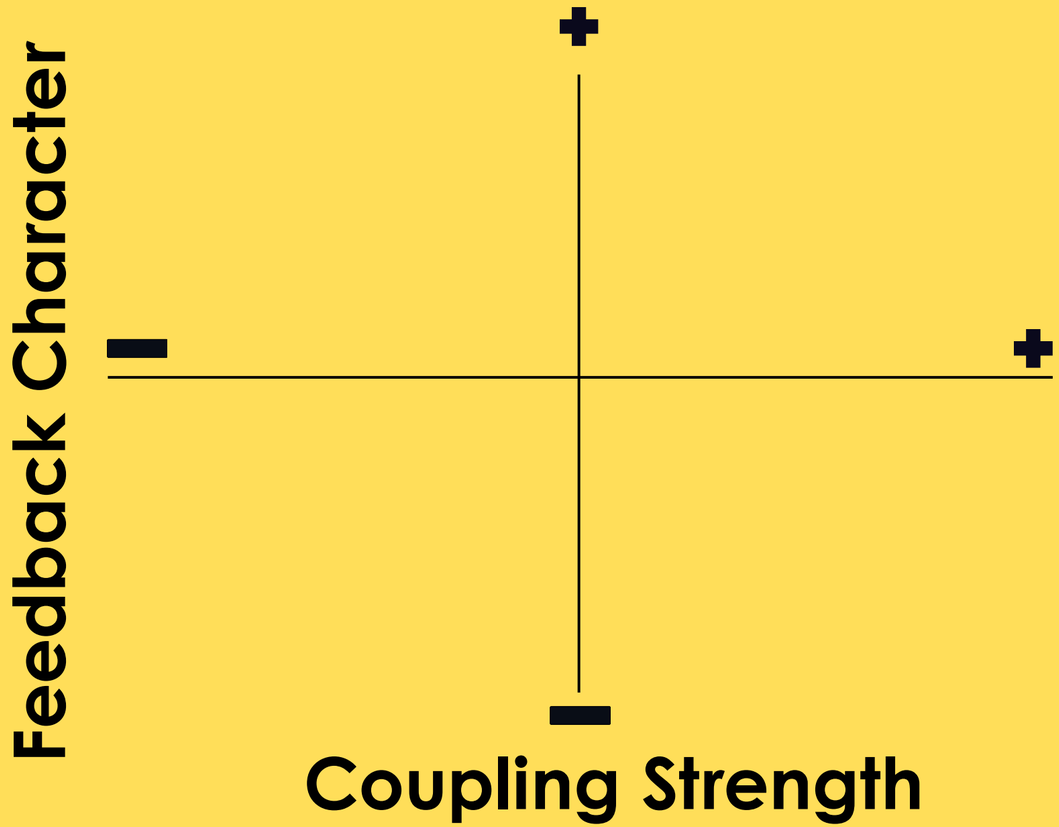


Proposed System Dynamics

Proposed Dynamics

Coupling Dynamics

Coupling between systems occurs on a spectrum 1) degree of integration and 2) feedback loop character

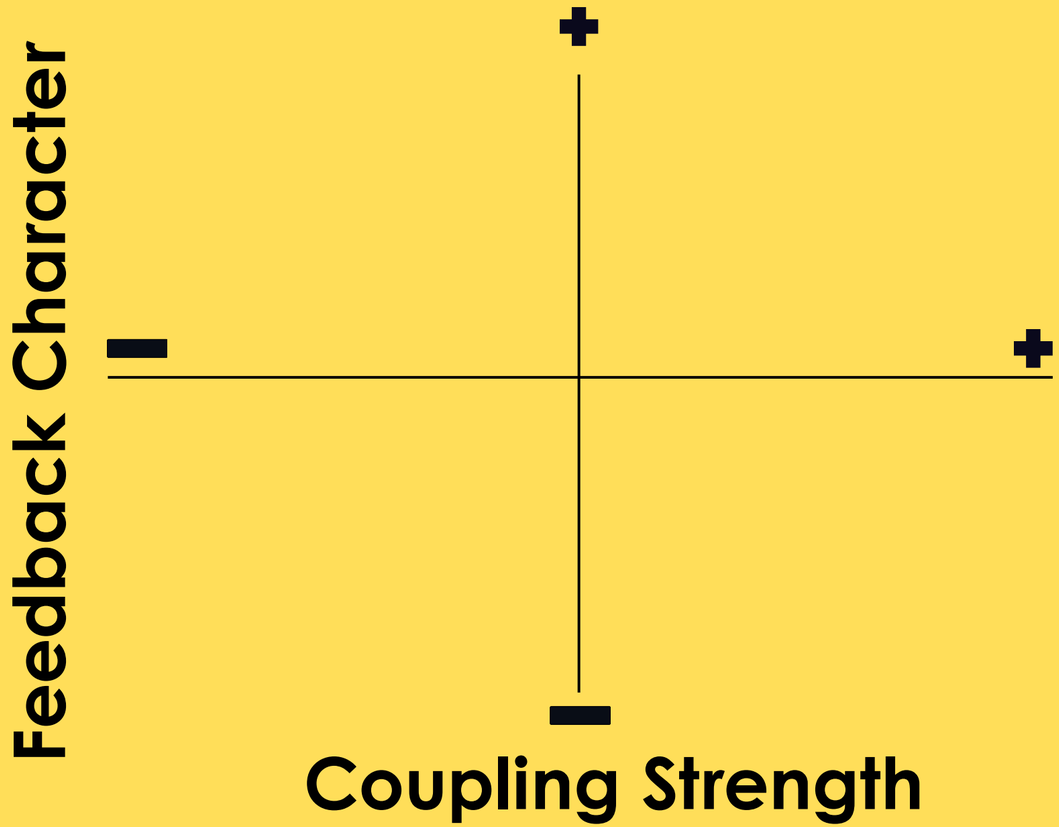


(Stankovski et. al., 2019)

Proposed Dynamics

Coupling Dynamics

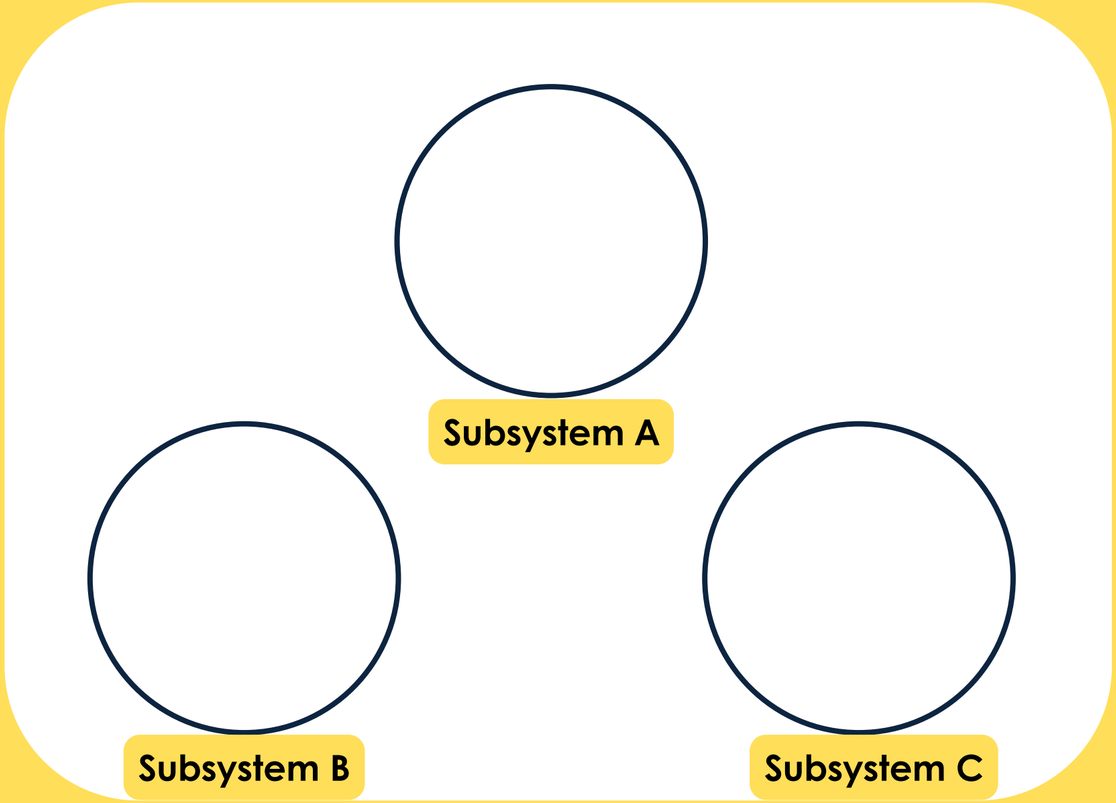
Coupling between systems occurs on a spectrum 1) degree of integration and 2) feedback loop character



(Stankovski et. al., 2019)

Near-decomposability

Interactions *within* a system are stronger than interactions *between* systems

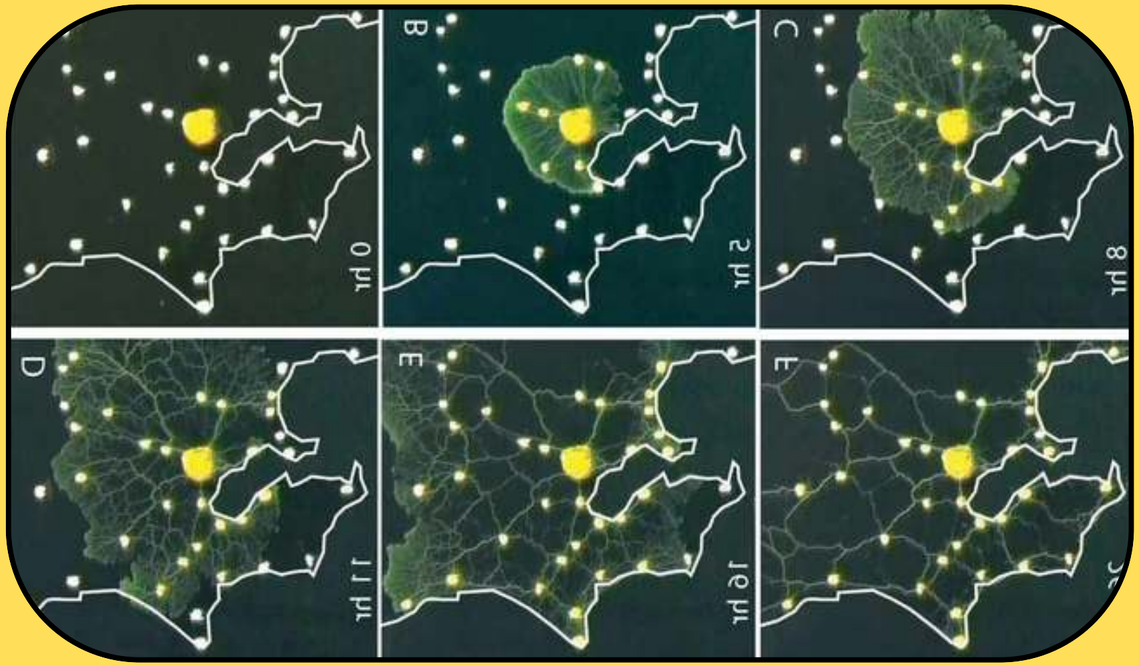


(Herbert, 1962)

Proposed Dynamics

Variation

Systems produce variation, emergent configurations or behaviors. Variation gives a system flexibility in exploring and adapting to the environment

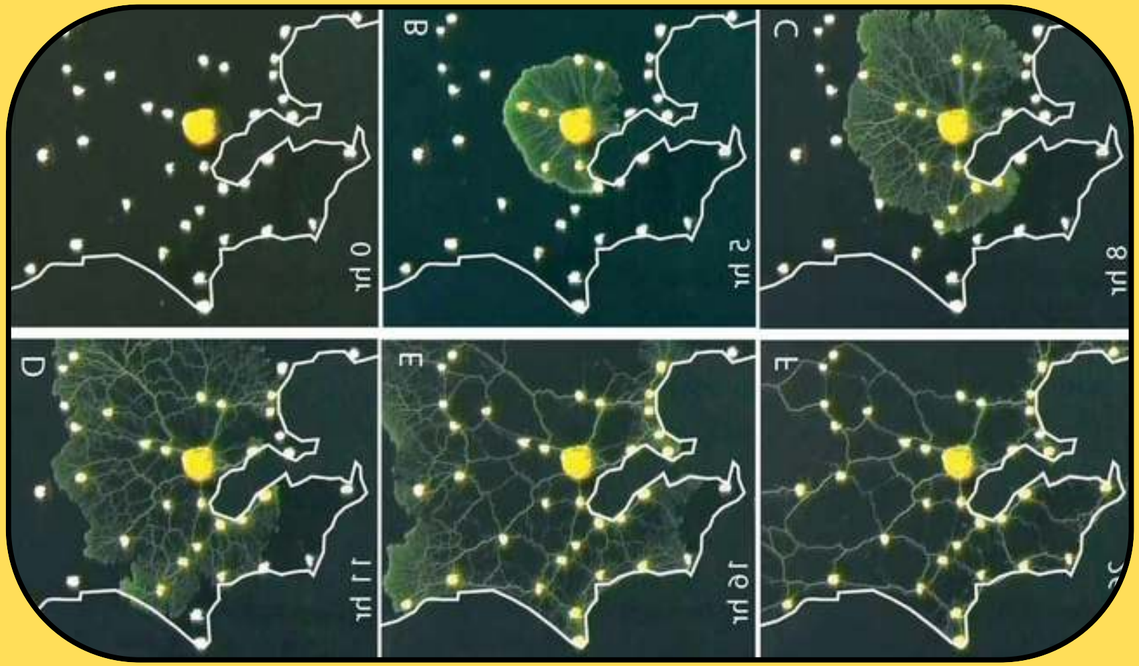


(March, 1991)

Proposed Dynamics

Variation

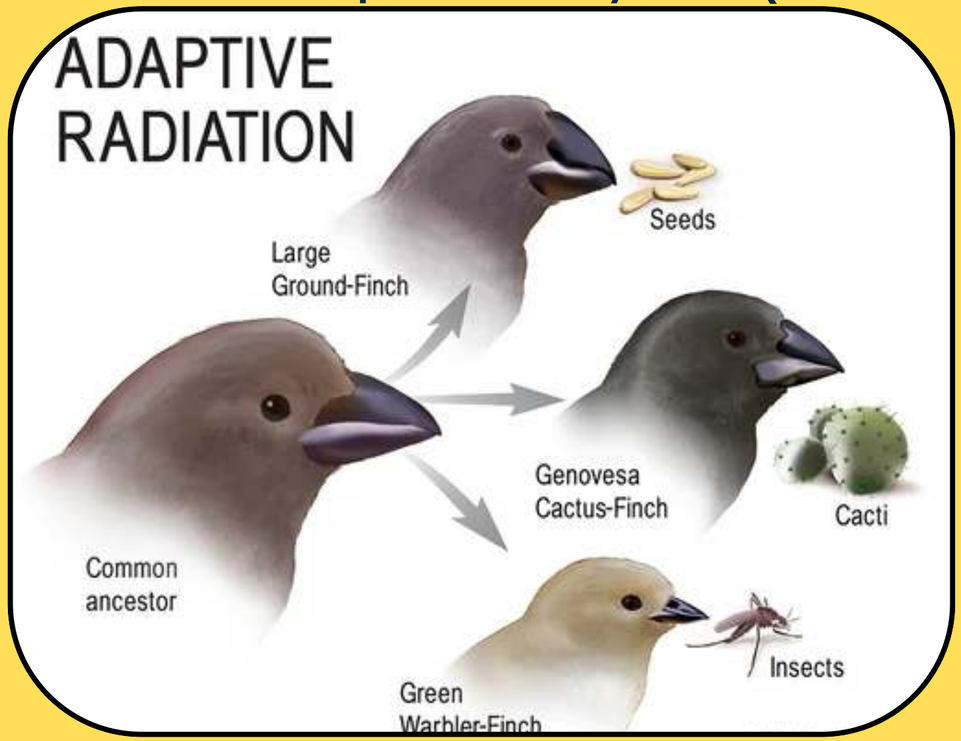
Systems produce variation, emergent configurations or behaviors. Variation gives a system flexibility in exploring and adapting to the environment



(March, 1991)

Intra-level Development

Behaviors that are fit to the environment persist while those that are not are pruned. Systems that persist continue to refine themselves (deepening) or split into distinct specialized systems (branching)

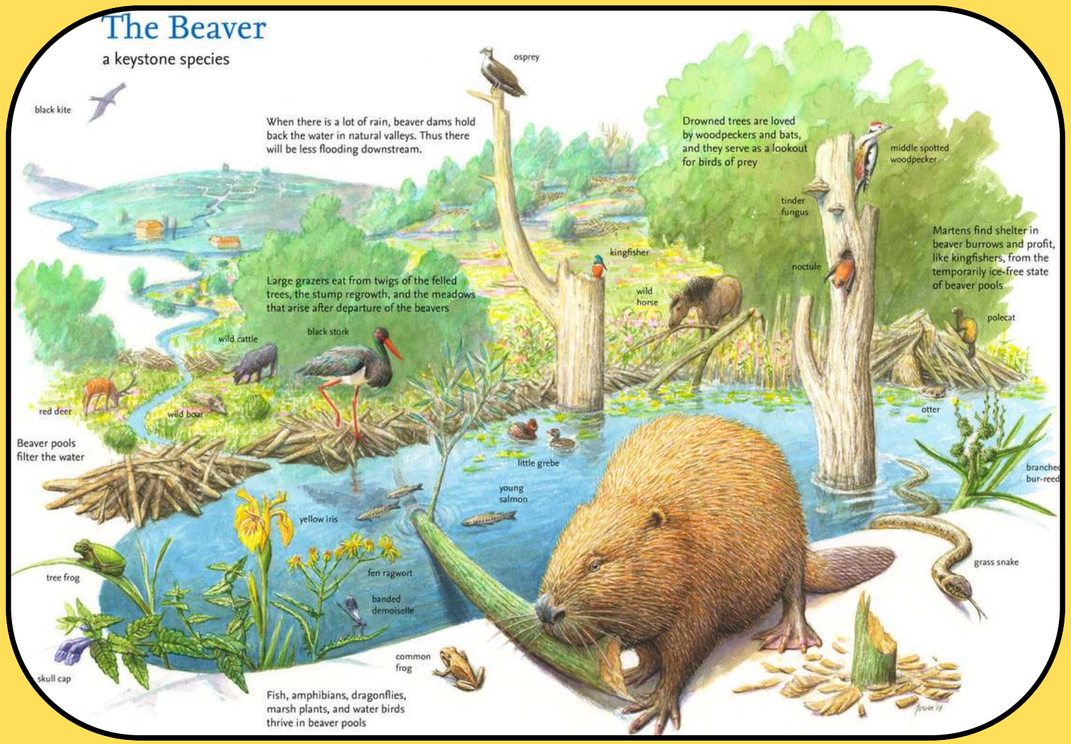


(Ashby, 1956; Holland, 1995)

Proposed Dynamics

Niche Construction

Parts reshape their environment, reshaped environment influneces interaction of parts. The environment can absorb the impact of relatively low energy interactions.

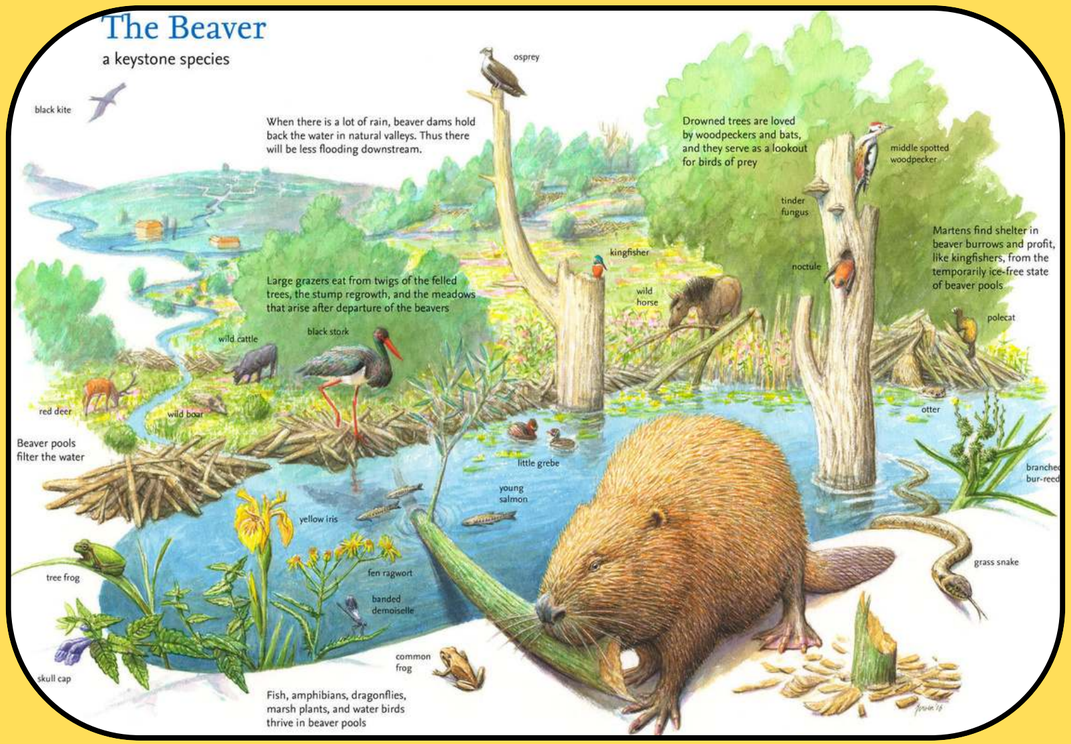


(Odling-Smee et. al., 1996)

Proposed Dynamics

Niche Construction

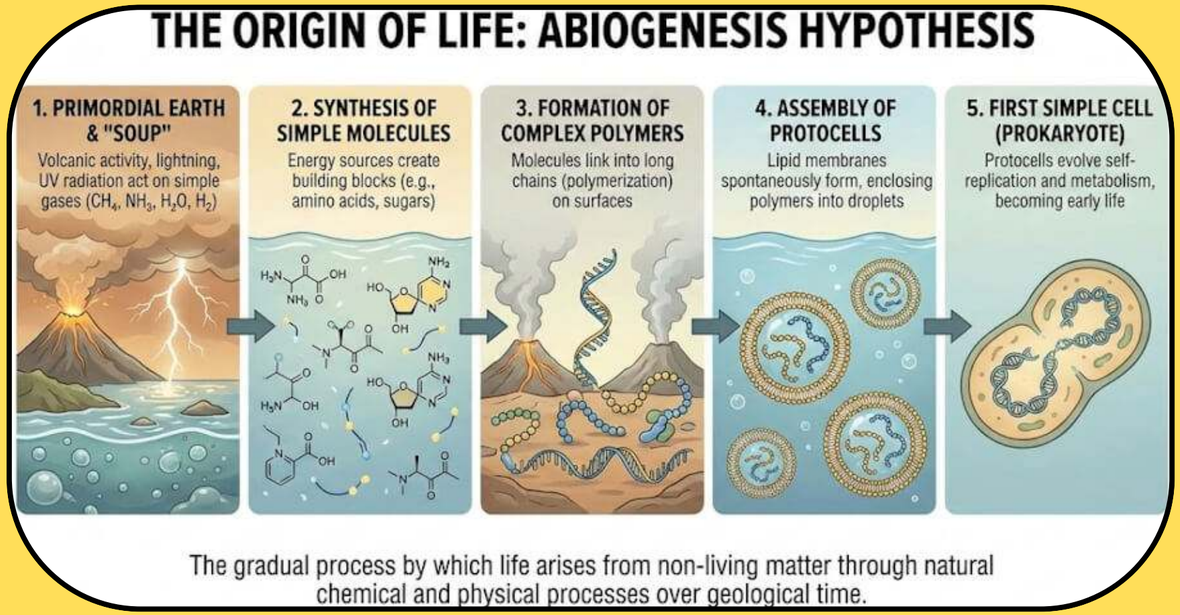
Parts reshape their environment, reshaped environment influneces interaction of parts. The environment can absorb the impact of relatively low energy interactions.



(Odling-Smee et. al., 1996)

Inter-level Emergence

Intra-level interactions build up over time towards a threshold, leading to a qualitatively different, higher complexity system with emergent properties.

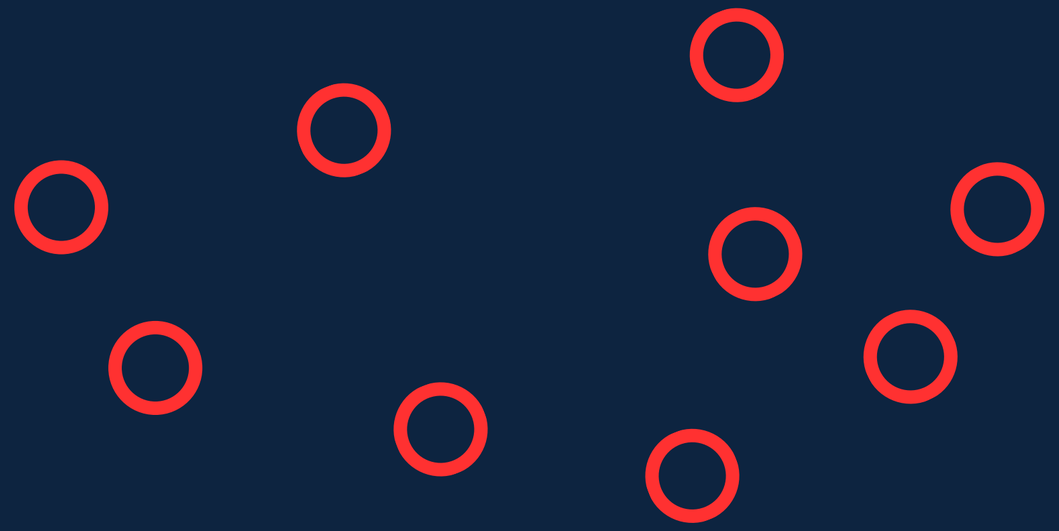


(Lewes, 1875; Chalmers, 2006)

Generation of Nested Fractal Organization

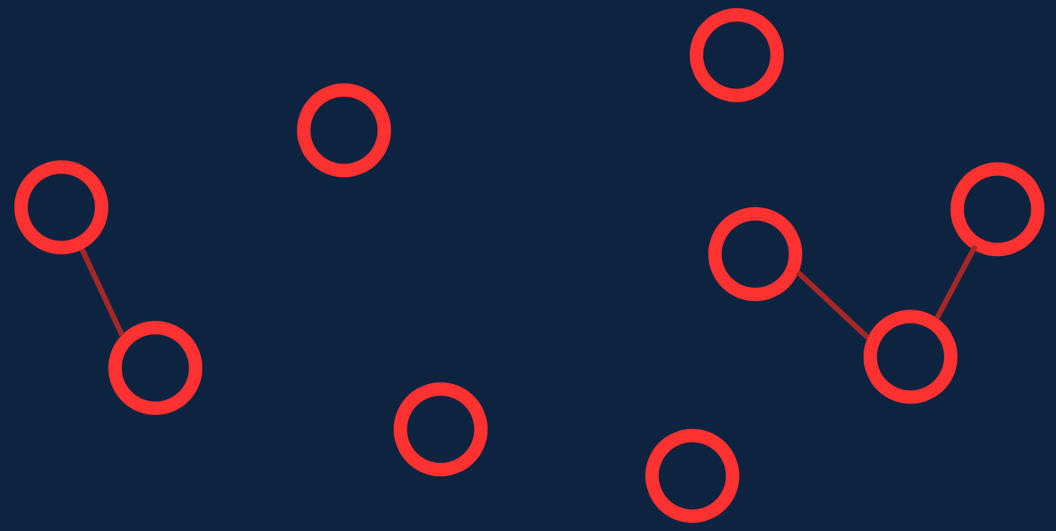
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups



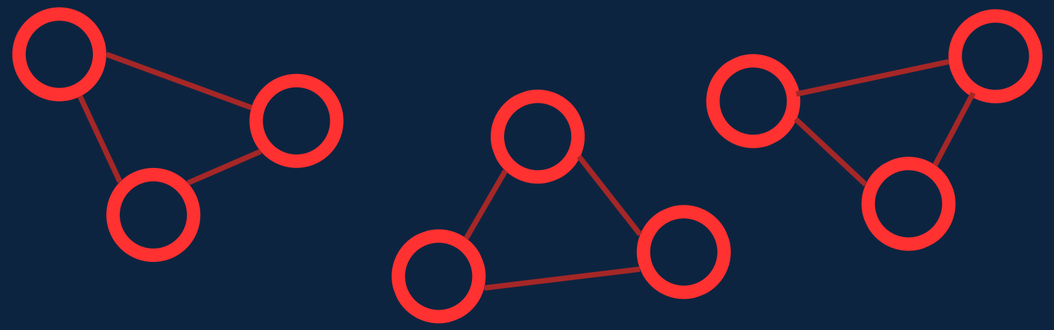
Nested Fractal Organiztion

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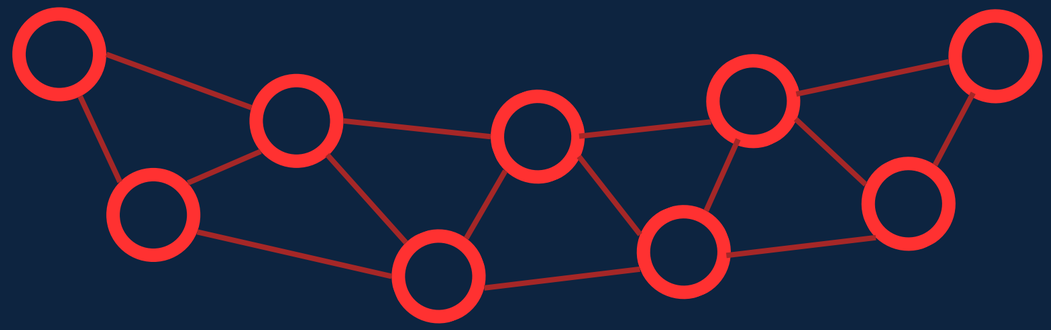
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups
- Variation appears, unstable parts are pruned



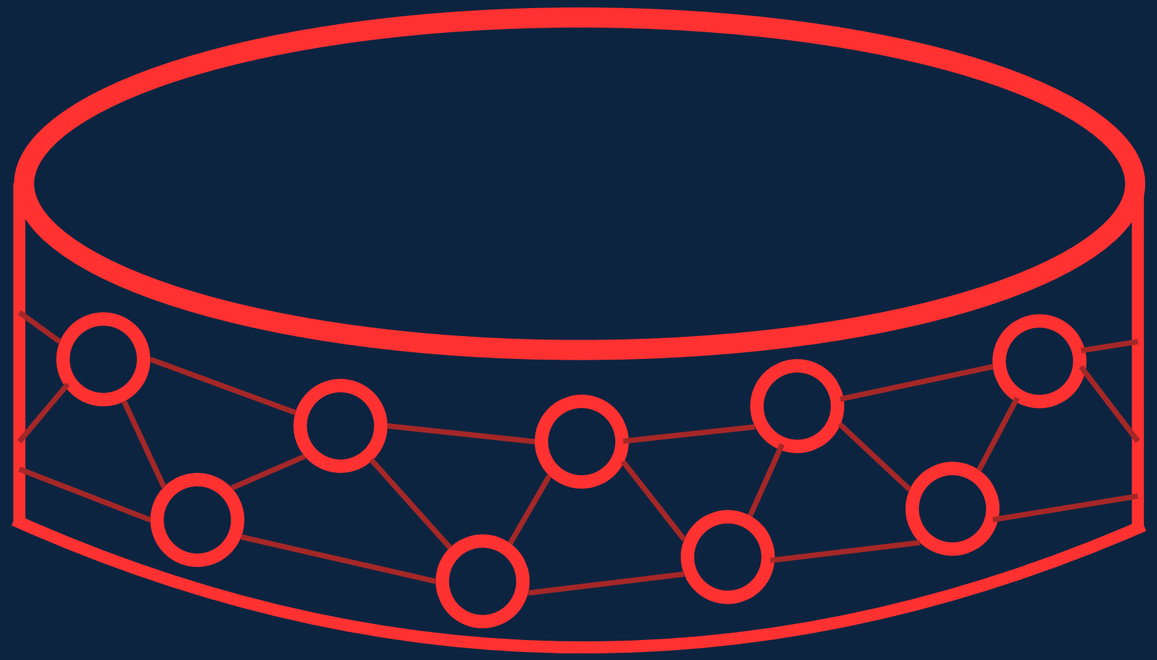
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups
- Variation appears, unstable parts are pruned
- Stable systems continue to interact and refine



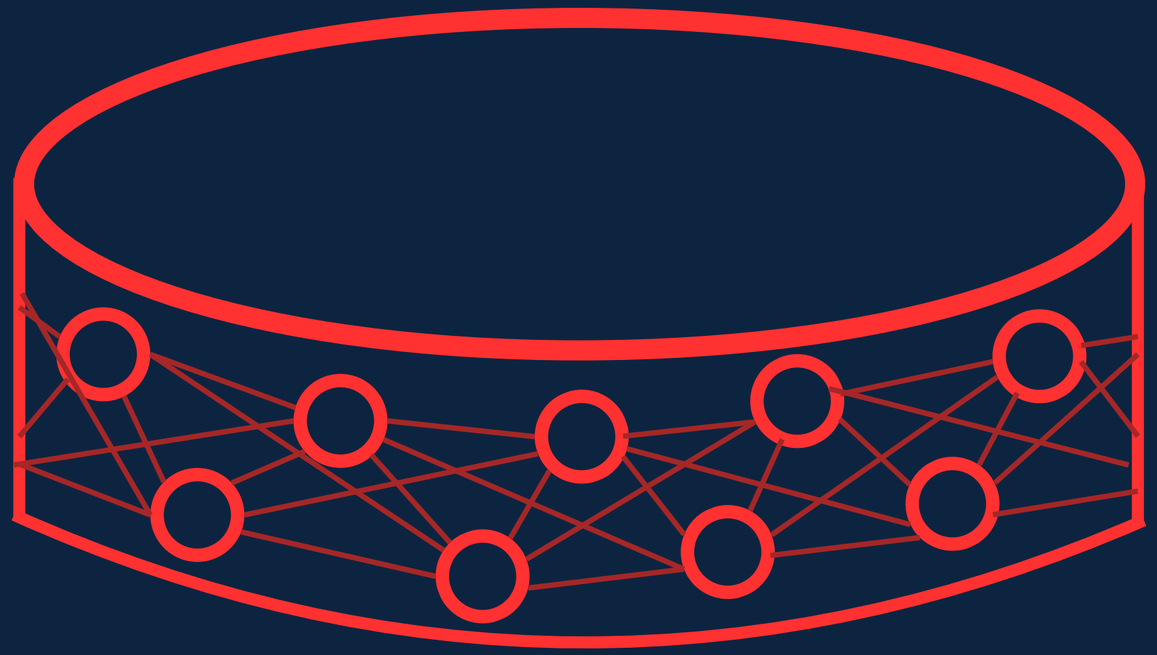
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups
- Variation appears, unstable parts are pruned
- Stable systems continue to interact and refine
- Interactions reshape the environment



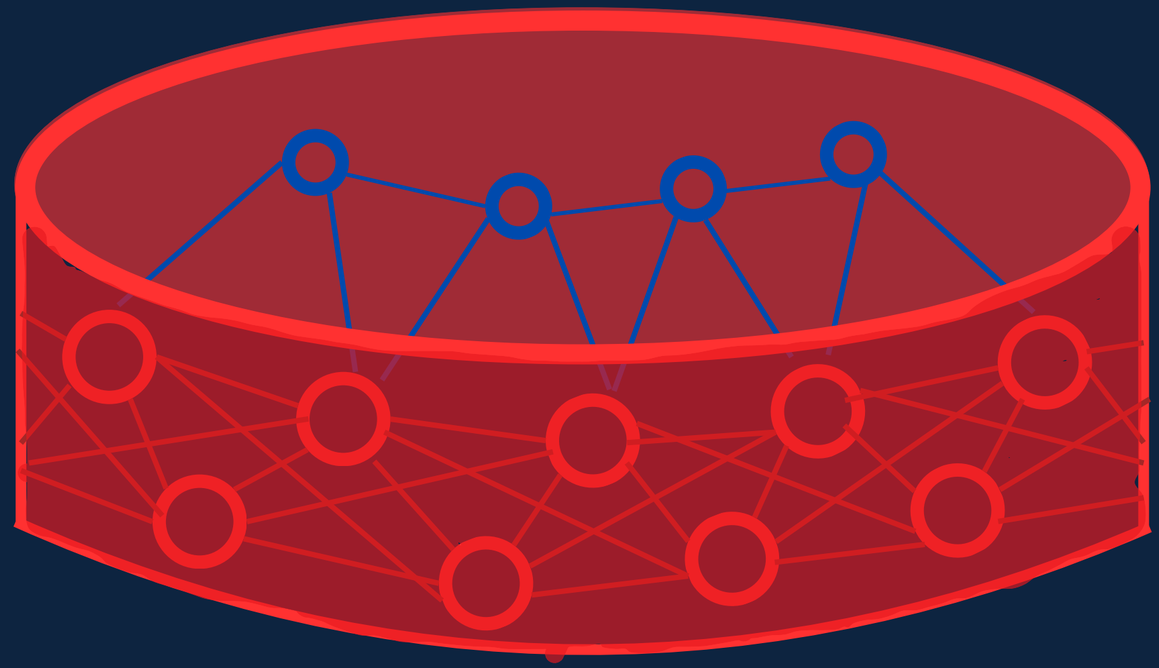
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups
- Variation appears, unstable parts are pruned
- Stable systems continue to interact and refine
- Interactions reshape the environment
- Influence of interactions builds up in the system



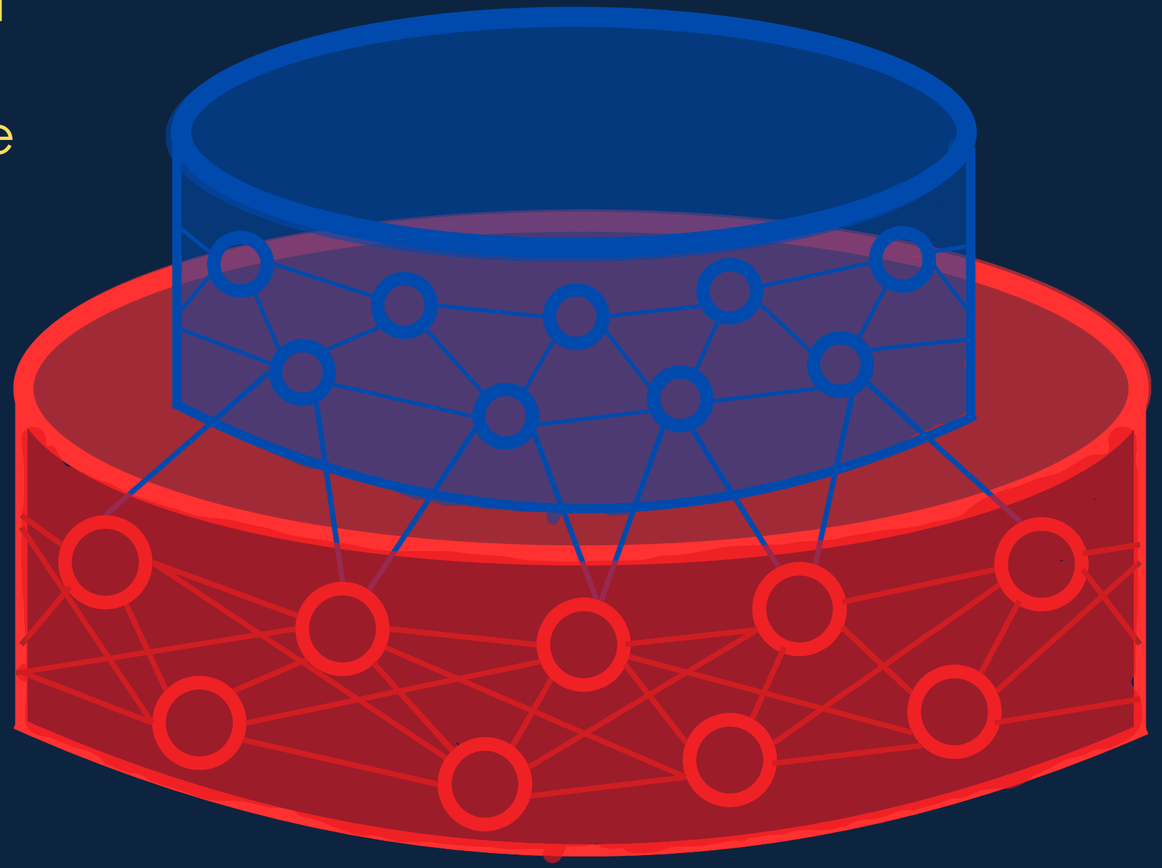
Nested Fractal Organiztion

- Parts interact, couple, and form subgroups
- Variation appears, unstable parts are pruned
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- Interactions reshape the environment
- Influence of interactions builds up in the system
- Threshold crossings bring emergent properties



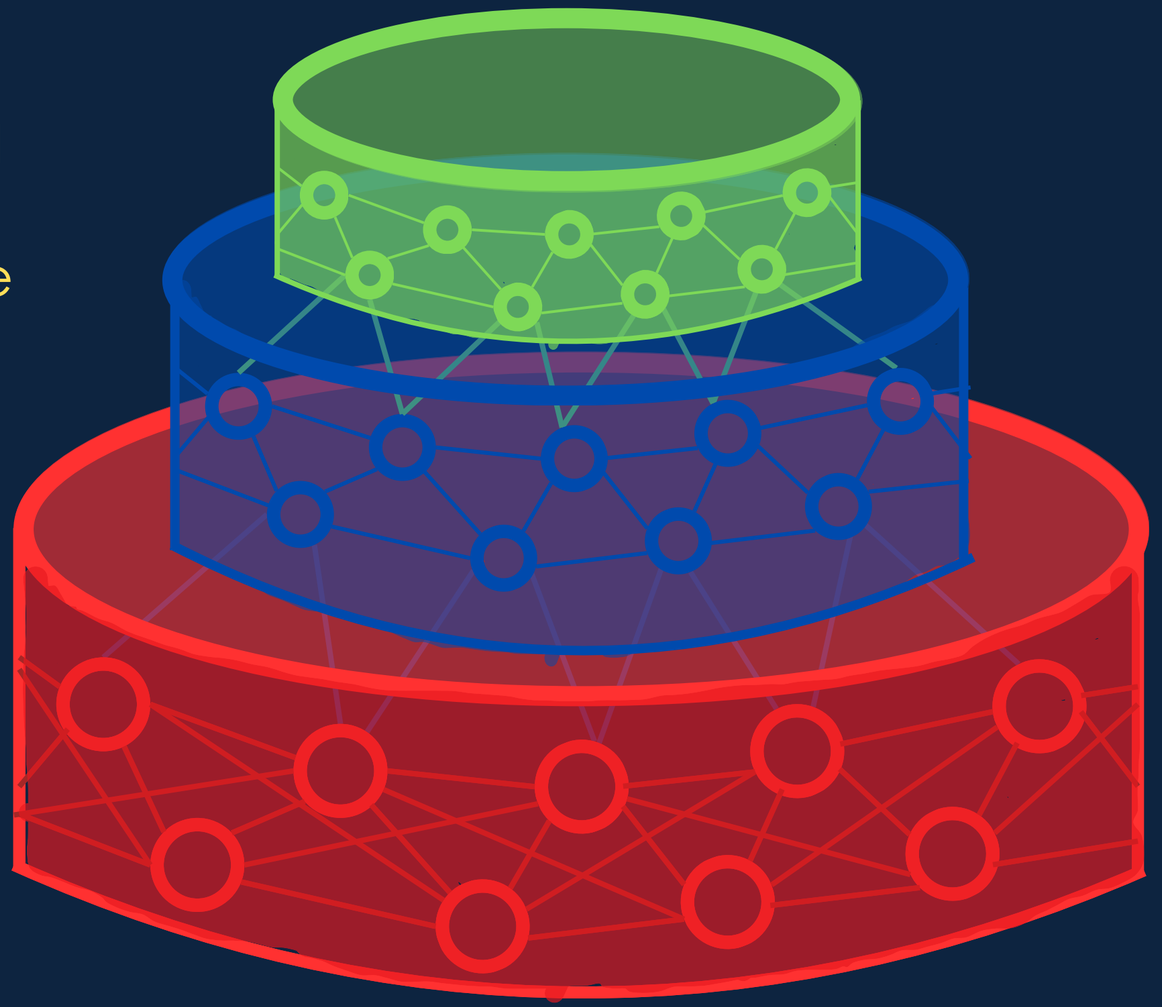
Nested Fractal Organiztion

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- Interactions reshape the environment
- Influence of interactions builds up in the system
- Threshold crossings bring emergent properties
- New emergent system becomes the foundation for parts at the next level



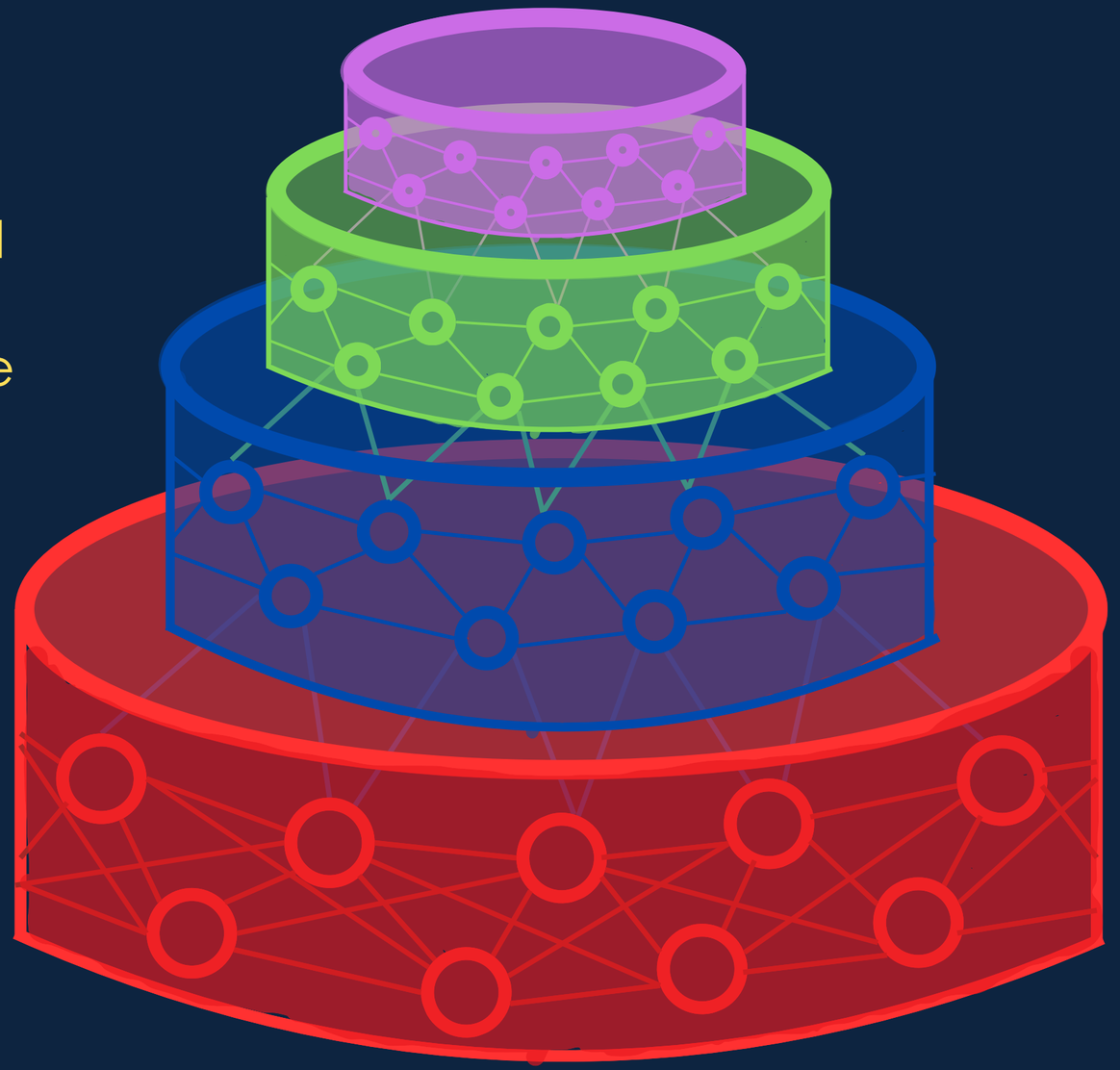
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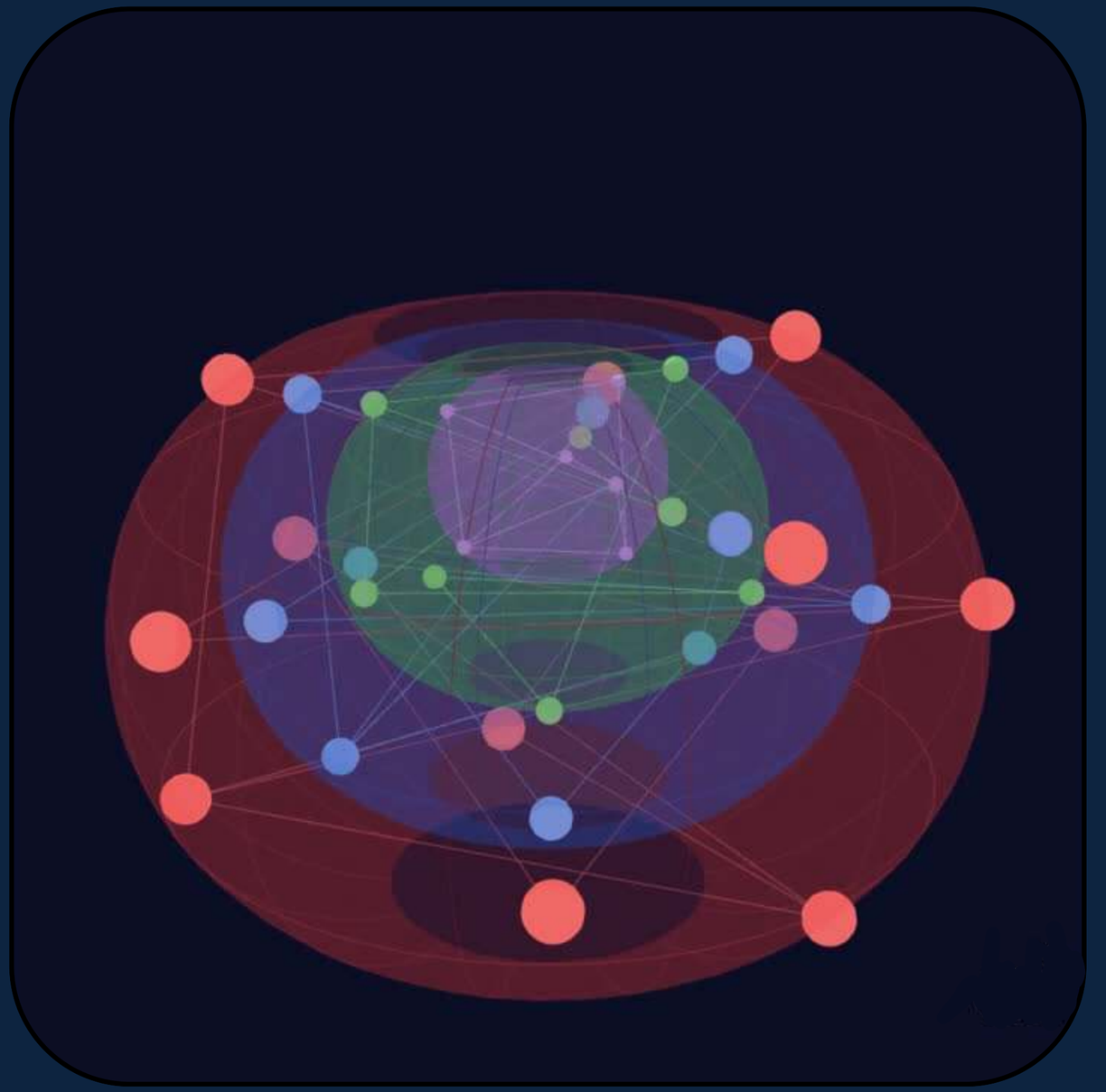
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Same Pattern Different Perspective

- More accurate to visualize systems *within* each other rather than *stacked* on one another
- **Example**: Biological systems nested *within* physics and chemistry

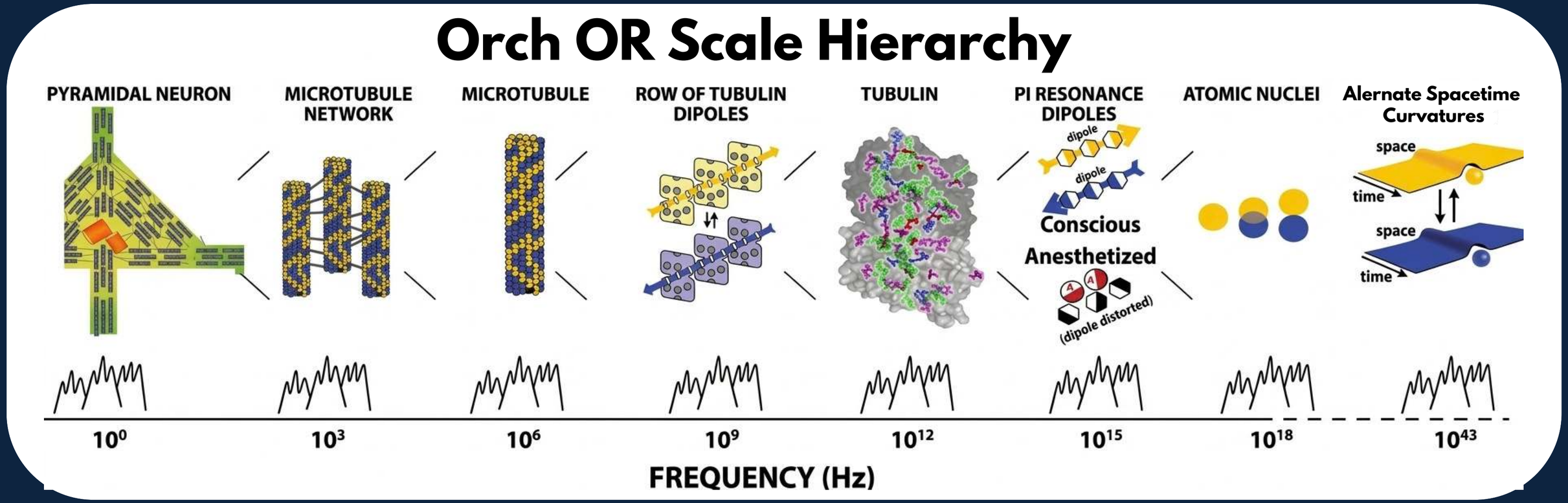


Contemporary Examples

Quantum

Orch OR (Hameroff & Penrose, 1996)

- Investigates quantum properties within microtubules
- Bridging the gap between quantum and biological systems

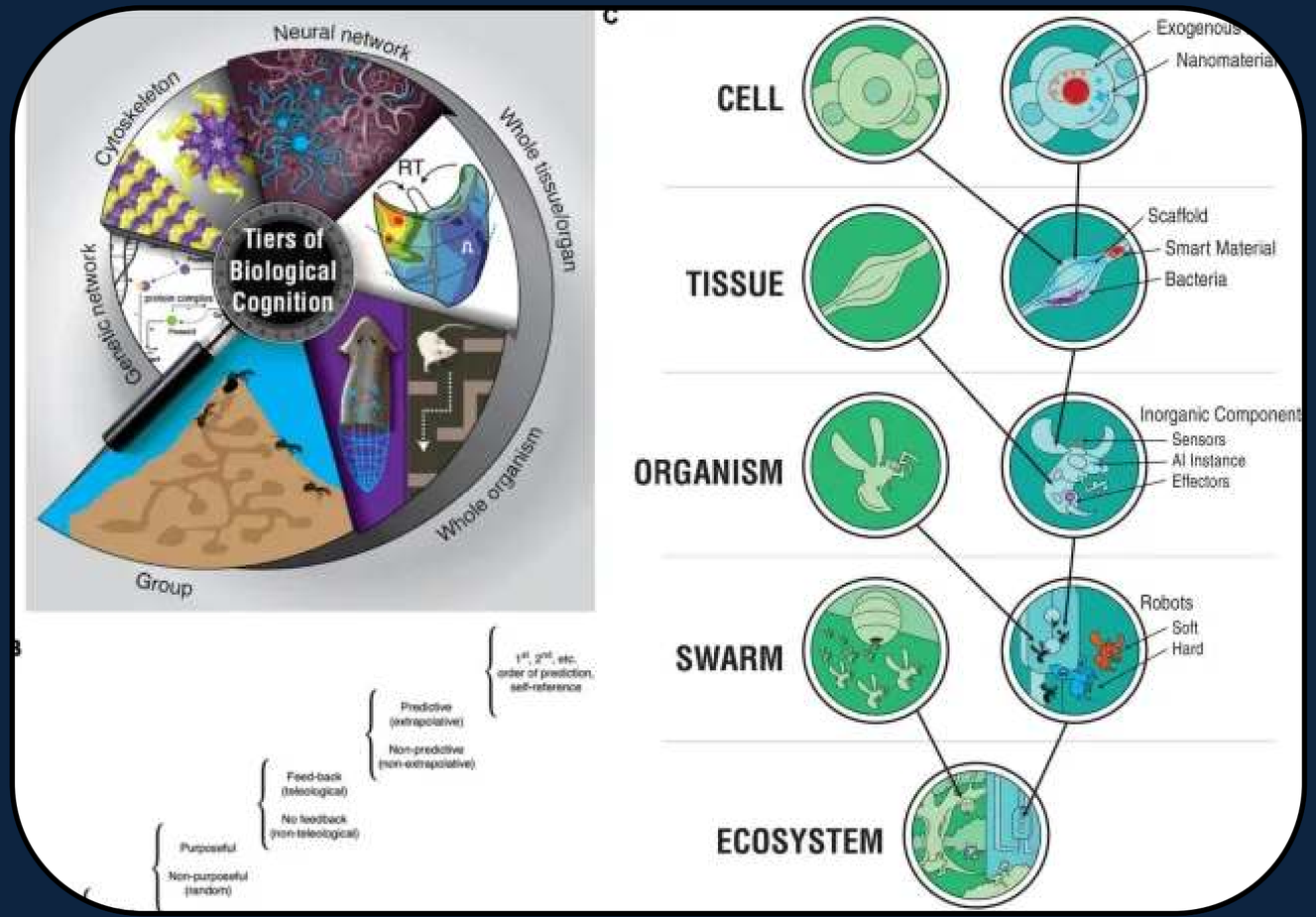


(Hameroff & Penrose, 1996)

Cellular

Technological Approach to Mind Everywhere (TAME)

- Investigates cognition at multiple levels of biology, including non-neural substrates for cognition
- Each intelligent agent is constructed of other intelligent agents

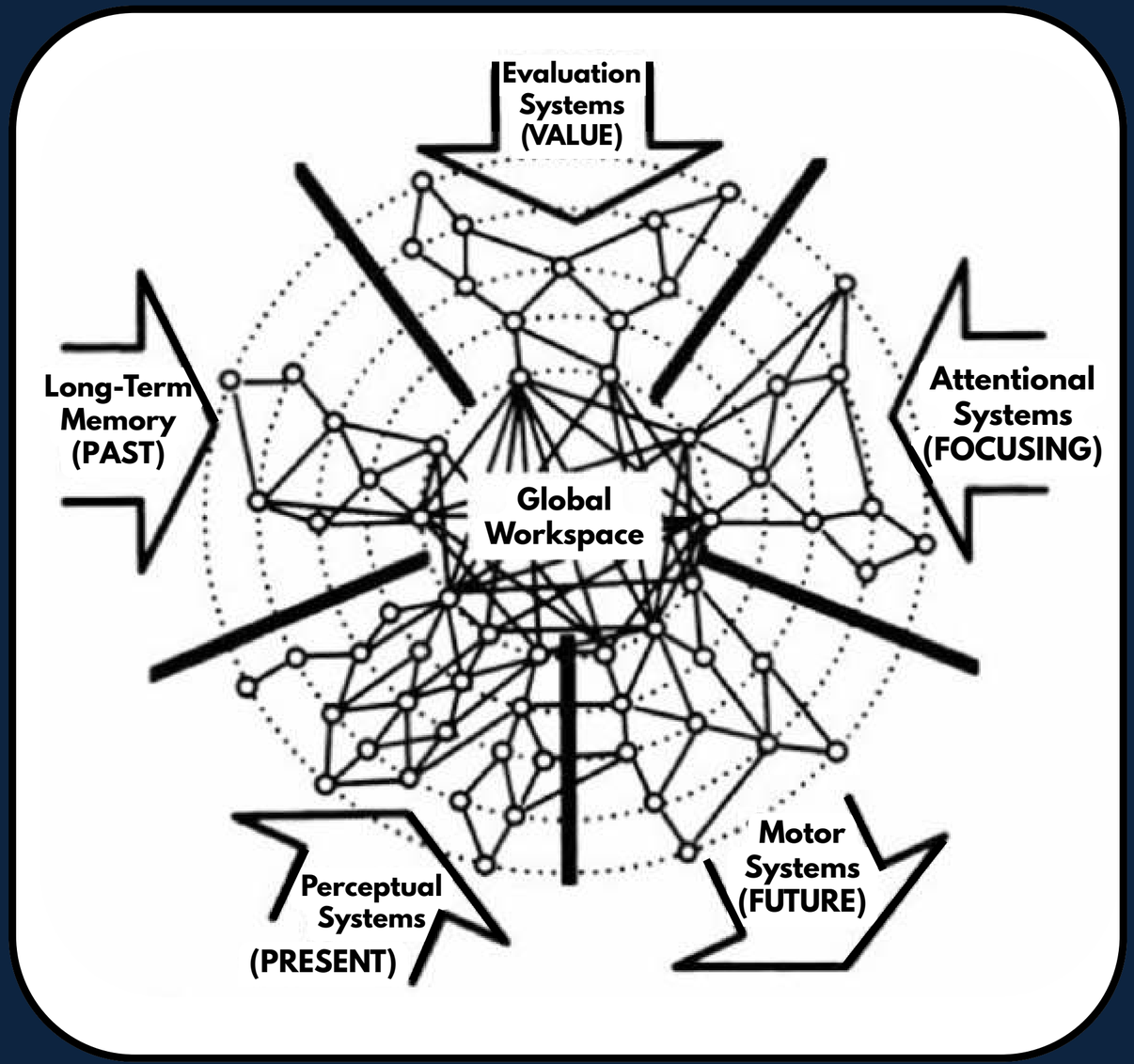


(Levin, 2022)

Neurocognitive

Global Workspace Theory

- Information is processed by lower unconscious systems
- Interactions build up to reach the pinnacle “theater”
- Within this theater, we become aware of the information and can integrate it with other processes in the global workspace

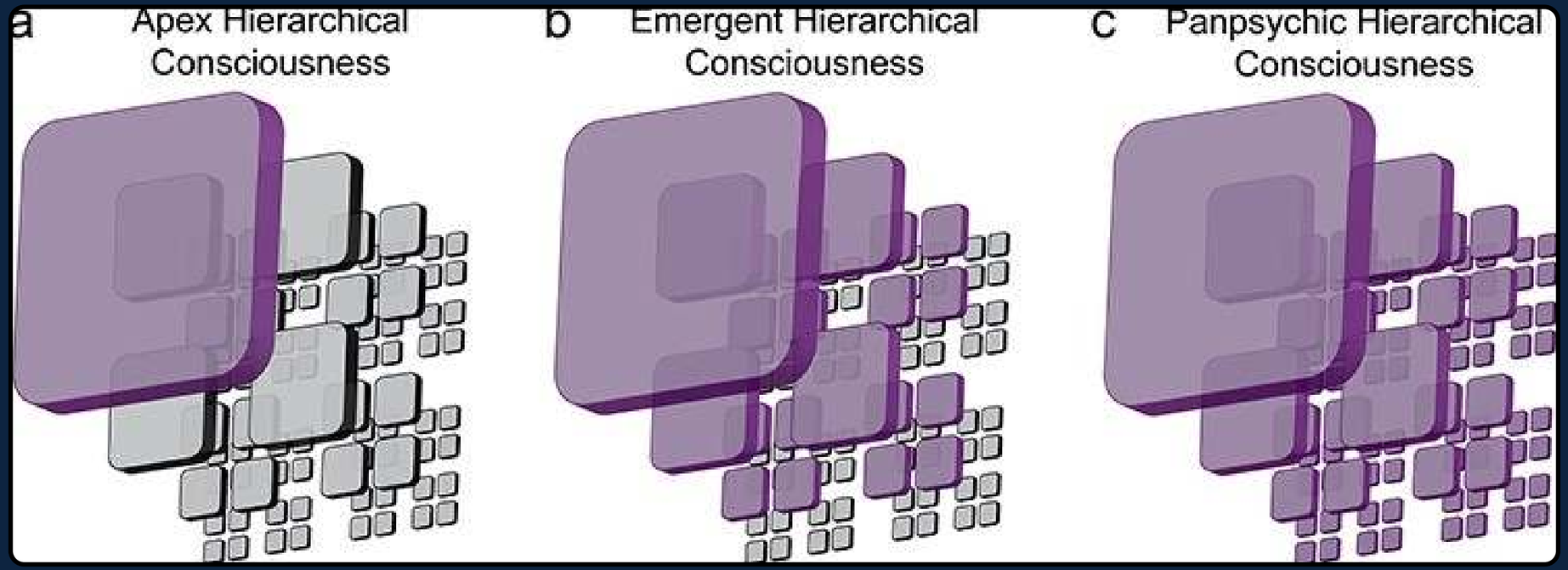


(Dahaene et al., 1998)

Neurocognitive

Nested Observer Window Model

- Proposes awareness as a nested fractal structure of observer “windows”
- Remains agnostic on where exactly consciousness begins occuring in these windows



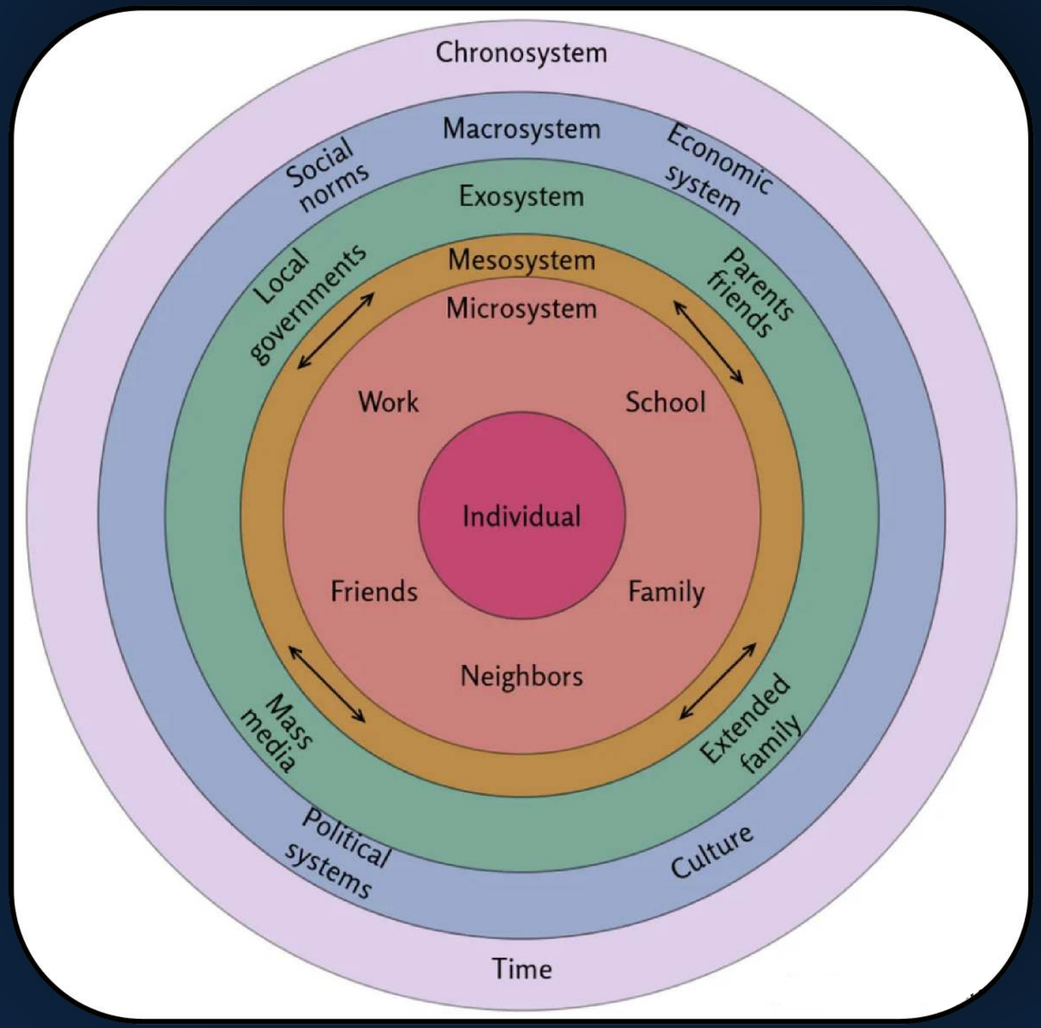
(Riddle & Schooler, 2024)

Social/Ecological

Bronfenbrenner's ecological model

- Maps the nested relationships that impact a person

- Shows relations from the closest to the broadest social systems



(Bronfenbrenner, 1979)

Ancient Analogies and Philosophical Examples

Philosophical Example

Allegory of the Cave

- The things we see in our reality are just the shadows of a deeper, more fundamental reality

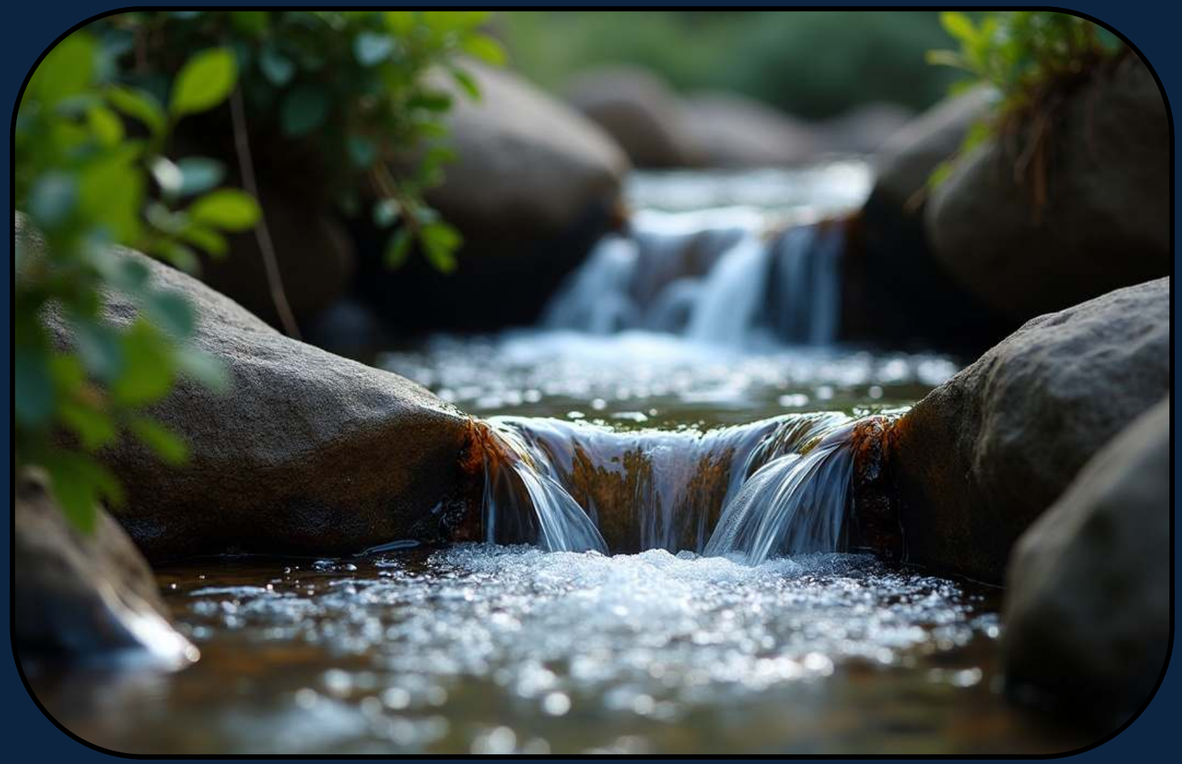


(Plato, 360 BCE)

Philosophical Example

Process Philosophy

- Reality is not static, but defined by the process of becoming.
- Objects we see are made of serially ordered events that continuously flow into the next event

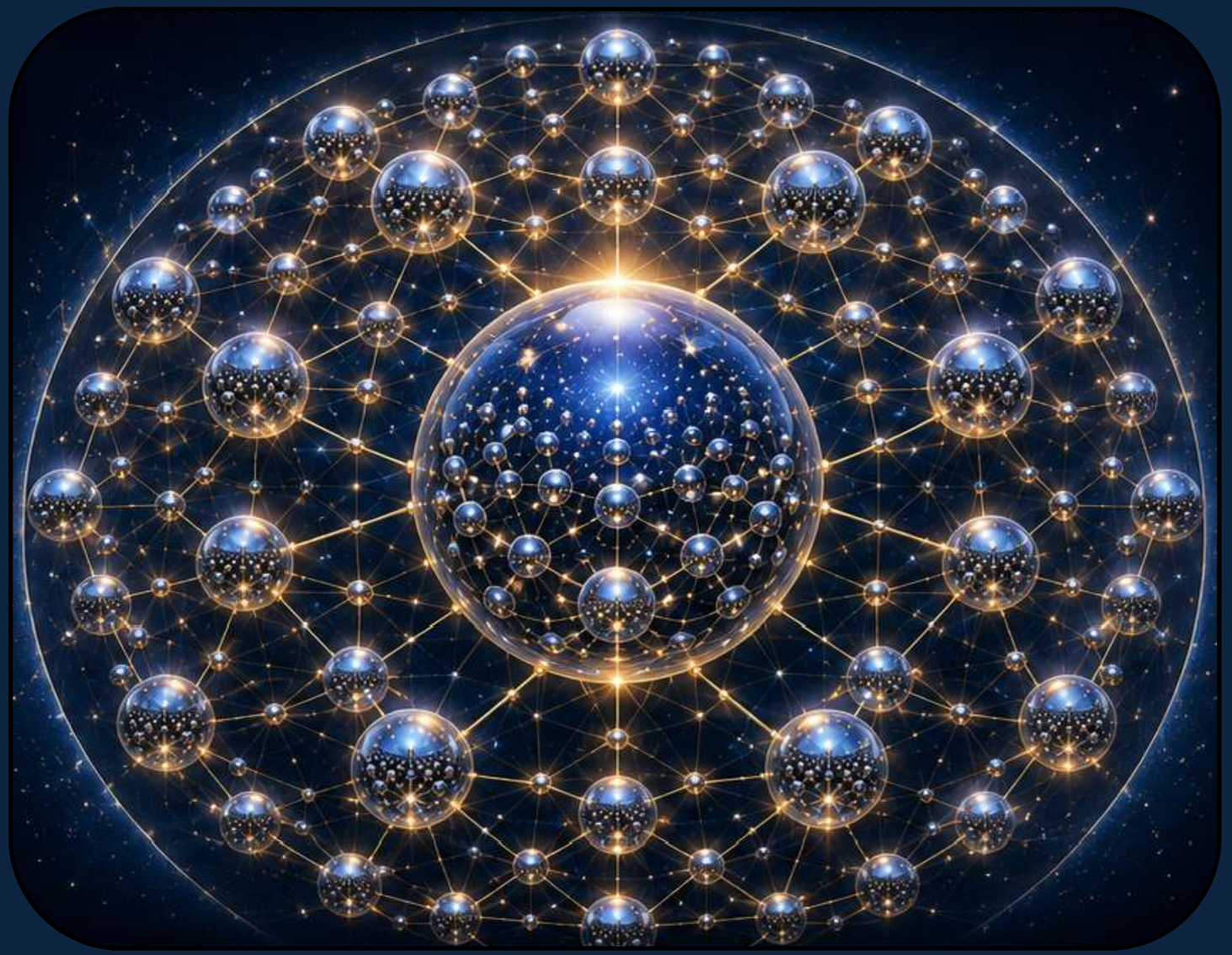


(Whitehead, 1929)

Hinduism & Buddhism

Indra's Net

- Boundless web of interconnection
- Reflective jewels at each intersection
- Each jewel reflects the other jewels as well as the whole net



(Atharva Veda, 1,000 BCE; Flower Adornment Sutra, 300 CE)

Daoism

- The Dao is the fundamental force that drives and sustains creation

Daoist Cosmology

- The Dao created The One
- The One differentiated from 1 to 10,000

(Laozi, The Dao De Jing,
350 BCE - 1060 CE)



Christianity

Perichoresis

- The Holy Trinity
- "Mutual indwelling"
- "Circle dance"

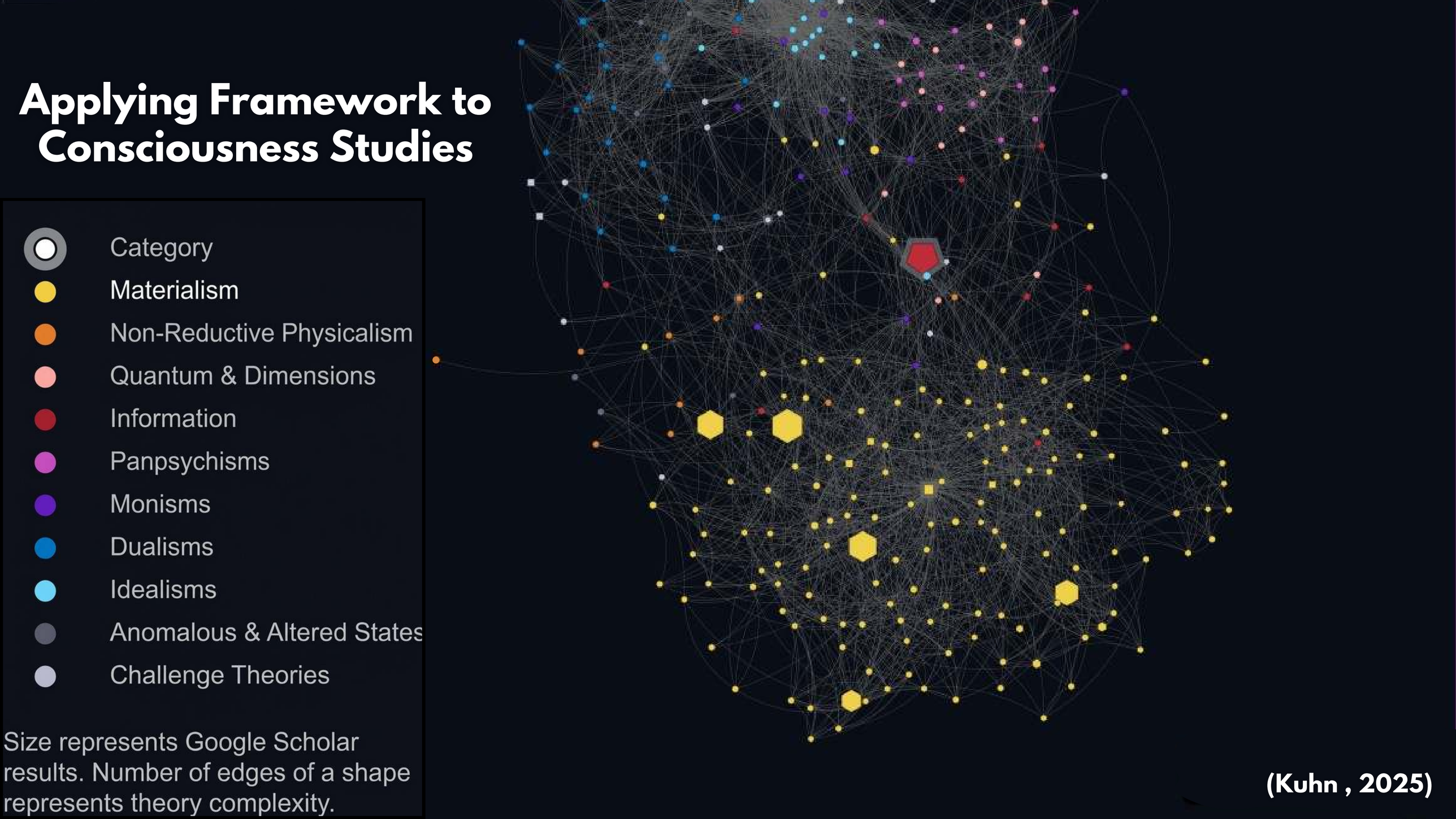
- Relationship between human nature and the divine (Gregory of Nazianzus, 390 CE)

- Dynamics of how the father, son, and holy spirit relate to one another (John of Damascus, 749 CE)



Applying the Framework to the Science of Consciousness

Applying Framework to Consciousness Studies



(Kuhn , 2025)

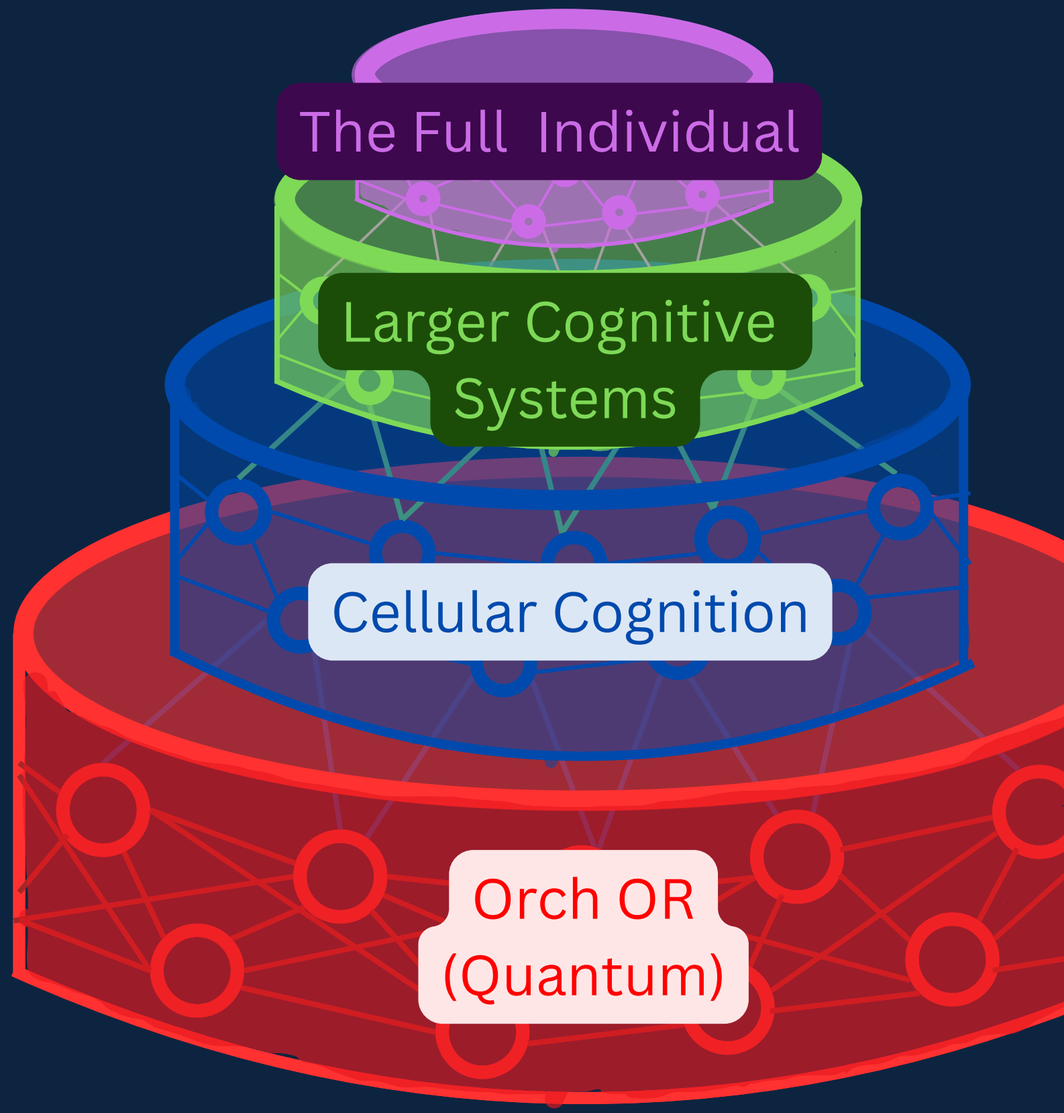
Applying Framework to Consciousness Studies

Organize theories holistically based on

- how they naturally occur in reality
- part-whole relationships and dynamics

- Mapping similarities may help by transferring known solutions in one area to unsolved problems in others

Broad Domain Example



Future Goals

- Continue to develop this framework and philosophy as we learn more
- Establish guided interdisciplinary collaboration with explicit effort towards unification
- Goal is to connect isolated fields to gain a more holistic view of consciousness and generate unifying research questions

Conclusion

- Propose Nested Fractal Reality Framework as a meta-framework that could organize theories of consciousness and guide them towards unification
- We encourage researchers to engage with NFRF and apply it to their specific area of research
- Unification requires deliberate collaboration between researchers from all levels to build conceptual bridges
- We would love to hear how you all see yourselves or fields fit into this framework

Special Thanks

- Team
- Conference Organizers



Anthony Ryals Ph.D.



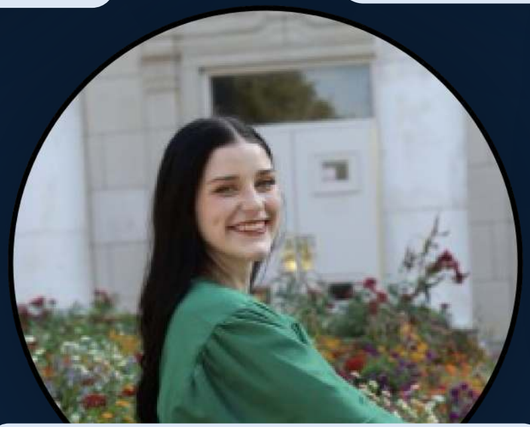
Kara Stuart M.S.



Calvin Sims Ph.D.



Molly Rhode B.S.



Riley Petherbridge B.S.



Kurt Geggus B.A.



Jennifer Wadlington B.S.


Thank You

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Questions & Comments

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This Project is now in Pre-Registration