

Semiosic Agency: Self-regulated Habituation of Ever-novel Signs via Virtual Field

23rd Gatherings in Biosemiotics

Copenhagen, Denmark

J. Augustus Bacigalupi

bacigalupiworks@gmail.com

University of Tartu

Outline

- 1. Semiotic Threshold? Transformation and Transduction in Semiosis**
- 2. Proposal: A General Model of (Peircean) Semiosis**
- 3. Implications: Dynamical of Model of Semiotic Agency**

(actual)

(virtual)

$$\text{Kinetic Energy} + \text{Potential Energy} = \text{Total Energy}$$

Quantum

$$\frac{-\hbar^2}{2m} \nabla^2 \Psi(r) + V(r) \Psi(r) = E \Psi(r)$$

Mechanical

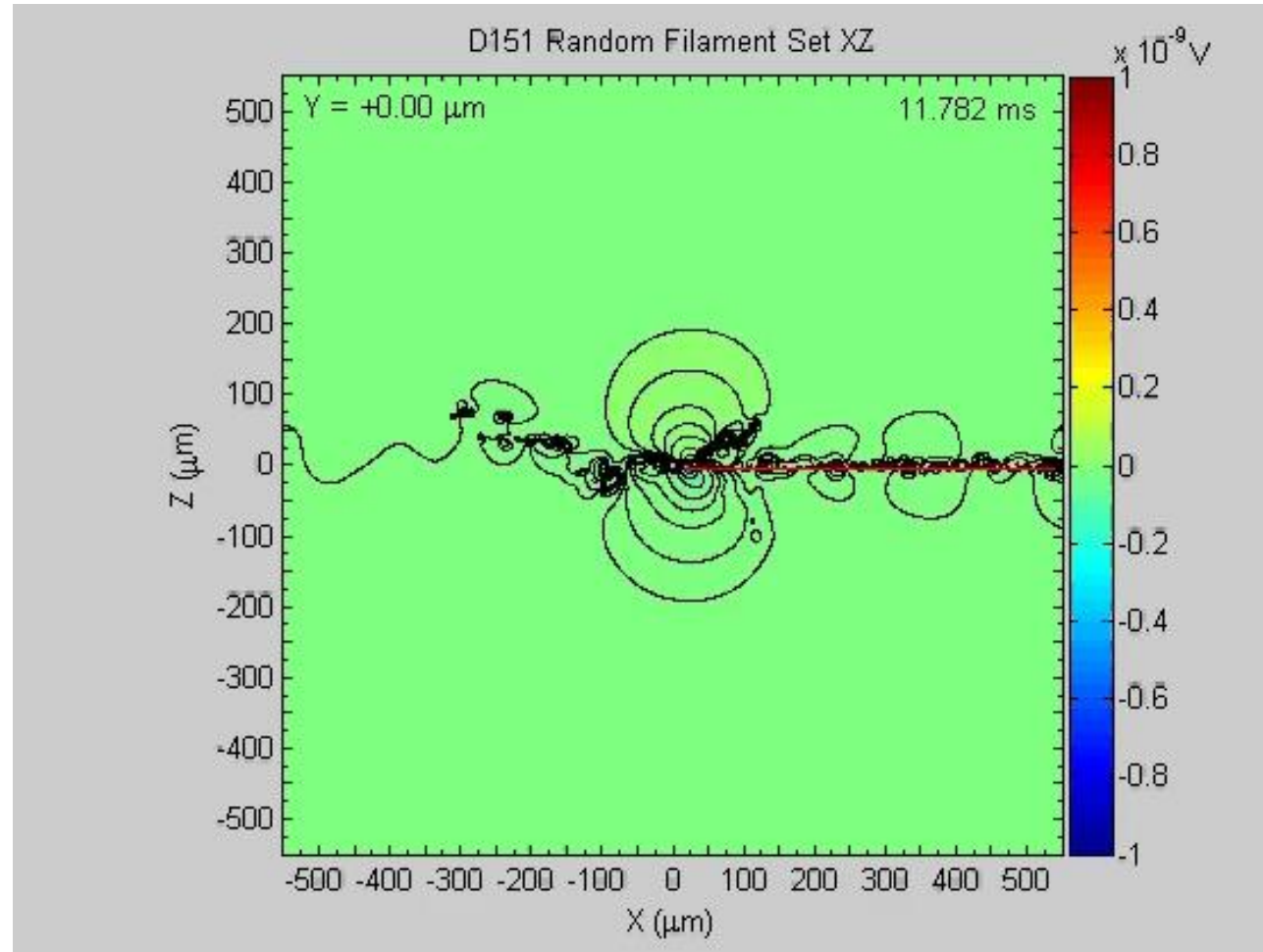
$$\frac{1}{2} m V^2 + mgh = E$$

Chemical

$$T \Delta S + \Delta G = \Delta H$$

Energy in the Universe

1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency

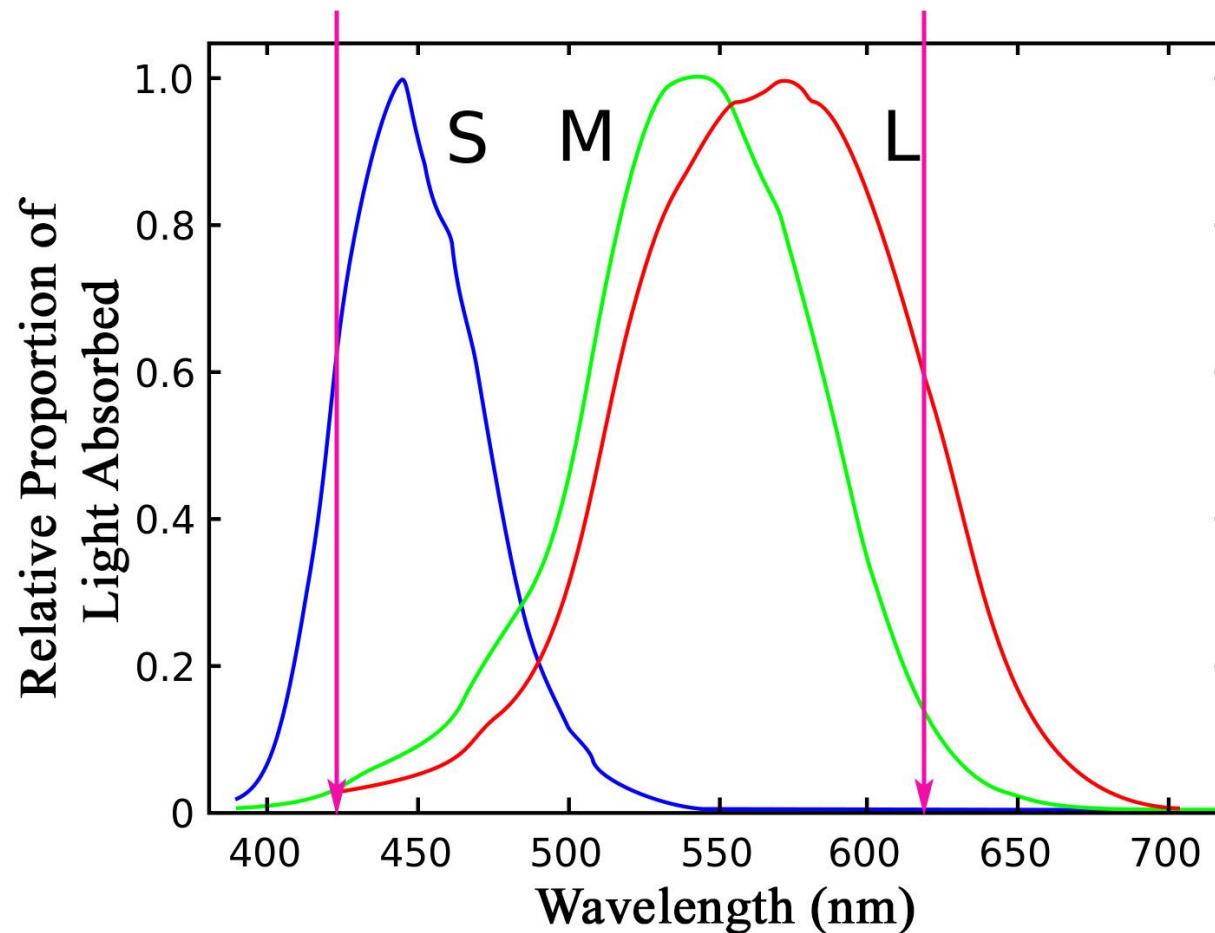


Actual (kinetic) and Virtual (potential) in Life

1. Semiotic Threshold? Transformation and Transduction

2. Proposal: A General Model of Semiosis

3. Implications: Dynamical Model of Semiotic Agency



Magenta

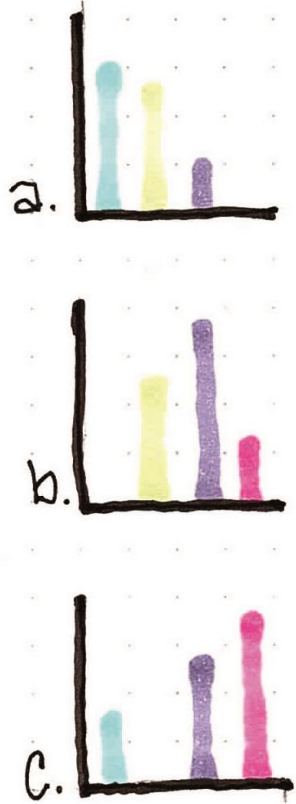
“Red” and “blue” as a single higher order phenomenon: *magenta*.

How is it that one distinct transduction can ontogenetically be about another distinct thing? *How are they about each other, simultaneously?*

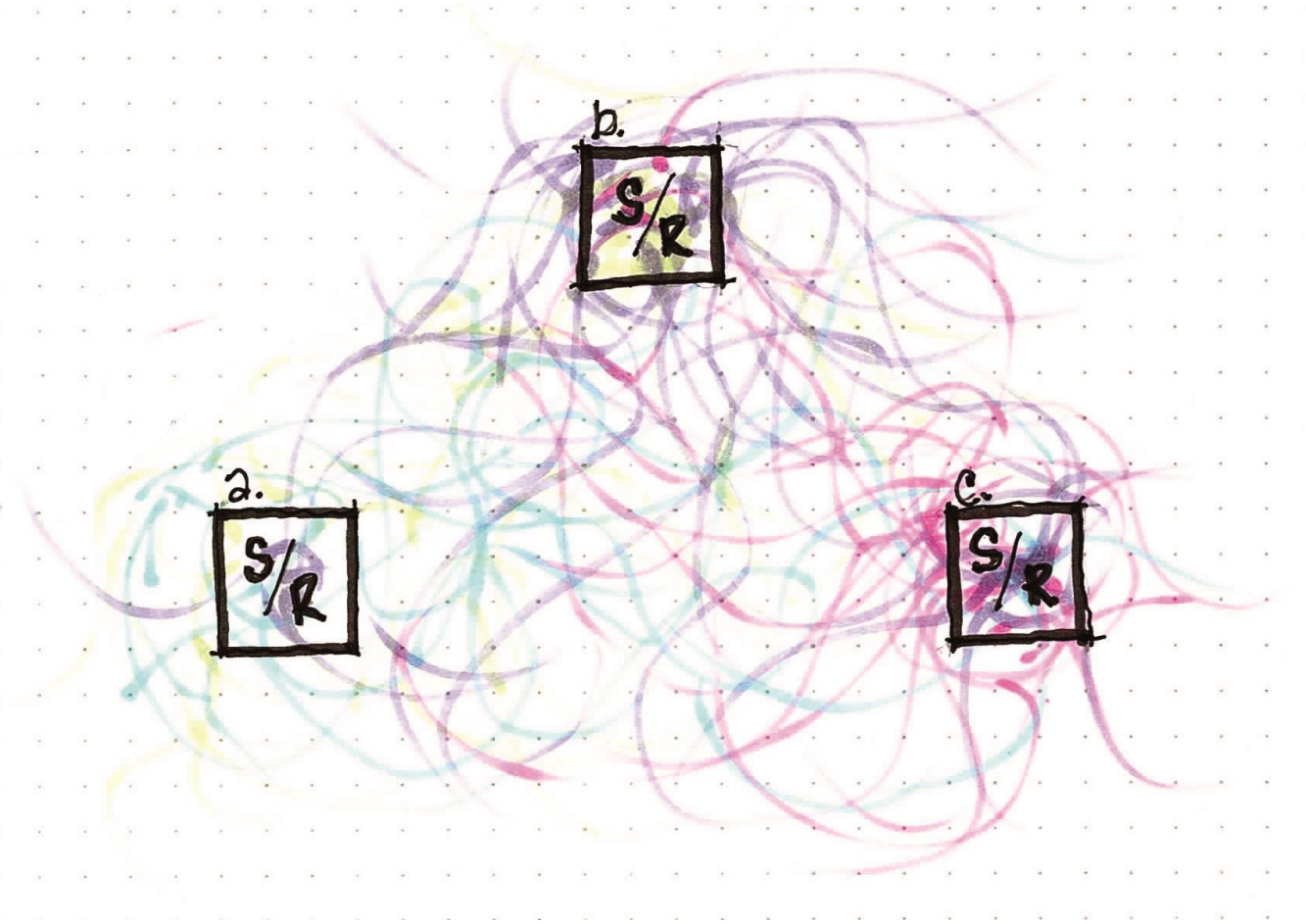
Continuous Individuated Distributions

1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency

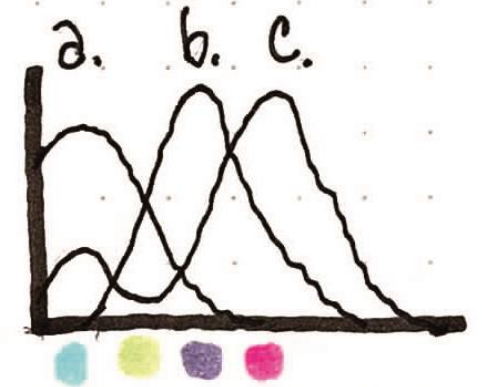
Iconicity
(*analog*)



Individual Sympathies



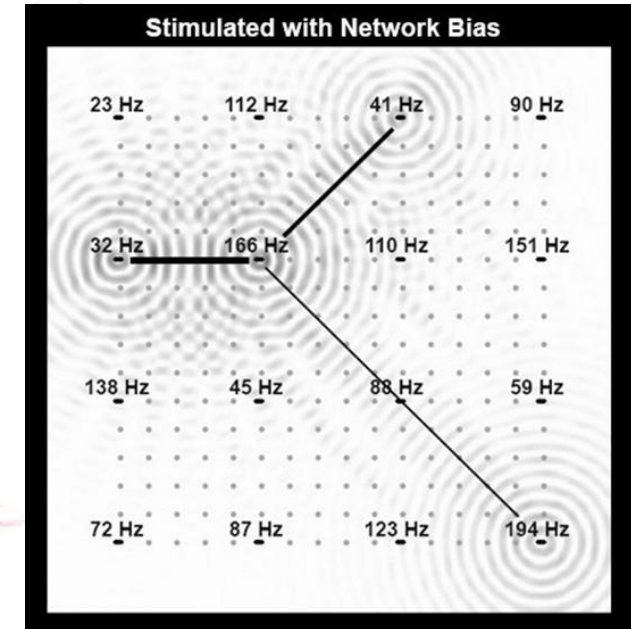
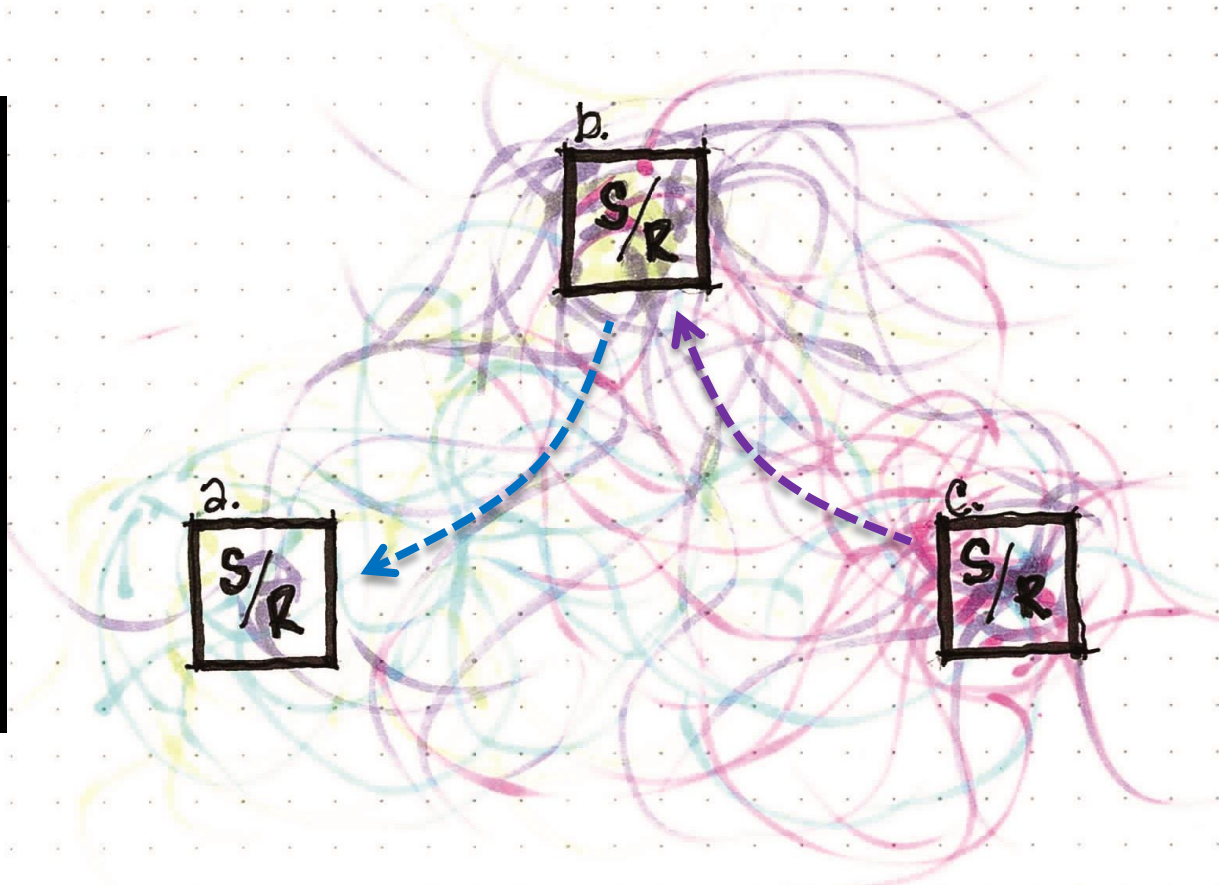
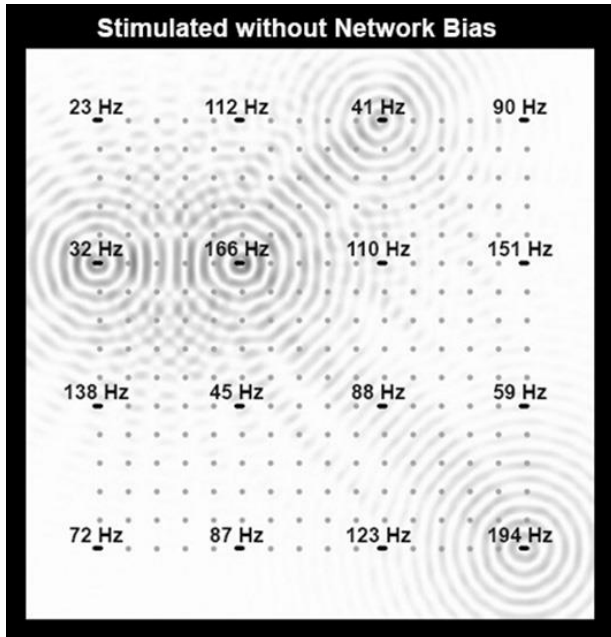
Affective Field (a.k.a. *relevant noise*)
Physical basis for abduction and feelings.



Overlapping Sympathies

1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency

Indexicality (metaphor)



Bacigalupi, J.A., 2013.
Bacigalupi, J.A., 2022.

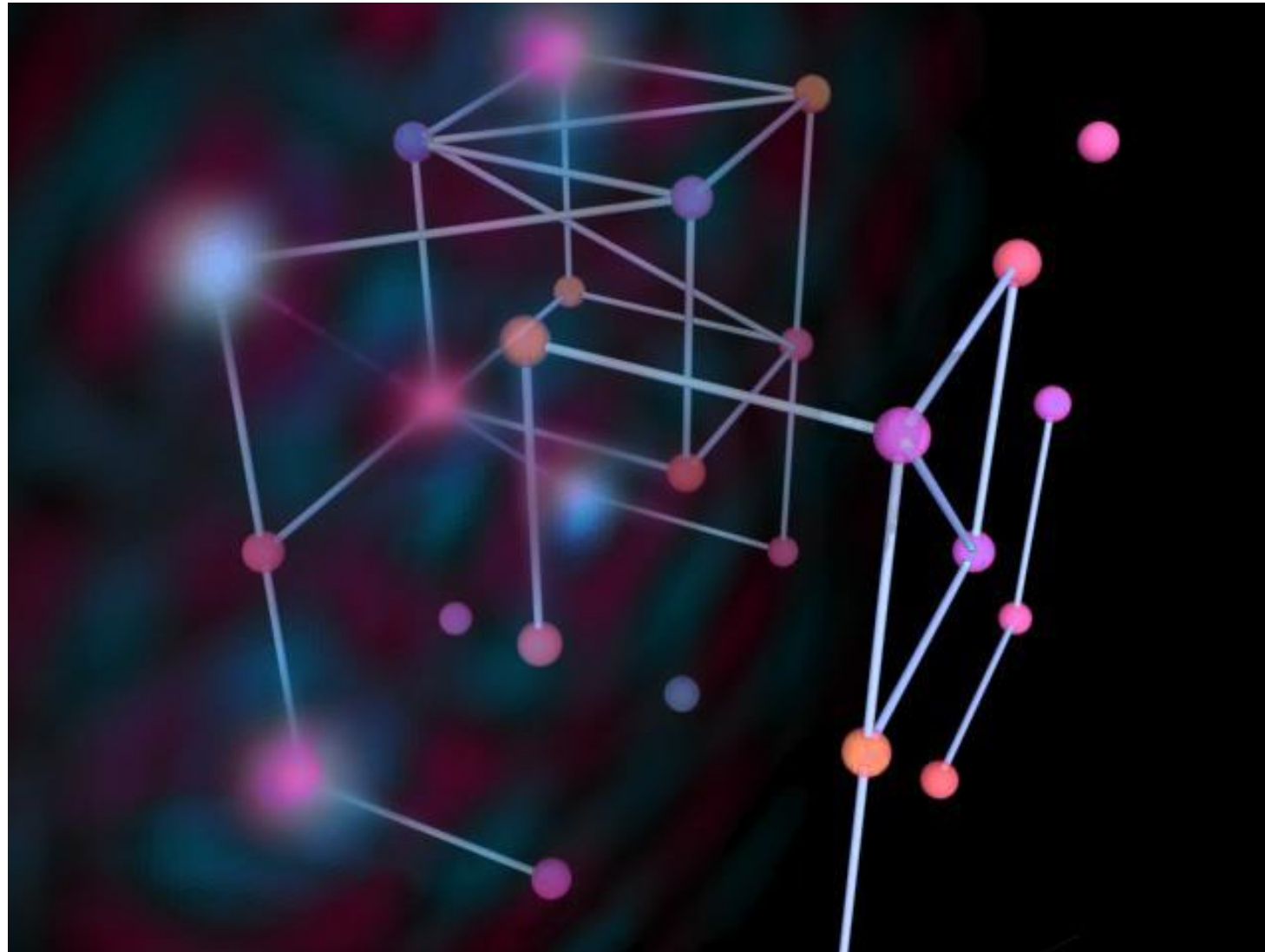
Semiogenesis
w/ affective field (Valsiner 2020), or
“agent’s own esthetic quality” (CP 5.136).

1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency

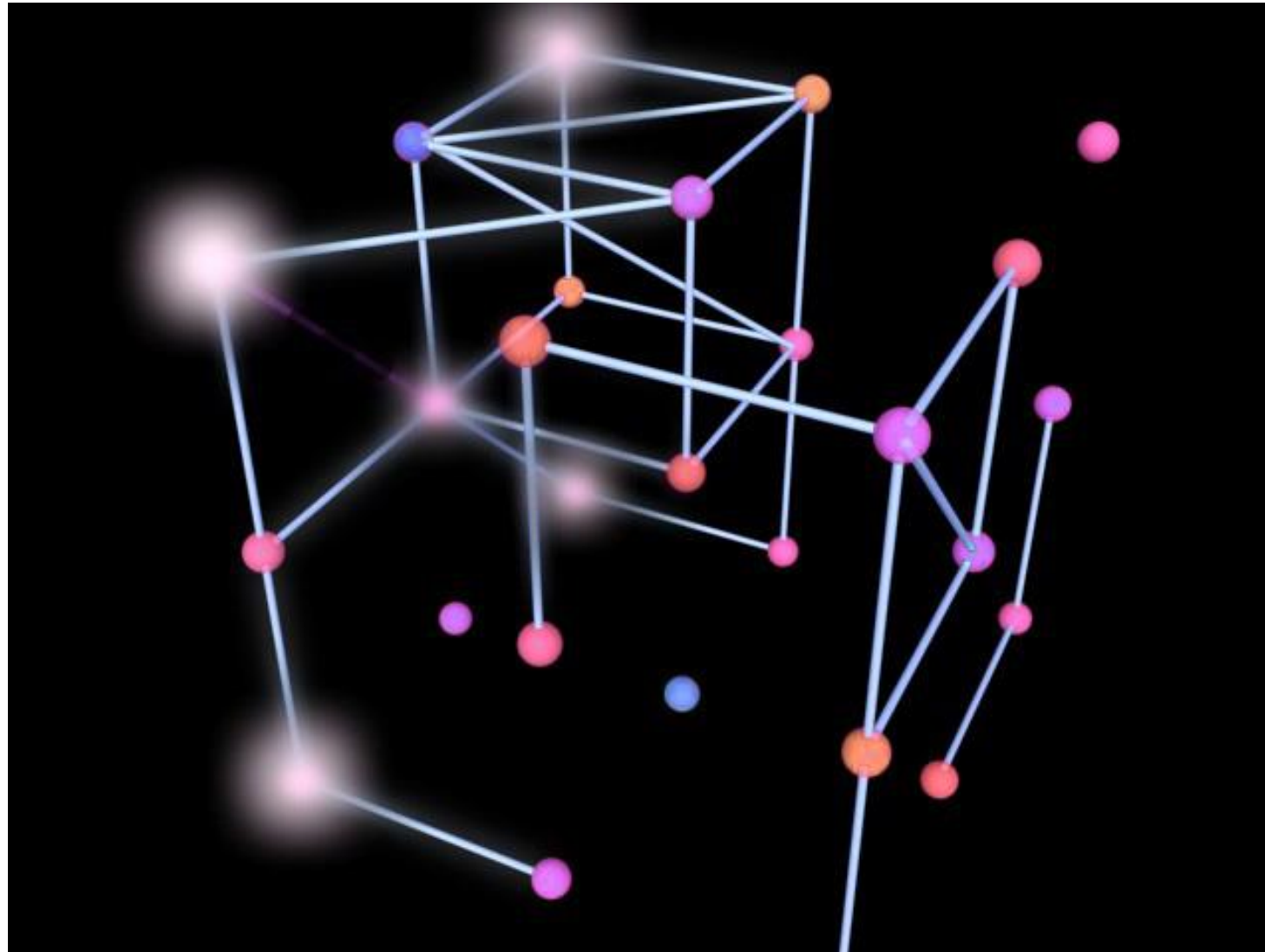
Object

Interpretant

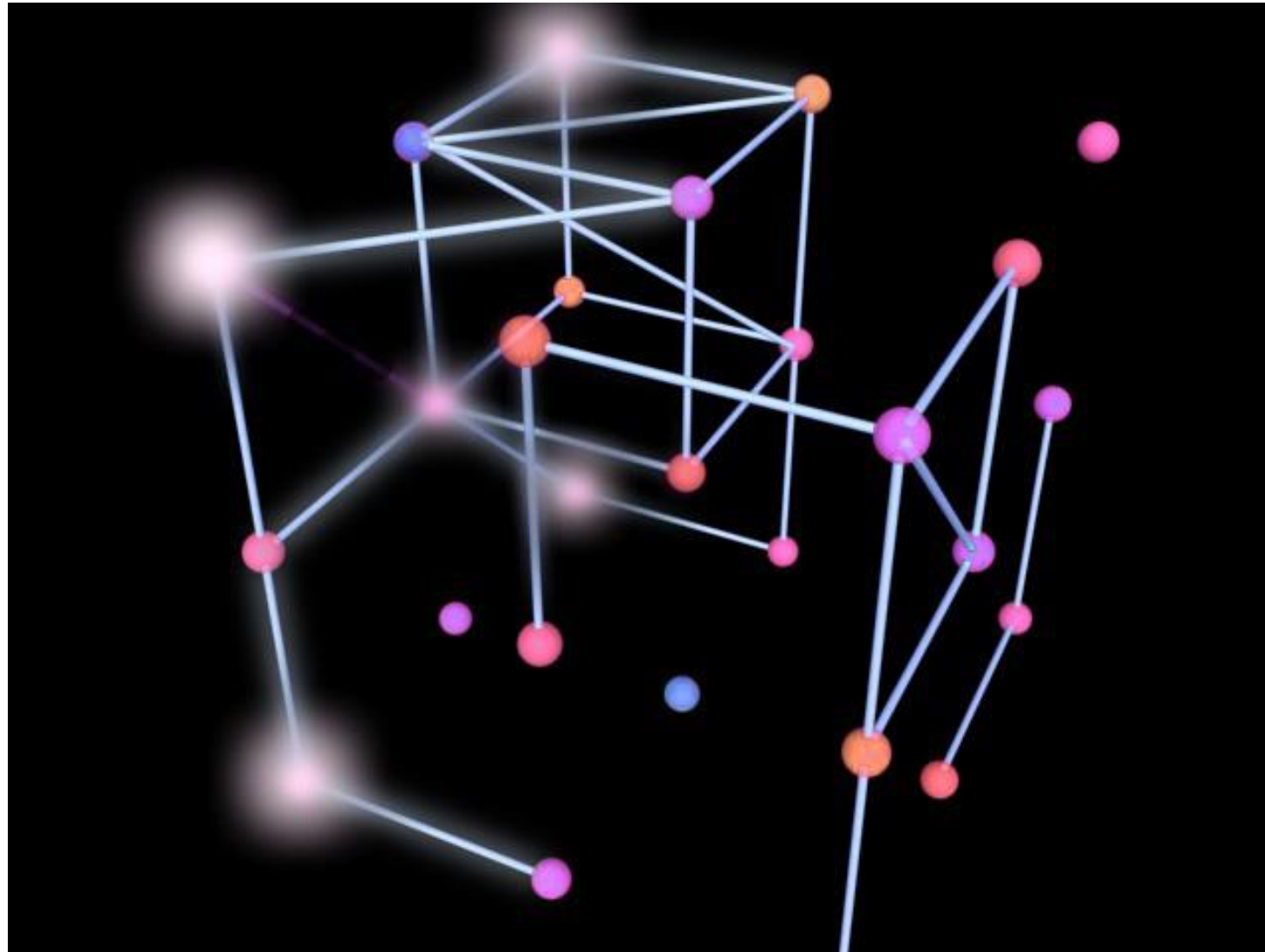
Representamen



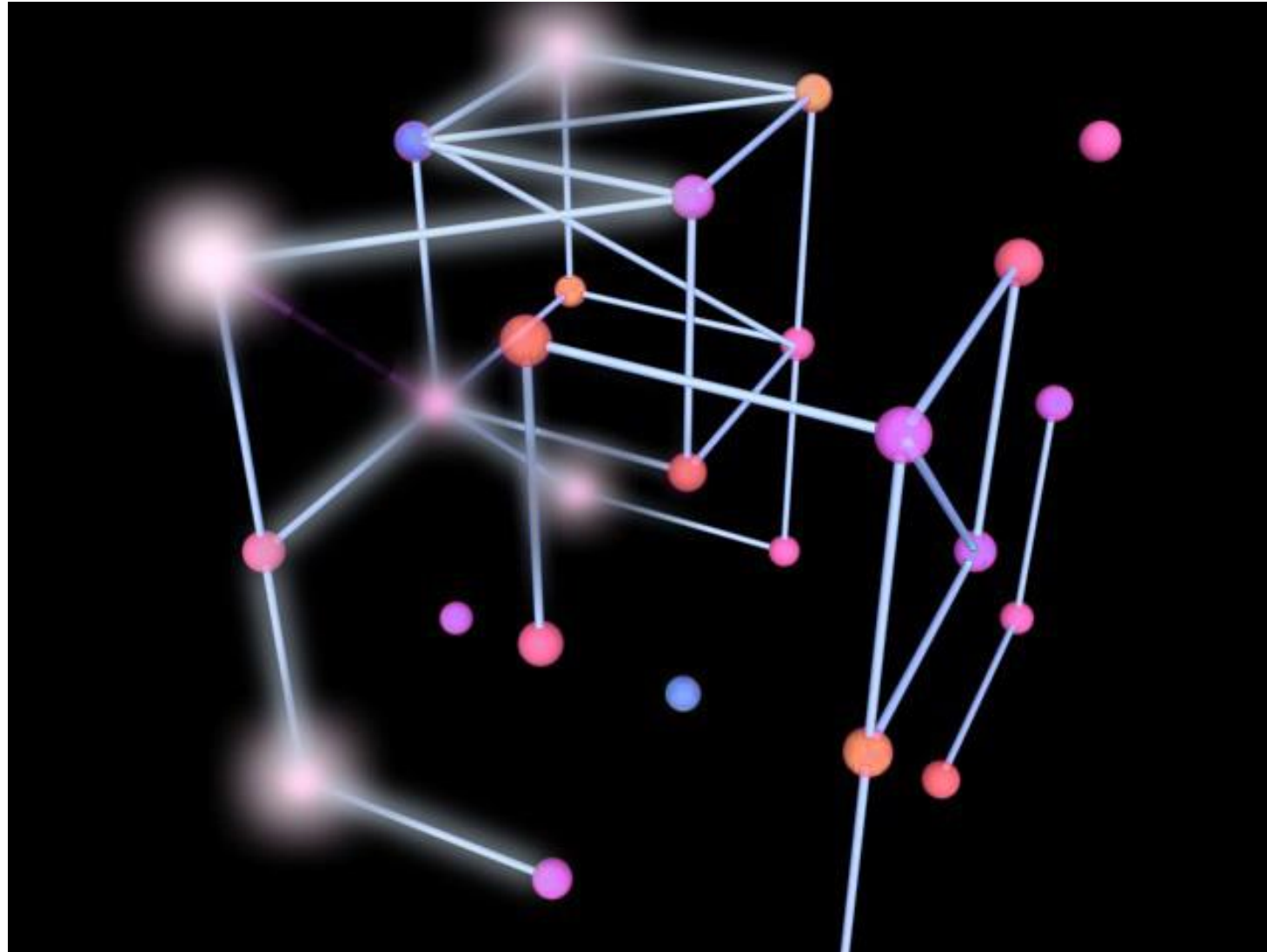
1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
- 3. Implications: Dynamical Model of Semiotic Agency**



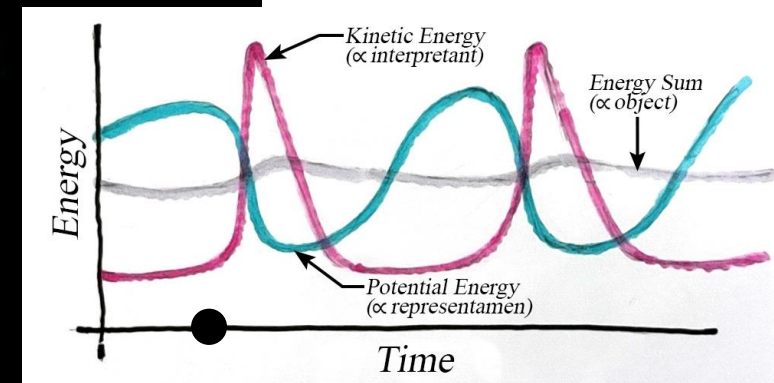
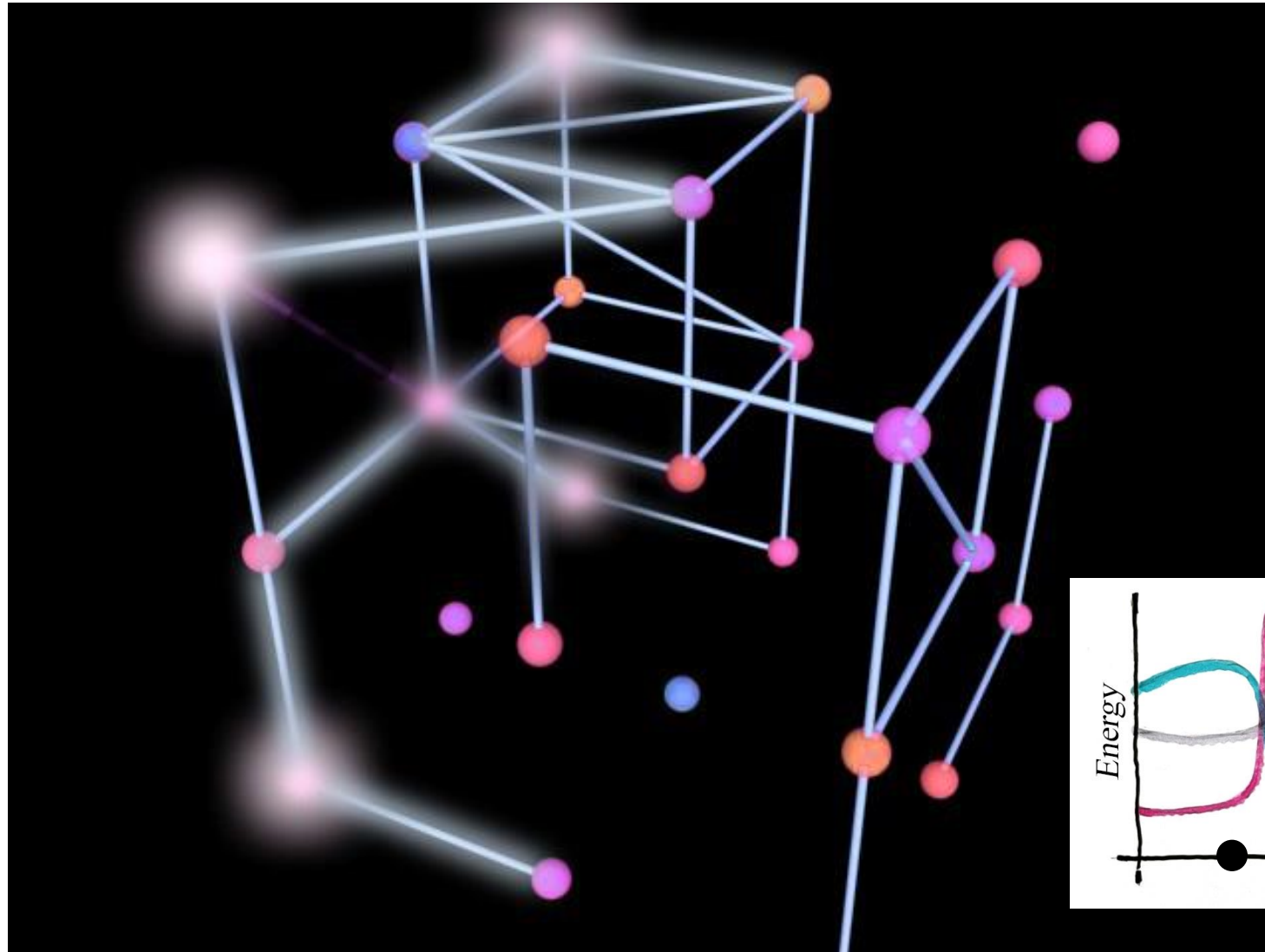
1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
- 3. Implications: Dynamical Model of Semiotic Agency**



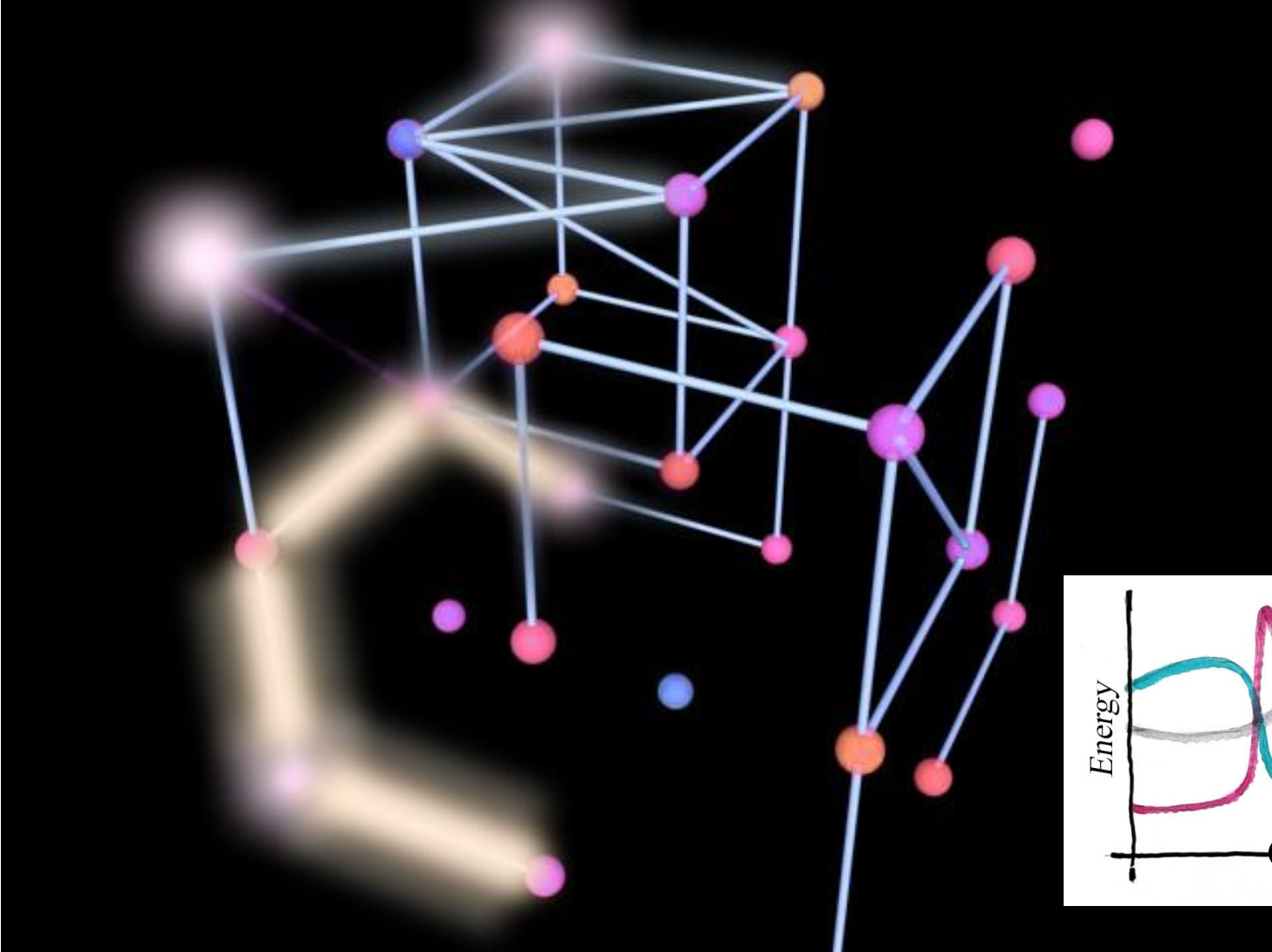
1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
- 3. Implications: Dynamical Model of Semiotic Agency**



1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency



- 1. Semiotic Threshold? Transformation and Transduction
- 2. Proposal: A General Model of Semiosis
- 3. Implications: Dynamical Model of Semiotic Agency

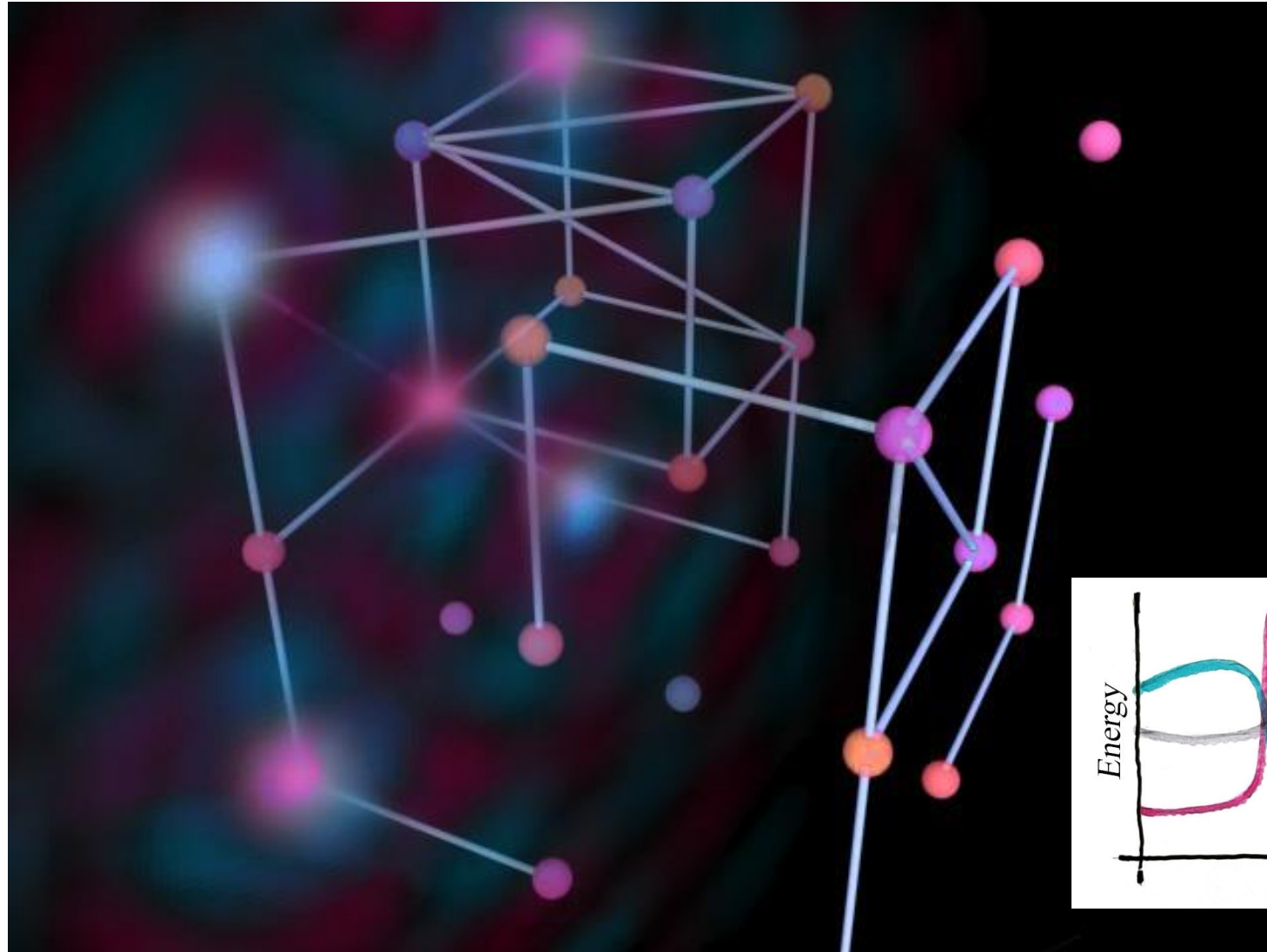


Irreducibility AND Continuous

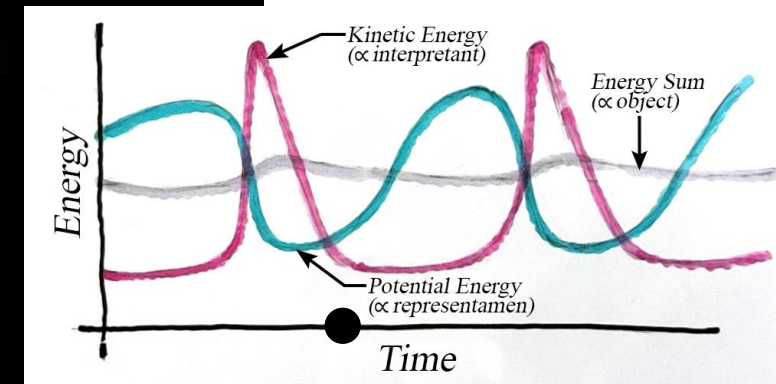
1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency

Object
*a network of relations,
 simultaneously Virtual
 and Actual*

Representamen
*Virtual emergent
 “figures” in the
 “ground”*



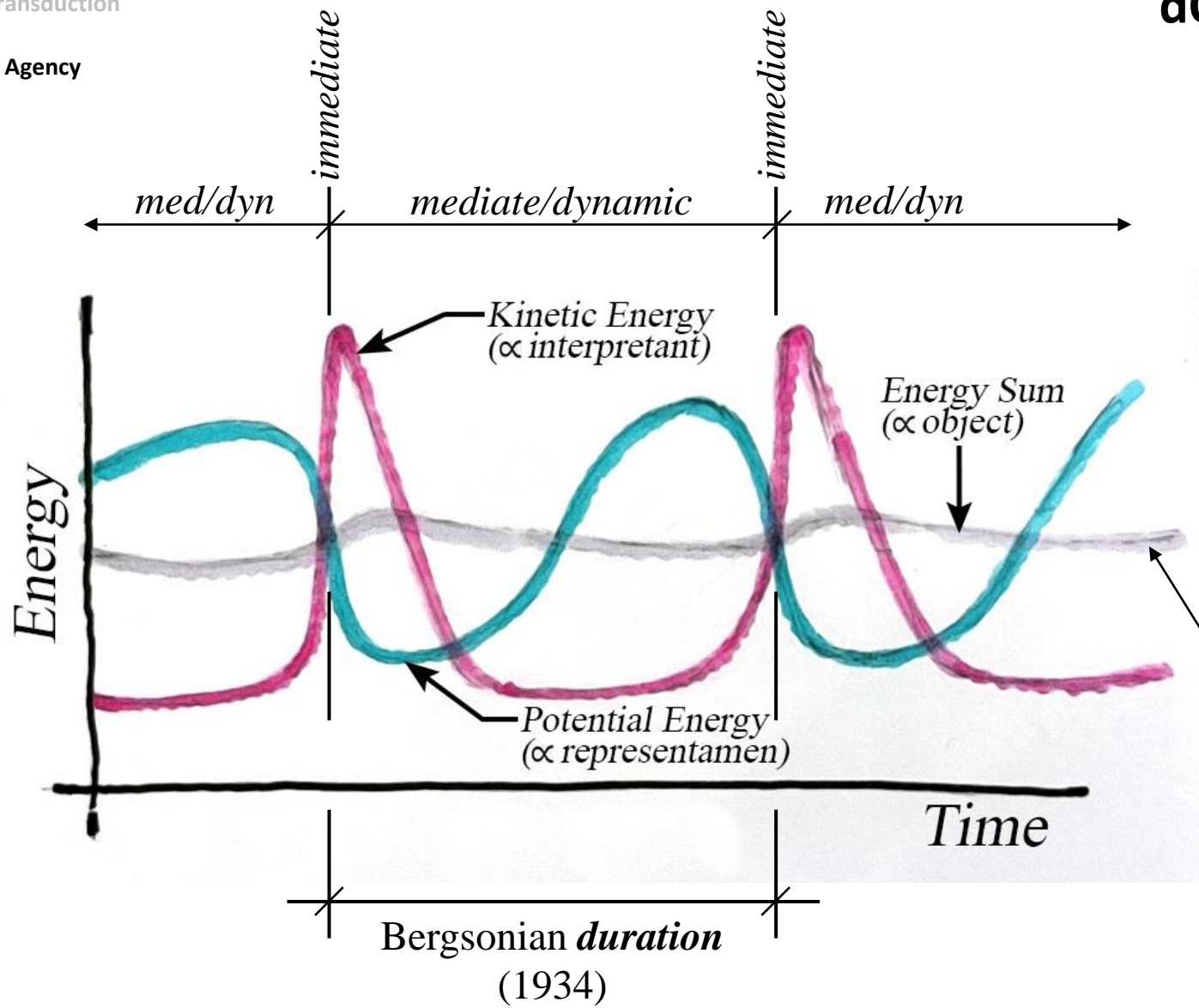
Interpretant
*Actual “lightning strike”,
 the after-glow of which
 seeds subsequent
 Representamen*



- 1. Semiotic Threshold? Transformation and Transduction
- 2. Proposal: A General Model of Semiosis
- 3. Implications: Dynamical Model of Semiotic Agency

dO – iO – S – dI – iI – fI
 (EP2: 481, 1908)

Object
*a network of relations,
 simultaneously Virtual
 and Actual*

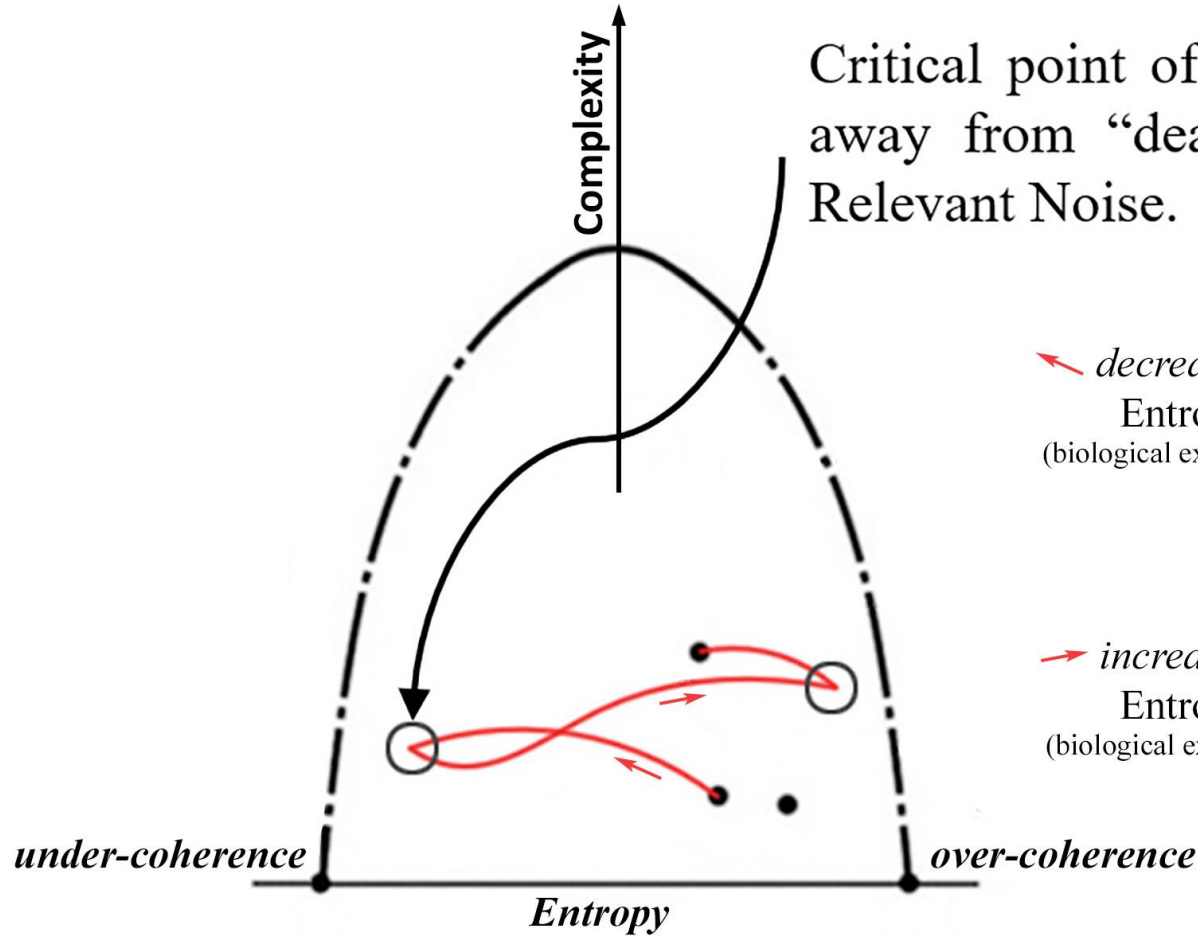


Interpretant
*Actual “lightning strike”,
 the after-glow of which
 seeds subsequent
 Representamen*

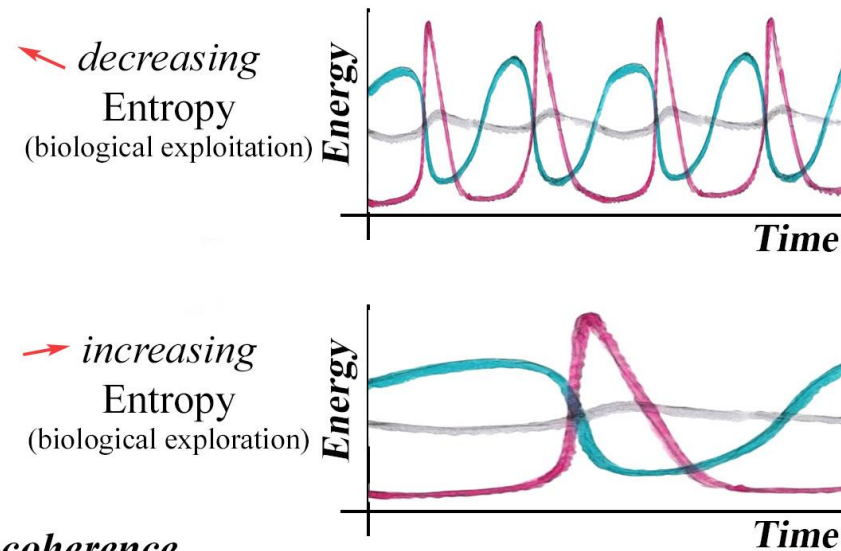
Representamen
*Virtual emergent
 “figures” in the
 “ground”*

Noise floor

1. Semiotic Threshold? Transformation and Transduction
2. Proposal: A General Model of Semiosis
3. Implications: Dynamical Model of Semiotic Agency



Critical point of pragmatic self-regulation. Turning away from “death-state” by *feeling* the interstitial Relevant Noise.

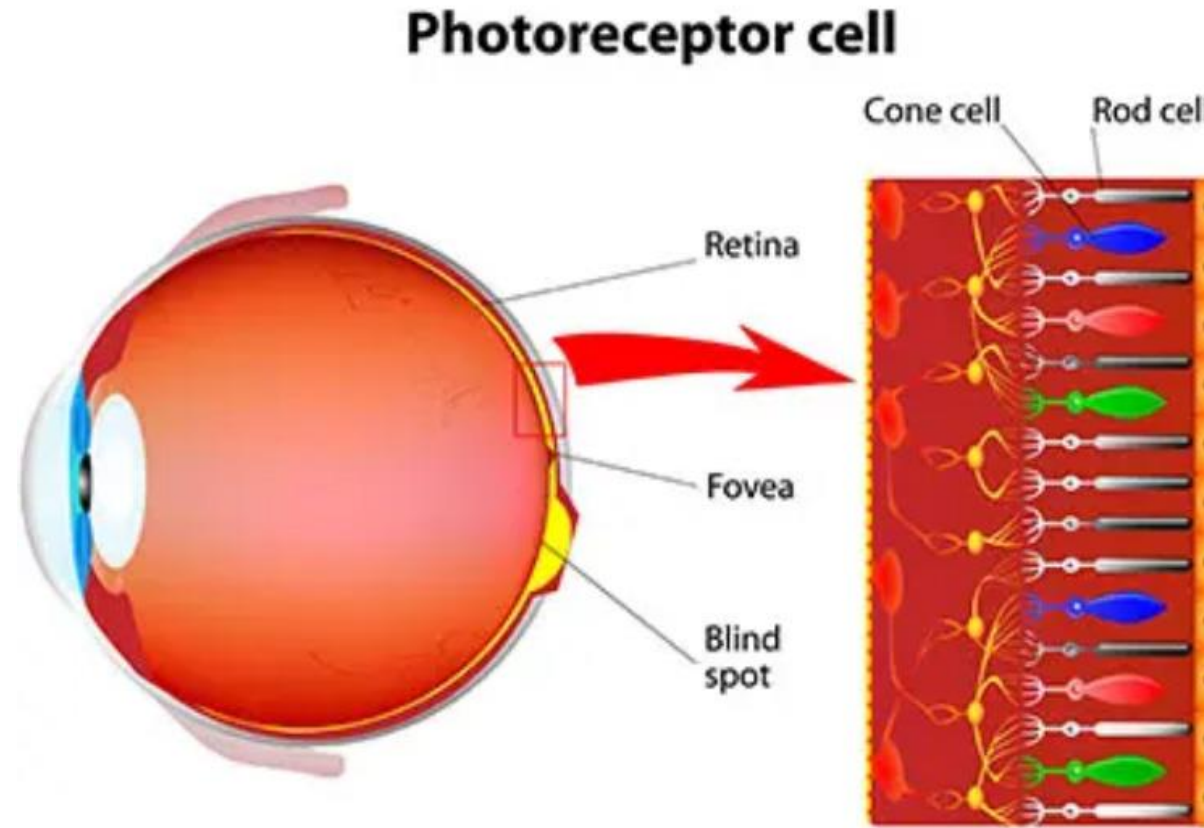


Thank You!

References

- Bacigalupi, J.A., 2013. Refinement: a rigorous description of autonomous adaptive agents. *Kybernetes* 42, 1313–1324.
- Bacigalupi, J.A., 2022. *Semiogenesis: A Dynamic System Approach to Agency and Structure*. Biosemiotics.
- Bergson, H., 1934. *The Creative Mind: An Introduction to Metaphysics*.
- Favareau, D. 2015. Creation of the relevant next: How living systems capture the power of the adjacent possible through sign use.
- Kull, K. 2023. Arbitrariness and the forms of semiotic indeterminacy. *Open Semiotics*. Biglari, A. (*eds*)
- Lotman, J., 1990. *Universe of the Mind; A Semiotic Theory of Culture*. I.B. Tauris & Co. Ltd.
- Peirce, C.S., 1994. *Collected Papers of Charles Sanders Peirce*. Hartshorne, C. and Weiss, P. (*eds*). Harvard University. Press (CP)
- Peirce, Charles Sanders. 1998. *The essential Peirce, volume 2*. Peirce Edition Project, (*eds*), Bloomington: Indiana University Press. (EP2)
- Simondon, G., 2020. Individuation; in light of notions of form and information. Regents of University of Minnesota. Adkins, T. (*trans*)
- Valsiner, J., 2020. *Sensuality in Human Living; The Cultural Psychology of Affect*. Springer.

1. Question: Is Continuity Really Necessary?
2. Proposal: A General Model of Semiosis
3. Implications: Dynamics of Model



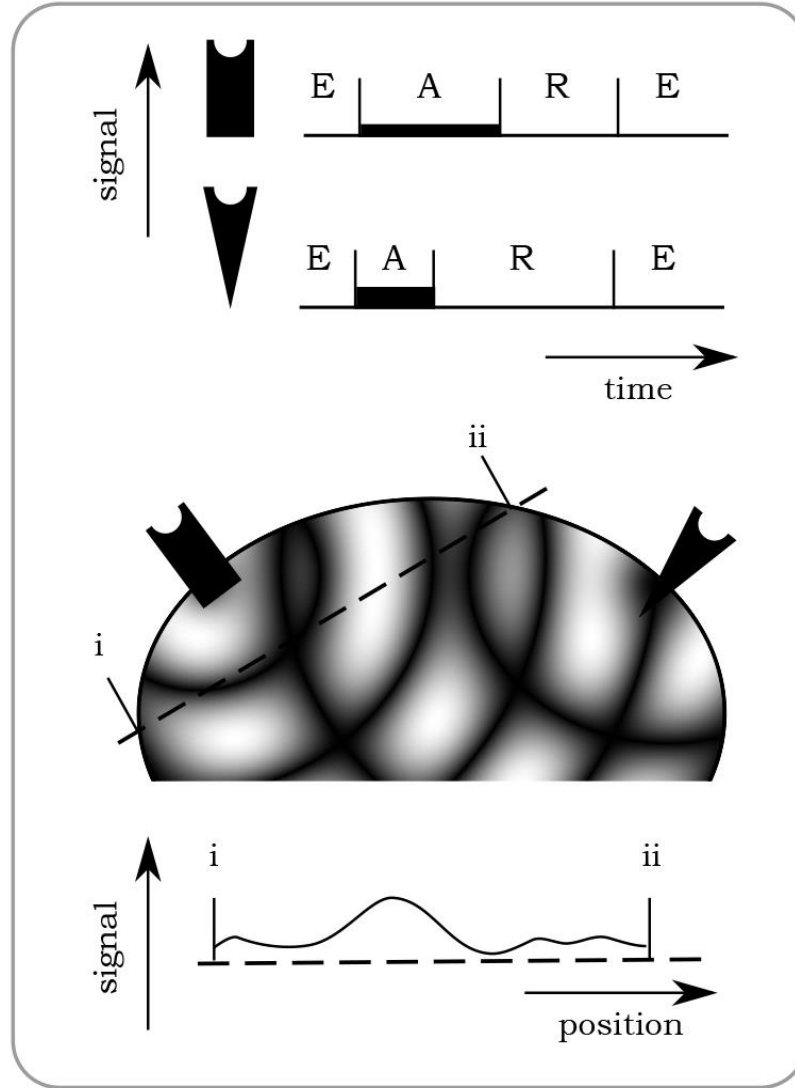
Cones, with their distinct “positive sympathies”, are *analogic* and *iconistic*.

Continuous Overlapping Distributions

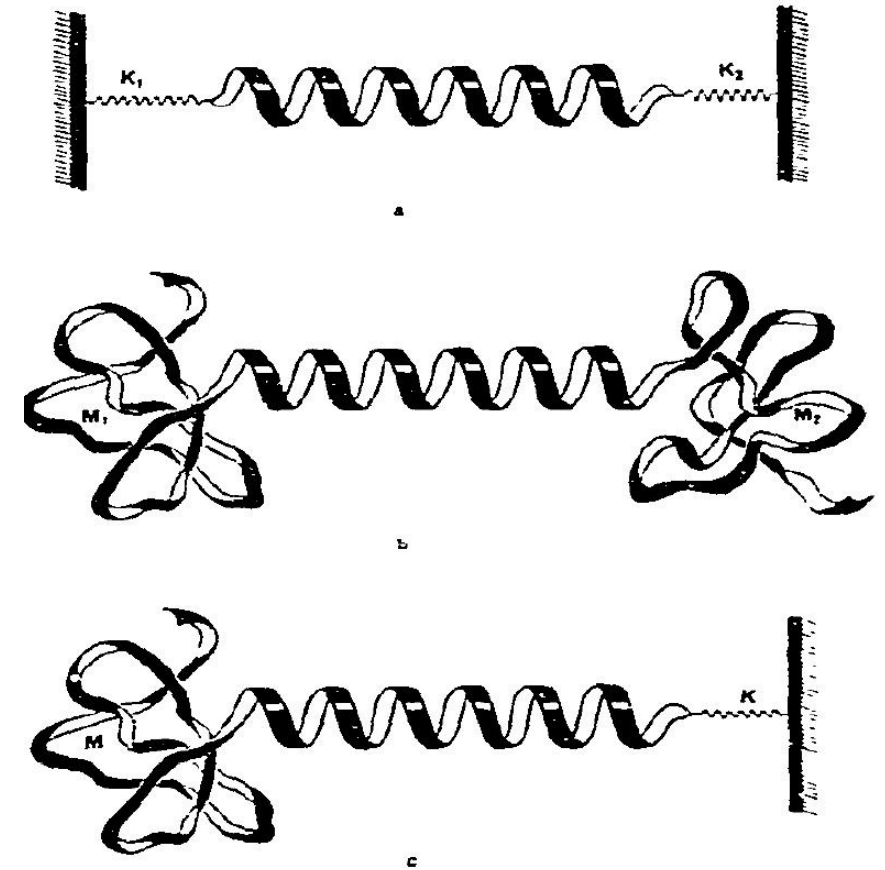
1. Question: Is Continuity Really Necessary?

2. Proposal: A General Model of Semiosis

3. Implications: Dynamics of Model



Markos, A., & Svorcova, J. (2019). *Epigenetic Processes and the Evolution of Life*. CRC Press. p. 121



Chou, K-C. (1983). *The Biological Functions Of Low-frequency Vibrations (Phonons); 4. Resonance Effects And Allosteric Transition*. *Biophysical Chemistry*, 20. p. 63

1. Question: Is Continuity Really Necessary?
2. Proposal: A General Model of Semiosis
3. Implications: Dynamics of Model

“There is a famous saying of Parmenides ..., ‘being is, and not being is nothing.’ This sounds plausible; *yet synechism flatly denies it*, declaring that *being is a matter of more or less, so as to merge insensibly into nothing.*” (CP 7.569)

*Synechism: relations all the way down
(and back around → causal closure)*

“In genuine agapasm, on the other hand, *advance takes place by virtue of a positive sympathy* among the created springing from continuity of mind. This is the idea which tychasticism knows not how to manage.”
(CP 6.304)

“Three modes of evolution have thus been brought before us: evolution by fortuitous variation, evolution by mechanical necessity, and evolution by creative love [or *positive sympathy*]. We may term them tychastic [...] anancastic [...] and agapastic evolution, or agapasm. [...] The geometers say that it is a degenerate cubic*. Just so, tychasm and anancasm are degenerate forms of agapasm.”
(CP 6.302, 6.303)

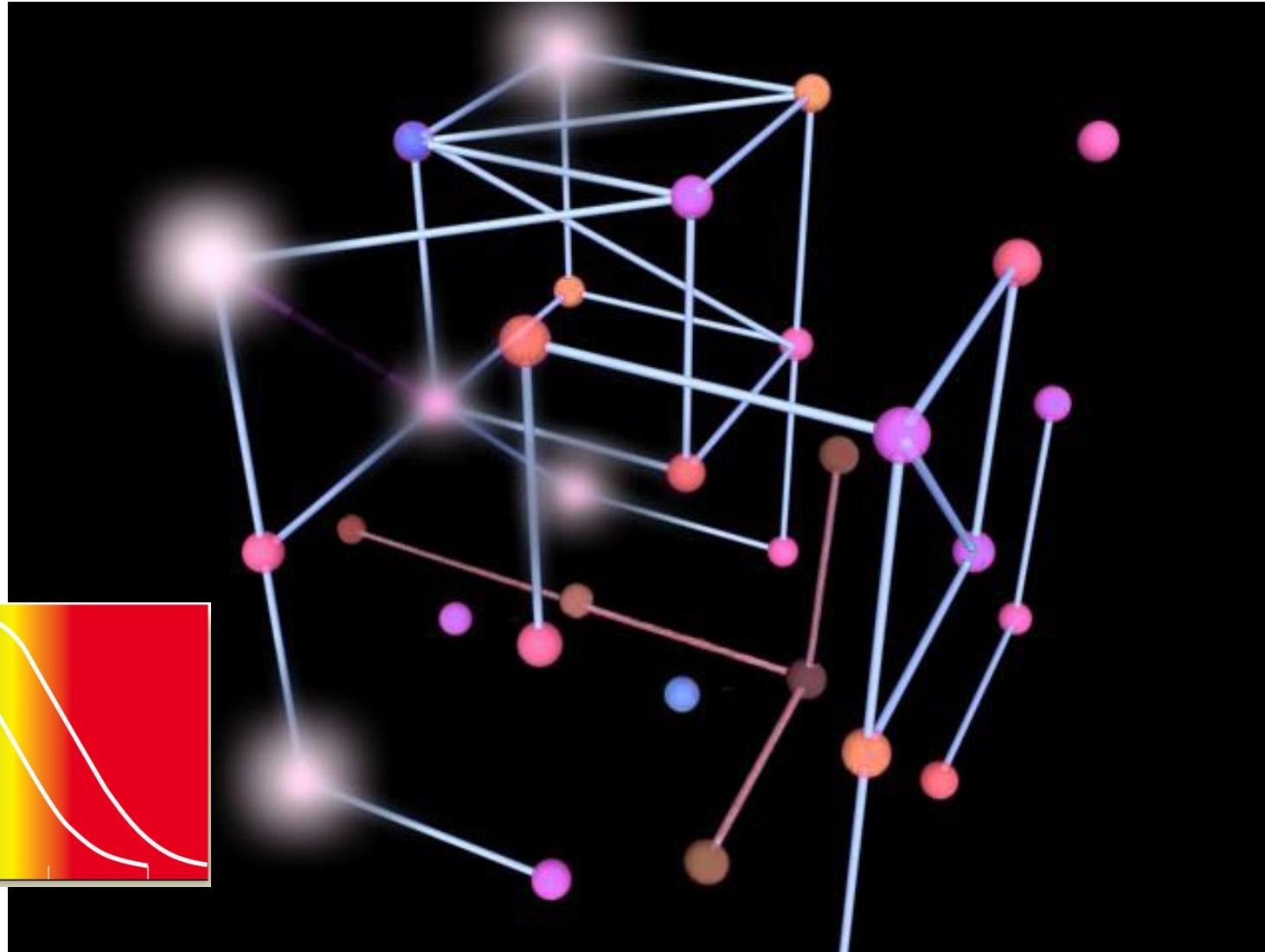
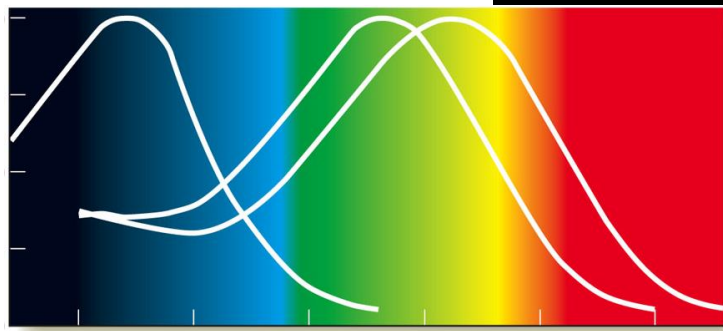
* A geometric point is a degenerate sphere with radius = 0.

1. Question: What and How is Magenta?
2. Proposal: Modes of Structure in Semiosis
3. Implications: Dynamics of Feeling, Skill and Knowledge

feeling, skill and knowledge

*Symbolicity
interprets feelings
and skills to create
knowledge.*

*1st Population
whereby feeling and
skill objects inhere.*

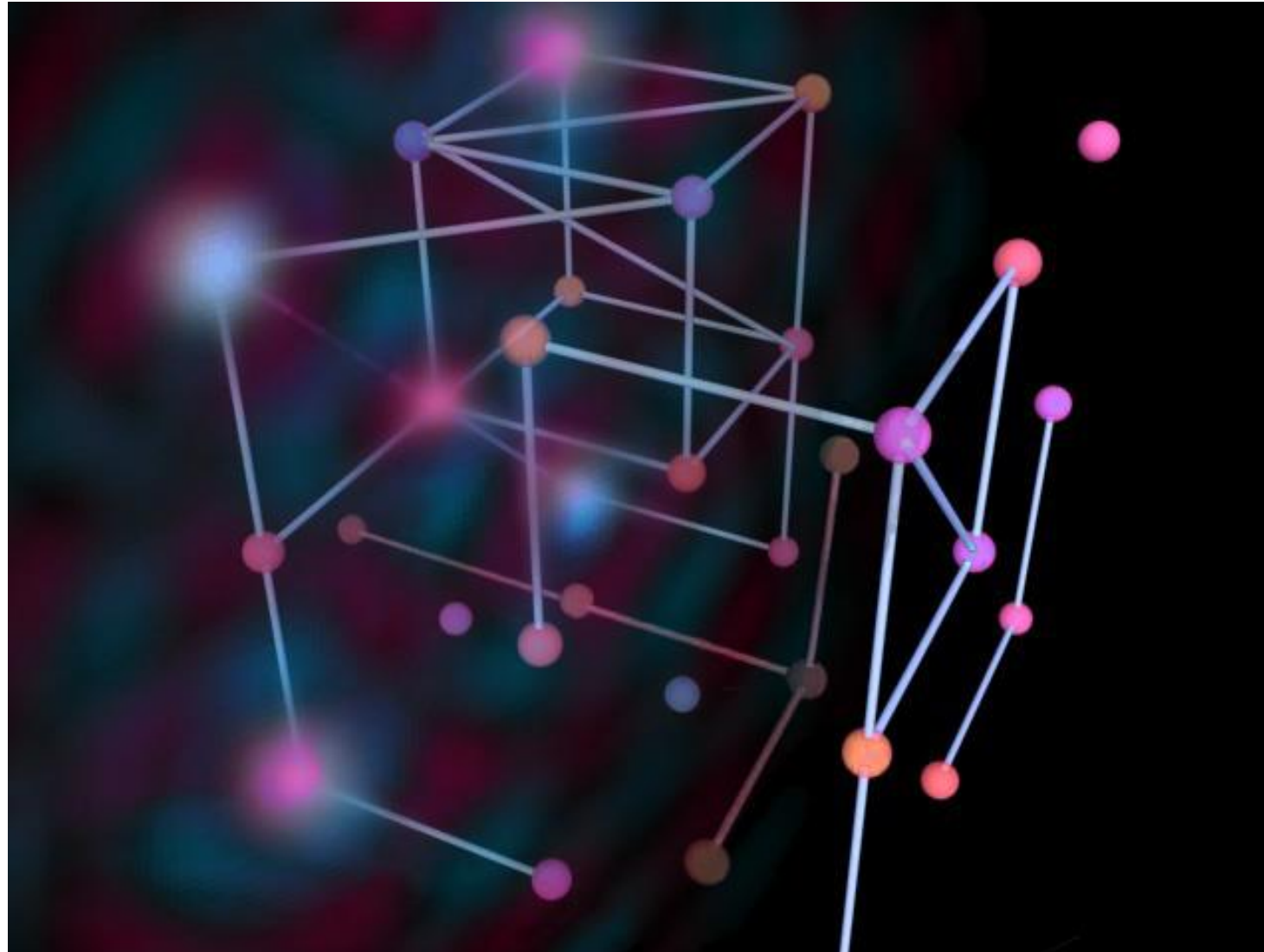


*2nd Population
has distinct
tunings, such that
feelings and skills
are (un)translated
(Lotman 1990, p. 15).*

1. Question: What and How is Magenta?
2. Proposal: Modes of Structure in Semiosis
3. Implications: Dynamics of Feeling, Skill and Knowledge

feeling, skill and knowledge

*1st Population
whereby feeling and
skill objects inhere.*

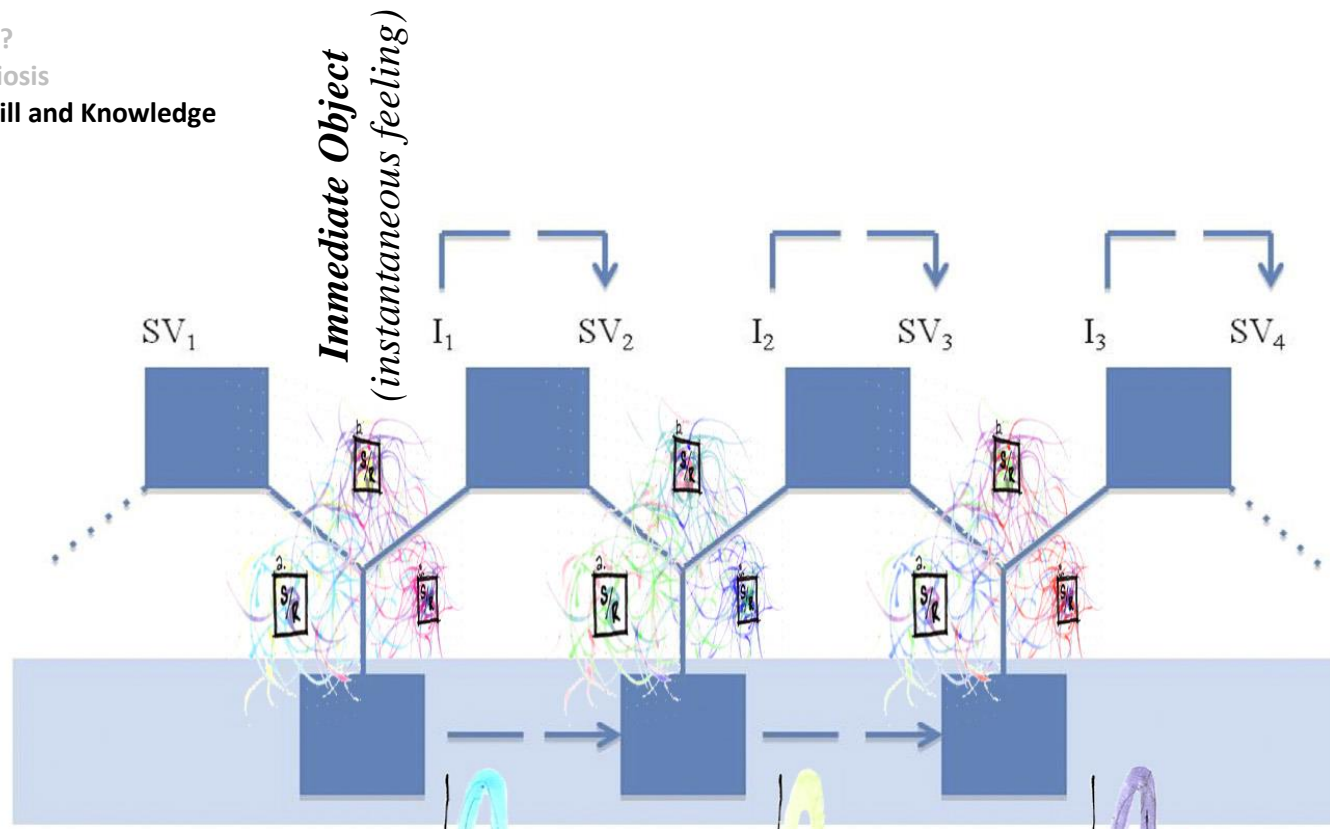


*Symbolicity
interprets feelings
and skills to create
knowledge.*

*2nd Population
has distinct
tunings, such that
feelings and skills
are (un)translated.*

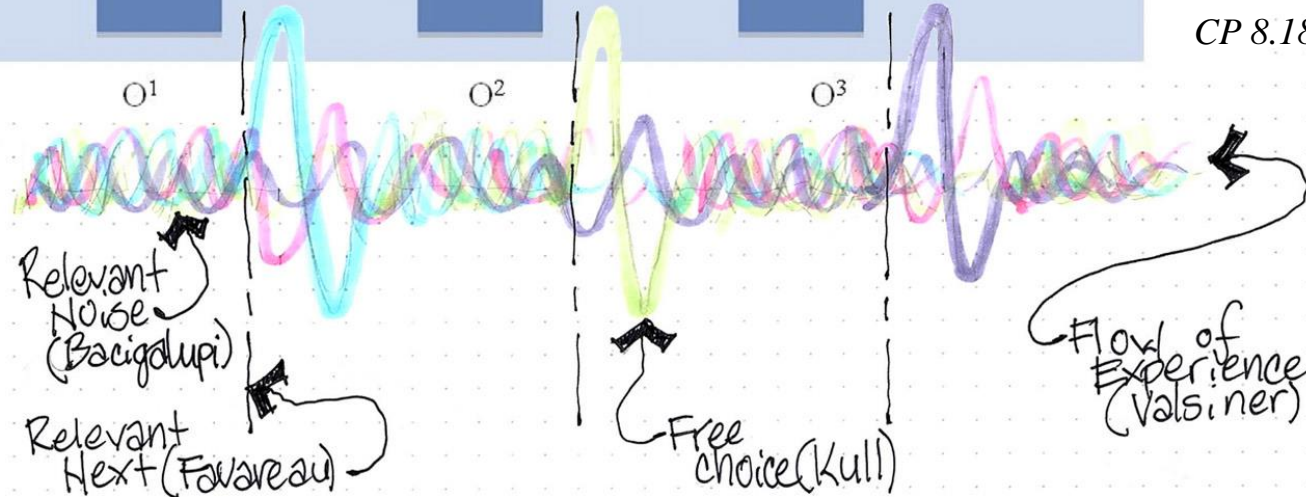
1. Question: What and How is Magenta?
2. Proposal: Modes of Structure in Semiosis
3. Implications: Dynamics of Feeling, Skill and Knowledge

feeling and skill



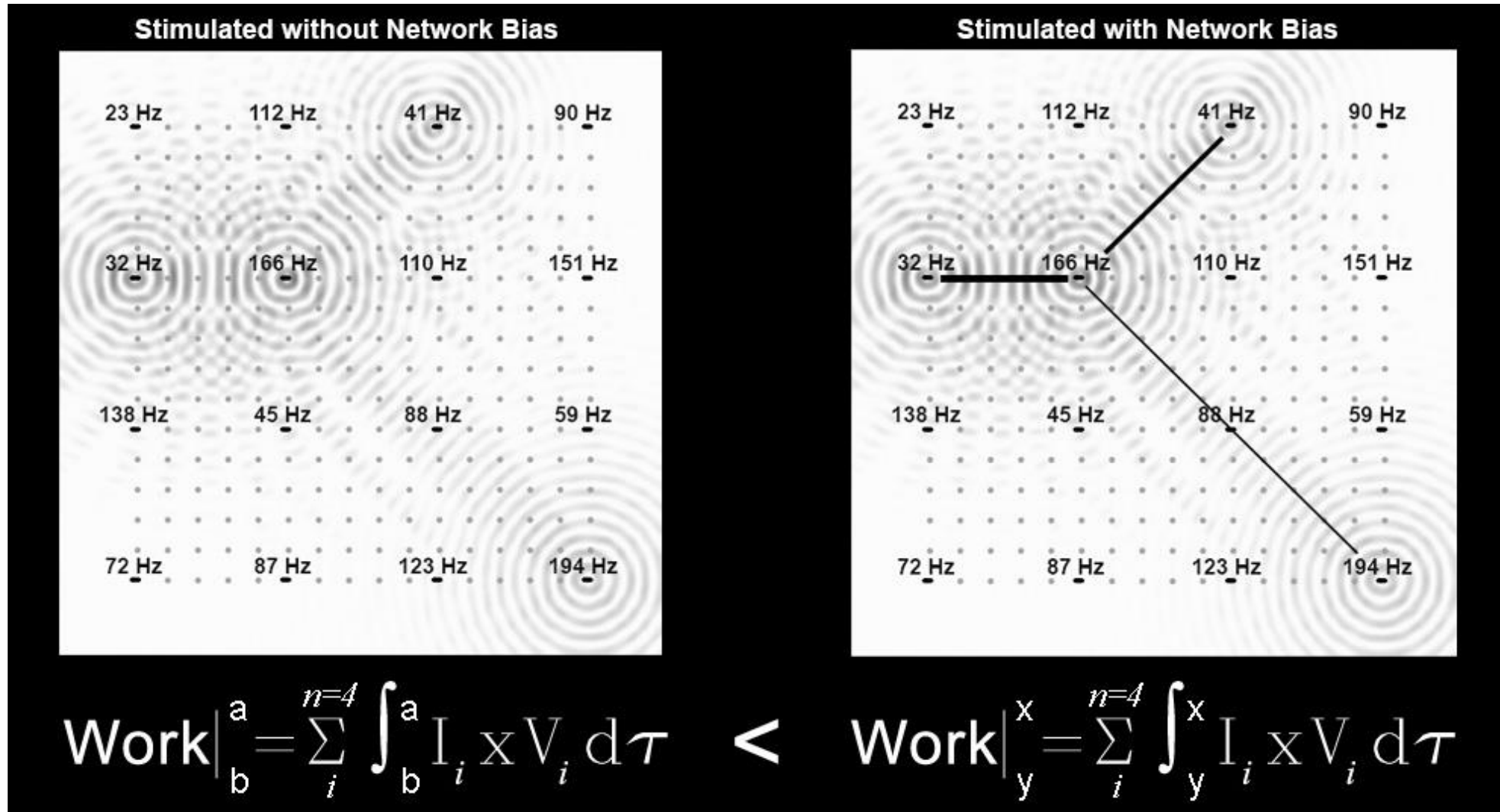
Dynamical Object
(continuous semiogenesis, cf. CP 8.183 and El-Hani (2013, p. 28))

Diagram adapted from Favareu (2015), which is adapted from El-Hani (2013).



Rhythmic Criticality

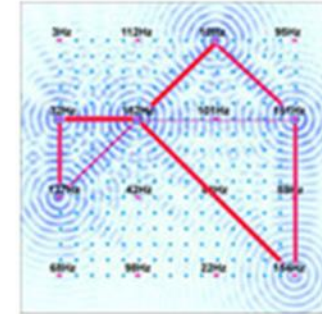
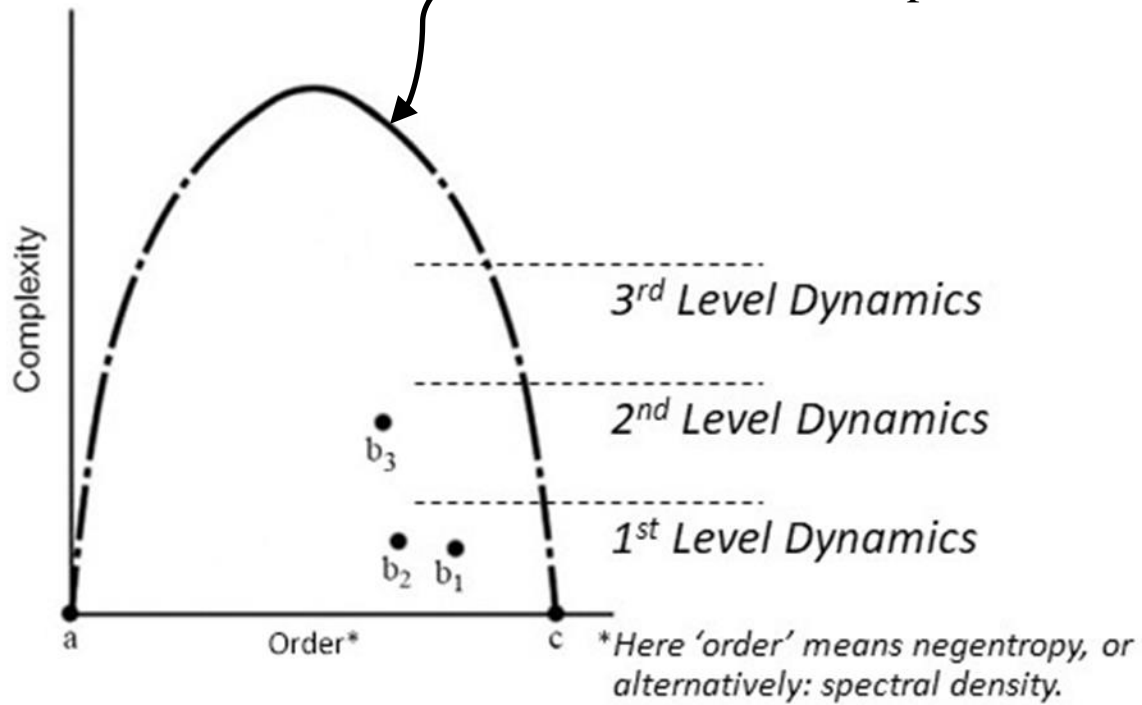
1. Question: Synechism?
2. Necessary: Immediate Triadic Medium
3. Sufficient: Ethical Habits via Esthetic Aiming



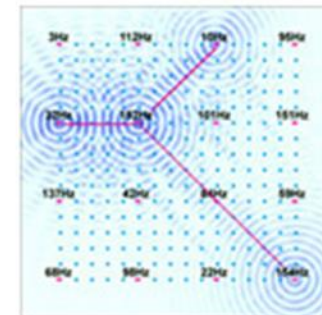
Bacigalupi, J.A., 2013. Refinement: a rigorous description of autonomous adaptive agents. *Kybernetes* 42, 1313–1324.

1. Question: Synechism?
2. Necessary: Immediate Triadic Medium
3. Sufficient: Ethical Habits via Esthetic Aiming

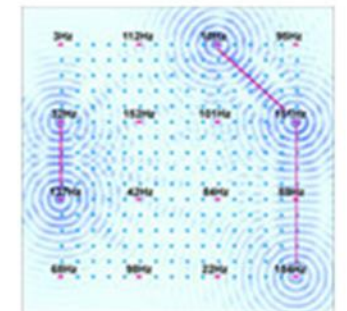
Inside the parabola, exists *a balance between over and under-coherence*, where an umwelt can evolve.
 Outside the parabola? ... *“death states”!*



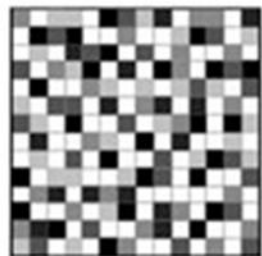
2nd Level Attractor b_3 : significant Mutual Information between b_1 and b_2 , or alternatively, significant Coherence.



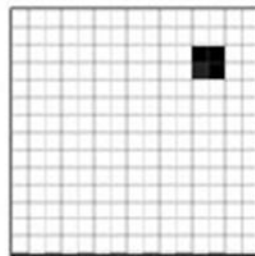
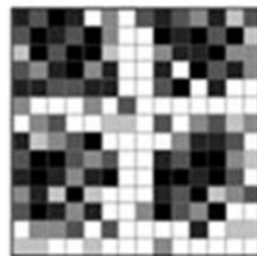
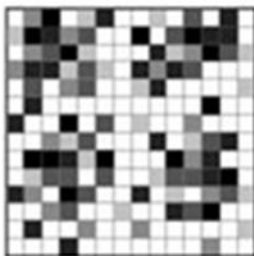
1st Level Attractor b_1



1st Level Attractor b_2



a
“death state”

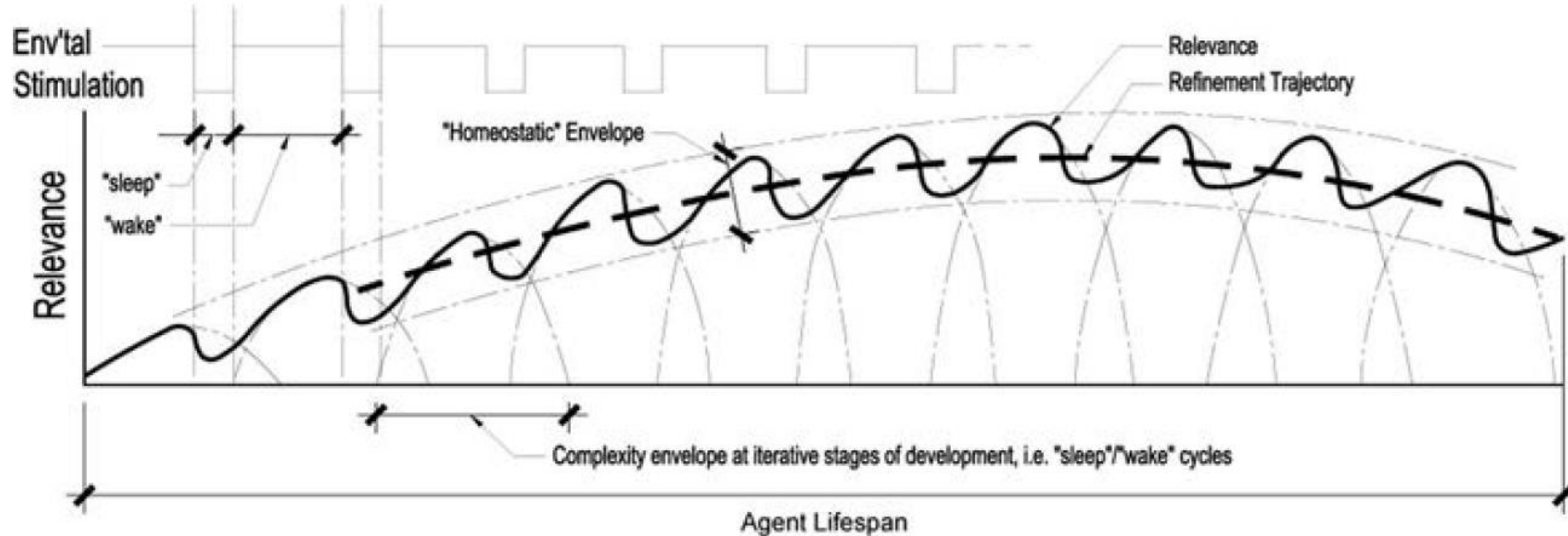


c
“death state”

Bacigalupi, J.A., 2013. Refinement: a rigorous description of autonomous adaptive agents. *Kybernetes* 42, 1313–1324.

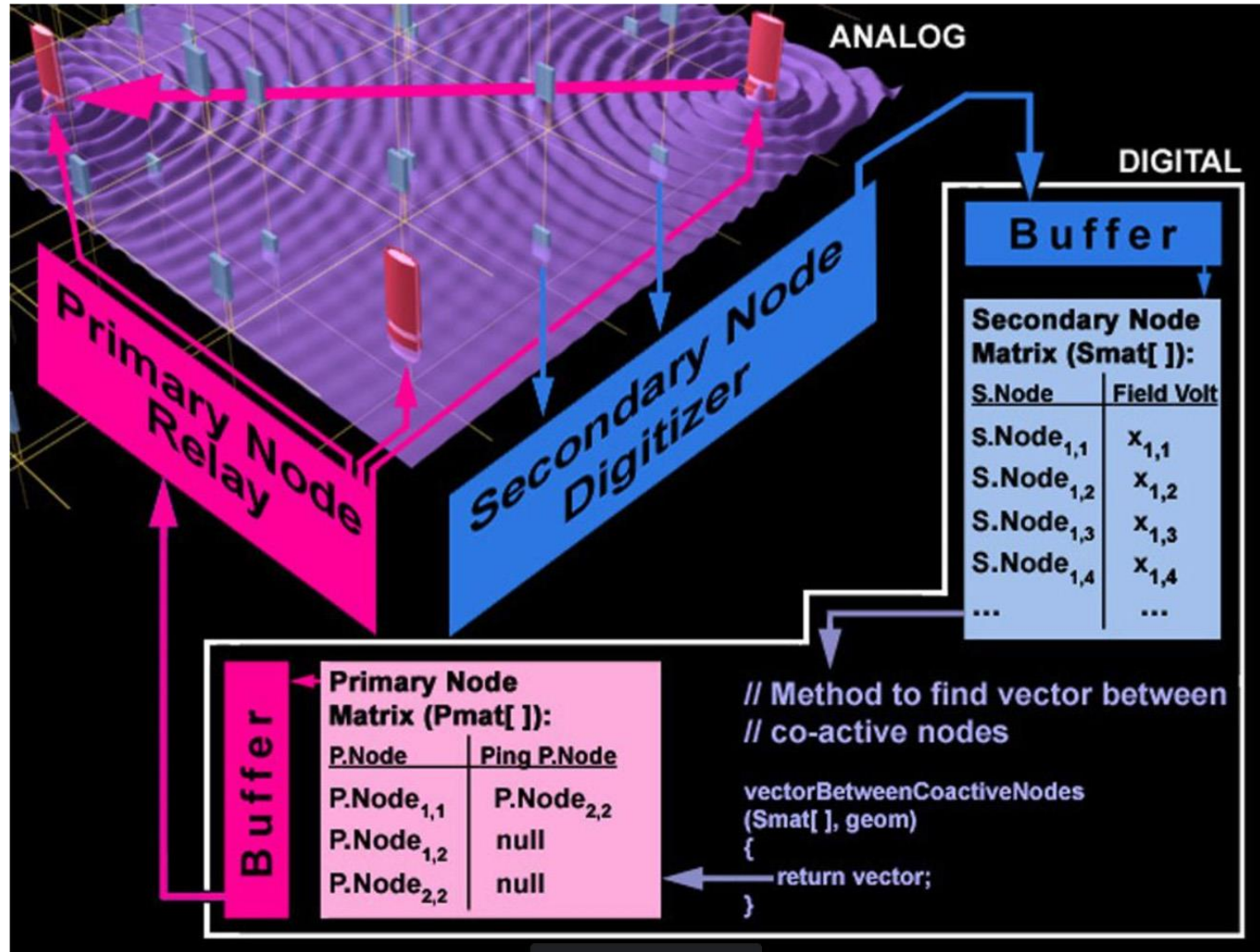
1. Question: Synechism?
2. Necessary: Immediate Triadic Medium
3. Sufficient: Ethical Habits via Esthetic Aiming

So, not a *being* with an *ultimate aim*, but perhaps *becoming* via *continuous aiming*!



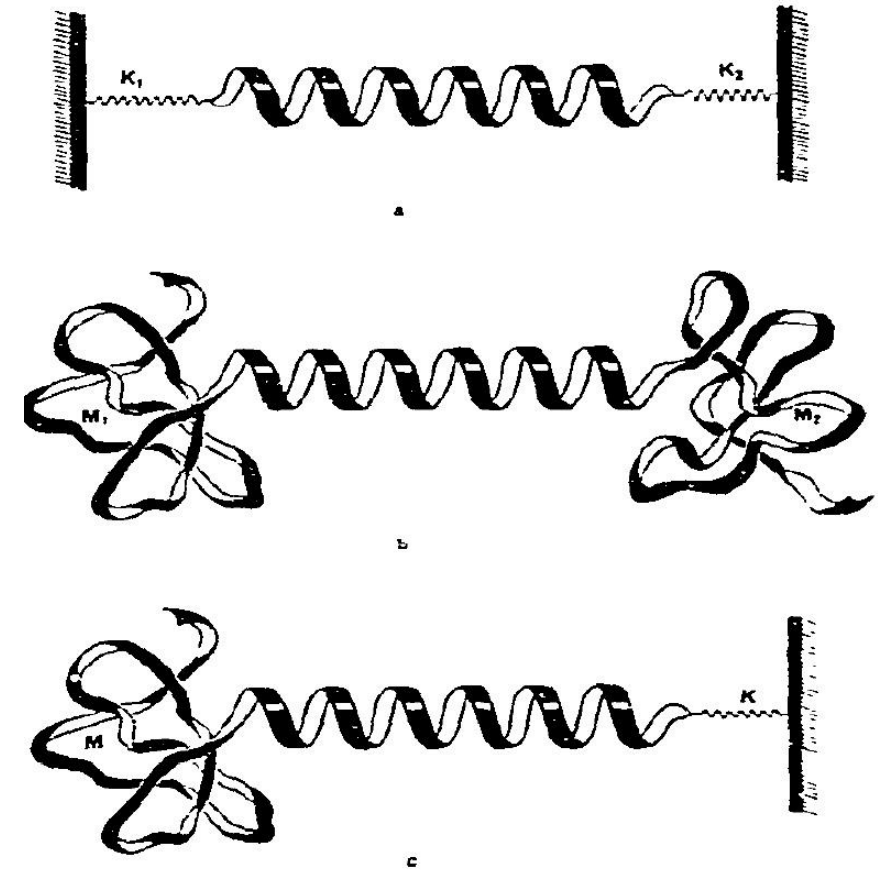
Bacigalupi, J.A., 2013. *Refinement: a rigorous description of autonomous adaptive agents*. *Kybernetes* 42, 1313–1324.

1. Peirce's *Individuation*
2. Lotman's *Individuation*
3. Generative and Relevant Noise



(Bacigalupi, 2012)

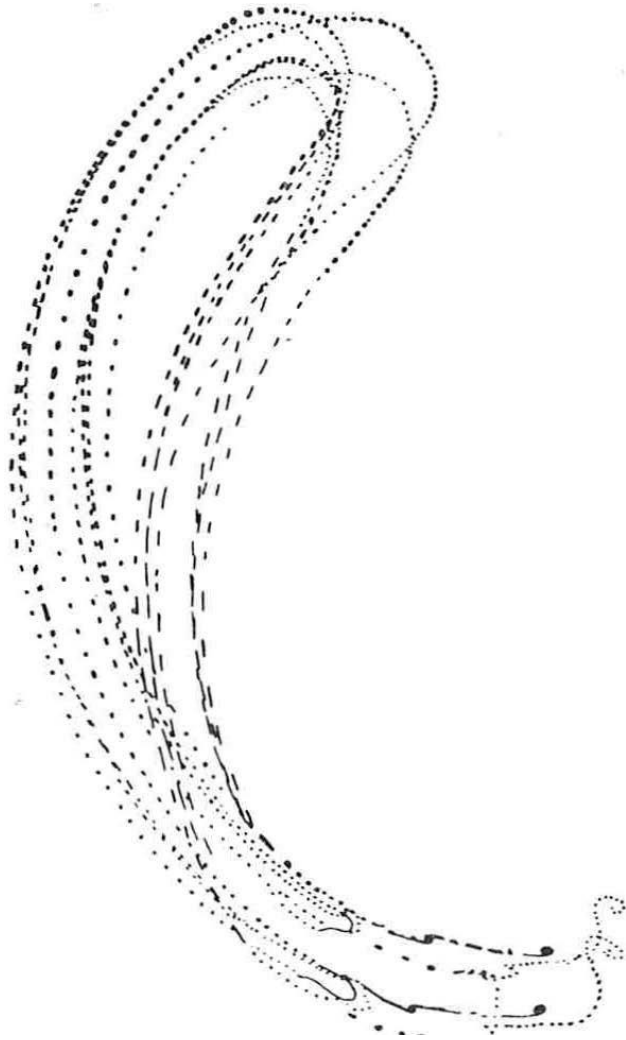
1. A Question and an Intuition
2. Codegenesis in Theory
3. Codegenesis in Practice



Markos, A., & Svorcova, J. (2019). *Epigenetic Processes and the Evolution of Life*. CRC Press. p. 121

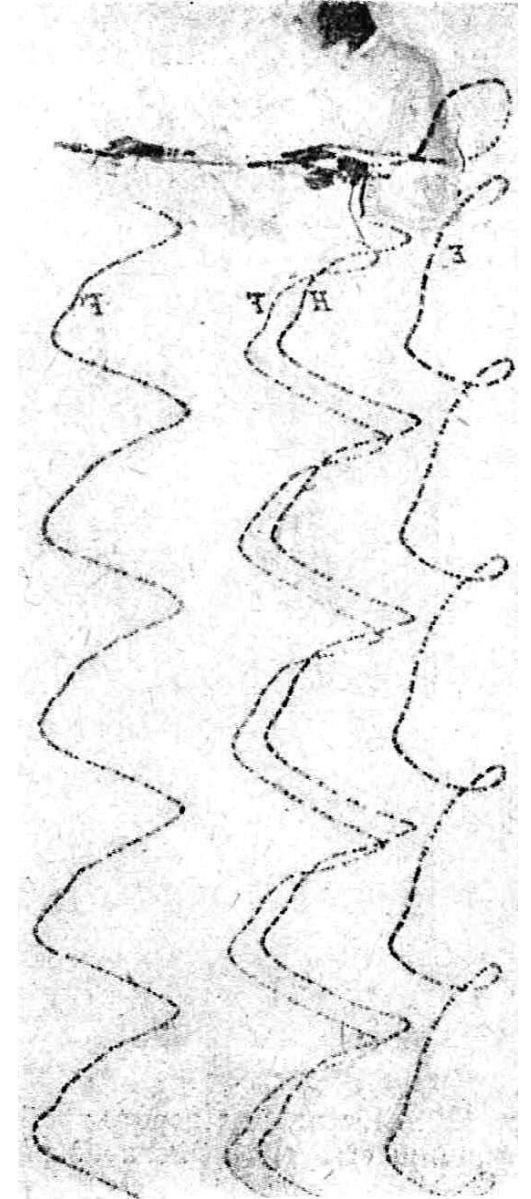
Chou, K-C. (1983). *The Biological Functions Of Low-frequency Vibrations (Phonons); 4. Resonance Effects And Allosteric Transition*. *Biophysical Chemistry*, 20. p. 63

1. Question: Complex Coordination
2. Hypothesis: Inter-modal Structure
3. Pragmatics: Feeling, Skill and Knowledge



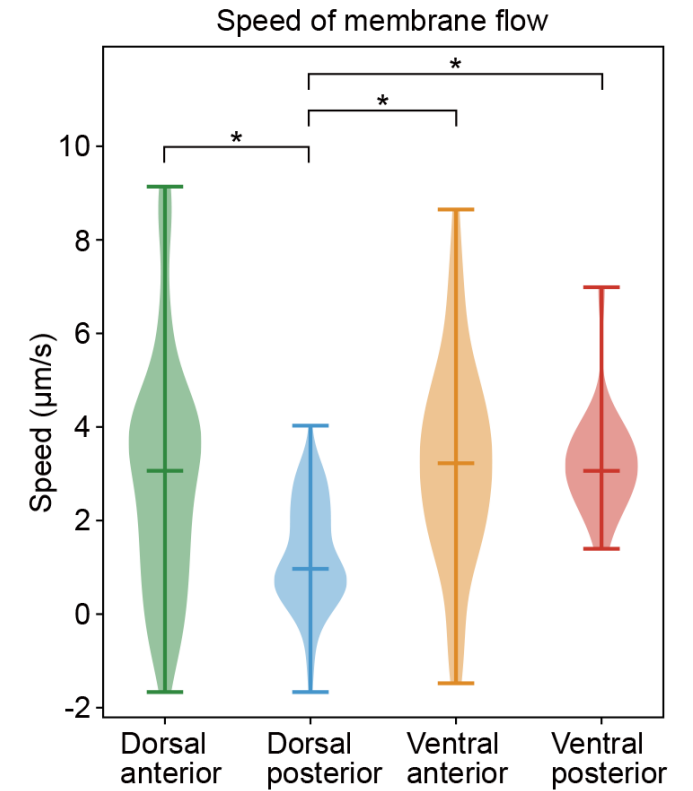
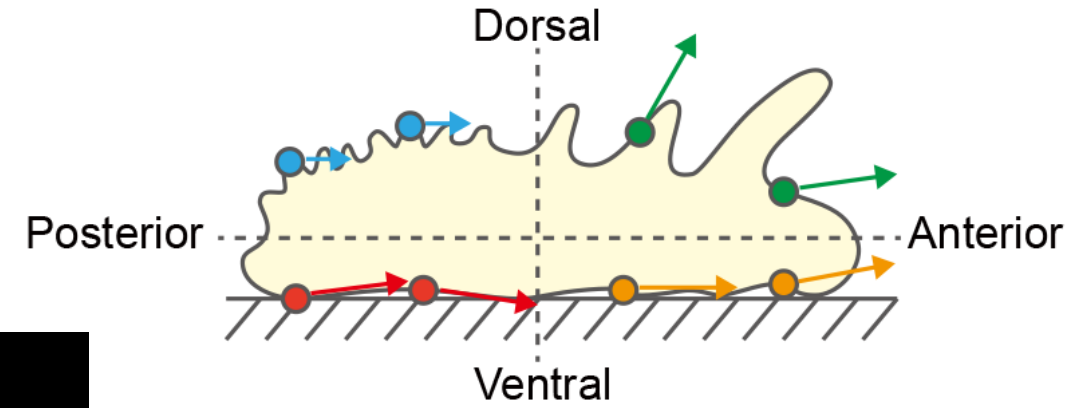
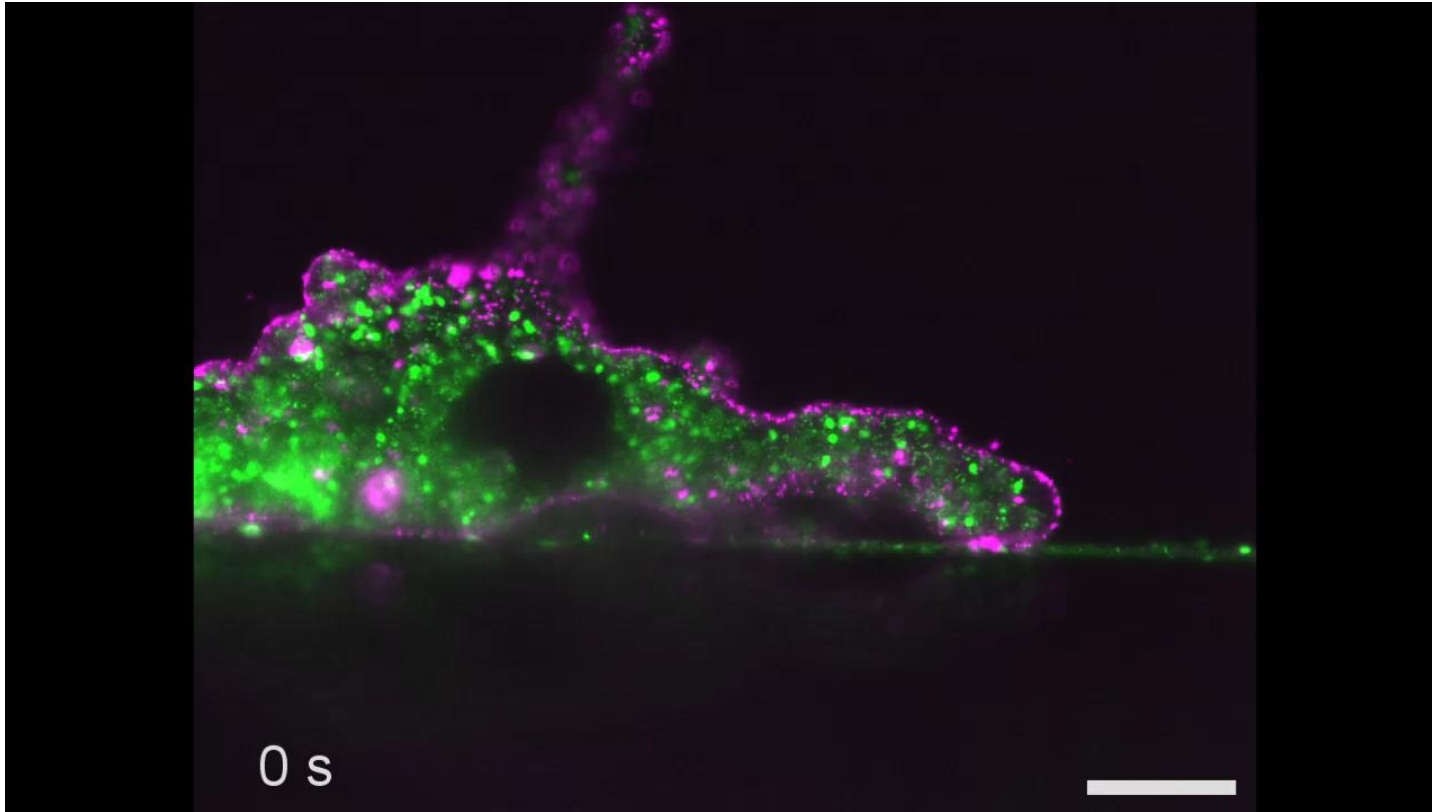
In biomechanics ... successive movements of cyclical nature never exactly repeat themselves. (Bernstein 1967, p. 48)

A movement never responds to detailed changes by a change in its detail; it responds as a whole to changes in each small part ... sometimes considerably distant both spatially and temporally from those initially encountered. (p. 23)



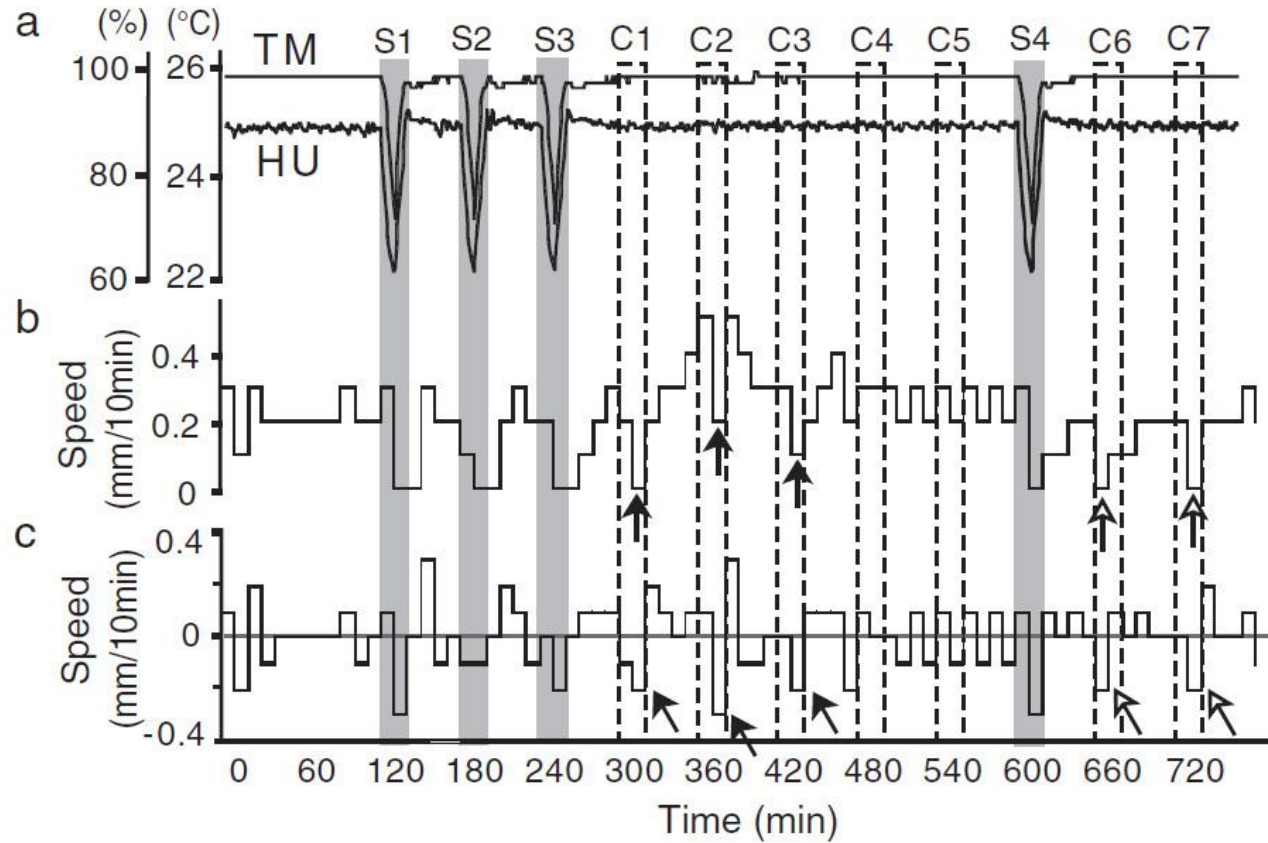
1. Question: Complex Coordination
2. Hypothesis: Inter-modal Structure
3. Pragmatics: Feeling, Skill and Knowledge

Taniguchi, A., et. al.; 2023; Light-sheet microscopy reveals dorsoventral asymmetric membrane dynamics of Amoeba proteus during pressure-driven locomotion; Biol Open.

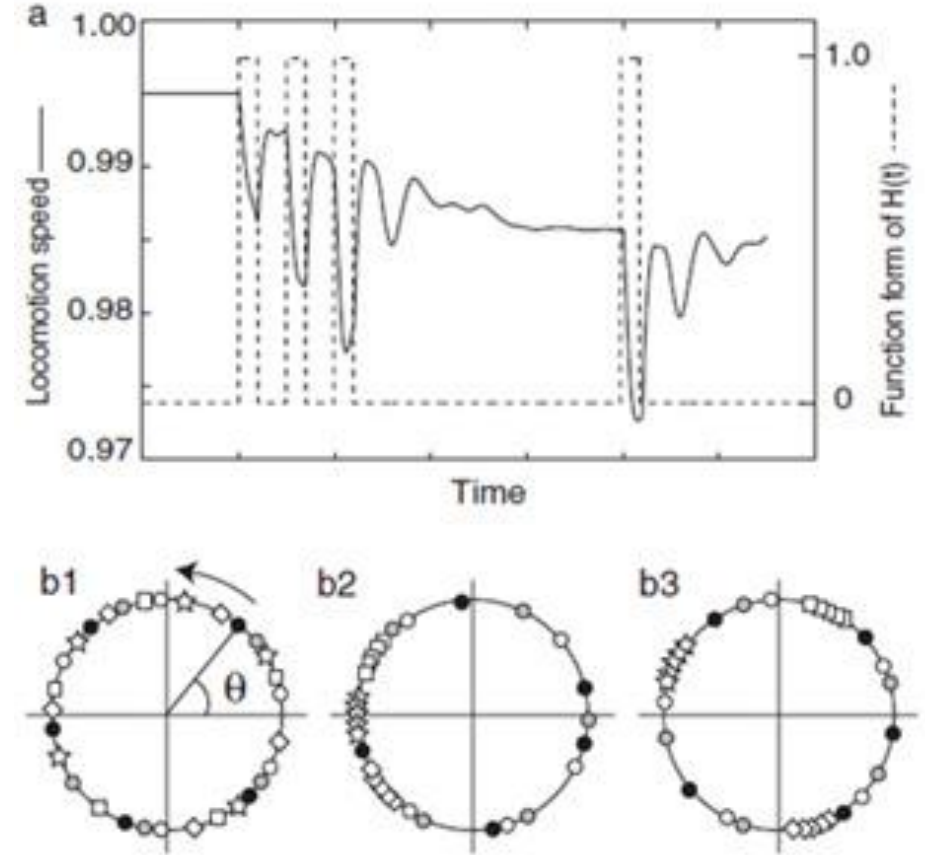


1. Question: Complex Coordination
2. Hypothesis: Inter-modal Structure
3. Pragmatics: Feeling, Skill and Knowledge

Spontaneous Slowdown of Amoebae



Empirical Findings



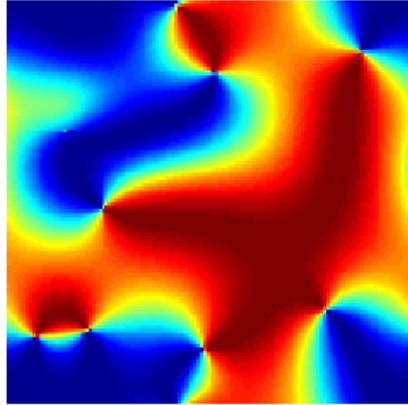
Model

Amoebae Anticipate Periodic Events
 T. Saigusa, A. Tero,
 T. Nakagaki, Y. Kuramoto
 2008

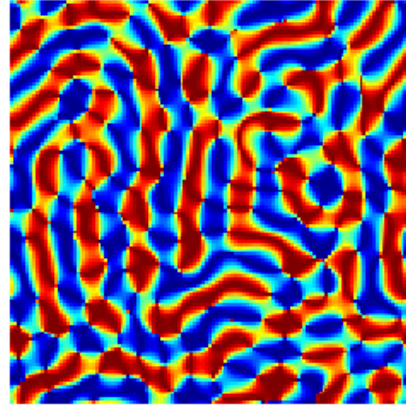
- 1. Question: Complex Coordination
- 2. Hypothesis: Inter-modal Structure
- 3. Pragmatics: Feeling, Skill and Knowledge

Relevant Noise
structured because there are global asymmetries. But it is noise, because many local chemical agents are independent of others.

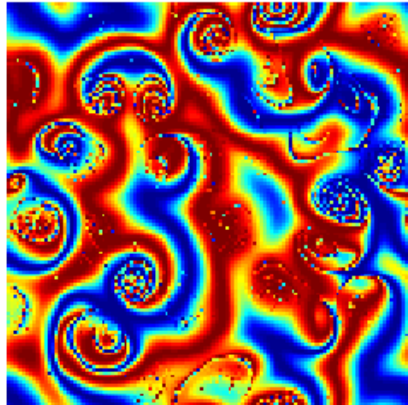
A



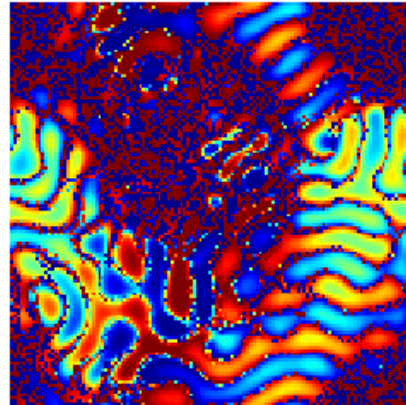
B



C



D



Distinct synchronization patterns in a two-dimensional array of Kuramoto-like oscillators with differing phase interaction functions and spatial coupling topologies. (A) Pinwheels. (B) Waves. (C) Chimeras. (D) Chimeras and waves combined. Color scale indicates oscillator phase. By Zeronought - Numerical Simulation, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=34168169>

Thank You!

References

- Bacigalupi, J.A., 2013. Refinement: a rigorous description of autonomous adaptive agents. *Kybernetes* 42, 1313–1324.
- Bacigalupi, J.A., 2022. *Semiogenesis: A Dynamic System Approach to Agency and Structure*. Biosemiotics.
- Bernstein, N. 1967. *The Co-ordination and Regulation of Movements*. Pergamon Press.
- Favareau, D. 2015. Creation of the relevant next: How living systems capture the power of the adjacent possible through sign use.
- El-Hani, C. 2007. Modeling a Semiotic Process in the Immune System: Signal Transduction in B-cells Activation.
- Kull, K. *in print*. Arbitrariness and the forms of semiotic indeterminacy.
- Saigusa, T. 2008. Amoebae Anticipate Periodic Events.
- Turing, A. 1952. The Chemical Basis of Morphogenesis.

J. Augustus Bacigalupi
bacigalupiworks@gmail.com
University of Tartu