The Twenty-fifth Annual International Gathering in Biosemiotics

August 25 to August 29, 2025

Hosted by Feral Ecologies Lab, Erasmus School of Philosophy,
& the Dynamics of Inclusive Prosperity Initiative

at Erasmus University Rotterdam
25 August: Langeveld 0.10
26-29 August: Langeveld 0.18
Burgemeester Oudlaan 50, 3062 PA Rotterdam The Netherlands

Program

The Program at a Glance

Schedule Gatherings in Biosemiotics 2025

Building	Langeveld 0.10	Langeveld 0.18			
Time	Monday 25-08	Tuesday 26-08	Wednesday 27-08	Thursday 28-08	Friday 29-08
9:00	Registration	**Applied Biosemiotics (Masked)** Devon Schiller, Brian Khumalo, Ľudmila Lacková, Yogi H. Hendlin, and Marc Mehu	Chris Barnham	Brian Khumalo & Shankar Aswani	Sigmund Ongstad
9:30	Welcome		Nouredine El Arras & Mohamed Abdelhamid Maleky	Manubiya Mohamed Eiasy	Lei Han
10:00	Kalevi Kull	**Zoosemiotics & AI** Nicola Zengiaro, Massimo Leone, & Daria Arkhipova	Constantijn-Alexander Kusters	Ivan Fomin	Arran Gare
10:30	Yagmur Denizhan		Barbora Jurková	Ananya Roy	Judith van der Elst
11:00	Pause	Pause	Pause	Pause	Pause
11:30	Rebeca Méndez-Veras	**Commercial Biosemiotics** Noël Theodosiou, Malcolm Evans, Vladimir Djurovic, Lucia Laurent-Neva	Daniel Olivier Kamp	Claudio Julio Rodríguez Higuera	Ekaterina Velmezova
12:00	Donald Favareau		Ali Haydar Demir	Stephen Philip Pain	Henrik Nielsen
12:30	Yogi H. Hendlin	Emanuela Bove	Mickey Vallee	Levi van den Bogaart	Ľudmila Lacková Bennett & Jana Švorcová
13:00	Lunch	**Lunch - Bento Boxes and Poster Presentations**	Lunch	Lunch	Lunch
13:30					
14:00	Jos de Mul		Erik Ljungberg	**Visit to Trompenberg Botanical Garden**	Marcella Faria
14:30	Jaime F. Cárdenas-García	Katja Pettinen & Myrdene Anderson	Liqian Zhou		J. Albert Yoo
15:00	Pause	Phillip Guddemi			Ray Nayler
15:30	Morten Tønnessen	Pause	**Outing to Amsterdam - Ruigoord Ecovillage, Dinner and Dancing**	John Pickering	Thorolf van Walsum
16:00	Susan Petrilli	**Warm Data** Nora Bateson, Heide Maria Baden, Vitalija Povilaityte Petri		Alexei Sharov	**Conclusion**
16:30				**Biosemiotics Journal Editorial Board Meeting**	gatherings in biosemiotics rotterdam, 2025
17:00	**Welcome Gathering (Borrel): finger food & drinks**				
17:30		**Warm Data Labs evening program (open to the public)**			
18:00					
18:30					

Erasmus University Rotterdam

Burgemeester Oudlaan 50, 3062 PA Rotterdam

Abstracts

in presentation order

Semiotic split

Kalevi Kull
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Acceptance of semiotics by biology is critically dependent on the clarity of the concept of semiosis, together with the concepts of meaning and interpretation. Thus, my talk proposes further discussion on fundamental aspects in modelling of semiosis. I would apply it to the question whether ‘normative chemistry’ in the sense as introduced by Harold Morowitz and described by Terrence Deacon is sufficient for having semiosis.

An important attribute of life is plurality. Plurality requires doubling. Without doubling another life’s attribute – restorability, or reparation – wouldn’t exist.

According to a fairly common understanding in biology, life must begin with (self)reproduction. Theorizing based on reproduction as a necessary process of living systems led to neo-Darwinism – which is a clear and completed theory. However, it excludes life itself, as demonstrated, for example, by Robert Rosen. That means: there can be self-reproduction without semiosis.

Reproduction is a kind of doubling where one becomes two, which is no longer one. In case of semiotic doubling, however, one becomes two which remains to be one. Through semiotic doubling, something turns into a sign *(s.l.)*.

Moreover, real meaning appears in case of tripartition. Mapping turns to be semiosis due to triadicity. Semiotic tripartition is distinguishing – or rather, in its simplest case, iconic indistinguishability or identification. This provides a key to also approach the fundamental problem of measurement as a semiotic problem – which is related to normativity.

I am going to argue that normativity requires semiotic space, which is a product of a particular form of doubling-producing-tripartition, where the parts are in relation to simultaneity. And, as interesting for ecology – semiotic doubling is a no-growth doubling.

The Symphony of (the) Living:

Macromolecular Dynamics from Uexküllian and Simondonian Perspectives

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> If we look at an orchestra, we can see that each individual instrument has a music stand, upon which are found the written notes it will play. The complete score of the work rests on the conductor's desk. We can, however, also see the instruments themselves, and we ask ourselves whether these instruments are possibly attuned to each other by virtue not only of the respective tones they emit, but also of the manner of their entire construction: that is, do they form not merely a musical but also a technical unit?
> (Jacob von Uexküll, (1982 [1940]))

The parallelism between Jacob von Uexküll and Gilbert Simondon can be partially attributed to an indirect intellectual heritage relation with Merleau-Ponty as an intermediary. In his efforts to overcome subject-object dualism, Merleau-Ponty shifted his focus from phenomenology to biology and was deeply influenced by von Uexküll. His student Simondon inherited Merleau-Ponty's perspective of relational ontogenesis and developed it further in his theory of individuation, which spans from physics and chemistry to life sciences and from there to psycho-collective and technological domains.

But the connection between Uexküll's approach to the living nature and Simondon's cosmogony, which places life in its centre, goes beyond a simple case of inheritance and resides in the fact that they look at the same essence only from two different angles; the former from the position of a biologist, the latter from that of a philosopher.

Simondon's relational ontology is based on the process of individuation, which starts from pure potentiality, a state without structure and phases, the so-called *pre-individual being*. Attributing ontic status to all kinds of relations, he defines the individual as a mediator of relations: What makes up an individual is the interactive communication it provides between unrelated and even incompatible orders. This system of interactions is called *internal resonance*.

Simondon distinguishes between three operational modes of individuation: physical, vital and psycho-collective. In the living being, the regime of internal resonance enables the emergence of *phases* from within the pre-individual being, thereby sustaining vital functions. Thanks to internal resonance, occasional instances of dissonance can be detected and eliminated such that structures and processes at different orders of magnitude can perform in harmony like a colossal orchestra. The deterioration of this regime corresponds to the decline of the orchestra members' ability to listen and attune themselves to each other. Lack of such interaction unavoidably leads to discord, frustration and eventual disbanding of the orchestra, which is analogous to the death of the living Being.

The "more complete regime of internal resonance which is a condition of life", enables *the living being to conduct its own individuation mode by "**tuning**" it on the physical - vital axis as favoured by the topo-chronological context*. At the most fundamental level, such tuning is accomplished by biological macromolecules which can switch between physical and vital modes in a context-sensitive manner. For the macromolecules to support life, they need to have an "appropriate degree" of metastability depending on their location and function in the body. Biomolecular condensates can exist in different states of matter depending on functional requirements. What keeps "membraneless" biomolecular condensates together is the phenomenon of (Liquid-Liquid) Phase Separation, which turns out to be a very fundamental mechanism underlying life.

In this contribution, we will exemplify the philosophical descriptions mentioned above by results from cutting-edge biological research.

The *Sense of Microbial Harmony* as a Cognitive Biosemiotic Framework for Health and Well-Being

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Microbes are vital to all kinds of life. In humans, the microbiome -trillions of microorganisms and their genetic material- engages in a complex communication network with the host organism. This dynamic relationship supports critical processes such as homeostasis, metabolism, immune responses, and brain functions (Reynoso-García et al.,2022). Through the gut-brain axis, a bidirectional communication system connecting the gut and central nervous system, the microbiome influences cognition, mood, and emotional well-being by, for example, producing neurotransmitters such as serotonin and dopamine (Reynoso-García et al., 2022).

Disruptions to the microbiome, or dysbiosis, not only trigger physical and mental illnesses but also challenge philosophical notions of identity, interdependence, and resilience. Reframing the microbiome as a co-constitutor of health provides opportunities for cultivating an integrative approach to well-being (Reynoso-García et al., 2022; Suárez & Stencel, 2020).

Based on Jakob von Uexküll's Umwelt theory, humans and microbes co-create a shared environment through their distinct perceptual worlds shaped by species-specific signaling mechanisms. In this space, host-microbe interactions transcend passive stimulus-response dynamics, becoming a bidirectional dialogue where molecular signals (e.g., metabolites, cytokines) are imbued with ecological and physiological meaning. Cognitive biosemiotics extends this view, revealing how neural and cognitive processes interpret microbial signals, transforming biochemical signals into experiences of health or disease.

Based on Luis de Miranda's six senses of philosophical health (de Miranda, 2021), this paper introduces a new ***sense of microbial harmony*** as a fundamental component for achieving philosophical well-being and overall health. The ***sense of microbial harmony*** is the embodied awareness and mindful recognition of our symbio-semiotic relationship with microorganisms. It integrates biopsychosocial dimensions, nurturing a holistic view of health and well-being. This framework emerges as an intrinsically cognitive biosemiotic process where perception transcends passive reception to become an active interpretation: the dynamic interplay between host and microbes continuously shapes *our experience* of health.

This perspective advocates for integrating microbiome awareness into clinical care, public health, and daily decision-making, offering a path to richer, interconnected ways of living. Interpreting host-microbiome interactions as dialogues of meaning rather than mere biochemistry could inform new approaches to medical microbiology and general healthcare. Embracing ourselves as ecosystems is essential for fostering sustainable and harmonious relationships within our bodies and the natural world.

Relevance, Choice, Meaning ... and Statistical Probability?: Considering the Applicability of the Free Energy Principle in Biosemiotics

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Jakob von Uexküll once famously observed that “Nature comes to the organism in the form of questions.” And in my own writings, I have often written that the existential question of “What to do now, given this?” is one that nature forces every organism, including us, to confront and to answer with our actions at every moment (Favareau 2015: 590).

Current-context-dependent and next-context-creating, these fallible and provisional actions “collapse the wave function of possibility” not blindly, but guided by the use of signs that are inseparably entangled with the objects and with the other signs of our fellow interactants in the real world, and, in so doing, shaping the possibility space upon which all subsequent such action must take place.

Within the last twelve years, a mathematical model of predictive inference known as the free energy principle (Friston 2010) has been gaining popularity as a possible theoretical framework for modeling and understanding the ways by which organisms navigate the uncertainty of the ever consequential worlds they’re in by employing an enacted predictive coding strategy of Bayesian inference-updating that its adherents refer to as active inference. Here, organisms likewise are in a constant state of enacted inquiry with the world, at all times seeking to align their current experience of the world with their updatable repertoire of methods for anticipatorily acting in it.

Strongly reminiscent of Peirce’s seminal semiotic principles of pragmaticism, abductive reasoning and the economy of research, scholars Ahti-Veikko Pietarinen and Majid D. Beni (2021) argue that Friston’s free energy principle, especially in its realist, possibilist, and non-nominalist articulation, may be precisely the kind of theoretical grounding needed for the realization of a naturalistic explanation of biological meaning-making that biosemiotics has long been pursuing.

In this talk, I will briefly recap those arguments, and lay out what I see as some of the potential shortcomings of attempting to adopt Friston’s free energy principle as an explanatory framework for biosemiotics.

Semiocide: A Necessary Concept to Understand the Metacrisis

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Ivar Puura's introduction (via Timo Maran into English) of the term *semiocide* heralded a watershed moment for semiotics, and biosemiotics in particular. Semiocide gives a name to the loss of the intangibles which accompanies genocide, ecocide, biocide, terracide, and all the different forms of mass killing which accompanies the occluding of wider selection of multichannel semiosis.

If it is true that all semiosis selects on n+1 channels (and perhaps levels) compared to what we perceive or measure (epistemological asymptotes), then when we underdetermine semiotic systems, we do great damage to them.

The most simple example of semiocide can be seen when, in the throw-away culture of the globalized west, we put old folks out to pasture in elder care facilities. Ripped from their contexts, these people who have spent their entire lives in a place, in a home, with human and more-than-human relations suddenly find themselves in a place with unfamiliar contours, bumping into things on their way to the bathroom at night, with unfamiliar smells to guide them, receiving unfamiliar tastes – just at that moment of their life when sight or hearing might be failing them and the must most rely on their other senses to navigate reality. While traditionally the elderly of all cultures were matriarchs of patriarchs in intergenerational families, living out their lives with care in the communities they had tended, shipping the elderly off to old folks homes tended by mercenaries who have no intrinsic love for them is like giving your newborn to an anonymous daycare: it disconnects the most important aspects of intimacy and knowing, jettisoning the purpose of life.

Semiocide also finds its expression in everything that cannot be measured by ecocide: environmental destruction fetishizes numbers. How many gigatons of CO_2, how many hectares burned, how many climate refuges. The metrics obscure the real costs – what is lost for the organisms themselves. The destruction of mature ecologies must take into account the meaning lost for each being in that system, and the composite meaning that they had built up, which is irreducible to the meaning that any one organism in that devastated environment experiences.

Instrumentalization in all its forms fails to see the value, and the meaning relevant to an actor. Semiocide occurs when we mistake a single desiderata for the good. Goodhart's Law states that: "When a measure becomes a target, it ceases to be a good measure." Teaching to the test improves test scores (the metric) but may reduce actual learning (the goal). Social media platforms optimizing for engagement can amplify outrage and misinformation because those things drive clicks and shares. Measuring success by keystrokes or time online at work leads workers to simulate activity rather than focus on meaningful work. All of these perverse forms of metric maximization ultimately not only undermines that selfsame metric, but also creates a blackhole, sucking into it all real expressions of meaning, disabling the meaning that cannot be immediately glossed through reading reality through that metric.

Thus, semiocide provides us with a category of acknowledging and valuing the unseen, unmeasured, and instrumentalized aspects of what is crucial to life, the shadow of measurable phenomena. In this way, it is a useful *via negativa* complement to the aims of Warm Data, and Stengers' call for Slow Science.

The world as a Semiotic Database. With Cassirer from Stardust via Biomolecules to ChatGPT and Beyond

Jos de Mul, Erasmus School of Philosophy

Ernst Cassirer plays a very modest role at best in biosemiotics. This is remarkable, because his three-volume Philosophie der symbolischen Formen, can be characterized not only as a 'semiotic reform of the transcendental philosophy' (Habermas 1997), but also because Cassirer's main work incorporated the work of the biologist and Hamburg colleague Von Uexküll's work in a constructive-critical way. Moreover, Cassirer made fruitful contributions to the philosophy of biology in his later work and gave biology an increasingly important role in his semiotic project (Stjernfeld 2011). Cassirer's merit is thus to bring the philosophy of nature and culture under one semiotic heading.

The core of Cassirer's philosophy of symbolic forms is that our relationship with the world is not mediated by eternal forms of reason, but that man as an animal symbolicum opens up and shapes the world with the help of a multitude of semiotic systems. Myths, language, science, law and history each possess their own rationality, which, moreover, as Cassirer argues in line with Dilthey's Kritik der historischen Vernunft (De Mul 2004), develop in the course of history.

In 1990, Cassirer, as a kind of coda to his philosophy of symbolic forms, published Form und Technik, in which he presents technology as a practical form of world disclosure, in which magical thinking is replaced by an actual change of nature and culture. Technical intervention, understood as manufacturing semiosis, is, just like signaling and interpretative semiosis, inherent part of all organisms (Barbieri 2009). They form the syntax, pragmatics and semantics of life (De Mul 2015), which we already find in single-celled organisms (Margulis and Sagan. 1986).

In Form und Technik, Cassirer also discusses the development of technology, from tool to machine, in which technical intervention moves further and further 'from the realm of the real to the realm of the possible' (Cassirer 2009, 81).

In my talk, I will argue that in the age of the computer, this tendency has made the database the dominant symbolic form, disclosing inanimate and living nature as well culture as a collection of elements (from the periodic table of elements, gene pool, and linguistic and audio-visual cultural memes up to ChatGPT) that can be endlessly combined and recombined.

Infoautopoiesis: Manifestation of Individuated Pareidolia

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Pareidolia is a normal, adaptive and common tendency to perceive a specific, often meaningful image (or visual illusion) in a random or ambiguous visual pattern (Merriam-Webster). Such perceptions may also be expected when listening to random noise or music (Çakmak et al. 2016; Bauman 2007). Face pareidolia is found to be prioritized by the visual system (Caruana and Seymour 2022; Kato and Mugitani 2015), as is illustrated by Carl Sagan in the following passage,

> Humans, like other primates, are a gregarious lot. We enjoy one another's company. We're mammals and parental care of the young is essential for the continuance of the hereditary lines. The parent smiles at the child, the child smiles back, and a bond is forged or strengthened. As soon as the infant can see, it recognizes faces, and we now know that this skill is hardwired in our brains. Those infants who a million years ago were unable to recognize a face smiled back less, were less likely to win the hearts of their parents and less likely to prosper. These days, nearly every infant is quick to identify a human face and to respond with a goony grin. (Sagan 1997, 46)

The purpose of this presentation is to consider pareidolia as fundamental to the process of infoautopoiesis (information self-production). Info-autopoiesis is the self-referential, recursive, and interactive process of self-production of information. This is accomplished by finding the 'difference which makes a difference'(Bateson 1978, 453) from the spatially/temporally separated "Sensorial Signals" of the noisy environment in which all living beings live, in their motivated efforts to satisfy their physiological and/or relational needs to improve their ability to engage in their ever-changing environment (Cárdenas-García 2020; Cárdenas-García and Ireland 2019; Burgin and Cárdenas-García 2020; Cárdenas-García 2022; Cárdenas-García and Ireland 2020). Through their sensory organs, they discover the bountifulness of matter and/or energy as expressions of their environmental spatial/temporal motion/change.

Ecological semiotics

Martin Tønnessen

This presentation draws on my recently published encyclopedia chapter “Ecological semiotics” (Tønnessen 2024). Ecological semiotics, or ecosemiotics, can be understood as the study of sign use by organisms in an ecological context. In ecology, semiotic phenomena and sign processes occur at different levels of biological organization, and distinctive kinds of sign use is characteristic of different kinds of interspecies interaction. Ecosemiotic studies help to explain how ecological complexity can be understood in semiotic terms, and how sentient organisms interpret their environment and make choices that are informed by their sign use. The basic theoretical outlook of ecological semiotics includes lifeworld perspectives, particularly represented by the Umwelt theory of Jakob von Uexküll (2010). This connects ecosemiotics with phenomenology, subjectivity and agency. In a more rudimentary sense, even plants, fungi and microorganisms have agency which can be framed in semiotic terms. A semiotic approach to ecology is particularly pertinent in the context of human ecology and contemporary discussions concerning environmental sustainability. While ecosemiotics is amply informative applied to general ecology, it is especially pertinent in the context of understanding how human agency and sign use affects the environment at large. Ecological semiotics can help us understand how genuinely human sign use stands out from non-human sign use, and the ways in which human sign use is subject to cultural variation. Crucially, a semiotic approach to environmental issues can be informative with regard to understanding how human behaviour and sign use affects non-human lifeworlds by triggering environmental change which is experienced in sign-mediated ways. This positions ecosemiotics to address issues of environmental sustainability.

Translation Is Life: A Semioethic Approach to Global Biosemiosis

Susan Petrilli

Referencing the semiotic frameworks of Charles S. Peirce, Thomas A. Sebeok, and Mikhail Bakhtin, this paper explores how semiosis—as the unending interpretation and translation of signs in the infinite processes of deferral among signs—is coextensive with life across the biosphere, from mycosemiosis and phytosemiosis to anthroposemiosis. In this light I posit that the sign is in translation, such that translation emerges as a vital, dialogic, and embodied process necessary to survival, adaptation, and evolution. This paper proposes an understanding of translation not merely as a linguistic or cultural process, the condition foregrounding plurilingualism, multiculturalism, and living together, but as a biosemiosic process constitutive of life itself. Translation is necessary if life is to flourish under all its aspects in nature and in culture. However, as regards human semiosis with its inevitable implications for semiosis overall, translation today, in the context of globalisation, is trapped and embroiled in mechanisms connected with ideology, control, commodification, and alienation. I examine how dominant communication, namely communication-production, renders translation functional to replication of the world as it is, this world—the "same" world ever and over again—undermining its dialogical, creative and disalienating potential, together and beyond the biosemiosical drive for life. The failure of translational processes manifests in global symptoms across the planet, from hunger, forced migration and ecological degradation through to linguistic and cultural homogenisation, social injustice, discrimination against the other in general, ultimately war and destruction of lifeforms, human and nonhuman. Current proliferation of the dysfunctional with respect to life in the sphere of anthroposemiosis, or more specifically, anthroposociosemiosis calls for a social symptomatology, a social semeiotics alongside the medical sciences, in tune with the latter, likewise capable of listening to symptoms, in this case to the symptoms of social disease. As emphasized in semioethics, the world today demands a shift toward a responsibility-centred social practice at all levels, epistemological, moral, political, aesthetic, religious, etc. based on listening to the other, where the emphasis is on the global condition of entanglement, of dialogic interconnectivity, interdependency among human and nonhuman lifeforms, where the other and listening to the other is the ultimate categorical imperative for the continuity of semiosis throughout the biosphere. By reinterpreting translation as a vital condition of life, structural to life, and not only a human culture activity, we propose a new paradigm in biosemiotics—one that embraces the ethical implications of interpretation/translation processes as they evolve in semiosis and are at once presupposed by semiosis, thereby promoting a planetary consciousness rooted in dialogical openness to the other.

Biosemiotics and the epistemic structure of scientific endeavour: The case of food confusion

Emanuele Bove

Food confusion, understood through a biosemiotic lens, emerges from disruptions in the semiotic processes underlying the identification of edible matter across levels of biological organisation (cf. Kull 2009). These disruptions span human abstract-symbolic reasoning, animal sensory mechanisms and cellular-level biochemical interactions, demonstrating the inherently cross-disciplinary nature of the phenomenon. The study of food confusion demands interdisciplinary research and thus faces the challenge of integrating insights from different disciplines while preserving their distinct perspectival consistency and epistemic boundaries. In this context, Alrøe and Noe's (2014) Polyocular Framework for Wicked Problems has been proposed as a second-order scientific model—grounded in observing the observers—for tackling complex, multifaceted phenomena through the deliberate coordination of field-specific viewpoints. However, its application was originally conceived for collaborative teams, raising the question of whether and how it can be adapted for a solo researcher without compromising its structural integrity. In response, the present study puts forward a novel refinement of this framework to facilitate such adaptation, using the phenomenon of food confusion as an analytical case.

By implementing the Polyocular Framework as a systematic observational tool, this work examines how disciplines contribute distinct yet partial understandings of this phenomenon, while simultaneously generating epistemic blind spots. The reworking of the framework for a single researcher, as opposed to collaborative research groups, entails a streamlined methodological strategy that leverages the ontological and epistemological grounding of each discipline, ensuring rigorous engagement with multiple perspectives rather than ad hoc blending of them. This procedural modification allows the integration of varied scholarly contributions into a coherent analysis without diluting the precision inherent in each field.

In advancing this adaptation, the discussion also highlights the broader significance of positioning biosemiotics as a second-order science. Biosemiotics, by examining meaning-making processes in biological systems, offers a meta-theoretical vantage point that accounts for the Polyocular Framework's reflexive logic in knowledge production across domains. Embedding biosemiotic principles within the adapted framework illustrates how semiotic processes underpin interpretations of food confusion as an object of first-order empirical research, ultimately enabling the harnessing of interdisciplinary knowledge while maintaining the conceptual congruity of individual disciplines. This approach not only enhances the observational scope of a single researcher but also clarifies the role of biosemiotics in interdisciplinary problem analysis, for a more holistic—but not Monolithic—understanding.

This investigation has notable implications for both biosemiotic inquiry and interdisciplinary studies. First, it underscores the role of biosemiotics as a second-order perspective capable of critically examining the epistemic structures underlying scientific endeavours. Second, it showcases the Polyocular Framework's capacity to function beyond its original team-based conception, making it accessible for individual scholars involved in intricate, cross-disciplinary explorations. Finally, it provides a concrete example of how theoretical refinements can facilitate the practical application of biosemiotic theory to real-world issues. As contemporary scholarship increasingly grapples with epistemic fragmentation and the demands of synthesising diverse disciplinary insights, the proposed adaptation of the Polyocular Framework offers a valuable model for future biosemiotic research seeking to navigate similar complexities.

Embodied Storying: Perception Nests in Ecological Relations

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This paper examines how human key semiotic capacities, such as intelligence and creativity, emerge through the deep interplay of bodily experience (inclusive of cognition), ecological awareness, and narrative expression. We explore how early humans engaged in complex meaning-making through coordinated representations of inspired movement and feeling that transcended mere decoration, even though their marks may resist interpretation today. These prehistoric expressions demonstrate how creativity and intelligence emerge through embodied engagement with the world, long before any language was preserved through formal marks eventually recognized as "writing." Those later writing systems would represent images, concepts, or sounds of language—or more accurately, the process of "languaging." The evolution of human expressive capacities—from the immediacy of gestural communication through cave incisions, applications, and stencils, to early writing—reveals how meaning-making has always been grounded in the dynamic interaction between the all-inclusive body, its umwelten, and other living creatures. These others include both our social and anti-social fellow humans, larger organisms, as well as plants and microscopic biomes.

All human groups—whether ancient or contemporary—living through varied cultural subsistence practices (foraging, food production) exhibit significant ecological literacy. This is evident in their acute ability to read and respond to ecological affordances within umwelten and across species. We suggest that human creativity emerges not as an abstract cognitive capacity, but through what we call "embodied storying"—the ability to connect sensory and perceptive experience, physical gesture, and shared narrative forms. Early narrative expressions integrated multiple modalities: the hand that both creates and points, the voice that emerges from interior gesture, and the eye that both sees and shares.

Contemporary frameworks for understanding creativity and intelligence can be enriched by recognizing how meaning-making has always been an embodied, multi-sensory process of engaging with environments across a range of species.

Towards An Umwelt Ecological Concept of "Power"

Phillip Guddemi

The umwelt, as I understand this term originated by von Uexküll, is the environment of an organism not merely as a physical surround, but as the field of perception and perception-based action in which an organism has its being and maintains its ongoing existence. It is relative to each particular organism, to the dangers and opportunities which are afforded in each organism's ongoing life, as this life is embedded in relations of ecosystem.

Regarding the concept of "power," Gregory Bateson criticized it for being a misleading metaphor from physics, lending itself to metrics and comparisons which simplify the world. But near the end of his life Bateson asked what people mean when they talk about power, and he answered, something like prominence in an ecosystem. Note that in a well functioning system, this prominence is never of one simple or single type. This ecosystemic view of power is at odds with a unitary or fungible concept of power and leads instead to an understanding of power as diverse and pluralistic. Indeed in Bateson's analysis a kind of separation of powers is extolled as ecosystemic wisdom, as opposed to concepts which imply a concentration of power.

Bateson's experiments with what "power" might mean, are attempts to counteract our cultural tendencies for seeing power as an explanatory principle or prime mover. The goal would be to minimize "power's" epistemological allure by changing the concept's ecology of mind.

Partly in dialogue and reaction to Bateson's perspectives and observations, in earlier publications I have synthesized a concept of "power" which has a certain elegance with regard to some, if not all, of the ways that people use the term, at least in the case of "social" power, of "power-over" if not "power-to." This concept can be expressed as "you are adapting to me more than I am adapting to you," or vice versa – though this deliberately begs the question, "what does more mean?" -- a question which may not always (or ever) have a simple answer. Nonetheless, such a concept of "power" as relational asymmetry of adaptation has interesting implications. For example, adaptation, in the sense meant here, includes learning, and this leads to an apparent paradox: that, at least in social power relationships, "power" often has an inverse relation to learning and adaptability. The organism of lesser "power" does more learning within the relationship, more biosemiotic "work" so to speak, while the organism of more "power" can fall back on habit and predictability, resting on its past-adaptational laurels while its "lessers" increase their flexibility or adaptability to change.

Again, adaptation in this sense is not merely a measure of physical survival, but always entails semiotic activities of deployment of attention, embedded in cybernetic systems. (Some relational asymmetries are possibly inevitable in natural systems though they need not be nearly as extreme as we see them in our current "civilization.") Such asymmetrical adaptation has consequences in how organisms organize their attention and action with respect to their perceived environment or umwelt. However, this asymmetry of adaptation is intrinsically unstable, insofar as it can lead to blind spots in the longer term, subverting the apparently advantaged position of so-called power holders.

Peirce's Icon: An Interface Theory of Perception?

Chris Barnham

Peirce's icon has undergone much re-evaluation in recent years. Eco's view that we should 'get rid of icons' (Eco: 1976: 216-220) has been replaced by Stjernfelt's positioning of the icon at the heart of his 'Diagrammatology' (Stjernfelt: 2007) and his 'Natural Propositions' (Stjernfelt: 2014). The debate around Hoffman's 'Interface Theory of Perception' (Hoffman et al: 2015) has further elevated the role of the icon in perception.

But Peirce's icon is still largely misunderstood. This paper will argue that the icon is a central feature of Peirce's rejection of the dominant framework for cognition since the 18th century - the 'Mirror Model' of perception. This model has been attacked by Richard Rorty in his 'Philosophy and the Mirror of Nature' (1980), but this critique was already familiar to Peirce, and, indeed, it is one that he inherited from Hegel (Barnham: 2022).

This paper will outline how Peirce views the icon - as an abductive guess at an identity. As such, the icon is not a veridical similarity between known identities, but rather an attempt by the mind (using similarity) to establish the existence of an identity in the indeterminate 'Phaneron' (Peirce: EP2: 362). The icon is frequently viewed as a relationship between two items, in which case it would be dyadic. But in Peirce's classification of signs the icon is positioned in a way that indicates a monadic, rather than dyadic, status.

This paper will seek to show, referencing ITP, that the icon is, indeed, central to the establishment of a critical interface between sense data and the 'outside' world, but it fulfils this role by forming a semiotic bridge between a representamen and an 'object of thought'. In this activity, the mind creates, in partnership with the world, synthetic interfaces that are fashioned, initially, by the icon (firstness) and, subsequently, by the qualifying actions of reality (secondness). The outcome of this partnership are signs which act as 'tools' for our understanding of the world. Hoffman is right in suggesting that our perceptions act as 'adequate guides for adequate behaviour' (Hoffman et al: 2015), but this is because of the intrinsic pragmatism embedded in Peirce's theory of sign production.

In summary, this paper will explore the potential offered by ITP, develop insight into Peirce's notion of the icon as an interface in human perception, and provide deeper understanding of the biosemiotic concept of Umwelt from a Peircean perspective.

Semiosis of Quantum Biosemiotics: Quantum probability formula and systems of interpretation

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For more than half a century, scientific studies have tended towards inter/multidisciplinary. The "Quantum Biosemiotics" project involves this trend. It is also based on two essential correlations between three main fields. First biosemiotics, mid-twentieth century with works (Rothschild.F.S, Uexkull.J.V, Sebeok.T, Lotman.Y), up to the founding of the International Society for Biosemiotics Studies 2005 (Kull.K, Emmeche.C, Hoffmeyer.J). Meanwhile, it has gone further by interesting on cognitive and neurological sciences (Favareau, 2002, 2010), on the other hand a project is being formulated by Maleky (2008/2022 in Arabic), which based on the results of (AI) revolution (quantum computing and chat GPT, Bard) and the developments of cognitive consciousness neuroscience (Orch-OR, Penrose, Hameroff Koch and others), regarding what theoretical limits are permitted on epistemological framings of dynamic semiotics (Andersen, Wildgen). In this paper, we will work to bring the work of semiosis closer as the basis of any communication process, through a theoretical and procedural combination with a broader research horizon that we propose to call it “quantum biosemiosis”. Quantum bio-interpretation of the perceptual phenomenon (cognitive consciousness) as it occurs within the microtubules of brain neurons (Orch-OR) allows us to understand the complexity that characterizes language and speech. It provides us with different and promising theoretical and procedural tools to recognize and explain "How Meaning is Produced" according to the approach of "quantum biosemiotics". There is a hard problem that is summarized in the difficulty of separating between the phenomenon and the approach, because speech itself, as an individual act, is subject or force to constraints of the "language institution, we do not want to answer, but rather just ask about the phenomenon of semiosis, such as:

1. How to produce the dynamic communicative phenomenon in the uses of the various brain dynamics and mechanisms of "self-generating" and production of language?
2. How does the Higher Brain Functions (HBF) produce cognitive consciousness?
3. How signs emerge from production of semantics and interpretation through relevant synapse on the molecular organism level genetic code?
4. How molecular organisms level produce semiosis?
5. Is Quantum biology behavior related to the brain and conscious perception and unconscious as a result of the interactions across semiosis systems?
6. How signs emerge as a result of the dynamic interactions between systems of the singularity semiosis in order to produce and reproduce other simultaneous systems (entanglement)?
7. Is there a need to rehabilitate our conceptual system of duality of value (1,0 = true, false)? How can our brain cells communicate quantum biology, meanwhile, our thinking system is standard duality? Isn’t language, thought even neurological diseases, result of the brain's process?

Diseased, Disordered, or Mistaken

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In the philosophy of medicine the concept of function plays a major role in the naturalistic "objective" determination of biological dysfunction and its subsequent classification as a disease (Boorse '1975). Social constructivists have countered such analysis by justifiably arguing that social values play a major role in the ontology of disease as indicated by historical examples such as the pathologization of homosexuality or left-handedness. As a result, so-called "hybrid theories" have integrated both naturalist and constructivist considerations into their concept of disease (Wakefield 1992).

While hybridization might imply a mixing of naturalist and constructivist considerations, hybrid theories keep a strict separation between the naturalist/constructivist and fact/value parts of their argument. From a Biosemiotic perspective such hybrid accounts therefore both fail to properly naturalise social systems while simultaneously ignoring the values and judgements that permeate living organisms.

In this paper I set out a framework which integrates systemic functional analysis with value-laden constructions through a Biosemiotic lens. I argue that not only does this create a more coherent disease concept, but it also manages to solve many of the existing critiques levied at the philosophy of disease by the public health community critical of its neglect of social processes in the emergence of disease in the population.

Reduced to codes: lost behind the metaphors

Barbora Jurková

One of the most profound and enduring questions we pose about our existence and surroundings is: What is life? The pursuit of an answer to this question remains complex, one of the challenges being how to articulate the nature of life in a manner that accurately reflects reality without becoming entangled in metaphors, especially those that have influenced the scientific discourse over the past several decades, despite the growing criticism of this approach. The integration of classical mechanistic thought with information theory in the 20th century precipitated a rapid adoption of a new linguistic model within scientific disciplines, particularly in biology. This model, inherently mechanistic in nature, reinforced the conceptualization of this idea of life - machine.

This interpretation of information theory and its application to biology has been partially criticized by Hoffmeyer and Emmeche in their articles, particularly in Code Duality and the Semiotics of Nature (Hoffmeyer & Emmeche, 1991a) and From Language to Nature: The Semiotic Metaphor in Biology (Hoffmeyer & Emmeche, 1991b). Another key critique can be found in the work of Stuart A. Kauffman, who does not directly oppose the strong mechanistic school of thought from Descartes and others but instead focuses on a somewhat softer approach, particularly in the works of Newton and Darwin. This is evident in his foreword Evolution beyond Newton, Darwin and entailing law (Kauffman, 2013) to the publication Beyond the Mechanism as well as in his book A World Beyond Physics: The Emergence and Evolution of Life. Additionally, science journalist Philip Ball brought this topic to a wider audience in his book How Life Works: A User's Guide to the New Biology, in which he opposes and challenges the tendency to reduce life and its complexities to a mere informational code.

This paper explores how critiques of the mechanistic perspective have evolved into critiques of the linguistic structures that sustain it, particularly in the context of contemporary technological developments in the fields such as artificial intelligence and artificial life. While these advancements continue to reinforce mechanistic metaphors, this discussion considers the possibility of rethinking mechanistic frameworks not as reductive models but as complementary perspectives within the life sciences, particularly through the lens of linguistic and semiotic metaphors. By critically assessing the role of language in shaping scientific understanding, this paper aims to contribute to a more nuanced discourse on the conceptualization of life in the modern era. This is an ongoing project and I have been partly covering it through my other works, for example The Category of Thirdness in the New Mechanical Philosophy and some others.

Japanese Gardens and Biosemiotics: Lessons for Commercial Organizations

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This contribution explores the lessons Japanese gardens can offer commercial organizations through a biosemiotic lens. Japanese gardens reveal that experience is always simultaneously human and non-human. Tending to a garden is inherently proscriptive—one cannot force it to grow, despite the illusion of control. Historically, many Japanese gardens have been designed with proscriptive methods, such as Shakkei ('borrowed scenery') (Cheng 1631) and minimal intervention. These design principles operate as a catalyst that dissolves the subject–object dualism that constructs identity, making awareness an unfolding relation rather than an individual possession.

Once designed as such catalysts for embodied awareness, they have since been repurposed into touristic institutions that prescribe a commercialized experience. Goshuin stamp books, designated photo spots, and 'must-see' landmarks shape visits into acts of consumption rather than immersion.

Despite such fragmentation of biosemiotic and semiotic meaning, fragmentation does not need to dominate. People can reclaim modes of meaning-making, where selves emerge from socio-ecological relations rather than preceding them. This argument does not suggest a return to a static awareness, which would merely be the inverse of an identity-obsessed stance. Rather, it calls for an attentiveness to the continuous movement between figure and ground—between self and relational context—by noticing one's socio-ecological and biosemiotic entanglements. Even in their commodified state, Japanese gardens still invite this awareness if one is attuned to the shifting interplay of meaning.

Extending this insight to commercial institutions, I propose a reversal: instead of bringing people to the garden, organizations should become garden-like by fostering relational, proscriptive environments. For instance, by drawing a person's attention to the dialogue between self and relational context, an organizational culture could simultaneously be more robust and adaptable. Taking up the design principle of Shakkei—borrowing external elements to enrich the whole—can inspire knowledge management practices that integrate diverse perspectives rather than impose rigid hierarchies. A decentralized, subsidiarity-based approach can better navigate the postmodern ubiquity of information, encouraging adaptability over control. An organization's true value lies in a culture where people freely shape their own purpose together, not like espaliered trees forced into rigid patterns.

While commercial institutions may have significantly contributed to the fragmentation of meaning as acts of prescriptive semiocide (Puura 2013), they also function as proscriptive semiotic spaces full of revitalization potential, much like a garden. Every organizational member is embodied, and hence carries with them biosemiotic and semiotic entanglements waiting to be actualized for a more meaningful future.

Reconsidering Ayahuasca Induced Shamanic Visions From Ecosemiotic Perspectives

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What if an ethno-botanist, anthropologist or a medical doctor from the modern world had the ability to connect with the rest of the ecosystem (flora, fauna and fungi) and come up with practical solutions to the most pressing issues of our planet? Luckily, exceptions like Indigenous Amazonian communities still maintain that capacity between the shaman, the plants and the ecosystem where signs “glue together various entities and beings of the world into meaningful relations, thus embodying a huge ecological potential to reconnect, to heal” (Maran 2020). We argue that Amazons as an alive entangled complex and multi-layered network is a grand example of symbiosis between flora, fauna, fungi and the shaman. Ayahuasca at the center of this network has a pivotal role in enabling the shaman make sense of this symbiotic exchange which to an outsider remains enigmatic. We argue that as sign relations don't make sense outside a given context, environment, and culture, different epistemologies (such as Indigenous Shamanic ways of knowing and being) also can’t be fully understood from an outside approach. In this indeed at least a necessary amount of enculturation needs to take place. In efforts to overcome the enculturation gap, many researchers during their field studies have also tried ayahuasca and other plant guides but still shamanic ways of communicating and knowing plant properties remain enigmatic to the western gaze. Solving this enigma starting with the ethnobotanist Richard Evans Schultes has been an ongoing quest to this day (Sheldrake, 2020). For instance anthropologist Jeremy Narby suggests this enigma can be tackled with, “by looking at both perspectives simultaneously, with one eye on science and the other on shamanism” (Narby 1999, 52). Although this is an approach far from the practice Narby continues on underlying the issue further, “It is as if they knew about the molecular properties of plants and the art of combining them...” the knowledge of which he continues, “comes directly from hallucinogenic plants” (Narby 1999, 11). In his search to reconcile science and shamanism, Narby draws attention to the lack of corresponding concepts between the two paradigms and comes to the conclusion that the concept of DNA might be the ideal reference to fill the gap. And he bases the rest of his book’s argument on the creative analysis of similarities between DNA and shamanic visions, which take him to entertain questions like, “A twin serpent, of cosmic origin, symbolizing the sacred energy of life?” (Narby 1999, 61-62). Eventually his observations suggest a symbiotic relationship between the shaman, the plants and the ecosystem where the concept of DNA and the visions of ayahuasca are treated as the common denominator. In this symbiotic network, dimethyltryptamine (DMT) compound, acting like an alchemical magic, bridges the gap between the default reality and the shamanic vision. And the unifying symbols, the twin serpent and the double helix of DNA as the two corresponding concepts, help reconcile science and shamanic vision in the quest to understand the nature of this grand symbiosis at which point ecosemiotics approach we believe can deepen these efforts.

Research Centres as Living Systems

Mickey Vallee

This paper presents a biosemiotic framework for conceptualizing research centres as adaptive, semiotic organisms, actively engaging in relational knowledge co-production within Indigenous educational contexts. Traditional institutional frameworks typically depict research centres as bureaucratic entities concerned primarily with legitimacy, funding, and measurable outputs, often neglecting the relational and ecological complexity inherent in Indigenous educational environments. In contrast, our study—grounded in the experience of establishing a research centre at Canada's first Tribal College serving the Blackfoot Confederacy—employs biosemiotic theories, including Umwelt theory (von Uexküll), ecosemiotics (Farina), and multimodal modeling frameworks (Olteanu, Mäekivi). These frameworks emphasize how research centres dynamically interpret and respond to diverse community and ecological signals through reciprocal semiotic exchanges involving Elders, students, researchers, and community stakeholders. Central to this model is the active integration of Blackfoot epistemologies, with Elders guiding the translation of traditional knowledge into contemporary research practices, thereby maintaining cultural integrity. This study identified that successful community-responsive research emerges from sustained relational interactions among institutional structures, Indigenous epistemologies, and ecological contexts, resulting in adaptive organizational practices deeply aligned with community needs; and provides a timely and necessary study of how biosemiotic theories can transform understandings of institutional responsiveness, emphasizing the value of research centres that amplify and sustain research practices which have been occurring on Blackfoot Confederacy territory since time immemorial, thus enriching contemporary knowledge production through continuous cultural engagement and ecological adaptation.

Quasi-Signs in Silicon: The Triadic Structure of Algorithmic Learning

Erik Ljungberg

Drawing on Charles Sanders Peirce's triadic model of semiosis, I argue that machine learning systems enact a form of proto-semiosis where a genuinely triadic process of signification evolves in computational systems receiving data from environmental sensors and are subjected to learning algorithms, where new sign-vehicles give rise to interpretants which give rise to signs which become interpretants, and so on and so forth.

Building on Deely's insight that sign-action can precede cognition—including what he terms physiosemiosis—I explore how machine-learning algorithms likewise depend on a pre-cognitive substrate of indexical relations. By situating these relations within Peirce's triadic framework (where environment, sign-vehicle, and interpretant stand in a genuinely triadic relation), we clarify how algorithmic "interpretants" accumulate as memory traces and recalibrate the system's responses.

This perspective not only resolves tensions between reductive information-processing models and richer semiotic accounts of meaning, but also reorients discussions around the ontology of computation. Essential to this reconciliation is acknowledging that, while algorithms deal in "quasi-signs" lacking the living organism's capacity for self-modification and agency, they still participate in an interpretive dynamic irreducible to mere mechanistic cause-and-effect. Critics may object that this conflates formal pattern recognition with authentic semiosis; we counter that attending to the gradient between physiosemiosis and anthroposemiosis reveals how algorithms and living systems may align at certain structural levels while diverging in phenomenological depth.

While attributing semiotic properties to algorithms risks either anthropomorphizing computational processes or diluting biosemiotic theory, this paper explicitly acknowledges the ontological distinctions between biological and computational semiotics while revealing a shared logical structure. Ultimately, understanding the proto-semiosis that takes place in learning systems is necessary for understanding the semiosis that takes place when humans make sense of the output of those systems, as the latter enfolds the former. This biosemiotic perspective reveals not merely a difference in degree between computational and biological intelligence, but a fundamental ontological distinction in how meaning emerges—suggesting that our technological future depends not on more computation, but on bridging the gap between virtual and actual semiosis.

Biosemiotic Understanding of Plant Intentionality

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Plant cognition has become a new battle field for the so-called cognition war. Supporters argue that biomechanical explanation is insufficient to explain plant behaviors and we can better understand adaptation of plants by appealing to cognition and intelligence. While others argue against that, on the one hand, plants do not fit well with our common notions of cognition and intelligence; on the other hand, we already have a good enough theoretical framework to understand plant behaviors and gain nothing more than some theoretical redundancy by explaining plant behaviors as intelligent.

In this presentation, I propose to understand plant cognition within a biosemiotics framework. I will argue that we cannot understand plant behaviors by solely appealing to biomechanical processes. A pivotal difficulty to understanding plant behaviors as semioses is interpretation as interpretation plays a central role in semiosis. I propose the concept of operational interpretation to formulate the interpretive processes in plants. A distinctive character of operational interpretation is its self-referential code-duality. Taking Deacon's thought experiment of autogenesis as an example. The constraints in autogens are digital because they are arbitrary. The dynamic structure of the autogen re-represents its own boundary conditions. Essentially, these constraints store the sequence information of the autogen itself. When an autogen reproduces another one, these constraints are preserved and intrinsically represent and reproduce the critical boundary conditions necessary for the autogen's existence. On the other hand, these constraints are analogue because they are realized through spatio-temporal (self-assembly) and causal continuity (reciprocal catalysis). We can describe the dynamic structure of an autogen as digitally coding information about its boundary conditions. When damaged, remaining parts initiate an analogous decoding process to self-repair or self-reproduce, given adequate environmental conditions. This kind of operational interpretation also manifests in varieties of plant behaviors, as those case studies have shown. Plants have the competence of iconic and indexical interpretation. Therefore, plants have intentionality and plant behaviors are semioses, namely meaning-seeking-making processes.

Semio-Materialism: A Quest for A Science of Culture

Brian Khumalo & Shankar Aswani

The integration of nomothetic (generalist) and idiographic (specialist/localized) approaches in knowledge production represents a crucial endeavor (Windelband, 1893), particularly within the realms of ethnography and ethnology. Despite this, enduring skepticism stemming from contemporary anthropological perspectives influenced by postmodernism persists regarding the utility of nomothetic propositions. Historically, cultural materialism has advocated for a generalist approach to understanding human cognition, behavior, society, and culture, yet faced application challenges in light of empirical evidence highlighting the dual influence of both material conditions and ideational factors on human behavior (Harris, 1979). Karl Popper's (1978) three-worlds model offers a recursive mechanism for sociocultural transformation, bridging the gap between materialist and ideational perspectives. In this paper, we propose a synthesis between materialism and mentalism, which we call Semio-Materialism. By combining anthropological semiotics, cultural materialism, and a sensitivity to cybernetic advancements, we promote an interdisciplinary dialogue that accommodates a variety of theoretical frameworks, thereby advancing theory-building social science.

Biosemiotics and Translation Studies: A Semiotic Epistemology Approach with SWOT and CADM Analysis

Manubiya Mohamed Eiasy

Biosemiotics, a branch of semiotics that focuses on the study of meaning-making processes in living organisms, provides a novel perspective for understanding how meaning is created and exchanged within both natural and linguistic systems. Translation studies, on the other hand, deal with the transfer of meaning across languages and cultures, making it an ideal field for integrating biosemiotic principles to analyze how meaning is encoded, interpreted, and transmitted. This paper aims to explore the intersection of biosemiotics and translation studies through a semiotic epistemology approach, emphasizing how texts are interpreted, signs are analyzed, and translators interact with texts within multidimensional contexts.

Studying translation as a semiotic process requires a comprehensive perspective that considers the complex relationships between symbols, contexts, and various agents. To achieve this, the research employs two analytical tools: SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis and CADM (Context, Agents, Dynamics, and Mechanisms) analysis. The SWOT analysis helps identify the benefits and challenges of incorporating biosemiotics into translation studies. One of the key strengths is the enhanced understanding of how linguistic systems interact with broader biological and semiotic networks. However, weaknesses arise from theoretical and methodological challenges in applying biosemiotic concepts to linguistic and cultural phenomena. Additionally, the analysis highlights opportunities such as improving interpretative models for translation, as well as potential threats, including the increased complexity of linguistic interpretations due to overlapping semiotic systems (Kull, 2009).

The CADM model provides a more detailed framework for examining the fundamental elements influencing translation as a semiotic process. This model focuses on analyzing context (the social, cultural, and political environment of translation), agents (translators, institutions, and technologies involved), dynamics (interactions between texts and languages), and mechanisms (strategies and procedures used in translation). By applying this model, the research identifies how translation processes are shaped by semiotic transformations at individual, societal, and cross-cultural levels (Torop, 2020).

The integration of biosemiotics into translation studies represents a theoretical and methodological advancement that contributes to a new understanding of translation—not merely as a linguistic process but as a cognitive, biosemiotic mechanism where multiple epistemological and semiotic elements interact. From this perspective, translation can be seen as a complex adaptive system that engages with its environment through interpretative and adaptive mechanisms, allowing for the development of new models for understanding meaning transfer across cultures.

The findings of this study suggest that incorporating biosemiotics into translation research can enhance translation practices by offering a more holistic view of interpretative processes. Additionally, this interdisciplinary approach opens new avenues for research in diverse fields, such as artificial intelligence and machine translation, where biosemiotic principles can help understand how intelligent systems process meaning in natural languages. Consequently, this study contributes to a multidisciplinary approach to translation research, bridging linguistic and semiotic sciences with biology and transdisciplinary knowledge systems (Marais, 2018).

(Sixty)-six ways to be confused about memes: (Quasi)-semiosis, (emonic) logonomy, and (sub)-agency of cultural "replicators"

Ivan Fomin

The study explores how biosemiotics can help address some theoretical and terminological issues related to the notion of a meme. In particular, it demonstrates how different conceptual options can be mapped onto six different dimensions.

Firstly, different conceptualizations of memes can be distinguished based on whether one equates any cultural signs to memes or assumes that the word meme should apply only to tardo-signs. If memes are defined as tardo-signs, they are supposed to be conceptualized as post-semiotic quasi-signs, characterized by reduced capacity to produce final interpretants (i.e., habit-changes).

Secondly, memes can be defined as logonomic signs. This would emphasize their role as entities that convey rules of social semiosis.

Thirdly, one can use the term meme to refer exclusively to emonic signs (Kull, 2018). Choosing this definition would imply that memes would be theorized as signs that convey logonomic rules by imitation.

Fourthly, one can distinguish three different approaches to defining memes based on whether a meme is theorized as a sign as a whole, as a sign-vehicle, or as an interpretant.

Fifthly, a meme can be theorized either as a token or as a type.

Sixthly, one can differentiate between the more relaxed approaches that do not require memes to be necessarily agentive and stricter ones that assume that only agentive cultural signs can be called memes.

Overall, by combining all these different definitional options, one can map at least sixty-six different kinds of semiotic entities that can be defined as memes (Fomin, 2024). For instance, in the strictest sense, memes would be defined as tokens of agentive logonomic tardo-signs. Conversely, if defined extremely loosely, the term meme would refer to any cultural signs. Ultimately, all the sixty-six different entities that can be called memes are essential for cultural evolution. However, it is important to make distinctions between them, which "memetics" often overlooks.

Signs of the Approaching Tide: Tracing Biosemiotics in the Eco-Fiction of Amitav Ghosh

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Biosemiotics, the study of sign processes and communication within and between living organisms, offers a compelling framework for analysing eco-fiction, particularly in the works of Amitav Ghosh. This paper examines how Ghosh employs biosemiotic principles to depict the intricate, dynamic interactions between human and non-human agents in the Anthropocene. Through the lens of social systems theory, ecosemiotics, and environmental justice, this study explores how Ghosh's narratives challenge anthropocentric worldviews, foregrounding the agency of non-human forces, such as climate phenomena, and the limitations of modern institutions in comprehending these interactions.

Amitav Ghosh's novel The Hungry Tide and his non-fiction work The Great Derangement provide fertile ground for a biosemiotic reading of eco-fiction. In The Great Derangement, Ghosh reflects on the unprecedented tornado that struck Delhi, an event dismissed by institutional frameworks as an anomaly rather than a symptom of climatic disruption. This event exemplifies the semiotic breakdown between environmental realities and societal narratives. Drawing upon Niklas Luhmann's social systems theory, the paper illustrates how contemporary institutions, structured around self-referential communication systems, fail to incorporate ecological signs, thus perpetuating climate inaction.

The concept of individuation from Gilbert Simondon further elucidates Ghosh's portrayal of collective systems in environmental crises. Simondon's theory suggests that entities continuously co-constitute themselves within their environments. In The Hungry Tide, the shifting tidal landscapes of the Sundarbans embody this process, as land, water, and human communities adapt and respond to ecological signals. Ghosh's characters, like Piya and Fokir, navigate the semiotic exchanges between land and sea, human and non-human life, illustrating how ecological awareness emerges from such interactions.

The paper also investigates the environmental justice dimensions of Ghosh's eco-fiction, highlighting how marginalized communities disproportionately bear the brunt of climate change's impacts. Biosemiotics reveals the asymmetrical communication between vulnerable populations and dominant socio-economic systems, which often disregard local ecological knowledge. This aligns with Gregory Bateson's concepts of 'schismogenesis' and the double bind in environmentalism, wherein climate discourse oscillates between alarmism and denial, leaving communities trapped in cycles of inaction and disempowerment.

Ecosemiotics, as developed by Winfried Nöth and Kalevi Kull, underscores the narrative strategies Ghosh employs to disrupt conventional distinctions between culture and nature. In Gun Island, myth and folklore function as semiotic devices, bridging human historical consciousness with environmental change. This intertextual dialogue between past and present, human and non-human, challenges the binary logic of modernity and suggests an alternative epistemology rooted in interconnectedness.

Ultimately, this paper argues that Ghosh's eco-fiction not only narrates climate change but also performs a biosemiotic intervention, encouraging readers to attune themselves to the semiotic flux of ecological systems. By integrating theories of social systems, individuation, and ecosemiotics, this study provides a nuanced understanding of how fiction can mediate the complex semiotic exchanges of the Anthropocene, advocating for more responsive and inclusive environmental narratives in both literature and policy discourse.

Biosemiotic Descaffolding: Meaning, Its Role and Destruction in Organic Systems

Claudio Julio Rodriguez Higuera

This presentation makes the following assumption: That there is some sort of causal role to meaning in organic systems. From this assumption stem two claims: That the causal role of meaning-making processes is what biosemiotics seeks to explain; and that this kind of causal role is–in at least some reading of the claim–not derivable solely from physical facts. What this presentation will tackle is that, given that assumption, how do we explain and study the persistence of meaning in environments? Can this meaning degrade? The presentation will use the concept of semiotic descaffolding to argue for the analyzability of the process and its potential relevance to biosemiotics.

Herring Gulls, Vocal Semiotics, and the Emergence of Mind in Urban Ecology

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Recent work in animal communication has challenged the boundaries between instinct, cognition, and mind—especially when examined through the framework of biosemiotics. In my paper, I explore the communicative behaviour of Larus argentatus (herring gulls) in a mixed urban/coastal environment, drawing on direct spectrographic field recordings and structured semiotic mapping of gull vocalisations in relation to behaviour, environment, and interspecies interaction. Using a field-generated taxonomy of five call types (long call, pair duet, juvenile distress, aggressive burst, begging cry), I trace how these vocalisations act as dynamic signs—ritualised, flexible, and situated in cognitive-emotional feedback loops.

My theoretical approach is informed by a structural model of "code–cue–signal–sign," with an emphasis on emergence: how signs develop from inherited acoustic forms and are shaped through environmental and social feedback. I use the concept of "vocal semiogenesis" to explain this, and build upon Jakob von Uexküll's Umwelt theory as well as the notion of distributed cognition. Additionally, I draw on ethological insights from Tinbergen and recent comparative work on parrot and mammal communication (see Kershenbaum, Why Animals Talk) to contextualise gull behaviour within a broader semiotic framework.

Special attention is paid to juvenile-to-parental distress calls (captured in urban settings) and to the possibility of gull dialects or kinship-based vocal templates, visible in spectrograms as harmonic mirroring and entrained timing. I argue that gulls, often seen as instinct-driven, instead display a system of contextual vocal plasticity that suggests a rudimentary, embodied mind—a semiotic interface composed of affect, space, and sound.

I also examine the anthroposemiotic implications of gull calls in shared human spaces—how public soundscapes become contested zones of meaning. Ultimately, I propose a field-adaptable glossary of gull vocalisations, with applications for ethology, urban ecology, and biosemiotic modelling.

Re-signifying Meaning, Transforming Care: a Biosemiotic Analysis of Disability Care

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While the costs of disability care in the Netherlands continue to rise to alarming heights, the influx of new healthcare professionals is expected to keep declining in the coming years. Within this context, small-scale, locally embedded, and inclusive homes for disabled individuals are at high risk of disappearing from society. Indeed, the care-full interplay and gradual co-creation of meaning taking place within such local ecologies can just as abruptly be disrupted and destroyed. For with environmental degradation comes semiocide, the direct or indirect destruction of semiotic processes (Puura 2013), weakening the emergence of meaning construed in co-participation with our environments.

As a case study in defying the dysbiosis of industrial culture, this paper takes the current project of futureproofing such a small-scale home for disabled individuals, located in Nunspeet, the Netherlands. In the face of possible shutdown, a feral ecology composed of family and friends has emerged to resist its semiocide, and instead opt to participate in the transition from a primarily institution-centred form of care to a more distributed, community-based form of Care.

As a novel field and conceptual framework, biosemiotics offers a powerful lens through which to investigate what kinds of semiotic exchange facilitate a system's stability and transformation. Within all ecosystems, futureproofing means building semiotic resilience. In other words, ensuring that the system can adapt not just materially, but in how it generates and sustains meaning. In this case, the transformation of the home for its disabled residents depends on creating a living network of shared responsibility, where care is not just performed but co-signified in a way that makes it sustainable and meaningful for all involved.

As such, this study will reframe care as a deeply interpretive, multi-layered process where biological, technological and cultural systems interact, shifting the focus from mere functionality to meaning-making, showing that disability care is not just about meeting basic needs, but about fostering meaningful connections across a span of modes of communication and being.

Moreover, this study will take disability as a sign-mediated phenomenon, emerging within a network of meanings, composed of diagnostic categories, social expectations, legal classifications, and cultural narratives. Against dominant ableist perspectives, however, it will affirm that residents are not merely passive and reactive elements in this equation. Rather, through the biosemiotics lens, this study reveals that residents take an active part in semiotic processes, and are thus each able, in their own way, to meaningfully contribute to the re-signification and transformation of their care. From an ethical perspective, such insights offer a chance to powerfully renegotiate concepts and experiences of disability, care, agency and interdependency.

Biosemiotics and Consciousness

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This paper takes as its starting point a remark made by Erwin Schrödinger:

> ... isolated knowledge obtained by a
> group of specialists in a narrow field has
> in itself no value whatsoever, but only in
> its synthesis with all the rest of knowledge …

Biosemiotics is neither isolated nor narrow. Quite the opposite, it seeks synthesis by building bridges to other disciplines. This paper will suggest how to extend and strengthen them based on the premise that signs are fundamental, constitutive components of the living world. It will also critically examine the idea that the main challenge faced by biosemiotics is to naturalise biological meaning and, hence, consciousness.

It's a good time to do this as Kauffman and Roli suggest that science is undergoing a third transition, one as significant as those from Aristotelian to Newtonian and then to Quantum mechanics (Kauffman & Roli, 2023). Their evidence for this comes principally from evolutionary biology, where they claim the creativity of the living world, what Hoffmeyer might have called the appearance of more developed signs, utterly escapes formalisation in terms of any physical theory. This leads them to suggest that "The twenty-first century promises to be the century of biology." Clearly, this is an area where biosemiotics can make a distinctive contribution.

In his appreciation the work of Jablonka and Ginsburg on the origin of consciousness, some of which was published in Biosemiotics, Noble commends and condenses their view into to the claim that "Conscious Agency is a major driver of evolution" (Nobel 2022, page 349). He then proposes to extend their notion of Unlimited Associative Learning with what he terms the "harnessing of stochasticity." By this he means the active preservation of variation at all levels of the living world. Here "active" seems to imply "purposeful" or something very like it.

This paper will propose that this is functionally equivalent to Kauffman and Roli's proposal that what drives evolution crucially involves " ... ever-new affordances ... which are seized by evolution and shape ever-new niches and biological adaptive functions ... the emergence of new affordances, opportunities, seized by heritable variation and natural selection, or by behaving organisms acting in their worlds." (Kauffman & Roli, 2023, page 4). Moreover it will be shown how their point about 'ever-new affordance' is very similar, perhaps identical, to Simondon's view that " ... technological objects have a superabundance of affordances over and above those translated into them by their human makers." (Pickering, 2024, page 514).

But to broaden the discussion to include technology is to apply concepts from biological evolution to cultural evolution. The paper suggests that the human ability to recognise that signs are signs as well as the capacity for metaphorical cognition places a limit on how far this can go (Pickering, 2024, page 515).

The paper will conclude by re-emphasizing that biosemiotics is not isolated, in Schrodinger's sense. Here, it will use the distinction made by Tim Ingold between what he calls the "major" and the "minor" styles or kinds of science. The major kind is, broadly, mainstream science, especially biology based on the modern synthesis, as it was before the transition that Kauffman and Roli believe to be in progress. The minor kind, however, is what follows the transition, namely, a new phase in evolutionary biology that addresses both meaning and conscious experience.

Biosemiotics clearly belongs in the minor style. But this is a strength not a weakness. As Ingold points out, although the major is most visible, it always trails the minor.

Challenges of the Notion of Semiotic Agency

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Semiotics is slowly growing into biosemiotics. It started from a primitive binary link between a sign and its referent (object), and then - the third mental component (sense or interpretant) was added by Frege and Peirce. The fourth component of the sign relation is the interpreting agency, which was proposed later by Morris (1971). Recently, the notion of semiotic agency emerged in the works of several authors as a new level of integration in semiotics (cf. Sharov & Tønnessen 2022), where sign relations appear as semiotic tools that come into being via biological, social, and individual development and learning. However, the term 'semiotic agency' remains controversial because there is no consensus on its nature. Dennett (2017) associated agency with mind and classified it into four levels of evolutionary perfection (Darwinian, Skinnerian, Popperian, and Gregorian). This approach is limited to the logical circuit of the learning unit and ignores physical functional components: sensors, tools-actuators, and representation tools (memory, association, and categorization). Most biologists assume that only organisms are agents; however, this assumption ignores evolutionary processes by which organisms emerge (origin of life, cellularization, multicellular transition, symbiogenesis, and reticulate evolution). Hence, autonomous parts of organisms (organs, cells, and cell components) and super-organisms (colonies, species, consortia, human nations and organizations) also deserve the status of semiotic agency. Autonomy and goal-directedness are key features of semiotic agency, which are partially inherited from parental agents in the form of essential autonomous components and encoded programs. Thus, there is no reason to deny agency in non-living autonomous artifacts (ribosomes, robots, or computers) based on the fact that they are constructed and programmed by organisms. Philosophers often require that all agents are highly-integrated units (with one body and single decision-making pathway). This approach contradicts to the existence of swarm agency, such as ant colony or human government. At a close look, almost all agents are composite and include a large number of semi-independent subagents. Even human decisions emerge from communication and negotiation between a large number of mental subagents (neurons or neural networks). It appears that the composite nature of agency is necessary for its evolvability and robustness. From the evolutionary point of view, it makes no sense to characterize agency as a conscious state (being awake vs. sleep or dormancy). Instead, agency appears as potentiality, a capacity to perform certain tasks when they are needed. Such capacities can be studied empirically even without knowing all the mechanisms that support them (non-mechanistic behaviorism). Similarly, signs are characterized by their potentiality even if they do not signify right now. Such potential signs form a semiotic field around them, indicating that signifying is possible to agents if they happen to appear within the range of the field (Sharov 2023).

Animals’ Ability to Interpret Habitual Life-Genres. A Search for Evolutionary Traces.

Sigmund Ongstad

Meta-studies of the five constituting aspects of animal utterances, form, content, act, time, and space, are now completed, as foreshadowed in Ongstad (2019), as well as semi-empirical conceptual studies of context and so-called life-genres, or kinds of communicative utterances. Based on a bio- and socio-semiotic framework relations between the mentioned five aspects, four communicational levels, sign, utterance, life-genre, and lifeworld, and a set of key semiotic processes such as semiosis, positioning, and genrification have been investigated.

The project originated from the hypothesis that humans’ advanced ability to interpret semiotic utterances as certain kinds of communication could have had certain pre-lingual, evolutionary non-human, communicational premises. Due to a time-gap of six million years from our cousins chimpanzees to the appearance of humans and to loss of traces of species from this period the project has taken an epistemic and methodological shortcut, working from the premise that today’s animals can represent these species as they once assumably were.

In contrast to a traditional view of animal communication, as linear (signal-message-reception), the studies have made likely that, at least some species have developed relatively complex communicational systems based on receivers’ interpretation: Utterance, with its joint five aspects are, when received, considered, both in direct relation to a species’ complete set of life-functions (the totality of their basic life-conditions) and to its lifeworld. Lifeworld is seen as a meaning-making mind-orchestrated resource system (affordance) built up by a totality of experience and communication through an individual’s life.

The crux of the matter is accordingly the claimed subtle combination of seemingly, rather simple utterances and a fragile functionality of parallel, highly variated context-dependent, interpretations and reactions. In this systemic perspective an utterance is multi-functional, although its structured form may appear simple. Receivers nevertheless seem able to differentiate their reactions functionally. This assumption may partly challenge a Theory of Mind as well as ditto objections to it. It is suggested that this particular interpretative faculty is related to a further developed mind in some animals/individuals, not as mind-reading, but by the interpreting subject’s consideration of the utterance’s subjective value within this subject’s lifeworld. Although individuals both utter and interpret, life-genres as a system rather ‘belongs’ to a species, as a community of sign-users. Besides, elements of this semiotic capacity might have been passed on evolutionarily across taxa, from vertebrates, to mammals, to hominids, and eventually to humans before the dawn of verbal language. A researchable late stage is hence great apes’ sign system(s), in particular gestures and vocalisation.

Considering the studies as a whole a conclusion is that the hypothesis is not yet disproven. The over-all project’s next step is therefore to muster key studies that can indicate whether such social, communicative systems may have been transferred even genetically, and thus evolutionary. A sub-hypothesis is that this systemic development has happened stepwise.

Searching relevant empirical studies some concepts seem crucial, in particular evolution of animal communication and of animal mind, indeed two very wide concepts (Andrews, 2020; Pina & Gontier, 2014). A search within these fields will hence be restricted to a set of well documented, fairly recent studies, especially of animals with more complex sign systems.

Cultural Dynamics Meets Semiotic Scaffolding: Theoretical Synergies for Understanding Complex Systems

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The dynamics of gradual and explosive cultural development proposed by Juri Lotman in the field of cultural semiotics, and the semiotic scaffolding theory developed by Jesper Hoffmeyer in the field of biosemiotics, though addressing different domains—cultural systems and living systems—share notable commonalities in their treatment of semiosis within complex systems. However, there is limited scholarly attention to the intersection and potential reciprocity between these two theoretical frameworks. This paper argues that a comparative study of these frameworks holds significant theoretical value, particularly in revealing the similarity (or even homogeneity) between life systems and cultural systems and providing new theoretical tools for understanding their evolution.

It is argued in this paper that both frameworks emphasize the gradual adjustments in complex systems that lead to stable evolution, as well as the explosive innovations that emerge through mutation and radical reorganisation at critical junctures. They also have the shared focus on the multi-layered interactions and translation within and across system boundaries, involving treatment of the memorizing, transmission, interpretation and creation of messages and semiotic relations. Furthermore, both theories offer valuable insights into the emergence, unpredictability, contingency, and self-organising properties inherent in complex systems. The commonalities between these two frameworks extend beyond the aspects outlined above.

Given the advent of the artificial intelligence era, the final commonality between these two frameworks is particularly illuminating, as it offers potential insights into processing uncertainty and anticipating future events. This paper therefore calls for a re-evaluation of both frameworks in the context of this transformative period. In the current AI-driven era, the humanities grapple with significant constraints due to increasing global skepticism about their value. It is within this context, the commonalities and reciprocity between Lotmanian cultural dynamics and semiotic scaffolding theory are of practical value. They demonstrate that scientific rationality and humanism are not in opposition but rather form a symbiotic and mutually reinforcing relationship centred on the study of life. Both frameworks are dedicated to understanding the history and the present of living beings, offering a foundation for building complex cognitive models of the world. And further by addressing future challenges, they offer insights into anticipating, adapting to, and governing future events, therefore providing theoretical support for the sustainable development of human society.

Biosemiotics Against Nihilism:

Arran Gare

Nihilism is the condition in which there is no purpose to life, or as Nietzsche put it 'Why? finds not answer'. While Nietzsche is normally seen as blaming Christianity for this, in his early notebooks he blamed it on modern science. As Whitehead argued, the scientific materialism of the Seventeenth Century portrayed nature as nothing but matter in motion, moving endlessly, meaninglessly. A place has to be accorded to knowledge and sensations, but with empiricism and its most advanced development in logical positivism, knowledge was conceived as nothing more than the means to make predictions from some sensations to others, facilitating control of nature and people. Kant and his followers, particularly Schelling, struggled against this nihilism. Neo-Kantians and phenomenologists defended a much richer notion of experience, and argued for the primacy of this over the abstractions of science. However, a more effective opposition came from metaphysicians who challenged the basic assumptions of mainstream science, and in doing so, rejected logical empiricism. Peirce was a major contributor to this tradition, and was a major inspiration for philosophers of science opposed to logical positivism, particularly through the work of Norwood Russell Hanson who at the same time embraced the work of the Gestalt psychologists. Another opponent of logical positivism, also influenced by Gestalt psychology, was Michael Polanyi who was explicitly concerned to overcome nihilism, and to this end, developed an anti-reductionist hierarchical ontology. Polanyi was a strong influence on Howard Pattee's work on hierarchy theory, through this, accounting for how matter became symbols. This inspired work in theoretical ecology, including Stan Salthe, who related Pattee's work to biosemiotics. Combining hierarchy theory, including the work of Polanyi, and biosemiotics, provides the basis for comprehending humans as participating through the development of their cultures in the creative becoming of nature, with a central part of this, developing their appreciation and capacity to appreciate the intrinsic significance of life. I will show how this synthesis provides the basis for a dialogic, transcultural, grand narrative upholding the quest to create a global civilization committed to augmenting life.

Mapping Wastelands

Judith van der Elst

In this paper I explore the need for land-based knowledge systems in sustainability efforts through the link between loss of language and loss of biodiversity (Gorenflo et al. 2012). The relationship to land is paramount for Indigenous societies, and psycholinguistic studies focused on spatial cognition have shown how many Indigenous ontologies conceptualize the indivisibility of language and land. I propose that a biosemiotic approach can support such efforts, based on the argument that environmental knowledge can be captured in language through indexical relationships. As the world transforms, the loss of biodiverse regions is replaced with a different surrounding, reduced biodiversity, increase in toxic elements and other pollutants, thereby becoming less hospitable landscapes for life as we know it. Through the introduction of a specific case study in the American Southwest, a place where the period of forced boarding school programs resulting in loss of language, coincided with resource exploitation projects, such as coal and uranium mining, I will discuss how landscapes change in detrimental ways, yet knowledge regarding this change is difficult to capture. Current language revitalization efforts are often confronted with several issues, such as: reduced or denied access to traditional lands; hiatus in language continuity through enforced boarding school Programs.

Like the case study, other wastelands, or ‘sacrifice zones’, often located in remote areas, comprise sensitive ecosystems, and are home to what we call marginal populations (Lerner and Brown, 2012). These are areas with high levels of pollution and environmental hazards because of toxic or polluting industrial facilities. The health and safety of these populations, and ecosystems are thus sacrificed for economic gains and prosperity for others elsewhere. Over time, many indigenous populations and minority communities were relocated to areas that now appear to be rich in minerals needed to drive global technological development.

To recognize this damage in more nuanced ways, I propose that it is necessary to map these wastelands in a way customary in land-based knowledge systems, giving names to fraught relationships between living beings and a land that cannot really support this life in a sustainable way. Although such knowledge systems are normally focused on how to live in the land in a reciprocal way, the resources now available to do so are dwindling and it is paramount to gain insight how this transformation takes place that turn these resources into toxic lands, even though this might not always be immediately clear or visible. A biosemiotic approach can prove to be instrumental in this process, providing a framework for understanding the changing relationships within ecosystems (Velmezova, Kull and Cowley,2015).

The objectives of this discussion are twofold: To explore the potential of a biosemiotic framework to support efforts in naming and understanding the processes of landscape change; To argue that to remediate environmental and societal/cultural detriment, a land-based knowledge system approach that encompasses the (history of) changing relationships can be an important means for justice.

Pedagogy as applied bio- and neurosemiotics: An aspect of history of the Tartu-Moscow semiotic school

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Several representatives of the Tartu-Moscow semiotic school were interested in the problems of bio- and neurosemiotics. One of the most famous participants of this school, Vyacheslav Ivanov (1929-2017), was interested in problems of pedagogy in connection with the study of the structure of the human brain. In his opinion, pedagogy had to collaborate with neurosemiotics in order to optimize the learning process for children (he was also among the first scholars who used the term “neurosemiotics”). As Ivanov believed, any learning should occur in such a way that the right material is absorbed at the right time, when the corresponding areas of the child’s brain are activated in an optimal way for this.

Ivanov’s ideas were not, in his opinion, accepted by the scientific and pedagogical communities of his time with due attention, but they are certainly interesting for historians of science. In particular, in the paper we will show how, when discussing applied bio- and neurosemiotics (together with developmental semiotics), Ivanov relied on the ideas of Juri Lotman (1922-1993), Roman Jakobson (1896-1982) and Aleksandr Luria (1902-1977), as well as on a kind of “Saussurean” structuralism, supposing the distinction of binary oppositions.

A part of the paper will be devoted to an analysis of why Ivanov’s ideas (as well as ideas of some other participants of the Tartu-Moscow semiotic school – Tat’yana Nikolaeva (1933-2015), Tat’yana Moloshnaya (1932-2010), etc.), at first glance innovative, were not received with attention by his/their contemporaries. In our opinion, the reasons lie partly in the specifics of the history of (bio)semiotics as an academic discipline in Eastern Europe in the second half of the twentieth - (and especially) at the beginning of the twenty-first century.

Finally, another important question to raise will concern the possibility to put into practice the corresponding ideas today, taking into account some modern theoretical achievements of biosemiotics.

Measuring the Meaning of Molecular Motifs

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For countless organisms, we today know their genomes as long sequences of A's, C's, G's, and T's. But what does this information – if it is information – mean? This is a question of semantics, while information theory, as introduced by Shannon (1948), explicitly is not concerned with meaning. Shannon considers literal communication, i.e. the problem of faithfully reproducing a message at another point in space and/or time in a noisy environment. This has led many scholars within theoretical biology and biosemiotics to disregard information theory as irrelevant.

However, without literal communication, there would be no semantic communication. Information theory thus defines a bound on how much meaning can be transferred. Battail (2013) argued that "information theory is a necessary prerequisite to biosemiotics", since literal communication is a condition for semantics. While Battail thus scolds biosemioticians for ignoring information theory, he in turn ignores bioinformatics, where information theory has been put to practical use for approximately 40 years (see, e.g., Schneider et al. 1986).

In living cells, the sequences are "read" by recognizer molecules – proteins or protein-RNA complexes – which bind to DNA or RNA. Importantly, the binding is specific: The recognizer molecules bind to certain motifs in the sequence. In bioinformatics, much effort goes into emulating the work of the recognizer molecules, i.e. trying to predict the presence and positions of the motifs from the sequence. Schneider and various coworkers have shown how the information content of a site – defined as the decrease in uncertainty upon binding – is often just enough to locate the sites in the genome. The conservation of the site – i.e. the amount of information communicated to future generations – is dependent on the evolutionary pressure which is defined by the biological function of the site, i.e. the Semantics.

Thus, I suggest that the quantitative definition of information as provided by Schneider is compatible with Bateson's (1972) definition of information as "a difference that makes a difference".

On Creative Love and Organismal Freedom

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In this presentation, we aim at presenting the idea whether organismal creativity, indeterminacy or a degree of freedom is inherent to living organisms. These ideas are traceable to Peircean agapistic evolution as ‘creative love’ (Acosta 2015) or Bergson’s concept of creativity (Bergson 1907; see Lacková Bennett 2025). Interestingly, both emerged around the same time, potentially reflecting what Peirce termed ‘the spirit of an age.’ Unlike Bergson, who views creativity as an unlimited potential, Peirce’s agapistic evolution integrates chance, randomness (tychasm), and law-like regularities (anancasm). In Peirce’s framework, creativity is not boundless but shaped by semiotic constraints (García-Valdecasas and Deacon 2024) and the formation of habits. As we examine the idea of creative love, we will focus on the role of chance, spontaneity, and indeterminism as understood within biosemiotics (Kull 2023). To illustrate these concepts, we will showcase examples from cellular and developmental biology (Švorcová 2024). The interplay between randomness, constraints, organismal experience and meaning attribution in living systems suggests that creativity is not merely a product of external forces but emerges from the internal dynamics of organisms themselves. Further, we explore selected approaches to modeling these processes in contemporary science. Our aim is to examine the extent to which degrees of freedom can be identified in organismal development and evolution.

Endless Forms of Endless Formation - morphogenesis in life, sciences and the arts

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The presentation will proceed from the premises that living forms and abstract formalization come into being by similar mechanisms (e.g., random variation, functional selection, arbitrary conventions) and have similar properties (e.g., semiosis and complexity). These convergences justify the comparative analysis of such forms in their development, evolution and action as different instances of the same process, the morphogenesis of metamorphic forms. Biological objects come into being. Their formation matters. Aristotle placed morphology at the basis of almost every field of human knowledge, including physics, law and politics. According to the German Mathematician Hermann Weyl (1921), in organisms “their form, morphé, Gestalt is the most imposing feature at play.” Goethe defined morphogenesis as “the laws of transformation according to which nature produces one part through another and achieves the most diversified forms through the modification of a single organ”. In line with Aristotle, Goethe considered morphology of paramount importance for science: “understanding Morphology blurs the distinction between objects of knowledge and the processes of knowledge.” Darwin closes “On The Origin of Species” by wondering how “whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.” We believe that by choosing the term “endless”— a polysemic word—he has perhaps unintentionally provided the basis for the further development of this core idea into new connotations and the formulation of new conceptual frameworks. Endless forms can be analyzed in light of the two main trends in biological sciences since the nineteenth century: the evolutionary perspective (which focus on the conservation, reproduction and potential for change of lineages of organisms through generations) and the physiological perspective (concerned with the organizational principles of individual organisms, those assuring their stability and capacity to establish organic cycles of energy and matter for continuous self-fabrication using changeable resources and as fuel for their creative singularity). I will examine the formation of living artifacts, words, and beings departing from five synonyms for the word “endless” selected from the Merriam-Webster Thesaurus dictionary, namely, perpetual, incomputable, manifold, unfinished, steady. I shall reason in line with some methodological perspectives by mentioning their seminal works—i.e., the comparative phylogeny/genealogy introduced by Darwin, the true-to-nature method advanced by Goethe, and the research agenda inaugurated by Claude Bernard’s inspiring ideas on experimental physiology. Those will be starting references to bring to light some of the otherwise tacit assumptions leading me to other scientific approaches that came later, such as Code Biology, Systems Biology, Cognitive Sciences, Biosemiotics and Relational Biology among others. My claim is that while dissecting how the five connotations of “endlessness” are enacted in the realm of biology and poetics. I will at the same time provide insights on how alternative domains have been coping with the creative demands aforementioned through the formulation of artefacts, concepts and research programs more attuned to the intricate levels of endless formation in living forms.

Meaning of Smells: Towards an Evolutionary-Cognitive

Semiotics of Olfaction

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How do we make sense of smells? We seldom discuss smell as a sign, compared to visual or auditory counterparts. This negligence has a long history, traceable at least back to when Kant put olfactus and gustus into the category of ‘lower’ senses in contrast to ‘higher’ senses such as visus and auditus in his Anthropology from a Pragmatic Point of View. However, it is clear that olfaction possesses the capability to carry meanings. Or rather, smells are always interpreted rather than directly represented, in that we cannot describe them without reference to their own sources or similitude to other smells also referred to by their sources, as in “This is the smell of an orange" or “This perfume smells like rose". Smells can also indexically signify, as in how incense is used in many religions across the world. Admittedly, however, understanding and explaining how olfaction works and how it differs from other senses poses some difficulties, as Aristotle also acknowledges in De anima.

There seems to be a fundamental neurobiological difference in the conscious processing of olfactory stimuli compared to other modes of perception. The pathway between the olfactory cortex and prefrontal cortex, responsible for conscious cognitive control and other executive functions, is mostly direct bypassing thalamus unlike other senses (Shepherd 2005). How does this neuroanatomical peculiarity influence the characteristics of olfactory experience relative to visual or auditory ones for example? And how should this difference be accounted for in our semiotic theory if we were to have a unified understanding of semiosis, not separate, ad hoc, systems for each modes of sensation?

One should be reminded when studying perception, that it is the biological evolution that has happened over millions of years that is the ‘efficient cause’ of perception if the sensory system itself is the ‘material cause’. The chemical senses, olfaction and gustation, are the oldest—phylogenetically—senses, developed to guide us what to avoid potential dangers such as poison. The reason certain smells evoke specific physiological reactions are not in us, but in the evolutionary path that we, from unicellular organisms to humans as species, has went through. Building on Peirce’s famous distinction of firstness, secondness, and thirdness, “zerothness” might be needed in order to address this evolutionary path-dependency of our cognition. The process of semiosis now goes beyond the individuals while not reducing such universalities simply into a priori. This project thus is directly linked to the newly arising paradigm of ‘Evolutionary Epistemology’ (cf. Wuketits 1984).

Nihilistic Umwelts & Umwelt Nihilation

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In what way is novelty related to loss? How do loss and novelty entangle, and manifest? How do they concern the Umwelt? This presentation will share core developments of ongoing Umwelt research at the Theoretical & Evolutionary Biology department of Charles University in Prague, drawing from Biosemiotic study at the University of Tartu from 2022-2023 and research conducted with the Finnish Ministry of Natural Resources from 2023-2024. My claim is essentially that Umwelts may degenerate, undergoing loss of ecological code. These sorts of loss may be most clearly understood in reference to nothingness, and thus our concern will be the Nihilistic Umwelt. To demonstrate nihilistic processes in the umwelt, this presentation will interweave empirical application and historical-theoretical precedent to draw continuities between ecological, historical and cultural appearances of what is here called Umwelt nihilation. We will begin by addressing how Umwelts may classifiably degenerate, and why. This initial argument will be presented with reference to currently-unpublished research concerning the invasive population of Pink Salmon in the North Arctic, a case in which the codes which structured the species' spatial umwelt were negatively selected against. We will show the contexts in which it is favourable for Umwelts to degenerate, and what types of Umwelt nihilation there may be. This will develop into our considerations of 'mechanisms of novelty and loss' and examples thereof. At this point we will review the historical literature of analogous claims, most notably Konrad Lorenz' writing on aggression and the 'waning of humaneness'. As a counterpoint to nihilistic Umwelts, we will present the concept of the 'harmony null hypothesis', by which thinkers like Jakob von Uexküll confidently posited point-counterpoint matchings to the whole of nature, and from which critical biosemiotic positions may be levied. We will show how Umwelt nihilation is an entity essentially belonging to cyclical (in lieu of linear) cosmologies, and how it may stand in row with analogous critical-cosmological positions. We will connect the argument of nihilistic Umwelts to the sociology of colonialism, capitalism, and ecological collapse.