Workshop on the Generative Aspects of Noise (GAN-2025)

The notion of noise traditionally designates undesirable, disruptive and even destructive factors that inevitably exist in any real system, and need to be eliminated or at least reduced in order to retrieve what is considered as the useful, meaningful and functionally relevant content of any signal or process. Accordingly, noise can be considered as the conceptual opposite or the complement of information, its Doppelgänger. The title of our workshop, «The Generative Aspects of Noise», may sound like a *contradictio in adjecto*. However, the aim of this workshop was to overcome this antinomy and discover how seemingly disruptive factors can play a generative role indissociable from a broader conception of information.

This workshop was the first live gathering of a group of scholars from diverse disciplines who have been meeting online for more than 1.5 years and elaborating on the referential character of information and noise, and on the mechanisms affecting the emergence and transformation of frames of reference. This collaboration emerged from the reverberations of Cécile Malaspina's book *An Epistemology of Noise* and the online seminar entitled "Aesthetics of Noise" she organised on behalf of the Collège international de philosophie and King's College London. Unfortunately, one of the group members, Sonia de Jaeger – working on the generative aspects of semantic noise in relation to Large Language Models –was unable to attend the workshop.

The following contributions were made during the workshop, which consisted of 5 half-day sessions, each reserved for one of the five speakers, thus leaving ample room for extensive discussions and the initiation of a transdisciplinary conceptual glossary:

Yagmur DENIZHAN: Information and Noise from a Modelling Perspective

Classically, science has developed an advanced tradition of accurately accounting for well-established and well-preserved regularities in nature, which, however, incubates a paucity in accounting for the transient states and processes that eventually generate such regularities. Inspired by Gilbert Simondon's ontogenetic theory of individuation and in line with his motto "Beings can be known through the knowledge of the subject, but the individuation of beings can only be grasped through the individuation of the subject's knowledge.", Denizhan focused on the dynamics of the overall body of knowhow and knowledge of a cognitive agent, a complex system that integrates all embodied and mental models, which she dubbed *the Edifice of Knowing* (EoK) in an earlier publication [1]. Accordingly, the EoK is a complex and dynamic hierarchical structure that has risen from the common ground of reality and keeps developing and evolving in the course of biological evolution, as well as during the lifetime of the agent, producing embodied structures and processes, as well as abstract mental models. Here, Denizhan uses the notion of "model" in a most generalised sense that can be applied to any concrete or abstract structure or process that can serve as a "functional substitute" for a structure or process involved in an operation. With such a generalisation, it becomes possible to refer to the trace of a system or process as a potential model, even prior to the emergence of a modeller (a cognitive agent), who can use it as a functional substitute for the system or process in a specific operation. Moreover, subsystems of living beings (including their receptive and effective organs) can be considered as partial, context-specific models of the environment and/or the organism itself. As a matter of fact, one can, without loss of generality, refer to the EoK as the cognitive agent itself. The lower levels of the EoK comprise relatively stable embodied models, associated with rather well-defined behaviours and response patterns of the living being, while the higher levels are the site of evolvable and emergent models and creativity. Interactions between models at various levels render ongoing negotiation and mutual tuning possible, which keeps the Edifice of Knowing in a dynamic state that can best be described in terms of Simondon's notion of *internal resonance*, a notion which does not necessarily imply harmony but can occasionally generate temporary and partial harmonious resolutions for the tensions and conflicts residing within the Edifice of Knowing.

Denizhan noted that the notions of information and noise are not objective entities that exist for and by themselves in the real world, but are designations that necessarily refer to a specific model (within the EoK of a cognitive agent), which describes and/or prescribes a context-, functionality-, and purpose-dependent, nominal or desirable characteristics for the hypothesised object of modelling. Each model within the EoK interacts with other models and can undergo modifications to the extent admitted by its flexibility. The inputs from other models and the environment typically encounter some resistance within each model. During these interactions, the model can be said to "extract the useful information" to be accommodated within predefined (i.e. modelled) uncertainties. This process can be envisaged as a filter or, according to Denizhan's terminology, as a *model-based sanitation mechanism* that eliminates or at least reduces irrelevant and disruptive components within the impacts, namely the *noise*. Noting that the standard notion of

information pertains to pre-defined and thus modelled uncertainties in a model, Denizhan pointed out that *every model provides a narrative within a "pseudo-closure"*, which is actively guarded against potential disruptions via the so-called model-based sanitation mechanism and may also have some degree of passive noise-immunity to the extent provided by its structural properties (such as compliant models with built-in uncertainties that can be specified via external information, or models composed of nearly atomistic building blocks that are insensitive to small perturbations, the most typical examples being digital models).

As long as the models that make up the EoK remain intact within the bounds of their predefined uncertainties, in other words, as long as the impacts on individual models can be accommodated as "information" or rejected as "noise", the EoK operates in what Denizhan calls the *conservative mode*. Within this operational mode, the EoK lends itself to a description as a complex hierarchical organisation of atomistic building blocks; a circumstance that promotes the assumption that this (epistemic) complex hierarchical organisation is analogous to that of the ontic system under consideration. In the conservative mode, *neither information nor noise can provide true novelty and generativity*: the former because it can only specify predefined deficiencies and/or uncertainties, and the latter because it is blocked and eliminated by the model-based sanitation process.

Nevertheless, interactions with the external world and negotiations within the EoK may eventually put some models under severe stress beyond their tolerance and the power of their defence system, and thus destabilise them, possibly affecting also several other models, initiating a relatively chaotic

process of unsystematic quest for conflict resolution and meaning making, which Denizhan designates as the *creative mode*. Unless it leads to a catastrophic collapse, this stressful and exhaustive mode eventually terminates with the discovery/invention/emergence of new models that provide new partial resolutions for the tensions and incompatibilities among the models in the EoK and allow for a (temporary) return to a routine operation within the conservative mode.

According to Denizhan, the generative aspect of noise, i.e. what would have been classified as noise by some models during the conservative mode, lies in its capacity to destabilise these models and push the EoK dynamics towards a creative mode, which eventually generates new models, new meanings and a qualitative change in the whole EoK.

Denizhan concluded that, without acknowledging the functionality of the disrupting factors and the role of the creative mode in the EoK dynamics, it is not possible to account for emergent phenomena both in the external world and their counterpart in the EoK.

[1] Denizhan, Y. (2023). Intelligence as a Border Activity Between the Modelled and the Unmodelled. *Angelaki*, 28(3), 25–37.

Cécile MALASPINA: Information Realism and Ontological Noise

Malaspina's intervention started from arguments made in *An Epistemology of Noise,* where she argues that "noise" is interesting not only as a descriptive term for undesirable or perturbatory phenomena, ranging from cosmic background radiation to the unpredictable market fluctuations associated with 'noise traders' in finance. It is, rather, a properly philosophical concept—central to how knowledge forms and to the way concepts circulate – across the boundaries of STEM subjects, but also of human sciences and artistic practices. She compares Shannon's notion—that information is tied to unpredictability (information entropy)—with Wiener's perspective, which associates information with the negation of entropy (negentropy as a metaphor for order). Malaspina argues that the tension between these views constitutes a form of 'epistemological noise' analogous to the myriad of context specific definitions of noise across disciplines. The tension of this epistemological noise disturbs and interferes with discursive clarity, but it is also conceptually necessary for the deliberative generation of new knowledge and ways of thinking. Expanding on John Ratey and Stephen Sands' psychiatric concepts of 'the mental state of noise' and Kurt Goldstein's concept of 'the catastrophic reaction,' she argues that a rashly eliminative stance or rigid attempt to control "noise" may inadvertently negatively affect systemic robustness and resilience.

In this workshop she presented recent novel developments in her thinking about noise, incorporating both Gilbert Simondon's ontogenetic theory of individuation and Duns Scotus' scholastic concepts relating to individuation, namely (*haecceity* or 'thisness'), 'unitive containment' (of individual singularity and common nature)*,* and 'formal difference' (while individual singularity and common nature are formally distinct, they are existentially one in the individual subject).

This approach intends to address realism and its speculative dimension, i.e. what experience or knowledge may we claim to have of reality, if we distinguish reality from our model of reality and if we admit, with Kant, that any possible object of experience for us is always already formatted by our *a priori,* that is, by an implicit and tacit model of reality, rather than of reality in itself. To this end she returned to a prior bifurcation in the history of philosophy, namely the scholastic turn from (Platonic) realism to nominalism, a turn whose consequences bear great significance for the emergence of the modern scientific paradigm. If we grant that modern European thought broadly followed Ockham in the idea that universals (and the common natures on which they rest) are merely thoughts in our mind and have no reality, then the following question arises, haunting the subsequent history of philosophy with various figures of its 'other': what experience and knowledge may we claim to have of reality, if we may know it only through ideas and concepts in our mind? What is left, when we suspend these ideas and concepts – other than perhaps a form of ontological noise?

The problem, as exposed by Malaspina in this workshop, hinges on the silent obliteration of the problem of individuation. Ockham's razor eliminates the need for Scotus' elaborate account for individuation (i.e. for the positive difference of the individual from more abstract categories of genera and species) by founding a radically simplified ontology: only individuals exist and all that exists is individual.

However, erasing the fine distinctions of Scotus, the individual also loses its positive

singularity. For, individuality as conceived by Scouts cannot be a combination of concepts that are true of many (universals). The nominalist thereby individual loses what Scotus called its 'ultimate definition' and becomes, rather, a mere particular. As a particular, whose singularity is a postulate rather than a philosophically valid foundation, it now slots into our theories and as a being that is equivalent to other individuals.

What is lost is the moderate realism of Scotus (not a Platonist realism, but a realism of common natures, giving rise to concepts with universality), but not only. What is lost is also the actual reality that grounds theory, namely, the singularity of what exists in its singularity, which is irreducible to any concept that is true of many. This singularity, Malaspina argued, constitutes a form of ontological noise that need not be the great other of philosophy and of knowledge. It is granted that the individual conceived in its singularity is not a possible 'object' for thought, in the sense that it is irreducible to concepts we may have of things or objects and that it is irreducible to any form of conceptual equivalence. Nevertheless the individual experienced in its singularity is not only real, but is the only reality we may experience. It is the grace, but also the problem and the springboard for conceptualisation. It is also the occasion for the patterns we recognise in empirical reality, which ground what the scholastic thinkers called common natures, and on the basis of which we can have concepts true of many, which underlie claims to universality.

The conclusion is that empiricism, which is the heir of nominalism, and with it the discretisation of the real that underlies statistical thinking and digitisation, is left with a chimeric individual, a token of equivalence, while losing both the singularity of what has individuality, and the efficacy of patterns as real basis for common natures that ground our scientific, technological and artistic ideas about the real.

The ethical, aesthetic and epistemological consequences of a contemporary update on moderate realism were discussed during the workshop, with regard to thinking about information and noise in the age of planetary digitisation. Simondon's concept of information, in particular, was foregrounded as a basis for a topological approach to analog processes of individuation.

Muindi Fanuel MUINDI, From Error to Errantry: Countering Brutalization and Specialization in Colonial Science

The "brute matter" and "brute facts" of Colonial Science are not givens: they are made by Colonial Science via processes of "brutalization". Colonizers submit beings to scientific study because they intend to brutalize them, to make efficient use of force as they transform beings into perversely pleasurable and profitable objects for collection and consumption. It is only when beings resist brutalization in remarkable ways that Colonial Science calls in the specialists in noise, complexity, chaos, and indeterminacy as reinforcements, for the purposes of risk management and damage control. Colonial Science then endeavors to marginalize those beings that are remarkable for resisting brutalization, writing them off as special cases, as cases for specialized know-how, and rendering them inaccessible to the multitudes. This presentation will consider the prospects for a Decolonial Science committed to and intent upon (i) deconstructing the colonial practices of brutalization and specialization that have entrenched themselves in the modern techno-scientific imagination, and (ii) (re-) constructing "other-whys" that enable scientists and technologists to approach beings otherwise than brutalizing and specializing them.

SHA Xin Wei: *Textural Sensemaking and Textural Subjectivation*

Introduction

What opens up when we shift from a logic of objects and predicates to operators, transformations, contingency and open-ended development; from *a priori* atoms and egos experiencing in terms of form and substance to topological distributions and other modes of contingent textural subjectivation? Drawing from process philosophies, radical empiricism, non-discrete topological dynamics and field theories, Sha speculatively proposed that some *open sets* of experience – which are retrospectively and contingently construed as texturally distributed subjects – create sense in the course of locally distinguishing signals from noise, consigning complements of discerned experience to the indiscernible.

Inspirations from live event

Sha started by showing examples of distributed, dense, enactive sense-making in live events from the Topological Media Lab [14], Synthesis@ASU [13] and from performance & installation art work.

Methodological tactics

Sha began with processual elements: (1) a propositional, "what-if" approach rather than claims about physical reality or socio-epistemic fact, (2) abstraction not divorced from but as found in concrete occasions, as lures for further adventure of thought, and, looking ahead to a technical heart of the presentation [12], (3) anexact but rigorous concepts [4: 407, 483]. Sha called on William James' radical empiricist account of experience in which subjects and objects contingently appear in incessant material — energetic, biosocial, affective symbolic — development. Radical empiricism takes relations to be as real as their relata [5]. An distinctive and important aspect of Sha's approach are the experiential experiments built by the Topological Media Lab, and by Synthesis blending movement art, gestural media synthesis, performance techniques, together with realtime multi-modal, dense signal processing [9].

Ingredient Concepts

Some core concepts derive from differential topological dynamics on manifolds [8] and what Sha called a **textural** approach inspired by metric-agnostic concepts from non-discrete, non-finite topology, multiplicity, and fields (implicitly employing and enabling concepts inspired from fiber bundles) [4]. In particular, with respect to a topology, "local" or "regional" has nothing to do with metric proximity, contiguity, finiteness, or even dimension, yet we have a rich suite of anexact concepts and theorems articulating for example interior, exterior, element, wholes, regions (parts), openness, boundlessness, boundary, coverings, limit, convergence, divergence, disparity, mixture, transformation, variation, dynamic, turbulence, intensity and so forth. This prepared a *textural* approach to the core question of sense and sense-making open-ended dynamical situations with no pre-given subjects, objects, or spaces of possibility, and no pre-stated rules for development, mindful of Gilbert Simondon's approach to ontogenesis and in particular, to individuation [11].

Sense

Relinquishing fixed pre-given schema demands relinquishing a fixed pre-given theory of meaning. However this is not giving up meaning altogether, but relinquishing appealing to a rule, scheme, or order that transcendentally precedes the ontogenetic processes at play in languaging. (Here languaging is interpreted in terms of its effects: coordinating collective attention and coordinating collective intention.)

Simondon's characterization of information suggests how we can approach languaging.

In place of information considered as that which is (can be) encoded in some scheme abstracted from contingent material processes Simondon writes: "Information is never relative to a single and homogeneous reality but … is the tension between two disparate reals… information supposes a phase change of a system…information is always in the present, actual, for it is the direction according to which a system individuates." (The metric-agnostic concepts Sha introduced offer a way to free up the notion of "direction" from a geometric conceit.)

This motivates a processualist treatment of sense, primordial to language. Sha drew first on David Morris's work on developmental ontology, where Morris characterizes sense as that which "allows things to develop without yet specifying in advance what will follow" [6]. Sha also drew from Deleuze's *The Logic of Sense* [3]. Adapting from the Stoics and from Leibniz, for Deleuze, sense is neither causal nor linguistic (propositional), but is, in Daniela Voss' words: "an incorporeal added to the object or state of affairs that makes it appear differently, that is, in another aspect or mode" [15]. One striking, exemplary element of this approach is Deleuze's replacement of the classical copula *x* IS *p* ("The tree is green.") assigning a property or feature *p* to *x,* by articulations of the form "Treeing" AND "Greening." We are led to think of *sense as event* [1]. Following Deleuze, we understand sense as emerging out of what he calls a problematic Idea (or structure) wherein events that characterize things in general are themselves determined only by other events [1]. (Here "problematic" doesn't mean the Idea is poorly posed, but that the Idea proliferates tensions and distinctions.) With this brief treatment of a notion of sense, Sha turned to the process of sense-*making*.

Sense-making

Keeping in mind that this project aims to create an account of sense-making that does not pre-suppose some subjects and objects, and employing Deleuze's characterization of sense budding from a problematic Idea, Sha recalled how Deleuze's differentiation (with a "t") engenders "the virtual content of an Idea" and generates sense that does not pre-exist its event. Given this preparation, Sha offered a diagram of thought, deliberately hijacked from physics, with three concurrent layers (*non-discrete* topological dynamical spaces). The first is a multiplicity — a manifold M — of tangible, material or embodied, social experience. Decision processes determine what aspects of M are observable, yielding a second space of *situations* of M. Another set of decisions yields a third space of phases of sense-making constructed from situations. A key point is that this does and must allow for *mutant* phases of sense, acknowledging the open historicity of biological life and of social situations. A profound difference between this diagram from statistical physics is that all the spaces can *mutate* along non-prestatable degrees of freedom; not only unprecedented change, but *unprecedented dimensions or ways* of change can emerge in dynamic (hence [7]).

Mindful of an earlier proposition that objects of experience are invariants of families of symmetries applied to the space of experience [10], Sha introduced another family of sense-making operators: Noah Moss Brender's proposition that sense is tantamount to the *breaking* of symmetry. [2]. By Noether's theorem, breaking of symmetry implies the emergence of non-conserved quantities.

Now, given the ever-proliferating contingency and plurality of material, experiential multiplicity, we admit indeterminately heterogeneous emergence

of sense, which in turn admits indeterminately heterogeneous fields that are sections of fiber bundles, characterized by *disparate* collections of differential operators.

Non-prestatability, and Deleuze's notion of differentiation's role in the emergence of sense motivate the turn to *differential heterogenesis* elaborated by Alessandro Sarti and Giovanna Citti [7].

Flux between the Discernible and the Indiscernible (Noise)

Assembling these ingredients, Sha proposed the following scenario constituted by operations of discernment in the textural magma of experience. As Malaspina observed in discussion, employing topological dynamical concepts can offer a way to constitute mereology (see Juarrero). Sha proposed contingent "regions" — that do not have to be contiguous and may in fact be immeasurably boundless and prolific — in which (regional) decision-making acts intertwined with (regional) apparatus (form) create sense as signal from *noise*, which Sha suggests is a name for the *indiscernible*. These regions operate in magmatic experience, texturally constituting sense and sense-making subjects. The open-ended historicity of that multiplicity may exceed current treatments from geometry or category theory. These regions operate in magmatic experience, texturally constituting sense and sense-making subjects. Future work may include zigzagging with Muindi's account of *maroon technologies*, and Denizhan's Edifice of Knowing.

[1] Bowden, Sean. *Priority of Events, Deleuze's Logic of Sense*. Edinburgh, 2011.

[2] Brender, Noah Moss. "Symmetry-Breaking Dynamics in Development." *Phenomenology and the Cognitive Sciences* 16 (2017): 585–96.

[3] Deleuze, Gilles. *The Logic of Sense*. Columbia, 1990.

[4] Deleuze, Gilles, and Felix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. Trans. Massumi, Brian. Minneapolis: University of Minnesota Press, 1987.

[5] James, William. *Essays on Radical Empiricism*. Dover (Harvard), 2003 (1912).

[6] Morris, David. *Merleau-Ponty's Developmental Ontology*. Northwestern University Press, 2018.

[7] Sarti, Alessandro, Giovanna Citti, and David Piotrowski. "Differential Heterogenesis and the Emergence of Semiotic Function." *Semiotica* 2019.230 (2019): 1-34.

[8] Sha, Xin Wei. "Topology and Morphogenesis." In *Topologies of Multiplicity*, ed. Celia Lury, *Theory, Culture \& Society* 29.4/5 (2012): 220-46.

[9] Sha, Xin Wei. "Writing in Water: Dense Responsive Media in Place of Relational Interfaces." *AI & Society* (2021).

[10] Sha, Xin Wei. "Textural Rhythm and Textural Sense-Making." In *The Rise of Rhythm Studies: Mediating Dimension, Discipline and Scale*. Eds. Sha, Richard and Mark Lussier. Bloomsbury, 2025 (forthcoming).

[11] Simondon, Gilbert. *Individuation in Light of Notions of Form and Information*. Tr. and Taylor Adkins. Minnesota, 2020.

[12] Stengers, Isabelle. "A Constructivist Reading of Process and Reality." *Theory Culture Society* 25.4 (2008): 91-110.

[13] Synthesis, Arizona State University, http://synthesiscenter.net/

[14] Topological Media Lab, Concordia University, http://topologicalmedialab.net

[15] Voss, Daniela. "Deleuze's Rethinking of the Notion of Sense." *Deleuze Studies* 7.1 (2013): 1-25.

Alicia JUARRERO: Mereology, Multiple Realisability and Noise

Forms and substances – the ground of ontology and foundation of knowledge -- were defined in contradistinction to concrete particulars. With the transition from realism to nominalism, universals turned into "representations," models, and maps. When Turing and Gödel showed that complete and consistent axiomatization was impossible, Western philosophy doubled down on atomism and reductionism at the expense of cosmic synthesis-making. The ontological and epistemological presuppositions concerning mereology, the relations between parts and wholes were dismissed. This presentation will argue that the historical rejection of circular causality is responsible for impasse and that constraints such as iteration, feedback, and autocatalysis can generate multiply-realisable and context-dependent synthetic wholes. The wiggle room of multiple realisability in complex systems is an ontic source of noise.