Signs of livingness in design material[itie]s

Conference Paper · July 2021

CITATIONS
0

READS
318

2 authors, including:

Barbara Pollini
Politecnico di Milano
17 PUBLICATIONS **29** CITATIONS

SEE PROFILE

21st Annual International Gatherings in Biosemiotics

July 26-29, 2021

Biosemiotic insights

Stepwise (slowly, but persistently), the understanding that semiosis is a fundamental attribute of life enters into contemporary biology. Discussions taking place at the Gatherings in Biosemiotics for over two decades have demonstrated that the insights from semiotic models are productive for explaining most difficult problems of theoretical biology, and provide an additional dimension for understanding in biology at almost every level.

Biosemiotics comprises any professional research on pre-linguistic meaning-making, regardless of its method (e.g. qualitative or quantitative) aspect (e.g., semantic, syntactic, or pragmatic), school (e.g. Peircean, Saussurean, Gadamerian), focus (e.g., codes, hermeneutics, interpretation), or terms used.[1] The proper understanding of semiosis and of meaningful communication in all their forms, together with their role in the phenomena of life, is what biosemiotics is aiming at, with necessary consequences for both biology and semiotics.

So, we go on.

To date, two volumes reviewing our annual international meetings have been published – the first giving an overview of the first twelve Gatherings from 2001–2012,[2] and the second reviewing the next eight from 2013–2020.[3] This year's Gatherings, we are sure, will be the inaugural entry in a forthcoming third volume.

We thank Donald Favareau, Vice-President of the ISBS, for his role as initiator and Chief Organiser of the Gatherings in Biosemiotics 2021, and Nora Bateson and the International Bateson Institute in Sweden for hosting the in-person component of this year's hybrid online and in-person Gatherings.

Gregory Bateson's writings have been an important source for biosemiotics – two volumes in the Biosemiotics Book Series have focused on Batesons's work[4] – and we are delighted to reaffirm this strong tie between our two communities of researchers.

With abiding thankfulness to:

The five anonymous members of the Abstract Selection and Programme Organizing Committee;

Daniel Lundqvist and NAV Sweden for providing a meeting space for our in-person presenters, and for enabling our online Zoom conferencing and YouTube streaming;

Claudio J. Rodríquez Higuera for designing, creating and maintaining our conference website;

Paul Cobley for helping Don and I edit this abstract book, Peter Vail for his design and Photoshop skills, and Emi Morita for her photographs of the members of the underwater community of the Lembeh Straits, Sulawesi, Indonesia.

Kalevi Kull
President of the International Society of Biosemiotic Studies

---

[1] Such a broad view animates all the major historical accounts of biosemiotics, e.g. Favareau, Donald (ed.) 2010. *Essential Readings in Biosemiotics: Anthology and Commentary*. (Biosemiotics 3.) Berlin: Springer. – Kull, Kalevi 2005. A brief history of biosemiotics. *Journal of Biosemiotics* 1: 1–25.

[2] Rattasepp, Silver; Bennett, Tyler (eds.) 2012. *Gatherings in Biosemiotics*. (Tartu Semiotics Library 11.) Tartu: University of Tartu Press.

[3] Lacková, Ľudmila; Rodríguez H., Claudio J.; Kull, Kalevi (eds.) 2020. *Gatherings in Biosemiotics XX*. (Tartu Semiotics Library 20.) Tartu: University of Tartu Press.

[4] Hoffmeyer, Jesper (ed.) 2008. *A Legacy of Living Systems: Gregory Bateson as Precursor to Biosemiotics*. (Biosemiotics 2.) Berlin: Springer. – Guddemi, Phillip 2020. *Gregory Bateson on Relational Communication: From Octopuses to Nations*. (Biosemiotics 20.) Berlin: Springer.

SCHEDULE

2021 GATHERINGS PROGRAMME AT A GLANCE

TIME	Mon 26	Tues 27	Wed 28	Thur 29
1:10-1:30	***Introductory Remarks***			
1:30-2:00	BATESON	JAROŠ	SHAROV	***Poster Presentations***
2:00-2:30	BENNETT	BEEVER	TØNNESSEN	CÁRDENAS-GARCÍA
2:30-3:00	FAVAREAU	MARAN	PHAROAH	BOHÁT
3:00-3:15	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***
3:15-3:45	CELY-SANTOS	HENDLIN	MIYAMOTO	PAINTER
3:45-4:15	GUDDEMI	KHUMALO	MÄEKIVI	SMITH
4:15-4:45	HARRIES-JONES & ANDERSON	CREIGHTON	ŠVORCOVÁ & LACKOVÁ	GÓMEZ
4:45-5:00	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***	***BREAK (and Breakout Room)***
5:00-5:30	POLLINI & ANGELINI	KURISMAA	CARIANI	BLOOM
5:30-6:00	ROBUSCHI	ALEXANDER	JACOB, et al.	SCALIA
6:00-6:30	VELMEZOVA	BACIGALUPI	ROSSAMINTH	CHAVEZ
6:30-7:00	KULL	KARATAY & DENIZHEN	JASTRZEBSKI & RACZASZEK-LEONARDI	SCHUMANN
7:00-7:30	***End of Day Discussion***	***End of Day Discussion***	***End of Day Discussion***	***Day End Discussion***
7:30-7:45				***Closing Remarks***
8:00 pm	Tuesday July 27: **A Special Performance of Music & Talk** with STEPHEN NACHMANOVITCH & DAVID ROTHENBERG			

Programme

All times are in Swedish (Central European) Time

Monday, July 26, 2021

1:10–1:30	Introductory Remarks
1:30–2:00	*Nora Bateson*: Abductive process, anticipatory systems, transcontextual mutual learning, and aphanipoiesis
2:00–2:30	*Tyler James Bennett*: The quasi-sign doctrine
2:30–3:00	*Donald Favareau*: Determinacy and indeterminacy in biosemiotics: The centrality of 'openness to possibility' in biology and semiosis
3:00–3:15	BREAK (and Breakout Room)
3:15–3:45	*Marcela Cely-Santos*: Inclusive vitality: Human-bee sensorial journeys in the tropical countryside
3:45–4:15	*Phillip Guddemi*: Semiotic scaffolding and the Batesonian paradox of play
4:15–4:45	*Peter Harries-Jones* and *Myrdene Anderson*: "In a communicational world there are no objects" Warren McCulloch to Gregory Bateson
4:45–5:00	BREAK (and Breakout Room)
5:00–5:30	*Barbara Pollini* and *Alberto Angelini*: Signs of livingness in design material(itie)s
5:30–6:00	*Camilla Robuschi*: The aesthetic dimension as a demonstration of the continuity between nature and culture in human beings
6:00–6:30	*Ekaterina Velmezova*: On the biosemiotics of beauty: Rereading the prose of science-fiction writer Ivan Efremov
6:30–7:00	*Kalevi Kull*: The biosemiotics of beauty
7:00–7:30	End of Day General Discussion

Tuesday, July 27

1:30–2:00	*Filip Jaroš*: Adolf Portmann: An old new narrative of an anthropological difference
2:00–2:30	*Jonathan Beever*: Biosemiotics, philosophy, and thinking (with) others
2:30–3:00	*Timo Maran*: Dark umwelts, species extinction and literary imagination
3:00–3:15	BREAK (and Breakout Room)
3:15–3:45	*Yogi Hale Hendlin*: The interspecies circularity of agency
3:45–4:15	*Brian Khumalo*: Ecosemiotics in human ecology: The implications of biosemiotics for social science
4:15–4:45	*Andrew Mark Creighton*: Extravaganzas, simulations, and intersubjectivity: A sociological and zoosemiotic perspective
4:45–5:00	BREAK (and Breakout Room)
5:00–5:30	*Andres Kurismaa*: From parabiosis to hormesis: Bridging experimental models and (semiotic) theory
5:30–6:00	*Victoria N. Alexander*: Applying biosemiotics to the theory and practice of qualitative vs qualitative methods
6:00–6:30	*Joshua Augustus Bacigalupi*: Semiogenesis: Harnessing higher-order dimensions from structured noise
6:30–7:00	*Vefa Karatay* and *Yagmur Denizhan*: How to address the circularity involved in semiogenesis?
7:00–7:30	End of Day General Discussion
7:00–8:00	BREAK
8:00–9:00	A special performance of music & talk with *Stephen Nachmanovitch* & *David Rothenberg*

Wednesday, July 28

1:30–2:00 *Alexei A. Sharov*: Explaining protosemiosis

2:00–2:30 *Morten Tønnessen*: The relevance of umwelt theory for the theory and practice of phenomenology

2:30–3:00 *Mark Pharoah*: Reconsidering causation and information from a biosemiotic perspective

3:00–3:15 BREAK (and Breakout Room)

3:15–3:45 *Oscar Miyamoto*: A biosemiotic interpretation of corvid episodic memory

3:45–4:15 *Nelly Mäekivi*: Analysing umwelt reversion: Communication between local people and the European mink (*Mustela lutreola*)

4:15–4:45 *Jana Švorcová* and *Ľudmila Lacková*: A Peircean reading of Lamarck: Evolution by habit

4:45–5:00 BREAK (and Breakout Room)

5:00–5:30 *Peter Cariani*: Cybernetics, neurosemiotics, and neurophenomenology

5:30–6:00 *Michael Jacob*, *Parham Pourdavood* and *Terrence Deacon*: Towards neurosemiotics: Ongoing neural activity as brain music

6:00–6:30 *Nicole Rossmanith*: Towards symbolic engagements – a tentative developmental trajectory over the first two years of life: From jointly moving through affect-imbued action arcs to co-creating systemically-structured sense-and-action-shapes

6:30–7:00 *Borys Jastrzębski* and *Joanna Rączaszek-Leonardi*: Leon Koj's event-based theory of signs: an alternative route for sign biosemiotics?

7:00–7:30 End of Day General Discussion

Thursday, July 29

1:30–2:00 Poster Presentations (*)

2:00–2:30 *Jaime F. Cárdenas-García*: The phenomenology of info-autopoiesis

2:30–3:00 *Róbert Bohát*: Metaphors to survive by II: From figures of perception to figures of speech

3:00–3:15 BREAK (and Breakout Room)

3:15–3:45 *Andrew Painter*: From Incomplete Nature to incomplete society: Sense, absence, and mass media communications

3:45–4:15 *Jacob Smith*: Mackenzie Crook's biosemiotic television

4:15–4:45 *Sergio Rodríguez Gómez*: Jakob von Uexküll meets Humberto Maturana and Francisco Varela: A hypothetic biosemiotic exchange on organization, experience and adaptation

4:45–5:00 BREAK (and Breakout Room)

5:00–5:30 *Jeffrey W. Bloom*: The dynamics of meaning expression and communication among people, dogs, and other creatures

5:30–6:00 *Jeremiah Cassar Scalia*: Language emergence and articulatory potential in biosemiotic perspective

6:00–6:30 *Eugenio Israel Chávez Barreto*: On language, communication and change: some notes on Sebeok's views on language

6:30–7:00 *John Schumann*: On the possibility of definition

7:00–7:30 End of Day General Discussion and Closing Remarks

(*) Overview and Open Discussion of Posters by:

Ali Tareq Abdul Hasan: Translational biosemiotics: Dermatosemiotics as a paradigm

Pavel Cenkl: An ecosemiotic model for learning: Designing experiential curriculum in a globally distributed learning network

Trace Fleeman Garcia: The individual biology seeks is the subject: Constructing a semiotic theory of individuality

Amelia Lewis: Patterned signals in animal social signalling

Felipe-Andrés Piedra and Donald R. Frohlich: On Peirce, freedom, and feeling

Tiago Rama: Towards a biosemiotic theory of development

TALKS

Applying biosemiotics to the theory and practice of qualitative vs qualitative methods

Victoria N. Alexander
Dactyl Foundation, NY, USA
alexander@dactyl.org

Social science researchers employ so-called qualitative methods, such as case studies, interviews, documentary evidence, participant observation, and the quasi-quantitative method of survey research. Physical science researchers employ quantitative methods; they take measurements, collect and count data points, and formulate equations that model how systems change. The difference in methods is said to make the social sciences more subjective compared to the hard sciences. But then, complicating things a bit, we acknowledge that the choice of what to measure and to count may bring in subjectivity at the outset of any scientific experiment.

Furthermore, on the one hand, we observe that evolutionary dynamics theorists, for example, almost seem to wax poetical when they make mathematical analogies between landscapes and reproductive fitness or between game theory and gene selection. On the other hand, humanities researchers may count word frequencies in novels or histories, make graphs illustrating the shape of a series of events, or compare culture to physical systems, providing insight previously unavailable with purely qualitative methods.

Interdisciplinary studies departments worldwide now offer courses combining quantitative and qualitative methods as a compromise intended to resist the privileging of one method over the other. In this talk, I will argue that we've been coming up with answers to the wrong question. Quantitative methods are appropriate for modeling how *any* complex system stays more or less the same. Qualitative methods are appropriate for understanding how *any* complex systems change significantly.

I will argue that the processes that cause change involve the qualities of similarity, proximity, and arbitrary association, which inhere in the relationships of the system's interactions themselves and are not imposed by an external observer. These local interactions give rise to emergent features that can be modeled quantitatively. Thus the conventional ways of thinking about the objective/subjective dichotomy needs some serious re-evaluation.

Semiogenesis: Harnessing higher-order dimensions from structured noise

Joshua Augustus Bacigalupi
Dactyl Foundation, NY, USA
bacigalupiworks@gmail.com

This presentation proposes a process ontology for semiogenesis, by which many analogs in a sentient agent superpose to create a disparation,[5] or "structured noise", viz. stereopsis. This disparation will be shown to be a kind of abduction,[6] by which novel higher-order dimensions can be harnessed. These new dimensions are then new constraints on the possible kinds of work available to the agent – not in place of existing constraints but composed of them – such that ever more complex and adaptive behaviors are accrued with experience in its environment.

The Paradox: To frame the question of disparation informally, an architectural design process will be outlined, which starts by asking: what are the numerous constraints and parameters that will impact the eventual design? These initial constraints are often contradictory, but, through a deliberate process, these divergent considerations are concretized into a complex, coherent and singular outcome. This paradoxical process can be generalized to life's continuously creative task of resolving innumerable tensions with existential implications.

Generalizing the Paradox: To extend this paradox to life more generally, semiosis will be explored in the slime mold *Physarum polycephalum* (Saigusa et al. 2008; Vallverdu et al. 2018). These examples will be used to demonstrate instances of iconic – i.e. analogical – and indexical – i.e. associative – phenomena in these amoebae. However, these examples typically consider resultant noise to be a pernicious perturbation to be neutralized by a stabilizing homeostatic response. This presentation, however, asks how this kind of experiential noise, or disparation, can be actively leveraged by the agent in the acquisition of higher-order dimensions that enables a more complex umwelt?

Semiogenesis: To start with a simple example, the Moiré pattern illustrates how a third pattern results from two superposed patterns. It is this third term that emerges from the interference pattern, which can be harnessed as a source of novel dimensions able to generate novel signs (Alexander et al. 2021). A canonical example is a *difference that makes a difference* in depth perception, i.e. stereopsis; the disparation between two 2D retinal images is harnessed by the visual cortex to enhance our fabricated experience of a 3rd dimension. These, and other examples, will be presented as a manifestation of semiogenesis.

References

Alexander, V. N.; Bacigalupi, J. A.; Castro, Ò. G. 2021. Living systems are smarter bots: Slime mold semiosis versus AI symbol manipulation. *Biosystems.*

Saigusa, T.; Tero, A.; Nakagaki, Y.; Kuramoto, Y. 2008. Amoebae anticipate periodic events. *Physical Review Letters* 100(018101).

Vallverdu, J.; Castro, O.; Mayne, R.; Talanov, M.; Levin, M.; Baluska, F., ... Adamatzky, A. 2018. Slime mould: the fundamental mechanism of biological cognition. *BioSystems.*

[5] In the process philosophy of Gilbert Simondon (1924–1989), he uses the example of stereopsis to introduce *disparation*. He then generalizes this phenomenon to explain ontogenesis; this presentation intends the same generalization to explain semiogenesis.

[6] As initially proposed by C. S. Peirce (1839–1914), abduction is meant in its generative sense of creating new hypotheses. Specifically, for this presentation: abduction is a phenomenon by which novel constraints, or dimensions, emerge from the rapport among existing constraints.

Abductive process, anticipatory systems, transcontextual mutual learning, and aphanipoiesis

Nora Bateson
International Bateson Institute
norabateson@aol.com

The multiple entities of a living system are always mutually responding to the shiftings of each other in ways that constitute both stability and change. It may be possible to name the changes that form, but prior to such naming, deeper abductive possibilities have already begun to quicken. Bateson sometimes described abduction as the way one context describes another. Charles Sanders Peirce more often described it as a way to hypothesize between contexts.

Both are viable toward what I propose to call *aphanipoiesis*, which I define below. The resonances of mutual learning and information between the entities in a living system become their communication, as well as their possibility for communication. What is possible to communicate is far more informative, as to the changes possible in a living system, than what is identified as communication. The brackets of possibility for communication are produced in the history of 'differences that made differences' into which any new information is brought. This waiting alchemy of difference is perhaps the most plastic aspect of what is sometimes called "change", though it is unseen until it later finds form in more emergent properties.

A new word for an aspect of living process: Aphanipoeisis

Pathology and vitality in living systems may be observable and describable, however, the ways in which they both come to occur are at least in part unseen. "Insidious" describes dangerous outcomes that 'creep up' through the combination of unseen contributing processes. But, there is lacking a way to describe a parallel but opposite process, by which vitality, healing, and creativity come into being by the coalescence of multiple unseen factors.

By bringing together two words from ancient Greek it might be possible to propose the word *aphanipoiesis* as a term for this way in which life coalesces toward vitality in unseen ways.
(*Aphanis* is from a Greek root meaning, obscured, unseen, unnoticed; *poiesis* is from one meaning to bring forth, to make.) Other words which also carry the root '*phanis*' include phantom, diaphanous, and phenomenon, while the root *poiesis* is familiar from the word poetry, along with Maturana and Varela's '*autopoiesis*'.

Hypothesis and aphanipoeisis

"Abduction is the process of forming explanatory hypotheses. It is the only logical operation which introduces any new idea" (CP 5.172).

Central to abductive process is the notion of hypothesis. But what does a hypothesis say about the anticipatory systems of perception of any given observer? In noticing *aphanipoiesis* it becomes relevant to explore the realm of unseen contributors coalescing to produce the foundations of hypothesis itself. Hypothesis is vital in the exploration of new perception, as Peirce observes. The process of hypothesis gives a scaffolding onto which new information can be recognized and built upon. But it is also limited by pre-existing anticipatory patterns. If one is listening only for that which one knows to listen for, that is what will be heard; it is the hum into which any new notes can find purchase. In the study of *aphanipoeisis* hypothesis is shown as an indicator of those pre-habituated perceptions into which new information will be filtered. The hypothesis itself becomes a permeable moment when the limits of perceptive capacity are revealed. The way in which familiarity with something in one context can enable a kind of description of another context becomes a basis of experiencing newness. A new flavor is explored though the experience of known flavors, a new form of music is explored through the understanding of other forms, and ultimately abductive process becomes a zone of untamed, unnamed, unseen and essential contributors to what may later be called emergence.

Biosemiotics, philosophy, and thinking (with) others

Jonathan Beever
University of Central Florida
Jonathan.beever@ucf.edu

A recent surge in public-facing books, film, and popular media focusing on giving voice to the human/non-human relationship suggests a western cultural shift in our perceptions of the value of the other. In this presentation, I focus specifically on the case of the octopus, articulating the rapid take-up on science and humanities driven efforts to resituate this animal as intelligence, interactive, and individual, as opposed to mechanical and abstractly alien. Popular author Sy Montgomery, through her book *The Soul of an Octopus* (2015), and Craig Foster, through his documentary *My Octopus Teacher* (2020), stand as key examples of this populist resituation. In each case, the human author explores the meaningful relationship they build with the individual octopus and extrapolate that meaning out to ecological relationships more generally. This new or renewed focus on the relationship to the nonhuman other shines a light on the growing intersections between philosophy – in particular so-called continental philosophy – and the philosophical roots of biosemiotics. Concepts central to biosemiotics including the semiotic web, meaning-making, and the umwelt are also central to twentieth-century continental philosophy. The unique intersection of Uexküllian biology and Peircean metaphysics at the root of biosemiotics has been taken up by philosophers working on 4E approaches to cognitive science, in the phenomenology of Maurice Merleau-Ponty, and the ontological work of Gilles Deleuze, among others. I argue that these diverse points of connection across philosophical traditions, evidence convergence of contemporary philosophizing around one central problem: the nature and meaning of *interdependence*, or the idea each individual is bound up in and constituted by a network of relations (see Sharma 2015). On this view, the very nature of the octopus is contingent on the network of meaning-full relationships in which it functions – and this same story is true of every individual. Drawing on the framing and content of popular octopus literature, I will explicate the problems and potential of interdependence and, in so doing, argue that the future of philosophy is the present of biosemiotics: a growing emphasis on ethical thinking with the thinking other.

References

Montgomery, S. 2015. *The Soul of an Octopus.* New York: Atria.
Foster, C. 2020. *My Octopus Teacher*. Netflix.
Sharma, K. 2015. *Interdependence.* New York: Fordham University Press.

The quasi-sign doctrine

Tyler James Bennett
University of Tartu
tyler.bennett1984@gmail.com

The quasi-sign doctrine originates from two excerpts from Peirce's CP 5.47. In the well-known g*round arms e*xample, soldiers learn after long practice to obey the command to place the butts of their rifles on the ground with little to no deliberation over the object of the sign, and with a resulting diminished interpretant. Peirce compares the nearly automatic response of the well-trained solider to his command with the fully automatic response of a thermometer to a rise in temperature. He speaks of them both as dyadic signals, but he reminds the reader that the act of the solider may never be fully dyadic. Though the cases of the quasi-sign differ in important respects, they always share the common feature of decreased deliberation (Kull 2000). In the recently defended PhD dissertation (Bennett 2021) this brief reflection upon the quasi-signs provides the basis for the further development of two types of quasi-signs, in order to describe their action in different domains. The first type, called the proto-signs, is already a major interest of biosemiotics (Sharov, Vehkavaara 2015) and describes the biologically simple signs which have not achieved the full differentiation of the symbolic. The second type, called the tardo-signs, describes signs which have achieved symbolic differentiation, but whose signification has ossified so to speak. Here, the primary reference is to semiotic literature outside of biosemiotics, where the idea of self-replicating signs which take on a life of their own independent of their biological hosts has always been a popular theme. Specifically ideology critique, psychoanalysis, and deconstruction are the semiotic domains that have always been preoccupied with what are called here the tardo-signs. The premise of the quasi-sign doctrine is that the study of the former, biologically simple, pre-triadic proto-signs is instructive for understanding the latter, post-triadic tardo-signs, one of the goals of the doctrine being to demonstrate the applicability of biosemiotic ideas to problems of culture. For instance, via this theoretic transposition cognitive science and evolutionary biology become relevant to ideology critique, and this relevance is demonstrated. Problems arise right away regarding the dangers of reducing issues of culture to biological realities, the disputed status of sign typologies themselves (whether all signs involve a symbolic aspect, and whether it is sound to speak at all of pre-triadic or post-triadic signs in the Peircean usage), and the abiding methodological, philosophical, and political differences between Peirce-inspired biosemiotics on the one hand, and the other semiotics that has classically been more interested in the tardo-signs on the other hand.

References

Bennett, Tyler James 2021. *Detotalization and Retroactivity:Black Pyramid Semiotics.* Tartu: University of Tartu Press.

Kull, Kalevi 2000. Copy versus translate, meme versus sign: Development of biological textuality. *European Journal for Semiotic Studies* 12(1): 101−120.

Sharov, Aleksei; Vehkavaara, Tommi 2015. Protosemiosis: agency with reduced representation capacity. *Biosemiotics* 8(1): 103–123.

The dynamics of meaning expression and communication among people, dogs, and other creatures

Jeffrey W. Bloom
International Bateson Institute
jeff@batesoninstitute.org

Continuing an interest that began with my early research on children's *contexts of meaning* (Bloom, 1990), this paper examines the dynamic nature of meaning and how that meaning is communicated between and among people, dogs, and other animals. This examination is based on the essential nature of contexts in meaning development and communication. Moving from one context to another as well as the changes within any particular context not only affect meaning, but also require that the expression and communication of meaning changes. Such changes are reflective of the fluid nature of personal and social epistemology (Bateson, G., 1979/2002), which, in turn, affect how individuals and groups develop and maintain relationships within themselves, with one another, and with their environments.

One of the challenges we have had in developing understandings of knowledge (epistemology) and communication in non-human animals (and even other organisms) is that we tend to base our perspectives or lenses on our own knowledge and communication. Although our anthropomorphic tendencies can be powerful tools for understanding other organisms, we also need to shift our lenses to see how these "abilities" have been adapted to the specific contexts in which other organisms live. This paper explores meaning and personal epistemology as it relates to communication in and across various contexts. In addition, cross-contextual (i.e., across more distal contexts) communication, such as wild animals attempting communication with humans, is examined, as well.

The keys to this sort of communication involve the dynamic interactions between the fluidity of epistemology, the changing and intertwining of contexts, relationships between individuals and their environments, the abilities of individuals to "pattern" (to observe and respond to patterns in behavior and action) (Bateson, N. 2016), improvisation, and meta-communication. This ecology of semiosis can provide ways of understanding the complexity of the matrix of relationships that exist within and across multiple contexts. In a significant way, such a view enlivens our view of the relationships between humans, animals, and very likely the whole range of living organisms. Hopefully, the present exploration of such a view will add to the enrichment our understandings of a semiotic ecology of the relationships, context, communication, and epistemology.

References

Bateson, G. 2002. *Mind and nature*. Hampton Press.

Bateson, N. 2016. *Small Arcs of Larger Circles: Framing Through Other Patterns*. Triarchy Press.

Bloom, J. W. 1990. Contexts of meaning: Young children's understanding of biological phenomena. *International Journal of Science Education* 12(5): 549–561.

Metaphors to survive by II: From figures of perception to figures of speech

Róbert Bohát
Charles University, Czech Republic
bohat@volny.cz

This theoretical paper is an attempt at a synthesis of my proposal to study biological mimicry as *embodied metaphors to survive by* (or biometaphors, since the mimic becomes an embodied sign of something that it is not) with Coletta's concept of the "biological metaphor" as the "metaindex" and a case of "indexical stretching" (Coletta 1993; Bohát 2021, in print; compare Maran 2011). Coletta argues that there is a "relationship between metaphor-making in human beings and the solving of complex visual puzzles in animals". My proposal to study such biosemiotic metaphors as metasigns with important zoosemiotic and ecological functions seems to be in harmony with Coletta's (1993) search for the biological grounds for "the isomorphism of linguistic and biological" phenomena.

Coletta also speaks of "indexical stretching expressed through the predator-prey relationship" which "is a kind of meta-trope out of which is generated an endless array of complex visual puzzles," such as toad crypsis which may make a toad "metaphorically equal" to a stone (Coletta 1993: 224). He further analyzes the "metaindex" "as a figure of speech and a figure of sight (in biological mimicry)" which is "a highly condensed image of biological transformation which achieves metaphoric status because it 'says' or 'sees' one thing as another... as all metaphors do" (p. 225). Hence, "in the toad-stone metaindex, then, the tenor is the toad because *looking like the stone* is the vehicle by which the toad attempts to escape predation. In other words, 'seeing' toads 'as' stones is a 'figure of sight' with survival value" (p. 227).

The main focus of this synthesis is twofold: first, to compare the usefulness of the terms "metasign" and "metaindex" and Coletta's analysis of "seeing certain forms in terms of others" as "figures of sight" (p. 227), and second, extend and generalize Coletta's "figures of sight" as ***figures of perception*** (including figures of sight, sound, scent and taste). This will include an "update" of these concepts by reformulating these figures of perception in terms of the currently most influential Cognitive Metaphor Theory (CMT) in order to further test the coherence of conceptualizing biological mimicry as isomorphic with human cognitive metaphors. A preliminary analysis of both approaches seems to indicate that "man" (sensu *Homo sapiens*) is indeed ***not*** the only "metaphor maker" in the global semiosphere. Furthermore, this transdisciplinary approach might help shed more light on some aspects of the biological roots of semiosis.

References

Bohát, R. 2021. Metaphors to survive by: Mimicry as biometaphors: Embodiment of sign and cognition (not only) in animals? *Linguistic Frontiers* 4(1); Special Issue: Delahaye, Pauline (ed.), on Zoosemiotics and Animal Ethology; Sciendo.

Coletta, W. J. 1993. The semiotics of nature: Towards an ecology of metaphor and a biology of mathematics. *The American Journal of Semiotics* 10(3): 223–244.

Maran, T. 2011. Becoming a sign: The mimic's activity in biological mimicry. *Biosemiotics* 4: 243–257.

The phenomenology of info-autopoiesis

Jaime F. Cárdenas-García
University of Maryland, USA
jfcg@umbc.edu

The purpose of this presentation is to describe the phenomenology of info-autopoiesis. The goal is to detail how meaning comes about for living beings engaged in the process of info-autopoiesis, or the self-referenced process of information self-production, in order to satisfy their physiological and relational needs (Burgin and Cárdenas-García 2020; Cárdenas-García 2020).

Info-autopoiesis relies on Bateson's *difference which makes a difference* and serves as the basis for its phenomenological nature. This allows the discovery not only that information is not an absolute quantity, but rather a derived quantity, useful to living beings, from the sensorially detected motion of matter and/or energy in the Universe. All living beings have this unique capability of detecting spatial/temporal differences or information that allows its use to derive meaning as active manipulators/observers of their environment.

For the human-organism, the process of info-autopoiesis is found to be triadic in nature and incorporates the simultaneity of a quantitative/objective perspective with a qualitative/ subjective perspective. These perspectives develop from the interaction of Impersonal/ Objective/ Absolute Information and Personal/Subjective/Relative Information, which result in Shannon/ Distilled Information. In interacting with its environment, the human-organism develops from a state in which its knowledge of the human-organism-in-its-environment is almost non-existent to a state in which the human-organism not only recognizes the existence of the environment but also sees itself as part of the human-organism-in-its-environment system. This allows a human-organism not only to self-referentially engage with the environment and navigate through it, but to even transform it in its own image and likeness. This is a succinct description of the phenomenology relevant to info-autopoiesis in the phylogenetic and ontogenetic development of the human-organism.

The analysis is shown to parallel Peircean phenomenology or phaneroscopy, a process grounded in the categories of – Firstness, Secondness, Thirdness – which corresponds to an exhaustive system of hierarchically organized classes of relations (Peirce 1931–1936). In brief, the categories can be defined as: (1) "Firstness: what is such as it is, without reference to anything else". This implies that "Firstness" has a subjective basis, since it exists without any reference to anything else. This is the living being just existing in a world of its own and does not need referring to anything else to be in the moment; (2) "Secondness: what is such as it is, in relation with something else, but without relation with any third entity". This implies that "Secondness" has an objective basis, since it exists with reference to something else. This is the living being existing in a world in which other things exist, and is able to engage in interactions with those things that do not lead anywhere; and, (3) "Thirdness: what is such as it is, insofar as it is capable of bringing a second entity into relation with a first one in the same way that it brings itself into relation with the first and the second entities". This implies that "Thirdness" has both a subjective and objective basis, being able to interact with other things so as to compare and contrast them.

References

Burgin, M.; Cárdenas-García, J. F. 2020. A dialogue concerning the essence and role of information in the world system. *Information* 11(9): 406.

Cárdenas-García, J. F. 2020. The process of info-autopoiesis – the source of all information. *Biosemiotics* 13(2): 199–221.

Peirce, C. S. 1931–1936. *The Collected Papers. Volumes 1–6*. Cambridge: Harvard University Press.

Cybernetics, neurosemiotics, and neurophenomenology

Peter Cariani
Boston University, USA
cariani@bu.edu

A general, *systems semiotics* is proposed as a conceptual, heuristic framework for understanding how signs are used in natural and artificial informational systems. Signs are regarded as materially embodied distinctions that reliably switch the subsequent behavior of a system (as recognized by some observer through some observational frame). In biological systems, signs guide the construction of the organism (genetic codes), mediate cellular signaling operations (molecular codes), coordinate organismic behavior (neural codes), and subserve the contents of conscious awareness (neurophenomenal bridge laws).

Drawing from Uexküll, Morris, Pattee, Rosen, classical cybernetics, theoretical biology, pragmatism, operationalism, and psychological constructivism, I propose a taxonomy of adaptive, self-modiying and self-constructing percept-coordination-action (observer-actor) systems. These functional organizations utilize three primitive semiotic operations that mediate relations between internal signs and with the external world. In "measurement" (sensing), contingent interaction of a sensory receptor with the external world produces sensory sign. In "computation" (coordination) internal signs are reliably mapped to other signs. In "action, " an internal command-sign directs an effector that causes a change in the external world.

Systems are purposive by virtue of evaluative, switching, and construction operations that adaptively adjust the organization and behavior of the system to realize internal embedded goals. Evaluations are performance-related measurements used to steer behavior towards goal satisfaction. Switching changes percept-action mappings using existing signs, whereas construction changes physical substrates that can enlarge the set of available sign-primitives. Switching enables combinatoric creativity within existing sets of primitives (Piagetian assimilation), whereas physical construction enables new primitives to be formed (emergent creativity, Piagetian accommodation).

Neurosemiotics involves the role of signs in nervous systems. The (unsolved) problem of neural coding entails identification of which aspects of neural (spiking) activity subserve informational functions, i.e., that switch internal functional states and subsequent behaviors. We will discuss prospective types of neural codes. Rate-channel codes and connectionist networks encode distinctions using patterns of firing rates across neurons, whereas temporal codes and neural timing nets encode distinctions using patterns of spike timings. Both rate-channel and temporal codes can support iconic, form-preserving representations or arbitrary "symbolic" representations. However, temporal codes enable multiplexing of signals and broadcast coordination mechanisms that can liberate signals from wires (as in a radio network). In contrast, channel codes and connectionist networks must precisely regulate specific connectivities and transmission paths (as in a telegraph network or telephone switchboard). Whereas connectionism are channel-centric (which neuron does what is critical), timing nets are signal-centric (spike patterns irrespective of specific neurons are critical). Conceivably, neural timing networks can create new sign-primitives by selecting or tuning delays within local neural assemblies to produce new temporal patterns that function as tags that signify new concepts (semantic pointers).

Neurophenomenology involves the dependence of conscious awareness and specific experiential states on patterns of neural activity. The neurophenomenal neural coding problem entails formulation of neurophenomenal bridge laws that predict 1) what organization of neural activity is necessary and sufficient for there to be any conscious awareness (NCCs) and 2) what specific patterns of neural activity correspond to particular experiential, phenomenal states (NCCCs). In line with neural global workspace theories, I hypothesize that those sets of temporally-coded neural signals that are stabilized in recurrent global circuits through active regeneration constitute the neurophenomenological contents of short-term memory and conscious awareness.

References

Cariani, P. 2012. Creating new primitives in minds and machines. In J. McCormack & M. D'Inverno (eds.), *Computers and Creativity.* Springer, 395–430.

Cariani, P. 2015. Outline of a cybernetic theory of brain function based on neural timing nets. *Kybernetes* 44(8/9): 1219–1232.

Cariani, P. 2015. Sign functions in natural and artificial systems. In P. P. Trifonas (ed.), *International Handbook of Semiotics.* Springer, 917–950.

Inclusive vitality: Human-bee sensorial journeys in the tropical countryside

Marcela Cely-Santos
Rachel Carson Center for Environment and Society, USA
cely.sandramarcela@gmail.com

Bee declines are a major socio-ecological problem largely affecting the tropics, where more than 90% of flowering plant species depend on animal pollination for ecological perpetuation. Drivers and impacts of bee loss are typically understood in terms of bee population sizes and socio-economic indicators that do not account for deep drivers of anthropogenic disturbance and their influence on bee daily performances, or how bees impact the intimacy of human everyday experiences. I argue that analyzing how humans and bees shared subjective sensorial worlds (Uexküll 1985) can help us create more inclusive understandings of multispecies relationships, and nurture an ethics of inclusion to counteract biodiversity loss. In this work, I engage in a journey guided by the senses to understand bee-human semiotic and material relationships (Haraway 1988) and how they transform in Anolaima, a tropical rural region in the Colombian Andes undergoing agrarian and socio-cultural change. Such an approach can help understand mechanisms of bee loss and the abilities of bees and smallholders to respond to environmental change.

In this journey, I describe bee-human encounters as a kaleidoscopic interplay of biology, culture and imagination mediated by sensorial perception. I use each sense to explore processes that portray the complexities, tensions and opportunities of a composite human-bee world-making: (1) *Taste*. Honey, typically – but not always – is produced after bees consume floral nectar. This liquid changed human food experiences forever, and despite being displaced by sugar, it is still praised for representing the promise of health for rural families without access to social care services; (2) *Smell*. Humans enact global trade when smelling coffee, whose aroma was preceded by an odorscape carefully understood by pollinating bees. Those smells have been disrupted by agrochemicals, with major effects on bee health and local food production; (3) *Sound*. Buzzing swarms announce bees and intimidate humans. But other sounds, accompanying intimate dances between bees and flowers, remind us of the irreplaceability of native bees and the origin of gourds later turned by humans into drums; (4) *Touch*. For farmers, bee touch and sting represents fear and death, but for bees touching is communication, care and the engineering of sophisticated bastions; (5) *Sight*. (Un)seeing bees brings the risk of dismissal and the challenge of noticing difference – in sizes, shapes and colors. Acknowledging and praising diversity helps to appreciate bee genius and exercise our sense of humbleness and awe in order to imagine new futures.

Extending our relational worlds and eliciting a concerned response towards other beings is a social innovation that would fuel novel ways of making kin and revitalize multispecies collaborations. This work aims to use biosemiotic approaches to make visible some challenges to overcome difference, and expose shared spaces where bee and human practices of meaning-making converge, which may offer important lessons to coexist in ongoing waves of environmental change.

References

Haraway, Donna 1988. Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist studies* 14(3): 575–599.

Uexküll, Jakob von 1985. Environment [Umwelt] and inner world of animals. *Foundations of comparative ethology*, 222–245.

On language, communication and change: some notes on Sebeok's views on language

Eugenio Israel Chávez Barreto
University of Tartu, Estonia
chachavezbarretoei@gmail.com

According to Thomas Sebeok, speech is an *exaptation* of language, and thus, language and communication have actually little to do. Sebeok's support for this claim comes mainly from his own development of modeling systems theory, borrowing both from Tartu-Moscow school's ideas on secondary modeling systems and Jakob von Uexküll's umwelt theory. The main proposal put forward by Sebeok is that language is first and foremost a modeling system, and as such it can be thought of as "ordering perception", i.e. as building a model in Lotman and Tartu-Moscow school's sense; it was only later that communication arose as a subsidiary function of language, even if now it is taken as its main one. However, while Sebeok's claim might be perfectly valid in a phylogenetic sense, it is possible that some adjustments must be made to it if we wish to include it within a theory of language that explains language change through time (e.g. diachronic linguistics). This presentation will then have two aims. First, to elaborate on a distinction between two ways of conceiving a sign system: (i) as a modeling system, and (ii) as a semiotic structure. The main difference we would like to point out is precisely that when a sign system conceived as a modeling system, its main function is conceived as that of ordering perception; on the other hand, when a sign system is conceived as a semiotic structure, its main function is that of enabling practices, e.g. communication. The second aim will be (i) to integrate such distinction within the whole apparatus of primary, secondary and tertiary modeling systems, and (ii) to draw some implications of this distinction in explaining diachronic changes of language and other sign systems.

Extravaganzas, simulations, and intersubjectivity: A sociological and zoosemiotic perspective

Andrew Mark Creighton
University of Tartu, Estonia
andmarcrei@gmail.com

Zoosemiotics and sociology have both taken nonhuman animals and their use within societies and commodification as a point of study on a vast number of occasions, while considering various forms of media, entertainment, and production within these studies. However, the concepts of extravaganzas (a man-made spectacle) and simulations, while have been taken into consideration, have rarely been areas of focus when considering nonhuman animal and human interaction. Within this presentation, I will synthesize George Ritzer's McDonaldization theory, as well as his work on enchantment, with Jakob von Uexküll's concept of umwelt as an attempt to fill this gap within the literature. I intend to use these perspectives to gain an emic etic understanding of how nonhuman animals experience simulations and extravaganzas, the social processes and structures associated with these phenomenon, and human perceptions of the nonhuman animals within these situations. Moreover, this presentation takes a specific focus on human-nonhuman animal intersubjectivity within simulations and extravaganzas. As such my aim here is to investigate how intersubjectivity between humans and nonhuman animals is used within simulations and extravaganzas to attract consumers to areas of consumption. This presentation's focus will largely take dolphins within captivity as its subject of study. This entails paying attention to their use within extravaganzas and simulations and focusing on Las Vegas casino attractions, as well as, largely, the works of Lori Marino, which consider dolphin umwelt, and their wider umwelt map within the context of captivity. I conclude this presentation by arguing that simulations and extravaganzas make use of anthropomorphization, McDonaldization, social and environmental changes and deprivations, as well as simulated animal behaviours to create a sense of intersubjectivity between humans and nonhuman animals. However, this sense of intersubjectivity simultaneously disguises the harmful nature of these practices while also enticing participants to partake in the consumption of activities and consumer goods associated with these nonhuman animals.

Determinacy and indeterminacy in biosemiotics: The centrality of 'openness to possibility' in biology and semiosis

Donald Favareau
National University of Singapore, Singapore
favareau@gmail.com

The ubiquity of sign-use and meaning-making in the organization of animal interactions at the macro-level is easily evidenced and argued for in biosemiotics. Such meaning-making, it is generally maintained, is an agentive act of determination from among a field of as yet undetermined possibilities. Given such an understanding, however, the question naturally arises as to how to characterize the manifold of internal biological processes that are themselves the products of such evolutionary meaning-making determinations, but that have now become so automated and canalized as to function all but deterministically. such as the processes of protein synthesis and the pathways of second messenger molecule signal transduction.

In my own work, I have argued that organisms live out their lives perpetually negotiating the omnipresent field of as yet undetermined possibilities, informed by the biological capture of their (and their lineage's) previous engagements in doing so. Moreover because that "capture" of previous agent-object-action relationships are instantiated as biological *signs* for the guidance of the organism, not only are "successful survival strategies" within a given possibility space captured (as in traditional accounts of natural selection), but captured as well within those signs are the entire complement of *previously untaken but still veridical real-world possibility spaces* that are inseparably 'entangled' with that sign, and just awaiting exploration by the organism (Favareau 2015).

More recently, Kalevi Kull has been advancing a view of semiosis that makes it co-extensive with the active negotiation of simultaneously available "options" (Kull 2021). Under this definition, those processes of sign-use that trace their origins to such agentive negotiation of simultaneously available possibilities in the long-gone evolutionary past, but have now become "hard-wired" instincts and "frozen" semiotic pathways, no longer qualify as instances of actual "semiosis." They are, rather, biological "mechanisms" in the larger sense, and it is the "process/relation duality" between such temporal and corporeal mechanisms and the atemporal and virtual sign-relations of non-identity that they manifest that is the issue most needing exploration and analysis in biosemiotics.

Tyler Bennett, meanwhile, arguing from the position of ideology critique, has even more recently proposed the neologism of the 'tardo-sign' to characterize those "post-triadic, self-replicating quasi-signs ... [wherein] what was once a fully-fledged sign now cycles back toward the [status of] a dyadic reaction or signal" (Bennett 2021: 192–194). Invoking Peirce's early efforts at distinguishing 'genuine' from 'degenerate' forms of semiosis, Bennett's 'quasi-sign doctrine' – which also addresses Sharov's contemporaneous notion of the 'proto-sign' – has been developed primarily to characterize the diminished open-endedness of interpretation common to both overt ideological capture and to the more mundane instances of everyday, unthinking, over-habituated response that are often the products of such capture.

In this talk, accordingly, I will attempt to preserve my and Kull's focus on the centrality of simultaneous possibility negotiation in the realization of semiotic processing, while incorporating Bennet's 'tardo-sign' notion, so as to suggest a way to understand those now "automated" processes in living systems as still legitimately triadic instantiators of biological semiosis.

References

Bennett, Tyler James 2021. *Detotalization and Retroactivity: Black Pyramid Semiotics.* Tartu: University of Tartu Press.

Favareau, Donald 2015. Creation of the relevant next: How living systems capture the power of the adjacent possible through sign use. *Progress in Biophysics and Molecular Biology* 119: 588=601.

Kull, Kalevi 2021. Arbitrariness and the forms of semiotic indeterminacy. In: Biglari, A. (ed.), *Open Semiotics.* Paris: L'Harmattan: in press.

Semiotic scaffolding and the Batesonian paradox of play

Phillip Guddemi
International Bateson Institute
pguddemi@well.com

In 1952 Gregory Bateson, in the company of the poet Weldon Kees, spent an afternoon in the San Francisco Zoo in order to observe whether the "advanced" mammals there understood their signals as signals. He found himself confronted with the well-known fact that animals play, and it was as if Newton's apple had hit him in the head. His thinking at that time exhibited a synthesis of early cybernetics and information theory with the theory of logical types of Bertrand Russell, and the result of this idiosyncratic combination of paradigms led Bateson to observe that play, particularly social play, exhibits a form of logical paradox: the playful nip stands for a bite, but does not "denote" the violence that the bite would "denote." Hence play points to, and depends upon, metacommunication. (Interestingly, play is not unique in this, and the ability to threaten, rather than simply start, a fight also exhibits some of this analytically paradoxical metacommunicative sophistication (Bateson 2000 [1955])).

I would follow up on his argument and expand upon the existence of play (as well as threat and similar behaviors) as constituting a pivot point in semiotic evolution. Play may be an example of what Jesper Hoffmeyer called semiotic scaffolding. And indeed, Hoffmeyer did at least once note the existence of play – his specific example was object play among turtles – as part of an overall evolutionary schema of semiotic scaffolding. Hoffmeyer did not however refer in this regard to Bateson's specific analysis of what might be called the "doubleness" of social play.

Bateson's own analysis (2000 [1968]) of what we might call the development of animal semiotics derives from Shannon's information theory but develops it further on his own principles. Bateson describes a typical indexical "coding" by animals which operates on the principle of part-for-whole, in which a part of a process or phenomenon is taken to refer to or indicate the whole in which that part participates. This is the context which is transformed by play's paradoxical double aspect. The nip is meaningful because it forms a part of the whole behavioral sequence of the bite, yet in play it also signifies a sort of negation of that behavioral sequence.

What play may not provide is an ability to negate explicitly, in the strong sense characteristic of human symbolic language, an intention or course of action. Negation of this strong kind is identified in many places by Bateson as one key way human symbolic language differs from the nonverbal communication which humans share with nonhuman mammals, octopuses, and other animals. But play, even if it does not enable the full detachment characteristic of human language, does provide the beginnings of a kind of "detachment" which both "is and is not" associated with that to which it refers. It is fair to note that I am going beyond Bateson by speculating that this may be a semiotic scaffolding. Nonetheless I think Bateson's analysis may point to how the "doubleness" of play may have enabled a pivot towards the ultimate "doubleness" of symbolic reference.

References

Bateson, Gregory 1955. A theory of play and fantasy. *A.P.A. Psychiatric Research Reports II.* Reprinted in Gregory Bateson 2000, *Steps to an Ecology of Mind*, pp. 177–193.

Bateson, Gregory 1968. Redundancy and coding. In: Sebeok, Thomas A. (ed.), *Animal Communication: Techniques of Study and Results of Research*. Reprinted in Gregory Bateson 2000, *Steps to an Ecology of Mind*, pp. 416–431.

"In a communicational world there are no objects": Warren McCulloch to Gregory Bateson

Peter Harries-Jones
York University, Canada
peterhj@yorku.ca
and
Myrdene Anderson
Purdue University, USA
myanders@purdue.edu

Warren McCulloch was an important figure in the early life of Cybernetics, and in the on-going revisionist evaluation of the American Society of Cybernetics, is a much more important figure than Norbert Wiener. The same revisionist evaluation holds true for Gregory Bateson. As Bateson put it, 'He was like Moses'. This paper lists and discusses the following aspects which turned Bateson's writing from a discussion of communication as the 'betweeness' in human social interaction into the larger dimension of perception of 'betweeness' in communication of all living forms, specifically animals but, by implication, all *creatura*.

He writes to McCulloch: in 1948 that cybernetics must draw a clear distinction in its formulations so that physical signals must be kept distinct from verbal communication, for the moment the latter (verbal communication) is given a physical topological form, 'we are lost.' "Instead Cybernetics must turn to values, to meaning, McCulloch pointed out that even though cybernetics was largely instrumental, using digital coding in information theory in a physical sense, it was also propositional. In propositional order, information drawn from simulation has a much closer relation to 'meaning' than in the physical world of quantitative analysis.

The difference between the Newtonian world of Wiener, Shannon and Weaver, and the world of his own exploration of communication, was that the Newtonian world ascribes reality to objects and achieves its simplicity by excluding any discovery of context. A propositional world, on the other hand, requires 'context' to know what information 'means' when it is drawn from simulation. And in his own way of handling cybernetics, as theorist, he himself insists upon examining the context of the context, or meta-relationships as well. The theorists who insists upon examining all meta-relationships makes the meaning of the message more complex but achieves a degree of simplicity by excluding all 'objects'. as well as that which objects might propose.

In short, McCulloch pointed out that the impacting cause in communication is no longer a thing but a percept, a transform of certain selected characteristics of the impacting entity. "There are no things in the domain of communication." From this initial instruction, through keeping in contact with McCulloch's suggestions, Bateson developed the notions of 'context,' 'meta-levels', 'report and command', 'logical types,' 'redundancy' and 'heterarchy'. In this talk, we will explore the influence of Warren McCulloch on Bateson's thinking and suggest the usefulness of both theorist's ideas for the ongoing development of biosemiotics.

The interspecies circularity of agency

Yogi Hale Hendlin
Erasmus University Rotterdam, The Netherlands; University of California, USA
hendlin@esphil.eur.nl

The medical ethnobotanist and philosopher Stephen Buhner has recently provocatively asked the question about the corona pandemic: if the virus escaped from a lab conducting gain-of-function research, we nonetheless must "consider the possibility that instead of us deciding to alter the organisms in the lab, that the organisms decided to be altered in a human lab and simply used scientists who believe in human control to do it for them" (see Hendlin 2021). This quite stunning and even uncomfortable thought, that no matter the trajectory, the virus itself had any degree of agency in the deadly pandemic that has precipitated, begs several questions. On the surface, we have the Pollanian reversal (in *Botany of Desire*, also expressed by Yuval Harari in *Sapiens*) that other organisms have been working through us as much (or even more) as we have sought to use, exploit, and control them. For biosemioticians, such ideas are not novel. There are all sorts of species caught up in mutualistic, commensal, or parasitic relationships they are not aware of.

At another layer, however, such a claim can seem to verge on determinism, not only with an almost "nature strikes back" trope often used by misanthropes and eschatologists alike, but also complicating the western project of enshrining human rationality as realizable. If humans are as interspecially keyed as the Extended Evolutionary Synthesis, John Dupré, and Luis Villarreal (2005) take them to be, then our actions are never our own. They are the product of an interspecies coterie of organisms making up our microbiome. They are likely cued by endosemiotic and exosemiotic phenomena not of our making. Rather than claiming that this leaves humans with *no* agency – the obverse intellectual error to believing in the myth of pure autonomy – the human part of us is afforded certain degrees of semiotic freedom (and tipping our hat to the work of Deacon and others, we likely have quite a bit more semiotic freedom than many other organisms). I argue, however, that this type of freedom or agency is not separate from the co-agencies affecting our decision, but rather that even attempting to break free from the "constraints" of other organisms' agencies on our "own" is a reactive response that plays into a specific grooving not of our own making, even if it can be against our own health. Instead of attempting to surrender or fight these co-agencies, I explore various techniques of co-production of agency that work with the possibility that every aspect of our action is biologically collectively produced. With this more phenomenological, embedded notion of agency, the key question becomes how we make best – symbiotic – use of this situation. I propose that this involves what Francisco Varela and his disciple Claire Petitmengin call 'first-person science', 'neurophenomenology', and 'listening from within' as necessary introspective aspects of science. Biosemiotics methodology can learn from these experimental scientific approaches to better account for this looping aspect of semiosis.

References

Hendlin, Y. 2021. https://yogihendlin.com/2021/06/01/organisms-and-agency/ June 1, 2021.
Villarreal, L. P. 2005. *Viruses and the Evolution of Life*. Washington: ASM Press.
Villarreal, L. P. 2009. *Origin of Group Identity: Viruses, Addiction and Cooperation*. New York: Springer.

Towards neurosemiotics: Ongoing neural activity as brain music

Michael Jacob, Parham Pourdavood *and* Terrence Deacon
University of California, USA
Michael.Jacob@ucsf.edu

A theory of neural semiosis is needed to provide a bridge between the molecular-cellular-physiological semiosis that has been the ground for much of biosemiotic theory and what might be described as phenomenally based semiotic theory, in which experientially familiar forms of signs are considered. Lacking such a bridging theory, these two domains can only be connected by loose analogy. More serious, however, is the assumption within much of cognitive neuroscience that it is unproblematic to correlate phenomenal semiotic processes (e.g. cognition and perception) directly with neural activity, since this merely assumes a mapping relationship is what needs to be explained. The utility of correlational mapping is brought into question by the presence of ongoing, "spontaneous" neural activity that persists during evoked increases in activity and also in the absence of experimentally introduced stimuli or tasks. We propose that the difficulty of interpreting ongoing background neural activity may offer clues that can help bridge the gulf between cellular and phenomenal semiosis.

A fundamental challenge facing a theory of neural semiosis is determining what constitutes a sign vehicle neurologically. It is tempting to view neuronal spiking activity as an elemental sign vehicle, since increased production of action potentials by a given neuron can be induced by presentation of selective extrinsic stimuli. However, single neuron spiking patterns occur in the context of incessant ongoing background neural activity. This is due to neurons needing to be continuously active as well as being enmeshed within a network of thousands of other spontaneously active neurons whose interconnections enable these signals to recursively influence each other.

Although a computational perspective might dismiss this ongoing neural activity as mere background “noise," we propose that this background activity is the local trace of a distributed dynamical attractor constituted by the signals circulating among thousands of neurons within a local network. Dynamical attractors are quasi-regular spatio-temporal patterns that form as recurrent effects continually circulate and self-organize under the biasing influence of connectivity and activity constraints. Patterns provided by extrinsic inputs thus will tend to modify an intrinsic resting attractor analogous to an interference pattern. And changes in local metabolism (e.g. due to changes of blood flow, glucose or ATP availability) will tend to up- and down-regulate the average neuronal firing rate within the network, thereby significantly changing the local attractor structure. We hypothesize that each cortical region can generate a repertoire of local attractor modes selectable by changing metabolic or modulatory inputs *and* which form the interpretive context against which extrinsically originating signals (e.g. relayed from peripheral receptors or other brain regions) are superimposed.

We further hypothesize that these dynamical attractors form the fundamental sign vehicles for neurosemiosis and that the fundamental semiotic operation they mediate is the determination of iconicity, assessed in terms of the relative consonance or dissonance of superimposed attractors. Because of the intrinsically distributed and dynamic nature of neural attractors, we suggest that "music" might offer an appropriate metaphor to bridge neural and phenomenal semiosis. Thus the determination of the degree of iconism can be analogized to the way that superimposed melodic patterns reinforce, complement, or conflict with one another, and the interaction between different interpretive frames might be analogized to leitmotifs.

In this manner, the activity of the brain is analogous to the differentiation of a musical composition from an initial embryonic melodic seed, to a complex multipart orchestral performance. This also suggests that phenomenal experience is not encoded in neurons or their connections, but is created on-line from a repertoire of potential correspondences and dissonances between attractor forms.

Adolf Portmann: An old new narrative of an anthropological difference

Filip Jaroš
University of Hradec Kralove, Czech Republic
filip.jaros@uhk.cz

The Swiss scholar Adolf Portmann (1897–1982) was an outstanding figure in the history of biology and the philosophy of the life sciences. Kleisner and Maran (2014) have shown the significant importance of his thoughts for biosemiotics as well, which is further underscored by a current volume *Adolf Portmann: A Thinker of Self-Expressive Life* (eds. Jaroš and Klouda, 2021) in the Biosemiotics series, Springer. Portmann's biological theory is primarily focused on the problem of animal form (*Gestalt*) and it poses a significant counterpart to neo-Darwinian theories about the explanatory primacy of a genetic level over the outer appearance of animals. Besides that, Portmann's morphological studies related to species-specific ontogeny and the influence of environmental surroundings can be classified as the antecedents of contemporary synthetic approaches such as "eco-evo-devo", extended synthesis or biosemiotics (cf. Kull 2016, Kurismaa 2021). The most influential of Portmann's concepts up to the present is his thesis of a social womb (*soziale Mutterschos*, Portmann 1941): human children are born physiologically premature in comparison with other primates, and they find a second womb in a social environment nurturing their healthy development. It is during the first year of extra-uterine life when a specific human nature is formed, characterized by the strong tie between an individual and a broader historical cultural whole. In my paper, I will closely analyze: a) the historical coordinates of Portmann's philosophy of the life sciences (e.g. the philosophical anthropology of A. Gehlen, H. Plessner, and their concept of humans as beings "open to the world"), b) the relation of Portmann's concept of the social womb to contemporary theories of infant helplessness (Trevathan, Rosenberg 2016).

Leon Koj's event-based theory of signs: an alternative route for sign biosemiotics?

Borys Jastrzębski
University of Warsaw, Poland
borys.jastrzebski@psych.uw.edu.pl
and
Joanna Rączaszek-Leonardi
University of Warsaw, Poland
raczasze@psych.uw.edu.pl

Famously, C. S. Peirce's theory of signs hinges upon the notion of interpretation which mediates the sign-referent connection. Despite having been undeniably influential, it is well known to pose at least two challenges to its students, especially those applying the theory to natural sciences.

First, the *interpretant* with all of its divisions has been modelled after Peirce's analysis of inquiry and thus seems to rely on the phenomenological process and the corresponding internal states of the sign user. Some biosemioticians, particularly of the code variety, suggest that this feature bars Peircean interpretation from any genuine relevance to life below the organisational level of a multicellular organism because of the disputed status of internal representations in cells (Barbieri 2009: 236–237).

Second, the teleological character of the *final interpretant*, the last of the three consistent divisions that Peirce made in his key concept, has proven equally inspiring and confusing. Defined in terms of an ideal to which the actual interpretation tends but never reaches (CP8 .315 1909) or as the product of reasoning of an inhumanly patient and scientifically well-informed agent (CP8 .343 1908), the final interpretant taken at face value adds an unexpected pinch of idealism to an otherwise pragmatic account of semiosis. Authors like Terrence Deacon and T. L. Short put that perplexing concept to work with some success. Nonetheless, to what extent their renditions remain grounded in Peirce's account of the final interpretant is still a subject of debate. As things stand now, the third stage of his model of interpretation is a theoretical equivalent of an embarrassing relative at the birthday party – it has to be included but we would rather pretend it is not there.

In our paper, we propose an alternative approach to the concept of interpretation, attempting to ease some of the worries listed above. We explore an account of semiosis by a Polish logician Leon Koj who presented a unique event-based theory of signs (Koj 1998). He represents semiotic objects in terms of relations on events and expands the Peircean triad with the fine-grained time and individually defined goals. These developments allow for a theory possibly capable of accounting for the better studied communicative signs grounded in experience and internal states as well as for the simplest, *non-communicable* (in Koj's terminology) signs at the level of a single cell. An account with these features may also contribute to the integration of the new evidence on symbol abstraction at the developmental scale (Rączaszek-Leonardi & Deacon 2018), a key step to take in order to explain the transition from simpler signs to complex semiotic structures of human languages. We will conclude with a brief overview of the expected advantages that event-based semiotics, with its clear-cut minimal conditions, may provide to the computational models of emergent communication.

Koj's work offers a valuable opportunity to reconsider the role of traditional analytic philosophy in biosemiotics. The theories of sign and language developed within the field of philosophical logic may prove helpful, or at least inspiring, in the quest for a more inclusive concept of interpretation. Perhaps biosemioticians could use a segue to the works of Alexius Meinong and his fictional ontology or the Relevance Theory of Barwise and Perry to put new heart to the discussion on the mechanisms of sign making.

References

Barbieri, M. 2009. A short history of biosemiotics. *Biosemiotics* 2: 221–245.
Koj, Leon 1998. *Zdarzeniowa koncepcja znaku*. Warsaw: Polish Semiotic Society.
Rączaszek-Leonardi, J.; Deacon, Terrence W. 2018. Language development from an ecological perspective: Ecologically valid ways to abstract symbols. *Ecological Psychology* 30(1): 39–73.

How to address the circularity involved in semiogenesis?

Vefa Karatay
Molecular biologist, independent researcher
and
Yagmur Denizhan
Bogazici University, Turkey
denizhan@boun.edu.tr

Theories based only on sequential causality are inadequate for accounting for complex phenomena like self-organisation, goal-directedness or emergence. Cybernetics was the first to introduce circular causality to science. In its original form, it had the claim of explaining goal-directedness both in machines and living systems in terms of simple feedback loops. This approach was largely criticised by some prominent cyberneticians who initiated the so-called 2nd order cybernetics movement. Heinz von Foerster, for instance, pointed out that focusing on feedback mechanisms in the environment amounts to the reduction of organisms to trivial machines, and suggested that one should seek feedback mechanisms within the organisms themselves to explain *autopoietic* phenomena. Yet the science-philosophical critique of Gilbert Simondon, who is referred to as both a philosopher of technology and a bio-phenomenologist by Hansen (Hansen 2009: 119), brings to the fore a common flaw of 1st and 2nd order cybernetics, and even of contemporary complex system theories.

Simondon criticises modern science – which he designates as "analytical science" – for its confinement to the study of structures and their relations, alone. According to him, what is missing here is an account of the not-yet-structured pre-individual potentiality, as well as of "genetic operations"[7] that actualise this potentiality. He dubs such study of operations "analogical science", and proposes the so-called "allagmatic project" to complement analytical sciences with analogical ones. As a matter of fact, he considers cybernetics as only the beginning of General Allagmatics.

What the inclusion of genetic operations in the picture allows is a conception of identity that cannot be captured by the notion of *operational closure* as suggested in the autopoietic theory, where – accompanied by *thermodynamic openness* (i.e. openness with respect to matter and/or energy) – it refers to the closure of production cycles (i.e. circular causality between different structural components) in living systems. On the other hand, Simondonian allagmatics is based on a circular relationship between structural and operational modes of being, and provides for an *ontogenetic openness*.

The aforementioned issues have a particularly important implication for semiosis and biosemiotics: Classical scientific paradigms can be sufficient in accounting for sign processes that involve only the re-usage of already existing signs. However, it is our contention that adequate understanding of semiogenetic processes demands an ontogenetic approach such as Simondon's.

References

Hansen, M. B. 2009. System-environment hybrids. In *Emergence and Embodiment*, pp. 113-142. Duke University Press.

Simondon, G. 2020. *Individuation in Light of Notions of Form and Information*, transl. Taylor Adkins. University of Minnesota Press.

[7] Simondon uses the term "genetic operation" to refer to operations pertaining to ontogenesis in its broadest sense. It should not be confused with the common usage of term "genetic" in the biological context.

Ecosemiotics in human ecology: The implications of biosemiotics for social science

Brian Khumalo
University of Lille, France
Ecolades11@gmail.com

Human ecology, the study of human-ecological relationships as an interdisciplinary project has suffered from the desire to distinguish itself as a legitimate science. Two traditions; one based on sociocybernetics and the neo-Darwinian paradigm of human behavioural ecology (HBE) and related disciplines, and another based on the structuralist and post-structuralist paradigms of cultural analysis stemming from social linguistics and literary studies have developed in service of investigation into human-ecological relations. This has resulted in an uneasy tension within the subfield. Fundamentally an issue of philosophy, the two have not been able to resolve disagreements in metaphysical, epistemological, and ontological worldview beginning in the 19th century when natural philosophy and social philosophy more clearly diverged, further exaggerated by the humanities' 'reflexive turn' in the 1970's. This presentation seeks to illustrate how biosemiotics (and ecosemiotics) could unite these human ecological traditions' most fruitful elements to benefit the subfield of human ecology and its research going forward. Like anthropology its parent field, human ecology is a hybrid and can be thought of as the most scientific of the humanities or the most humanistic of the sciences.

First, the development of sociocybernetic and neo-Darwinian approaches in human ecology (cultural ecology, cultural materialism, socio-ecological systems) will be discussed. On the more reactionary end, this approach has resulted in the rejection of structuralist and post-structuralist insights. Second, the historical development of both structuralism and post-structuralist thought in the social sciences and the humanities broadly will then be discussed. As products of Saussure's dyadic 'semiology', structuralism and post-structuralism lack the external world anchor provided by Peirce's triadic model resulting in handicapped assumptions when applied to human ecological study and aspects of human behaviour and organization that seem less attributable to social construction which concerned proponents of HBE. Structuralist and post-structuralist approaches (historical ecology, political ecology, ecofeminism etc.) in human ecology will then be assessed for their insights as well as missteps, which in turn will be contrasted with the insights and missteps from the HBE approach.

Lastly, it will be explained how bio and ecosemiotics provide a third non-reductionist path which recognizes the boundary constraints placed on semiotic processes by a myriad of limiting factors while still maintaining scientific rigour. A human ecology grounded by the Peircean object would simultaneously limit structuralist and post-structuralist claims that via into unwarranted social construction and plurality, while also undermining the unjustified reductionism and unilinear causality that can result from HBE approaches. Applying biosemiotics to research interested in ecosystems function, ecosystem and cultural service production, and human socio-psychological and physical wellbeing can offer human ecology the unified framework which it currently lacks.

References

Aswani, S. 2019. Perspectives in Coastal Human Ecology (CHE) for marine conservation. *Biological Conservation* 236: 223–235.

Maran, T.; Kull, K. 2014. Ecosemiotics: Main principles and current developments. *Human Geography* 96(1): 41–50.

The biosemiotics of beauty

Kalevi Kull
University of Tartu, Estonia
kalevi.kull@ut.ee

Ecological aesthetics was a topic of great interest to Gregory Bateson. Biosemiotics, among other approaches, provides some ideas for understanding the deep nature of the aesthetic. Peter Harries-Jones, Tommi Vehkavaara, Claus Emmeche, Andreas Weber, Dario Martinelli, Katya Mandoki, and Wendy Wheeler have all pointed out the relationship between biosemiotics and aesthetics. Several approaches in (co)evolutionary aesthetics as well as in developmental aesthetics also contribute to the understanding of biosemiotic nature of beauty. The processes that are responsible for the emergence of the quality of aesthetic are certainly pre-linguistic, therefore the nature of the aesthetic is unreachable and cannot be resolved in the realm of the human sciences, as it necessarily requires biosemiotics. In this talk, I attempt to draft the biosemiotic basis of aesthetics, demonstrating which are the processes that create beauty in living nature.

The main point to be argued for states that the process that is creating the aesthetic in perception, and the process that makes the organic form itself beautiful, are fundamentally one and the same. These are the multiple choices that lead via semiotic fitting towards polysemy and perfection, both in the semiotic development of organic form and in perceptual categorization.

By definition: *meaning* is that what can be chosen. Meaning-making *is* the primary choice that *is* semiosis. Semiosis resolves the incompatibility of possibilities, it builds the habits and forms that fit. Thus, meaning is also the pattern that connects, using the words of Gregory Bateson – which means that semiosis results in fittedness. More precisely: iterative primary semiosis has a tendency to build fittedness. What has multiple fittedness is by definition beautiful. Beauty is perfect semiotic fittedness.

Moreover, fittedness is *individual*: it depends on bodily constraints and individual history. Thus it is species-specific and individual both in perception and in form. The growth of semiotic fitting is what Jesper Hoffmeyer described as individuation.

The process of semiotic fitting is a factor with a harmonizing capacity, leading stepwise to the richness of meaning, and serving as the basis for the intrinsic aesthetic of living beings. This can be identified as the intrinsic value of life. Accordingly, understanding the nature of beauty turns out to be possible via the inclusion of primary processes of meaning-making, in which the freedom of creation will become evident.

The *artistic* can be defined as the level of aesthetic which includes the symbolic. This is often based on the intentional inclusion of unfittedness. (Therefore also true ugliness is mostly human.) Accordingly, as based on the typology of living forms, it is possible to distinguish between the vegetative, animal, emotional, and artistic aesthetics – and the corresponding types of beauty.

A community that has had enough time for developing individually its multiple mutual fittedness turns out as beautiful. This is the case in the old local native ecosystems, as well as, for instance, in the biosemiotic community.

References

Kull, Kalevi 2016. Ecosemiotics of art: Whether nature may be beautified. In: Allora, Jennifer; Calzadilla, Guillermo (eds.), *Puerto Rican Light (Cueva Vientos)*. New York: Dia Art Foundation, 99–105.

Kull, Kalevi 2019. Becoming beautiful through interpretation: The old forest floor – the mission of eco-aesthetics. In: Remm, Jane, *Views on Landscape.* Tallinn: Kunstihoone, 6–8.

Kull, Kalevi 2020. Semiotic fitting and the nativeness of community. *Biosemiotics* 13(1): 9–19.

From parabiosis to hormesis: Bridging experimental models and (semiotic) theory

Andres Kurismaa
Charles University, Czechia
andres.kurismaa@gmail.com

In recent years, the need to complement classical reductive and molecular-level accounts of neurobiological functions with broader and more qualitative concepts of cellular responses and behaviors has been increasingly recognized, as is particularly evident in research on hormetic phenomena (Agutter 2007; Calabrese et al. 2017). Defined operationally as dose and intensity dependent effects of stimuli on cells (e.g., stimulatory or beneficial effects at low doses, versus inhibitory or adverse effects at higher ones), hormetic processes highlight the need for time-course studies of cellular responses, and their dependence on precise modes of stimulation. In this talk, we consider how these recent theoretical works, so far mainly confined to toxicology, may be conceptually relevant also from general and neurobiological viewpoints, where the multi-phasic nature of cellular responses to exogenous or internal agents (e.g., neurotransmitters, hormones, stressors and toxins) have been often underappreciated and ignored (Mattson 2008). At the same time, accounting for this response variability would be critical for any account of context-dependent factors in cellular signaling, such as sought in biosemiotics.

To explore these connections in new theoretical and historical lights, we propose to reexamine the approach of the Wedensky-Ukhtomsky physiological tradition, where in terms of "parabiosis" similar response variations have long been analyzed, albeit using different concepts and models. Indeed, respective historical connections have been highlighted in cytological context (Agutter 2007) and seen as important avenues for future investigation. This may be particularly important considering the potential ubiquity of hormetic effects in biology and neuroscience (beyond toxicology and pathology), and the need to couch these effects in terms of broader a theoretical framework, as currently sought (Calabrese et al. 2017). The possible biosemiotic implications of these early and current approaches will be discussed, particularly with reference to the anticipatory early response and cytoprotective mechanisms evoked by diverse cellular stressors.

References

Agutter, P. S. 2007. Cell mechanics and stress: from molecular details to the 'universal cell reaction' and hormesis. *Bioessays* 29(4): 324–333.

Calabrese, E. J.; Calabrese, V.; Giordano, J. 2017. The role of hormesis in the functional performance and protection of neural systems. *Brain Circulation* 3(1): 1.

Mattson, M. P. 2008. Awareness of hormesis will enhance future research in basic and applied neuroscience. *Critical Reviews in Toxicology* 38(7): 633–639.

Analysing umwelt reversion: Communication between local people and the European mink (*Mustela lutreola*)

Nelly Mäekivi
University of Tartu, Estonia
nelly.maekivi@ut.ee

European mink (*Mustela lutreola*) is the most endangered small predator in Europe. The island of Hiiumaa is one of the few places in the entire world where this species can be found and has a self-sustaining *in situ* population. However, in order to achieve this self-sustaining population, the mink was reintroduced over the course of almost two decades from Tallinn zoo. Since the animals were taken to the island from a captive environment, they were used to people and the food that humans provided. Thus, during the process of reintroduction, this animal had also a lot of contact with human settlements and the locals of Hiiumaa. This presentation focuses on the European mink's encounters with local people and the stories that they have to share regarding the animal's behaviour. More specifically, we see the information gathered from interviewing local people of Hiiumaa as essential to modelling the umwelt of the given animal and the major changes that have taken place in the animal's umwelt. Based on relevant literature, interviews and information gathered from the reintroduction project managers, we shall argue that the mink population has undergone an umwelt reversion, which is seen as a special case of umwelt transition. Umwelt reversion takes place due to environmental affordances, but also due to humans' activity regarding the reintroduced animals. We will use the examples of how the meanings of "food" and "human" have changed for the European mink population to illustrate the case of umwelt reversion.

Dark umwelts, species extinction and literary imagination

Timo Maran
University of Tartu, Estonia
timo.maran@ut.ee

The species extinction events are perceived in human culture in different degree from *celebrity extinctions* to *quiet extinctions*. Many species live and disappear outside the reach of human awareness and attention. Such species can be described as having *dark umwelts*, that is, their perceptual worlds and living are largely inaccessible to us.

Umwelts of different species can come into contact by overlap (there is a *similarity base*) or by fitting (there is a feature of a species that becomes a sign for another species). A similarity base is any constructional umwelt property (e.g. upright position, breathing air) that serves as a cognitive connection for an overlap. Consequently, we can name dark umwelt such umwelts that *do not have contact to human umwelt through overlap or fitting*. Like dark matter in physics, dark umwelts become evident through the contact with the other living and non-living agencies of the environment. Also, we can follow Jakob von Uexküll's (2010) umwelt theory to deduce the animal umwelt structure cased on anatomy and physiology of the alien species.

A problem with most scientific approaches to species extinction is, that they do not evoke human empathy and compassion. Especially in contemporary era of sixth mass extinction, species extinction events tend to remain mere statistical counts. Here combining von Uexküll's umwelt analysis with tools of semiotic modelling and literary creativity could result in productive and interesting approach (Maran 2020).

Umwelt analysis provides theoretical principles for constructing meaning structure of species umwelt. Semiotic modelling (e.g. *umwelt translation*) makes it possible to convey animals' view of the world to human linguistic sign system, whereas literary creativity could result in fiction that evoke empathy and compassion towards vanishing species. Some guidance can be found from fictional works that depict the life of human-animal hybrids from the first person perspective: e.g. Jaan Kaplinski's trilogy "Lahkujad" [Leavers] (2009) or from the excurses of the philosophical anthropology to animal worlds.

References

Kaplinski, Jaan 2009. *Lahkujad* [The Leavers]. Tallinn: Tänapäev.

Maran, Timo 2020. *Ecosemiotics: The Study of Signs in Changing Ecologies*. Cambridge: Cambridge University Press.

Uexküll, Jakob von 2010. *A Foray into the Worlds of Animals and Humans: with A Theory of Meaning*. Minneapolis: University of Minnesota Press.

A biosemiotic interpretation of corvid episodic memory

Oscar Miyamoto
University of Tartu, Estonia
miyamotounam@gmail.com

Californian scrub jays (*Aphelocoma coerulescens*) anticipate when a perishable food item will no longer be edible (e.g. they eat fresh worms first, and nuts later; and stop minding 'expired' crickets, or 'pillaged' cache sites). A series of experimental studies (Kort et al. 2005: 159) account for this feeding behavior through the phenomenology of Episodic Memory (EM). The zoosemiotic relevance of such hypothesis cannot be overstated, inasmuch it suggests that a variety of animals (other than humans) posess a common long-term memory system that allows them to take goal-directed actions on the basis of absent spatiotemporal contexts.

The aim of this presentation is to reinterpret the above neurocognitive evidence through a biosemiotic perspective. More concretely, I will analyze the falsifiable relation between 'structure parameter', 'content parameter', and 'flexibility parameter' reported in those studies; making a case that such relation is *semiosic* in its causal nature.

In other words, I will argue that the pragmatic flexibility of EM acts as the *interpretant* mediating the connection between memory structure or *representamen*, and the memory content or *object* it stands for. The novelty of understanding this as "semiotic causality" (Hoffmeyer 2008: 64), is that we can deepen our understanding of how different memory subsystems orchestrated by EM make a *biotranslation* (Marais 2019) between semiosic relata. Namely, intentions afforded by Working Memory (inasmuch Thirdness) connect multisensorial images afforded by Sensory Memory (inasmuch Firstness), and actions afforded by Procedural Memory (inasmuch Secondness).

Resuming my previous participation in GIBS 2020 – which dealt with alloanimal EM as a whole – this presentation will look at the particular case of scrub jays, capitalizing on concrete experimental studies. As a whole, I will conclude that the concept of semiosis can be used as a crossroad between experimental developments in EM research, and philosophical advancements in biosemiotics. The potential of doing this, in short, is to account for animal episodic agency as a causal influence and continuity between the above relations, outclassing the reductionist and Cartesian separation between 'external' bodily behavior and 'internal' computational processes.

References

Hoffmeyer, J. 2008. *Biosemiotics: An Examination into the Signs of Life and the Life of Signs*. London: University of Scranton Press.

Kort, S. R. de; Dickinson, A.; Clayton, N. S. 2005. Retrospective cognition by food-caching western scrub-jays. *Learning and Motivation* 3: 159–176.

Marais, K. 2019. *A (Bio)Semiotic Theory of Translation. The Emergence of Social-Cultural Reality*. Routledge.

From Incomplete Nature to incomplete society:
Sense, absence, and mass media communications

Andrew Painter
Kyushu University, Japan
andypainter@flc.kyushu-u.ac.jp

Inspired by Terrence Deacon's claim that biologists need to change their view of complex living systems to include "specific absences"with real effects, this essay analyzes how Japanese TV is structured and constrained by ententional factors at a variety of levels. From helping to explain everyday work practices observed inside a major Osaka television station (for example, how TV producers avoid being caught on camera at all costs) to framing deeper systemic questions (how TV creates a quasi-intimacy with its amorphous viewers) the absential perspective is both flexible and productive. At the same time, a wider socio-theoretical framework is needed to more fully conceptualize the complex operations and functions of the mass media today. Here, Niklas Luhmann's pioneering writings on the functional differentiation of social systems, and especially his ideas about the mass media as the sine qua non of modern culture and communication, can help us begin to build such a model. While there are significant differences between biosemiotic and Luhmannian approaches to conceptualizing signs and meaning in complex systems, I believe that Deacon's focus on an incomplete nature and Luhmann's insistence on an incomplete society (incomplete in that it can never match the complexity of its own environment) together open up new spaces for observing and understanding our dynamic, evolving world.

Reconsidering causation and information from a biosemiotic perspective

Mark Pharoah
Independent scholar
markpharoah1@gmail.com

Most disciplines have key terms that function as conceptual placeholders. One of the roles of philosophical inquiry, however, is to question the veracity and coherence of the concepts underpinning such terms. While it is helpful to assume conceptual coherence because continual questioning can stifle communication, it is also the case that clarification of terms is often desirable. Within a discipline, it is common to have schools of thought that have differences in conceptual ideation. Additionally, there is the problem for any given discipline of extending its concepts and terms of reference to other fields. Clarification, therefore, is often beneficial in collating divergent ideas within a discipline and in establishing a discipline's relevance to other fields.

In 2020, I published a paper in *Biosemiotics* entitled, *Causation and Information: Where Is Biological Meaning to Be Found?* The primary focus of the paper was on the problematic terms, 'causation' and 'information'. These concepts are central to semiotic studies. They are terms that are used with unquestioning regularity as if their meaning is a given. However, these 'borrowed' terms, and the concepts they imbue, fail biosemiotics. They fail because they do not adequately bind the discipline with a coherent framework of understanding that clarifies the uniqueness of the biosemiotic approach. This failure highlights an incongruence between the intuitions of the biosemiotician and the adopted conceptual baggage that comes with those borrowed terms. This incongruence, or 'blurring', feels as though it undermines the disciplinary stance and, consequently, is often ignored or masked. It is my view, therefore, that careful examination is vital to extending the potency and influence of the field of biosemiotics. Biosemioticians need to understand that central to their project is the need to realign terms such as these.

In this presentation, I will be looking in detail at the incongruence that lies at the heart of the concepts of causation and information. I hope that a critical reevaluation of the concepts will help illustrate a more coherent framework. To demonstrate this, I will relate the framework to species, consciousness, institutions, and cultures. In doing so, the framework will be seen to impact semiotic thinking and understanding particularly in relation to meaningful engagement and its transition and evolution.

References

Pharoah, Mark 2020. Causation and information: Where is biological meaning to be found? *Biosemiotics* 13(3): 309–326.

Signs of livingness in design material(itie)s

Barbara Pollini
Polytechnic University of Milan
barbara.pollini@polimi.it
and
Alberto Angelini
noisetalgica@yahoo.it
Independent Researcher

For human-made objects, even when not explicitly hi-tech or distant from the so-called "natural" environment, it has been hard to express "signs of life"; nevertheless, thanks to some recent advancements in the field of material design, we can now consider (and reflect on) some innovative and quite expressive possibilities - in particular when it comes to cutting-edge smart features, strategically employed to encourage users' perception of a potential aliveness [with]in the object.

The aim of this study is to understand which materials' features can ignite – or suggest – signs of livingness when applied to an artefact (note that both non-living and living materials have been considered). Smart materials, no matter if their origin is natural or synthetic, have indeed the ability to change their status (color, shape, movements) in response to external stimuli such as temperature or humidity. As an example, think of a thermochromic ink that makes a kettle "blush" when the water is boiling: just a useful – yet funny – warning sign or an indication for the users to perceive the switch as an alarm signal directly sent from the object? Natural materials are known to highlight the passage of time and the interaction with the user (e.g. the darkening of a walking stick handle); after years of industrial standardization, the world of design is now clearly rediscovering their potentialities – considering natural materials' nuances and imperfections as para-linguistic markers, thus underlining (via some sort of "intersemiotic translation") their dynamism and changeability over time. Even more interesting is the growing discipline of biodesign, which focuses on the development of materials and objects directly from living organisms – such as fungi, bacteria and yeasts (primarily triggering designers for their sustainable features). These biofabricated materials are in some cases stabilized to become inert before use: generated (as wood or leather) by the reproduction of living tissues, once "fixed in time" they can still carry their peculiar species' aesthetics – like the velvety skin of a fungus transferred to packaging and fabrics; in some other (more speculative) scenarios, materials and objects are instead still alive during their usage: living architectures and sensors made by fungi or grass-made dresses that will change color, thickness, appearance and weight while "growing" – thus inevitably modifying the user experience in depth.

As exemplified, it's clear that some objects' embedded signifiers (along with their resulting sign[al]s, variously expressed via a chromatic, texture-based, shape-related idiolect etc.) can definitely trigger and enhance the (stale?) relationship between humans and artefacts: by paying attention to subtle changes, reflected in details and/or "activated" by living features, the user can now properly feel some additional active (and communicative) counterpart directly emanating from the object. It's then important to understand which particular sign[al]s on the material side(s) have the ability to trigger human attention towards something sensed as partially alive and smart; the analyzed case studies have thus been grouped in three main categories: (i) non-living material feature mimicking livingness; (ii) inert biofabricated materials once alive still carrying signs of livingness (sometimes even hidden for users acceptance); (iii) signs from living matter able to instill relationships.

Considering the philosophical and design trend towards multispecies environments based on symbiotic relationships, the possibility of a "user-object bio/inter/semiotic communication" is then of great relevance not only for the world of biosemiotics, but also (and more importantly, since experiments and advancements are mostly associated with project and lab expertise) for the expanding sector of biotechnology in general and biodesign in particular.

References

Hoffmeyer, J. 2009. *Biosemiotics: An Examination into the Signs of Life and the Life of Signs*. Scranton.
Skylar, T. 2017. *Active Matter*. The MIT Press.
Karana, E.; Barati, B.; Giaccardi, E. 2020. Living artefacts: Conceptualizing livingness as a material quality in everyday artefacts. *International Journal of Design* 14: 37–53.

The aesthetic dimension as a demonstration of the continuity between nature and culture in human beings

Camilla Robuschi
University of Trento, Italy
camilla.robuschi@unitn.it

The general aim of this paper is to explore how Biosemiotics can inform us about the aesthetic processes that led to the creation of a work of art and, more specifically, how the investigation of the aesthetic behaviour should be considered a good starting point for the study of the more complex semiotic exchanges that occur in and between all the living beings. Accordingly, such analysis can be useful also for the demonstration of continuity between culture and nature in human beings. The flawed argument that nature and culture are two distinct systems is in fact still present – explicitly or implicitly – in most of the contemporary literature, both scientific and humanistic.

Of great significance is that many writers, artists and philosophers – those who are repeatedly in close contact with the aesthetic experience – use similarities to the processes that take place in nature to describe the aesthetic process. A significant example to quote is certainly that of Juri Lotman, who already in the 1960s highlighted the similarities between the construction of a work of art and the functional structure of a living organism (Kull 2015).

These theories, however, are still at a pioneering level, whereas it will be useful to address the topic with an interdisciplinary research, such biosemiotics. As Sebeok states, aesthetics is first of all a modelling system that, at different levels, is in common with all the living beings (Sebeok, Danesi 2000). A work of art, therefore, is nothing but a specie-specific modeling product of the human being that finds its main collocation in the Tertiary Modeling System but its origins in the Primary and Secondary Modeling Systems, both shared by other non-human animals.

Posit that the three main Modeling Systems conceived by Sebeok are interrelated with each other, an hypothesis of how aesthetic modeling function will be provided to understand why the study of the process that led to the creation of a work of art could be in human beings the demonstration of the continuity of nature and culture. In conclusion, to better comprehend the aesthetic modeling system, it will be useful to take as example the metaphorical behaviour.

References

Kull, Kalevi 2015. A semiotic theory of life: Lotman's principles of the universe of the mind. *Green Letters: Studies in Ecocriticism* 19(3): 255–266.

Sebeok, Thomas A.; Danesi, Marcel 2000. *The Forms of Meaning: Modeling System Theory and Semiotic Analysis*. Berlin: Mouton de Gruyter.

Jakob von Uexküll meets Humberto Maturana and Francisco Varela: A hypothetic biosemiotic exchange on organization, experience and adaptation

Sergio Rodríguez Gómez
Pontificia Universidad Javeriana, Colombia
sergio_rodriguezg@javeriana.edu.co

Jakob von Uexküll's thought is considered to be one of the essential scaffoldings of biosemiotics. His umwelt research defined much of the horizon of inquiry in our field, as he raised powerful arguments that serve us to defend the stance that semiotics should concern all kinds of living beings and their close meaningful relationships; an encompassing view on semiosis, not merely focused on anthropocentric meaning-making. On their part, and relatively more recently, Chilean cyberbiologists and philosophers Humberto Maturana and Francisco Varela proposed a series of influential accounts on the biology of cognition, on the emergence of meaning as coextensive with life. Influential, most notably, on current research about autopoiesis and enactive cognition.

Although Maturana and Varela's theories are considered by many scholars as offering important insights for biosemiotics, the true reach of their thought has not been sufficiently connected with the grand narrative of the history of our field. In this presentation I want to propose a hypothetical exchange between Uexküll, Maturana and Varela's ways of thinking. Such exchange will concern three central biosemiotic problems: the place of semiosis in organization, experience and adaptation in living beings. I will attempt to sketch how Uexküll, Maturana and Varela's thoughts about these topics can be intertwined, integrated and extended, in order to, ultimately, propose a new path for research about the history of biosemotics and new insights on historical but current visions.

In parallel with the dialogue about central topics in biosemiotics mentioned before, and as an argumentative aid for my presentation, I will show another transversal connection between Uexküll, Maturana and Varela: their essentially visual ways of thinking and communicating their inquiry, their graphical methods of creating conjectures and to construct research insights. In this way, my hypothetic dialogue will not only comprise words, but also illustrations about umwelts, functional tones and cycles, autopoietic blobs, cellular automata, phylogenetic landscapes, etc.

Towards symbolic engagements – a tentative developmental trajectory over the first two years of life: From jointly moving through affect-imbued action arcs to co-creating systemically-structured sense-and-action-shapes

Nicole Rossmanith
University of Portsmouth, UK

In this talk I'd like to jointly explore and discuss the ontogenetic development of *symbolic engagements* over the first two years of life. I will approach this topic conceptually, as well as empirically, alternating theoretical explorations with looking at example videos of naturalistic everyday infant-caregiver-object interactions together.

First I will briefly sketch a conceptual working framework, aiming at establishing a shared perspective to ask productive new questions and to empirically explore symbolic engagements. Particularly I will take up aspects of Terry Deacon's (1997) hierarchical process model of "symbolic reference" – also rhyming with Rączaszek-Leonardi et al. (2018) – and bring them together with Karl Bühler's cyber-semiotic approach (1927, 1936). This latter suggests – as the "royal road" towards understanding the systemic and symbolically referential aspects of language – to take a wider, comparative look at the varieties of concrete social action-coordination and co-regulation and differentiate forms of sign processes as different, varyingly complex, forms of joint/participatory sense-making and action-co-regulation.

Thus equipped we will look at video examples of everyday infant-caregiver-object interactions over the course of the first two years of life (such as *nappy change, book sharing, social games* etc.) and will discuss how this intricately orchestrated dance spanning multiple modalities and action-strands is co-ordinated and how it qualitatively changes over the first two years of life.

Doing so and comparing notes with the conceptual framework developed earlier we might feel compelled to ask afresh: *what characterizes different sign- and action-control processes? In particular what characterizes symbolic engagement and how does it differ from other forms of engagement? What are the challenges to engage in such a way? What exactly is going on when the child's action co-ordination seems to change and become what we might consider "systemic"? Given that children seem to show "systemic coordination" in social practices well before they do so in verbal utterances, what is the relation of symbolic engagement, social action routines, and verbal language?*

Finally, I will sketch a tentative developmental trajectory of increasingly complex ways to engage with the world, to jointly make sense, co-ordinate, and co-create action structures which become increasingly reified, contributing to self, other, and a shared object-world. Among these we find increasingly complex means for processes of co-ordination and co-creation themselves, such as – as we will see – *symbol systems.*

References

Bühler, K. 1927. *Die Krise der Psychologie* (Vol. 4). Velbrück Wissenschaft.

Bühler, K. 1936. *Die Zukunft der Psychologie und die Schule* (Vol. 11). Verlag für Jugend und Volk.

Deacon, T. W. 1997. *The Symbolic Species: The Co-evolution of Language and the Brain*. W.W. Norton.

Rączaszek-Leonardi, J.; Nomikou, I.; Rohlfing, K. J.; Deacon, T. W. 2018. Language development from an ecological perspective: Ecologically valid ways to abstract symbols. *Ecological Psychology* 30(1): 39–73.

Rączaszek-Leonardi, J.; Rossmanith, N.; Nomikou, I.; Rohlfing, K. J. 2019. Levels of coordination in early semantic development. *Psychology of Language and Communication* 23(1): 212–237.

Rossmanith, N. 2017. *Culture in the Making: Jointly Structuring Shared Spaces of Meaning and Action in Infant-caregiver-object Interactions Over the First Year of Life*. University of Portsmouth.

Rossmanith, N.; Costall, A.; Reichelt, A. F.; López, B.; Reddy, V. 2014. Jointly structuring triadic spaces of meaning and action: Book sharing from 3 months on. *Frontiers in Psychology* 5: 1390.

Language emergence and articulatory potential in biosemiotic perspective

Jeremiah Cassar Scalia
McGill University, Canada
viacassar@gmail.com

The "hard problem" of the evolutionary emergence of the human animal's faculty for language has been deeply and perennially frustrated by an epistemological suite of analytic dichotomies particular to Western academe's nature/culture duo-paradigm. Speaking to this in semiotic terms, Thomas Sebeok asserted that "the strategic anthroposemiotics/zoosemiotics dichotomy will stand, just as long as the riddle of the origin of human language remains unsolved" (Sebeok 1985: 299). With respect to the fundamental necessity of a nondualist reframing of the problem, I take up a wide-lens (bio)semiotic framework, spanning the phenomenal and emergent, biophysical and sociocultural processes of life generally – according with Sebeok's global semiotic elaboration of a "semiobiosphere" extending from the molecular code to the verbal code (Maran et al. 2011). To this end, I locate the object of language emergence within a dynamic coevolutionary complex such that the question may be reformulated: how could *bioenergetic impulse* (zoosemiotic), articulated in and through *physioanatomical systems of organismic constraint* (kinesthetico-/kinesio-semiotic) enactively and responsively operating with respect to the *ecological pressures and forces which ever-define organismic umwelten* (ecosemiotic), give evolutionary rise to *symbolical insight* (anthroposemiotic)? At the heart of this theoretical complex, the sensate *body-in-motion* of the human organism (*Homo*) stands as the primary locus whereby processes peculiar to language emergence may be explored, specifically in terms of physiological and coevolutionary interrelations between the organism's neural core and periphery, i.e., between the brain (prefrontal cortex) and certain extra-encephalic constituent parts of the greater corporeal whole. Here I narrow focus to features and appendages of the anatomical periphery that have exhibited high perceptual and prehensile/gesticulative acuity for navigating and manipulating the environs (extra-periphery) in which the organism is embedded. Among these semiotically-adept peripheral features (rooted in internal neurological systems), I bring renewed attention to the muscular hydrostat (the tongue), the articulator *par excellence* of speech, perched at the orificial rim of the vocal tract/apparatus. I speculate then as to the existence and evolutionary significance of an underlying congruence, or analogue, of semiotic potentials for articulation shared across two significant articulatory systems at different scales – fine motor and gross motor, respectively – of the total *body-in-motion* system: the phono-lingual articulatory range of the speech apparatus (part) and the pan-corporeal articulatory range of the greater body (whole).

References

Maran, Timo; Martinelli, Dario; Turovski, Aleksei (eds.) 2011. *Readings in Zoosemiotics*. (Semiotics, Communication and Cognition 8.) Berlin: De Gruyter Mouton.

Sebeok, Thomas A. 1985. Zoosemiotic components of human communication. In: Innis, Robert E. 1985. *Semiotics: An Introductory Anthology.* Bloomington: Indiana University Press, 294–324.

On the possibility of definition

John Schumann
UCLA, USA
schumann@humnet.ucla.edu

In the book, *Life's Edge*, Carl Zimmer (2021) examines the history of scientific efforts to define the concept "life". He looks at indexes of life in a wide variety of "species": bats, viruses, and collections of artificial neurons (organoids). He then explores the relationship of DNA and RNA to life. Ultimately, he demonstrates that science does not have a definitive definition of life. We expect there to be a borderline between nonlife and life, but this line has never been found. Zimmer explorers the consequences of this state of affairs for science. The philosopher of science, Carol Cleland, argues that the difficulty in identifying the essential properties of life is not the problem. The problem she believes is the nature of definitions. The linking of concepts that characterize scientific definitions does not work for concepts such as life.

The field of biosemiotics has also had a profound interest in and concern for definitions. In their paper, "Theses on Biosemiotics: Prolegomena to a Theoretical Biology", Kull, et al. maintain that,

> Biology introduces "a plethora of implicitly semiotic terms like 'information,' 'adaptation,' 'signal,' 'cue,' 'messenger,' 'fidelity,' and 'cross talk'. These uses are seldom well defined and are often applied in an allegedly metaphorical way, with the implicit assumption that they can be reduced to mere chemical accounts if necessary" [...]. Semiosis is a central concept for biology that requires a more exact definition.

In my work (Schumann 2021), I have been wrestling with the notion of "physicality". Traditionally, in the world of physics, it has been assumed that physical entities require the properties of mass, energy, observability, and causal effects on the world. However, the human brain has the ability to produce and process concepts that lack mass, energy, and observability. Thus, their physical status is ambiguous, and concepts such as freedom, law, democracy, hope, motivation, emotion, peace, obstruction etc. do not fit the definition of "physical" as it is maintained in the field of physics. The concept, "life" seems to be in a similar condition. Not all entities that we might classify as "living" maintain a set of attributes that could constitute a definitive definition of life.

In this paper, I will attempt to further problemitize the notion of definition. It seems to me that biosemiotics is very much a combination of biology and philosophy. In the philosophical domain, we use words that do not necessarily refer to physical entities. They are words that get their meaning through their relationship with other words. I am referring to such words as "semiosis", "reference", "scaffolding", and "agency" etc. These words do not refer to a specific thing that would necessarily be characterized by mass, energy, and observability. Such less-than-fully-material concepts do not have strict borders constraining their meaning. Thus, they are always potentially in the process of meaning something else. Their definitions require complex signs which make their meaning a matter of interpretation. They are imperfect tools that give us a potential sense of what the concept means, but the interpretation of which can vary due to context, point of view, backgrounding, and foregrounding.

The task may be to see definition as a semiotic process that should be studied in and of itself. Definition, as a process in symbolic reference, cannot simply be expected or self-evident. It seems to be an aspect of symbiosis that requires not just application but also requires an understanding of its limits as well as its affordances, all of which change depending on the referent. Like symbolic reference itself, definition is not easy.

References

Kull, K.; Deacon, T.; Emmeche, C.; Hoffmeyer, J.; Stjernfelt, F. 2009. Theses on biosemiotics: Prolegomena to a theoretical biology. *Biological Theory* 4(2): 167–173.

Schumann, J. 2021. Getting physical: Exploring symbolic physicality/physical non-materiality at: johnschumann.com.

Zimmer, C. 2021. *Life's Edge.* New York: Dutton publishers.

Explaining protosemiosis

Alexei A. Sharov
Independent researcher, USA
sharov@comcast.net

Protosemiosis is a primitive kind of interpretation of signs that is typical for molecular interactions within living cells (Prodi 1988; Sharov, Vehkavaara 2015). Signs processed in protosemiosis are molecules that are usually called "signals", although they resemble human signals only remotely since they are not associated with relational models of space or time (i.e., there is no distance or duration). Bacteria seem to operate exclusively via protosemiosis. Their phenomenal world is represented by compositions of signals that specify the quality of the current state (here and now). Bacteria can sense outside objects by receptors (chemo-, photo-, and magneto-sensing) as well as by touch of flagella or pili. However, bacteria do not interpret these sensing signals as representations of the outside world since they do not differentiate between internal and external signals. All signals are interpreted similarly by such molecular mechanisms as protein binding, selective catalysis, and regulation of transcription and protein synthesis. Bacteria keep traces of past phenomenological states, but these states are not internally recognized as memory, as something associated with the past. Such undifferentiated phenomenal world cannot support perception of outside objects, and thus bacteria operate as signal-processing mechanisms that directly regulate cell activities: metabolism and movement of appendages (flagella and pili). Protosemiosis is opposed to the normal semiotic activity called eusemiosis, which supports relational models of space and time and categorical perception of objects (Sharov 2018). The distinction between protosemiosis and eusemiosis is largely empirical and both categories can be subdivided into several levels of complexity. Eusemiosis presumably appeared in eukaryotic cells together with advanced epigenetic regulation of cell-level functions such as mitosis, crawling, phagocytosis, and differentiation, although basic metabolism is still based on protosemiosis. The primitive level of eusemiosis is the 'minimal mind' that carries innate models of reality that support primitive object categorization but not individual learning. Minimal mind requires no nervous system (e.g., in single-cell eukaryotes and plants) but also can be supported by a simple nervous system mostly without well-defined brain. Cognition is a higher level of eusemiosis that requires at least some degree of learning in the lifetime of an individual and is observed in animals with brains. Advanced forms of cognition are characterized by the use of reasoning, symbols, and language.

References

Prodi, G. 1988. Signs and codes in immunology. In E. E. Sercarz, F. Celada, N. A. Mitchenson, & T. Tada (eds.), *The Semiotics of Cellular Communication in the Immune System* Berlin: Springer, 53–64.

Sharov, A. A. 2018. Mind, agency, and biosemiotics. *Journal of Cognitive Science* 19(2): 195–228.

Sharov, A. A.; Vehkavaara, T. 2015. Protosemiosis: agency with reduced representation capacity. *Biosemiotics* 8(1): 103–123.

Mackenzie Crook's biosemiotic television

Jacob Smith
Northwestern University, USA
Jacob-smith@northwestern.edu

What would it mean for film and television studies to engage with biosemiotics? How might media scholars develop an approach to media texts that avoids glottocentricity and refuses to treat human culture as, to quote Timo Maran, a "semiotic island in the vast ocean of unsemiotic void"? This presentation will speak to the implications of biosemiotics for the humanities – specifically for media studies – by developing a biosemiotic analysis of two television series made by the writer, director, and actor Mackenzie Crook: *Detectorists* (2014–2017), and *Worzel Gummidge* (2019–). Crook's work is best appreciated when apprehended from a biosemiotic conceptual scaffolding, aided by ecocriticism and the literary theory of M. M. Bakhtin. My analysis of *Detectorists* draws upon Bakhtin's notion of chronotope, ecocritical discussions of landscape and the pastoral, as well as the biosemiotic concepts of semiosphere, ecosemiotic interaction pattern, and interpretance. Turning to *Worzel Gummidge*, we find that Crook has amplified the latent environmental undertones in the Gummidge narrative and developed a text with deep biosemiotic resonance. With *Worzel Gummidge*, Crook has developed a narrative that thematizes multispecies sign processes, allegorizes the emergence of symbolic reference, and enacts an "abductive" mode of reasoning that, for scholars in biosemiotics, is crucial to our understanding of how language relates to the natural world. In sum, the presentation explores the cultural implications of biosemiotics, asserting that Crook has taken great strides in the development of a biosemiotic ecopoetics of television, and that biosemiotic criticism provides a powerful methodological toolkit for scholars interested in a cultural ecology of the media.

References

Bakhtin, M. M. 1981. *The Dialogic Imagination*. Austin: University of Texas Press.
Bateson, Gregory; Bateson, Mary Catherine 2005. *Angels Fear*. Cresskill: Hampton Press.
Cobley, Paul 2016. *Cultural Implications of Biosemiotics*. Dordrecht: Springer.

A Peircean reading of Lamarck: Evolution by habit

Jana Švorcová
Charles University, Czech Republic
jana.svorcova@natur.cuni.cz
and
Ľudmila Lacková
Palacký University, Czech Republic
Ludmila.lackova@upol.cz

In the attempt to de-mythologize J. B. Lamarck's heritage from vitalist associations, we propose to approach Lamarck's writings from the perspective of C. S. Peirce's papers published in *The Monist* (mostly between 1891 and 1893). Rather than as a proponent of the famous theory of signs, Peirce's figure will be introduced as an evolutionary theorist. Lamarck is often associated with teleological evolutionary thinking, but an attentive reading of his publications clearly demonstrates the contrary. His concept of the power of life represents an inherent power, a physical necessity due to which the organism's complexity cumulatively increases. Peirce's interpretation also relates Lamarckian evolution to the theory of anancasm, that is evolution by necessity or law. It will be argued that while teleology is completely missing in Lamarck, it finds a place in Peirce's evolutionary theory. In Peirce's conception, teleology is nevertheless not to be understood in the creationist or pre-deterministic way. Rather an agapeistic understanding of teleology is plausible where habit-making replaces law and allows for the heritage of acquired features. Similar ideas were quite popular during the second half of 19th century and resulted in the paradigm of organic memory which influenced diverse fields of science and arts.

The aim of this presentation is threefold: Peirce's reading of Lamarck will help to address the common misinterpretations of Lamarckian theory on one hand and an alternative habit-making approach to teleology will be proposed on the other hand. Also, our contribution should briefly reflect the heritage of such approaches in contemporary biology: the latest findings of epigenetics, ecology or alternative conceptions of instinctive behavior naturally resonate with these views. However, it needs to be said, that such revival of old concepts in the light of the new scientific knowledge often brings confusion and new misinterpretation.

References

Lamarck, Jean-Baptiste 1963. [Originally published 1809; Paris: Dentu et L'Auteur]. Zoological Philosophy. An Exposition with Regard to the Natural History of Animals by J. B. Lamarck, Hugh Elliot, (transl).

Peirce, C. S. 1998. Chance, Love, and Logic: Philosophical Essays. University of Nebraska Press. Reprinted from the original 1923 edition by Harcourt, Brace and World, Inc., New York.

Peirce, C. S. 2009. The Logic of Interdisciplinarity. The Monist-Series (Bisanz, E. ed.). Berlin: Akademie Verlag

The relevance of umwelt theory for the theory and practice of phenomenology

Morten Tønnessen
University of Stavanger, Norway
mortentoennessen@gmail.com

This presentation draws on two chapters I have recently written, one titled "Phenomenology" (to appear in Sharov & Tønnessen, forthcoming) and the other "Umwelt theory for practitioners: Semiotic guidelines for application in a more-than-human descriptive phenomenology" (Tønnessen, forthcoming).

In the first chapter, we discuss the phenomenological tradition within philosophy with emphasis on representative phenomenological positions on subjectivity, sentience, consciousness and self-consciousness, and make the argument that giving phenomenology a biosemiotic grounding will make it more comprehensive. Even though both Husserl and Heidegger, two classics of phenomenology, acknowledged that animals have subjective lifeworlds, their respective phenomenologies were clearly anthropocentric. The same goes for most mainstream versions of contemporary phenomenology. Heidegger states this anthropocentric bias plainly when, after referring to the umwelt theory of Jakob von Uexküll, he claims that animals are "poor in world". The umwelt theory offers an alternative, more pluralistic framework for phenomenology – a phenomenology beyond the human, with a biosemiotic basis. Uexküll's umwelt theory was discussed by Merleau-Ponty and has further inspired several contemporary philosophers within and beyond phenomenology. In the chapter we also discuss the relation between semiotics and phenomenology, including Peirce´s ideas and recent calls for a naturalized phenomenology. While modern phenomenology was from its inception programmatically presented as anti-naturalism, leading contemporary phenomenologists favour realignment between phenomenology and naturalism. With its roots in sign theory and biology, biosemiotics can contribute further to this endeavour, and be an important piece in the puzzle when realigning phenomenological studies of subjective experience and behaviour with natural science.

The second chapter outlines a scientific method for conducting qualitative studies of human and animal lifeworlds by introducing a semiotically informed *descriptive phenomenology* that goes beyond the human. A depiction of the theoretical basis for a more-than-human descriptive phenomenology is followed by a depiction of its methodological basis. The chapter concludes with a number of semiotic guidelines for practical application of umwelt theory organized by relevant professions and settings of study.

References

Tønnessen, M., forthcoming. Umwelt theory for practitioners: Semiotic guidelines for application in a more-than-human descriptive phenomenology. In Amir Biglari (ed), *Open Semiotics*. Paris: L'Harmattan.

Sharov, A.; Tønnessen, M., forthcoming: *Semiotic Agency: Science beyond Mechanism*. Springer Nature.

On the biosemiotics of beauty: Rereading the prose of science-fiction writer Ivan Efremov

Ekaterina Velmezova
University of Lausanne, Switzerland
ekaterina.velmezova@unil.ch

Soviet science-fiction writer Ivan Efremov (1908–1972) was at once – or rather, primarily – a famous scientist, a doctor of biology and a palentologist. In one of his most famous works, the novel *Razor's Edge* (1963), one of the key episodes features a lecture delivered by the Soviet scientist Ivan Girin on the biological fittedness (purposefulness) [*celesoobraznost'*] of beauty. He distinguishes in particular between *krasota,* 'beauty', and *krasivost',* 'beautifulness in its rather external and more "common" aspect'. The scientist thus defines beauty [*krasota*] as "the highest degree of expediency" and of "human suitability for life and struggle for existence", as the "[highest] degree of harmonious correspondence and combination of contradictory elements in every structure, in everything, in every organism". In his opinion, "every beautiful line, shape or combination" is "an expedient solution worked out by nature over millions of years of natural selection or found by man in his search for the beautiful, that is, for what is the most correct for a given thing". Therefore, the concept of beauty for Efremov went hand in hand with reasoning in terms of biology and evolution and with the concept of law or regularity [*zakonomernost'*]: beauty is considered as "a general regularity that flattens chaos", as a "great middle in purposeful universality". If the ideals of external beautifulness – *krasivost'* – can change from one era to another, the general concept of beauty – *krasota* – remains, in the scientist's opinion, practically the same from the most ancient eras to the present day because of its foundations in biology or, more specifically, evolution. These arguments about beauty are repeated in other fragments of Efremov's prose.

In our paper we will propose, in the categories of modern knowledge, a "biosemiotic" reading of Efremov's reasoning about beauty, which allows for a study that reaches as far back as the Soviet scientific context of "pre-biosemiotic knowledge".

POSTERS

Poster*:*

Translational biosemiotics: Dermatosemiotics as a paradigm

Ali Tareq AbdulHasan
University of Kerbala, College of Medicine, Iraq
ali.tariq@uokerbala.edu.iq

The skin is the largest and the most sensitive of our organs, our first medium of communication, and our most efficient protector, even the transparent cornea of the eye is overlain by a layer of modified skin. Hence, Touch is the parent of our eyes, ears, nose, and mouth. It is the sense which became differentiated into the others, a fact that seems to be recognized in the age-old evaluation of touch as 'the mother of the senses. Skin is the first medium that translates the inside into outside, the self into another. Skin is truly the navel of our world, not in the sense of the viewing point of the central perspective, but as the very locus of reference, memory, imagination, and integration (Pallasmaa 2012).

Method

We used Husserlian semiotics and biosemiotic as background to understand skin as a mereological boundary.

Result

Skin is a biosemiotic medium. Using biosemiotic phenomenology as a framework we can understand skin as a translational medium that communicates biological, pathological, psychological, social, and religious meaning. Introduction of dermatosemiotics as a relational paradigm that used the skin as a metaphor for liminal semiotic space that condition the possibility for translation. Using skin as a metaphor explains the primacy of the ontological stance as a paradigm. We are inside one of two kinds of ontological stance, that is, a skin: substance ontological stance that view reality as independent and objective controlled by linear causality and oculo-semiotics while the second stance views reality\Being as a relational process using the language of complexity, interconnectivity, liminality, in-betweenness, which best embodied by the skin as semiotic boundary-making holarchy and translation possible, layers inside layers (Hoffmeyer 1998).

Conclusion

(1) The main theme in this study is to show that translation is an intrinsic biological phenomenon resulting from being inside skin\boundary making touch possible between different levels of reality using biosemiotic as a meaning-making process. Without translation, semiosis there is no touch, no connection, no feeling\co-feeling and consequently action.

(2) To be a member, we need to wear a membrane\skin. Paradigm\mental models function as a secondary skin that made us in touch with a predefined world. Awareness of these secondary skins is a critical thinking task that can ensure authentic translation.

References

Pallasmaa, Juhani 2012. *The Eyes of the Skin*. 3rd ed. John Wiley & Sons.

Hoffmeyer, Jesper 1998. Surfaces inside surfaces: On the origin of agency and life. *Cybernetics & Human Knowing* 5: 33–42.

Poster:

An ecosemiotic model for learning: Designing experiential curriculum in a globally distributed learning network

Pavel Cenkl
Dartington Trust & Schumacher College, UK
pavel.cenkl@dartington.org

What can higher education look like if we understand and model our world as a complex, integrated socioecological system? This paper shares both theoretical framework and practical demonstration of resilient learning networks in an ecologically-focused experiential higher education curriculum delivered in a hybrid online and site-based context. An ecosemiotic approach to curriculum design and delivery is introduced that situates humans as deeply enmeshed in a complex sympoietic network. This multi-scale learning network is always already in the process of becoming / cobecoming, manifesting a world in which organisms communicate always in an unfinished processual dynamic.

A foundation of an ecosemiotic model for learning can be built upon Timo Maran and Kalevi Kull's assertion that "the categorization of visual geometrical forms that a person acquires in the process of education will affect the forms that the person later creates in the environment". This paper will use the delivery of the Master's programme in Movement, Mind, and Ecology at Schumacher College as a case study of a transdisciplinary environmental humanities course focused on exploring and interrogating interrelationships, communications, and performative practices between human and more-than-human participants around the world. The course is delivered both onsite in England and online for students across multiple time zones, ecosystems, and cultures and thus presents a tangible opportunity to explore and assess the manifestation of interspecies collaboration, cooperation, and communication in site-based and online contexts.

Key points of an ecosemiotic curriculum model include:

- Development of new network identities and ecologies for interspecies collaboratory spaces;
- Deployment of learning clusters of colocated off-site students to enable face-to-face collaboration even when travel is not possible;
- Equitable site-based facilitation of experience-based learning for all students, whether on or off campus;
- Implementation of next generation digital learning environments (NGDLEs) that integrate a self-organised set of tools to complement the use of a VLE or LMS.

Influenced by Neri Oxman's use of design to argue for the need for material-centred trans-disciplinary multi-scale systems; Ingrid van de Leemput's research on the resilience of alternative states in complex ecological systems; Ned Rossiter's insights into developing new institutional forms of organised networks; and the work of Donna Haraway, Eduardo Kohn, Tim Morton and others on interspecies collaboration, this paper argues that a hybrid learning model based on globally distributed site-based experience can build a far more resilient learning network than existing site-based, online, or hybrid higher education allows. Our covid-influenced present and unpredictable future both demand and create opportunity for a revision of higher education's traditional forms of delivery. An ecosemiotic approach to scaffolding distributed site-based learning can help sketch a pathway toward a resilient, adaptive, and multi-scale curriculum.

Poster:

The individual biology seeks is the subject: Constructing a semiotic theory of individuality

Trace Fleeman Garcia
Oregon Institute for Creative Research, USA
tracefleemangarcia@gmail.com

Recent developments in the quantitative life sciences have made great progress in solving the problem of individuality, which has posed a persistent dilemma for theoretical biology since its inception. In this rejoinder to the working group for the information theory of individuality (ITI), I respond critically from a semiotic perspective, to argue that information-theoretic individuality without semiosis is needlessly, perhaps fatally, sterile. Instead, I propose a model in which living systems develop, internally by means of sign processes, a complex notion of self-individuality. These notions are endemic to particular living systems and cannot be divorced or otherwise separated from them, and therefore cannot be generalized or made perceptible to so-called objective methods. In essence, information is seen as the quantitative flattening of sign-systems, which are necessarily qualitative. This, I argue, allows for a richer model that can be combined with statistical and empirical methods to arrive at a semiotic theory of individuality.

References

Krakauer, D.; Bertschinger, N.; Olbrich, E.; Flack, J. C.; Ay, N. 2020. The information theory of individuality. *Theory in Biosciences* 139(2): 209–223.

Maran, T.; Martinelli, D.; Turovski, A. (eds.) 2011. *Readings in zoosemiotics.* (Vol. 8). Walter de Gruyter.

Favareau, D. 2010. *Essential Readings in Biosemiotics: Anthology and Commentary.* (Vol. 3). Springer Science & Business Media.

Poster:

Patterned signals in animal social signalling

Amelia Lewis
Queen's University, Belfast, UK
alewis08@qub.ac.uk

Many animal species communicate both inter- and intra-specifically. Moreover, animals can eavesdrop on other species' signals, and it can be advantageous (indeed, necessary) for one species to be able to read the signals of other species. To explore these concepts, I use Morten Tønnesen's model of the 'total umwelt', which develops Jakob von Uexküll's umwelt theory further, to describe the formation of a complex semiosphere with shared meaning (Lewis 2020a).

Further, I relate the meaning an interpreter gives to a signal not simply to the object, as is consistent with Peircean semiotics, but to the energetic phenomena which transmit a sign. These phenomena include EM light radiation; acoustical vibrations; physical forces including tactile, proprioceptive, and magnetic forces; and chemical signals. Whilst the latter are generally accepted to be formed from matter due to the commonly accepted 'docking' theory of olfaction, recent years have seen the 'vibrational theory of olfaction' (VTO) gain supporting empirical evidence. Potentially, therefore, all sensory modalities process mechanistic, vibrational energetic phenomena (Lewis 2020b). However, whilst the VTO remains controversial in biophysics, it is not disputed that the neurological signals generated by chemical odorants are electrical energetic phenomena. Thus, whichever theory of olfaction proves to be accurate, chemoreceptor perception can indeed be treated as being an energetic, patterned phenomenon with spectral characteristics.

In this way, human and non-human animal signalling and sensory perception has been driven by the evolution of complex, multi-dimensional cognitive pattern recognition. A simple example can be seen in the binary approach/avoid dynamics in bacterial chemotaxis, which also form the basis of behaviourist 'learning' theories in higher organisms. However, binary choices do not allow for cognitive and behavioural plasticity, or organismal agency; yet, when simple, binary (or digital) decisions take place at higher speeds in multi-dimensional space, then analogue sensory processing becomes the more plausible model of higher-organism sensory processing mechanisms (Lewis 2021) with digital processing occurring for more basic functions. Indeed, the ability to process and ascribe meaning to patterned energy signals, whilst not infallible (being prone to umwelt-specific translation mistakes) is proposed to be what binds all animal life on Earth, semiotically.

References

Lewis, A. 2020a. Total umwelten create shared meaning the emergent properties of animal groups as a result of social signalling. *Biosemiotic* 13(3): 431–441.

Lewis, A. 2020b. In search of a unified theory of sensory perception: Possible links between the vibrational mechanism of olfaction and the evolution of language. *Biosemiotics* 13(2): 261–270.

Lewis, A. 2021 (forthcoming). Chemiosemiosis and complex patterned signals: A chemosemiotic hypothesis of language evolution. *Linguistic Frontiers.*

Poster:

On Peirce, freedom, and feeling

Felipe-Andrés Piedra
Donald R. Frohlich
Baylor College of Medicine, Houston, USA
piedra@bcm.edu

For Charles Sanders Peirce – the 19th century philosopher, scientist, and logician – mind is primordial in the universe and matter is a particular product of its action. This metaphysical perspective, termed *objective idealism*, is consistent with that lying at the heart of Buddhism, ancient and varied mystical traditions the world over, and emerging but still fringe thinking within quantum physics and biology; it is the opposite of the materialism currently prevailing within mainstream science and the disciplines derived from or strongly influenced by it. For Peirce, one of the hallmarks of mind is spontaneity, which he identifies with a "certain swerving of the facts from any definite formula" (Peirce 1891). Mind is also habit-forming, producing regularities from a less differentiated background of spontaneity. Thus, mind defies regularity even as it produces it, and a universe perfused with mind evolves in ways not fully deterministic. Peircean metaphysics is therefore an evolutionary idealism, and one that encompasses all empirically verified (and verifiable) phenomena. This is the core of Peirce's complete or architectonic philosophical theory, one he invited "future student[s] [to] go over [...] again" (Peirce 1891) and that he considered a "task for a whole era to work out" (Peirce 1892). Here we summarize the implications of some major scientific and mathematical findings (some well-known, others not) occurring after the death of Peirce in 1914 for the kind of evolutionary idealism Peirce espoused. Early in the summary of these findings, we connect the *objective chance* of quantum mechanical phenomena with Peircean spontaneity of mind and make the obvious but nevertheless abductive leap that all feeling (i.e., all qualia, all subjective experience) is tied to and recognizably issues from matter and energy in, exiting, and returning to states of quantum coherence. This hypothesis draws support from recent and varied work by Kauffman et al. (Kauffman 2016). The proposed connection between cycling into and out of quantum coherence and subjective experience is consistent with the objective idealism of Peirce, and has obvious implications for biosemiotics. Indeed, we propose that all agency in the living world must ultimately derive from constituent matter and energy of organisms persistently entering into and exiting from quantum coherent states playing a decisive role in organismic dynamics and behavior.

References

Peirce, Charles S. 1891. The architecture of theories. *The Monist* 1(2): 161–176.
Peirce, Charles S. 1892. The law of mind. *The Monist* 2(4): 533–559.
Kauffman, Stuart 2016. *Humanity in a Creative Universe*. New York: Oxford University Press.

Poster:

Towards a biosemiotic theory of development

Tiago Rama
Autonomous University of Barcelona, Spain
trama.folco@gmail.com

> *Den Lebens-Prozess aber halten wir nicht für ein Resultat des organischen Baues, sondern für den Rhythmus, gleichsam die Melodie, nach welcher der organische Körper sich aufbaut und umbaut.*
>
> Karl Ernst von Baer 1864: 280

This poster has two aims. The first one is to connect biosemiotics with developmental biology. To do so, I will be based on specific approaches within these disciplines. On one hand, I will hug the view of Tartu-Copenhagen school (Emmeche, Kull 2011). On the other hand, I will understand development under the light of Ecological-Developmental Biology (Gilbert, Epel 2015; Sultan 2015). The main overlapping point is the study of signs in developing organisms. By stressing signaling systems as key components, they share a similar view of central developmental processes. I will show how both disciplines (i) reject a gene-center view and posit that development must be understood as a process guided by the cell, (ii) stress the role of sings to epistemically construct the organism's niche or umwelt, (iii) and argue that the scaffolding role of signs makes development constantly a context-sensitive process.

The second aim is to analyze how this integration could help to tackle two central concepts in theoretical biology: adaptivity and (intrinsic) teleology. To analyze these issues, I will appeal to two different sources. The first source regards the founders of developmental biology and biosemiotics: Karl Ernst von Baer and Jakob von Uexküll, respectively. Crucially, there is an explicit connection between them concerning, primarily, musical metaphors. I will argue that musical metaphors were the way that they could speak about the complex dynamics and aptness between parts and with the environment. With the advances of science, such metaphors now refer to complex signaling systems at different levels of the organisms. Therefore, the second source concerns the renewed understanding of metaphors by eco-devoists and biosemioticians. Signaling pathways then explain the timing ("rhythm") of cell development and differentiation ("melody"), and the interaction ("orchestration") of developmental resources ("instruments") to produce an adaptive ("harmonic") phenotypic outcome ("music"). The main conclusion is that signs play the pivotal function of providing organisms with adaptive and teleological capacities. Adaptivity is achieved thanks to the organismal capacity of adjusting environmental circumstances according to what signs inform. Goal-directedness (teleological, or *Ziel* as Baer understood it) development takes place insofar as organisms are constantly responding to internal and external signs. The unification of these areas is a crucial step to overcome the gene-centered, Neo-Darwinan view of development. Development is a complex and harmonic orchestra that does not have a (molecular) director.

References

Baer, Karl Ernst von 1864. *Reden gehalten in wissenschaftlichen Versammlungen und kleinere Aufsätze vermischten Inhalts*. Vol. 1. Schmitzdorff.

Emmeche, C.; Kull, K. 2011. *Towards a Semiotic Biology: Life is the Action of Signs*. London: Imperial College Press.

Gilbert, S. F.; Epel, D. 2015. *Ecological Developmental Biology: The Environmental Regulation of Development, Health, and Evolution*. (2nd ed.) Sinauer Associates Publishers.

Sultan, S. E. 2015. *Organism and Environment: Ecological Development, Niche Construction, and Adaptation*. Oxford University Press.

Special Performance Event

Music, Words, and Animal Sounds

by Stephen Nachmanovitch & David Rothenberg

Stephen Nachmanovitch & David Rothenberg will present an hour of dialog alternating with live music on themes of interspecies signs and sounds. Both of us are professional musician-philosopher-improvisers. We will play and talk about play, about *Funktionslust* (the pleasure of doing), and how the search for meaning is, of its nature, less complex and less interesting than the actual sounds made by animal and human musicians. When we engage with the natural world, we become deeply aware of how the limits of our perceptions shape the world in which we think we live. William Blake, who would have been very much in tune with the biosemiotic idea of Umwelt, wrote, "How do you know but ev'ry Bird that cuts the airy way / Is an immense world of delight, clos'd by your senses five?" and "The Sun's light when he unfolds it / Depends on the Organ that Beholds it."

Our music incorporates birdsong, violin- and clarinet-family instruments, percussion, and voice. An album of our collaboration along with a book of discussion will be released on May 7.

Stephen Nachmanovitch performs and teaches internationally as an improvisational violinist, and at the intersections of multimedia, performing arts, ecology, and philosophy. He is the author of *The Art of Is* and *Free Play*. Born in 1950, he graduated from Harvard and the University of California. He was a student and friend of Gregory Bateson, earning a Ph.D. in the History of Consciousness with Bateson in 1975 for a study of William Blake. A musician, author, educator, and multimedia artist, Nachmanovitch continues to write and teach about Bateson and ways to extend Bateson's ideas into the 21st century. He has taught and lectured widely on creativity and the spiritual and social underpinnings of art. He has presented master classes and workshops at many conservatories and universities, and has had numerous appearances on radio, television, and at music and theater festivals. He has worked in the intermedia world of visual music, and has developed programs melding art, music, literature, and computer technology. He lives in Charlottesville, Virginia, USA.

Musician and philosopher **David Rothenberg** wrote *Sudden Music, Why Birds Sing, Bug Music, Survival of the Beautiful,* and many other books, published in at least eleven languages. Born in 1962, he has more than thirty recordings out, including *One Dark Night I Left My Silent House* which came out on ECM, and most recently *In the Wake of Memories* and *They Say Humans Exist.* He is an authority on animal music and has researched and played music with whales, birds, insects, and other species. He has performed or recorded with Pauline Oliveros, Peter Gabriel, Ray Phiri, Suzanne Vega, Scanner, Elliott Sharp, Iva Bittová, and the Karnataka College of Percussion. *Nightingales in Berlin* is his latest book and film. Rothenberg is Distinguished Professor at the New Jersey Institute of Technology, USA.

INDEX

List of all presenters

AbdulHasan, Ali Tareq
Alexander, Victoria N.
Anderson, Myrdene
Angelini, Alberto
Bacigalupi, Joshua Augustus
Bateson, Nora
Beever, Jonathan
Bennett, Tyler James
Bloom, Jeffrey W.
Bohát, Róbert
Cárdenas-García, Jaime F.
Cariani, Peter
Cely-Santos, Marcela
Cenkl, Pavel
Chávez Barreto, Eugenio Israel
Creighton, Andrew Mark
Deacon, Terrence
Denizhan, Yagmur
Favareau, Donald
Frohlich, Donald R.
Garcia, Trace Fleeman
Guddemi, Phillip
Harries-Jones, Peter
Hendlin, Yogi Hale
Jacob, Michael
Jaroš, Filip
Jastrzębski, Borys
Karatay, Vefa
Khumalo, Brian
Kull, Kalevi
Kurismaa, Andres
Lacková, Ľudmila
Lewis, Amelia
Mäekivi, Nelly
Maran, Timo
Miyamoto, Oscar
Nachmanovitch, Stephen
Painter, Andrew
Pharoah, Mark
Piedra, Felipe-Andrés
Pollini, Barbara
Pourdavood, Parham
Rączaszek-Leonardi, Joanna
Rama, Tiago
Robuschi, Camilla
Rodríguez Gómez, Sergio
Rossmanith, Nicole
Rothenberg, David
Scalia, Jeremiah Cassar
Schumann, John
Sharov, Alexei A.
Smith, Jacob
Švorcová, Jana
Tønnessen, Morten
Velmezova, Ekaterina

Gatherings in Biosemiotics

2001 (May 24–27) Copenhagen
2002 (June 14–17) Tartu
2003 (July 11–14) Copenhagen
2004 (July 1.–5) Prague
2005 (July 20–24) Urbino
2006 (July 5–9) Salzburg
2007 (June 6–9) Groningen
2008 (June 23–28) Syros
2009 (June 30–July 5) Prague
2010 (June 22–27) Braga
2011 (June 21–25) New York City
2012 (July 16–21) Tartu
2013 (June 4–8) Castiglioncello
2014 (June 30–July 4) London
2015 (June 30–July 4) Copenhagen
2016 (July 4–8) Prague
2017 (June 6–10) Lausanne
2018 (June 17–20) Berkeley
2019 (July 1–5) Moscow
2020 (July 8–12) Olomouc and online
2021 (July 26–29) Stockholm and online

Stay in contact at www.biosemiotics.org