systems and networks

Complexity | Connectivity | Creativity



Lecture Aims:

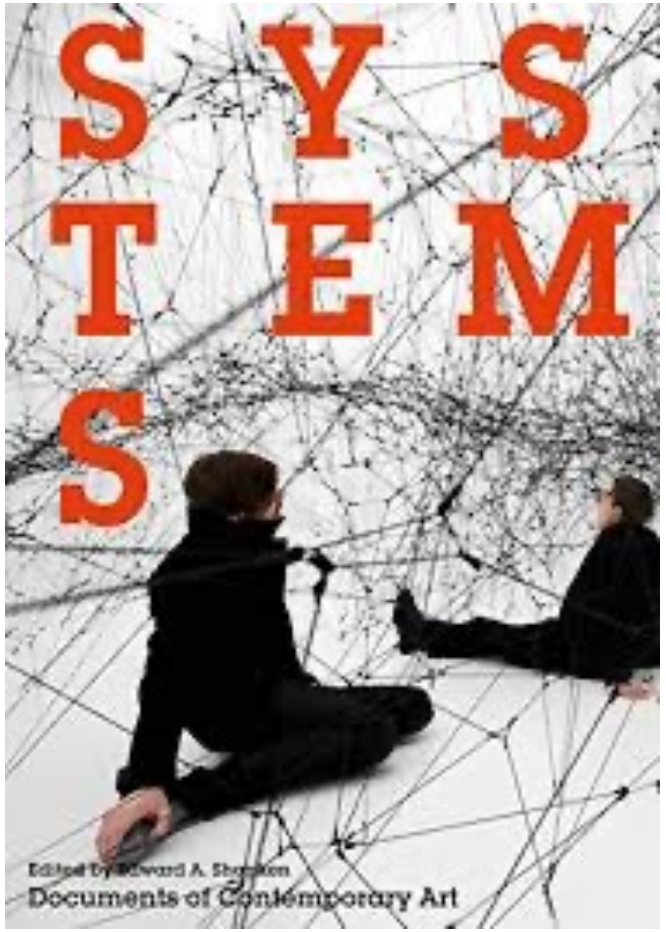
- To establish some potential connections between **systems thinking and networks** in relation to art and design practice.

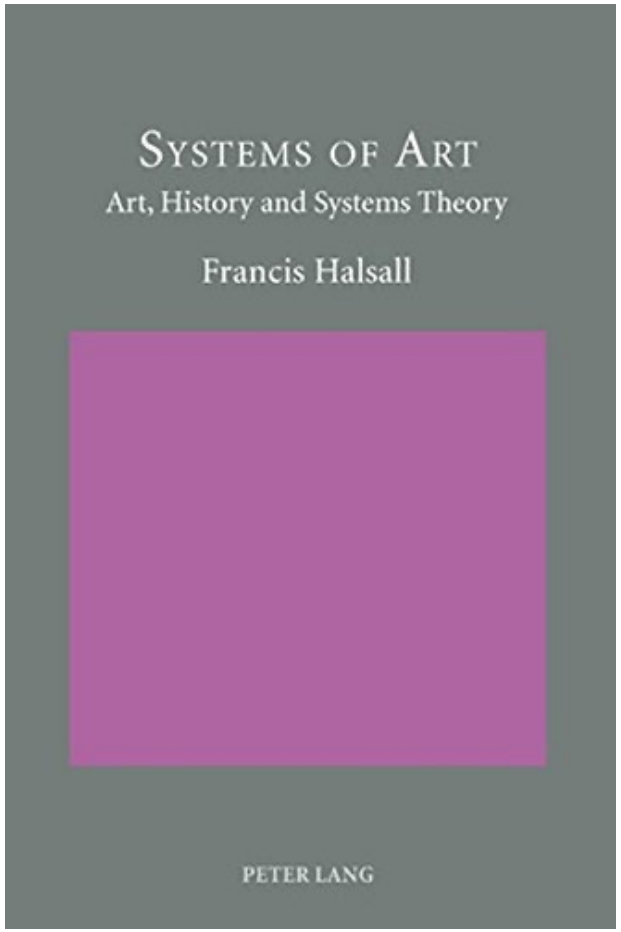
- Identify potential **research methodologies** and corresponding **research methods** suitable for engaging with systems thinking and networks.

systems theory

Loosely describes a group of radical artists working in the late 1960s early 1970s who reacted against art's traditional focus on the object with the aim of making their art more responsive to the world around them.

Systems theory emerged in the mid-20th century along with related theories such as Cybernetics and Information Theory. Recently it has included **Complexity Theory, Chaos Theory and Social Systems Theory.** Systems theory understands phenomena in terms of the systems of which they are part.





jack burnham

Writing in the 1960's and 70's, American art critic Jack Burnham argued strongly against the prevailing Formalist approach to art criticism. Instead he put forward the idea of a **'systems esthetic',** a way of **rethinking art as a system or network of social-technical processes.**

Burnham's systems aesthetics comprehends five key insights:

1.That there has been a transition from an ***object-oriented*** **to a *systems-oriented* culture.**

2.That art does not reside in material entities.

3.That art is not autonomous.

4.That art is conceptual focus.

5.That no definition or theory of art can be historically invariant.

Jack Burnham's systems aesthetics was one of the first, fully developed, critical theories of **post-formalist artistic practice**.

All Systems Go: Recovering Jack Burnham's 'Systems Aesthetics'





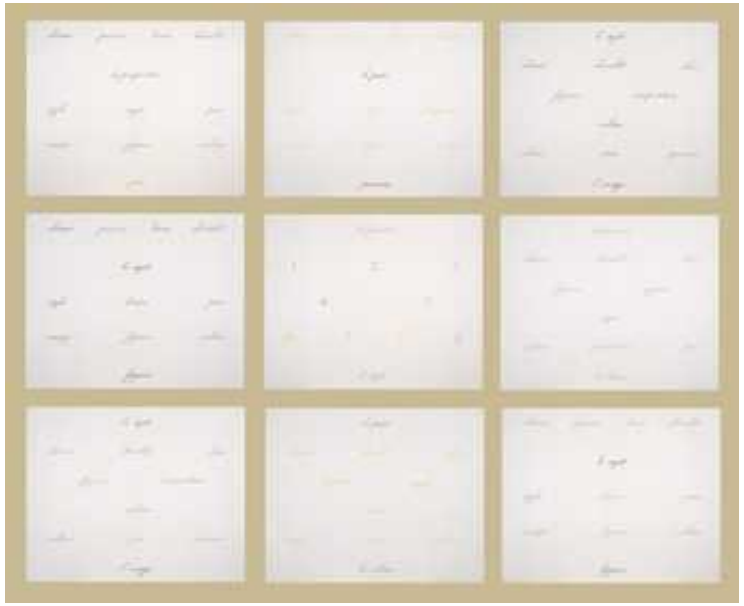
We are now in transition from an *object-oriented* to a *systems-oriented culture*. Here change emanates, not from *things*, but from *the way things are done*.

Post-formalism as I will describe it attempts to shift ground from the history of artworks to the history of visual imaging and imagining.

SYSTEMS ART



Room Situation (1970), Vito Acconci



Paintings (1973), Marcel Broodthaers

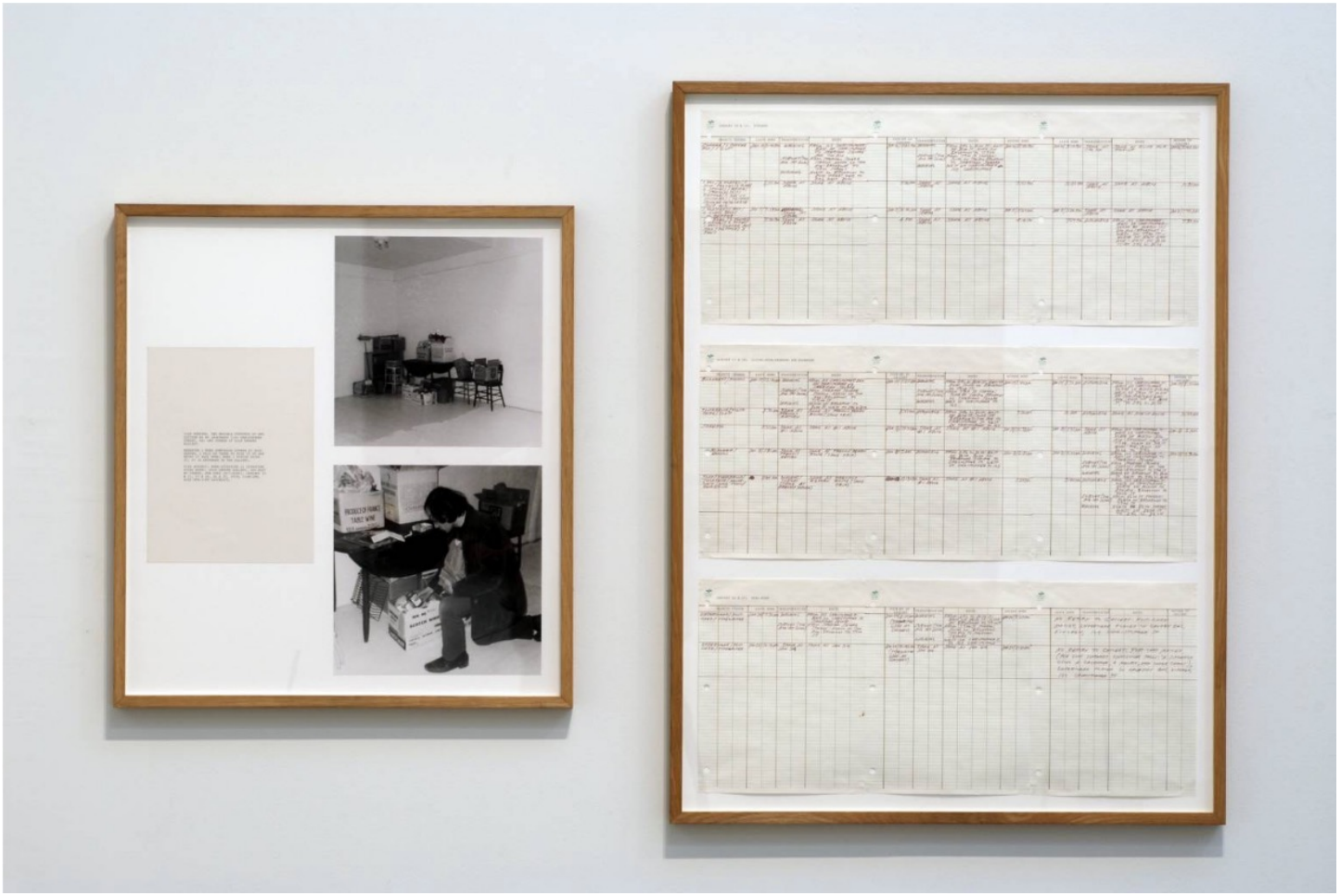


A Line Made by Walking (1967), Richard Long

Building on the structures of minimal art and conceptual art, the artists adopted experimental aesthetic systems across a variety of media including photography, dance, performance, painting, installation, video and film as a more effective means to connect with the political developments of the decade.

Vito Acconci
Room Situation
1970

Room Situation documents a performance entitled Room Piece that was staged over three weekends in January 1970. Each weekend, Acconci moved furniture and objects from his New York apartment to a gallery eighty blocks uptown. If he needed any of these items, he would return to the gallery to borrow them, and take them back when he had finished using them. The distinction between the artist''s home and his gallery, and between his private and public activities, became increasingly blurred.



Marcel Broodthaers
Paintings
1973

Broodthaers was a Belgian poet and artist who had a lifelong fascination with the work of the Belgian Surrealist, René Magritte. He was particularly interested in those works where Magritte introduced written words to contradict a visual image, and made a number of paintings and prints based on this idea.

Such works question the relationship between art and the reality it depicts. This is one of a large series of works each consisting of nine panels and referring to various areas of culture. Here sixteen words refer to traditional paintings, listing for example, 'style', 'subject', 'colour' in French. The way the words are combined in each canvas represents a different painting.



Richard Long CBE
A Line Made by Walking
1967

Nature has always been recorded by artists, from prehistoric cave paintings to twentieth-century landscape photography. I too wanted to make nature the subject of my work, but in new ways. I started working outside using natural materials like grass and water, and this evolved into the idea of making a sculpture by walking … My first work made by walking, in 1967, was a straight line in a grass field, which was also my own path, going ‘nowhere’. In the subsequent early map works, recording very simple but precise walks on Exmoor and Dartmoor, my intention was to make a new art which was also a new way of walking: walking as art.

For a seemingly simple and prosaic action to be understood as art was a breakthrough for Long’s artistic career and also anticipated the practice of performance art that was to become widespread during the 1970s. Although no human figure appears in Long’s photograph, *A Line Made By Walking* presents a trace of corporeal presence and bodily action.



experimental aesthetic systems

Systems Art

or

Conceptual Art?

- Richard Long's *A Line Made by Walking* is often cited as an example of land art, which is a movement that emerged in the 1960s and 1970s that focuses on using the natural environment as the medium for creating art. In this work, Long walked back and forth in a field, creating a line in the grass through the repetitive action of his footsteps.
- While *A Line Made by Walking* is not a strict example of systems art, it does share some characteristics with the movement.
- **Systems art often emphasizes the use of rules, processes, and structures as the basis for creating art, and Long's use of repetitive walking to create a line in the grass could be seen as a kind of system or process.**
- However, unlike systems art, Long's work is not typically concerned with **the exploration of complex systems or the use of advanced technology,** but rather with the interaction between the artist and the natural world.

The Shipping Forecast
(1996)

Mark Power

Intangible and mysterious, familiar yet obscure, the shipping forecast is broadcast four times daily on BBC Radio 4. For those at, or about to put to sea, the forecast may mean the difference between life and death.

But for millions of landlubbing radio listeners it is more than this; the enigmatic language of the forecast has entered the public conciousness, creating a landscape of the imagination and confirming romantic notions of Britain's island status.

Captioned by the 0600hrs forecast on the day they were taken, these photographs attempt to challenge our assumptions of these far-flung places.












entropy



Jackson Pollock’s paintings have a high degree of entropy

Order and Chaos

The Birth of Tragedy

Friedrich Nietzsche

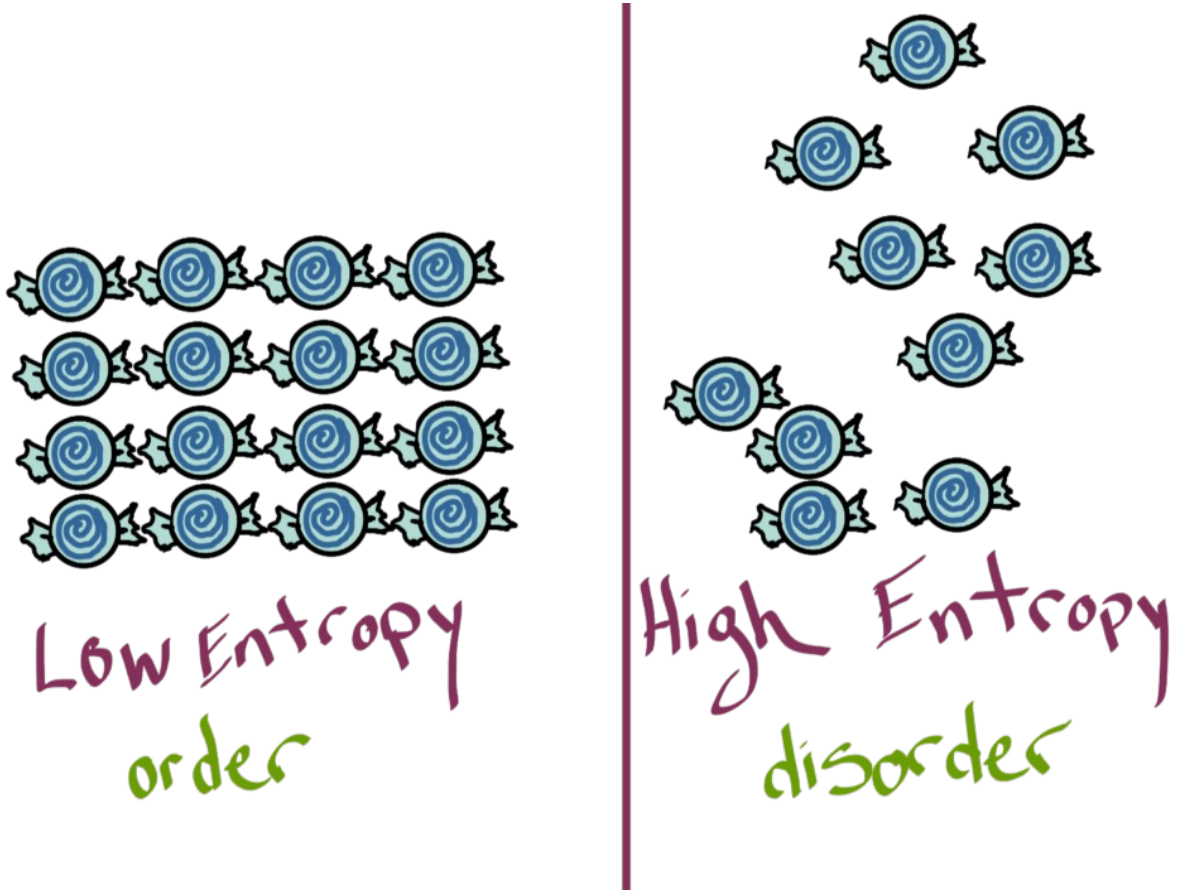
Nietzsche says because god doesn't exist we, as humans, are thrown back upon ourselves.

The nature of who we are is based on two impulses; order and chaos. We can't have one without the other.

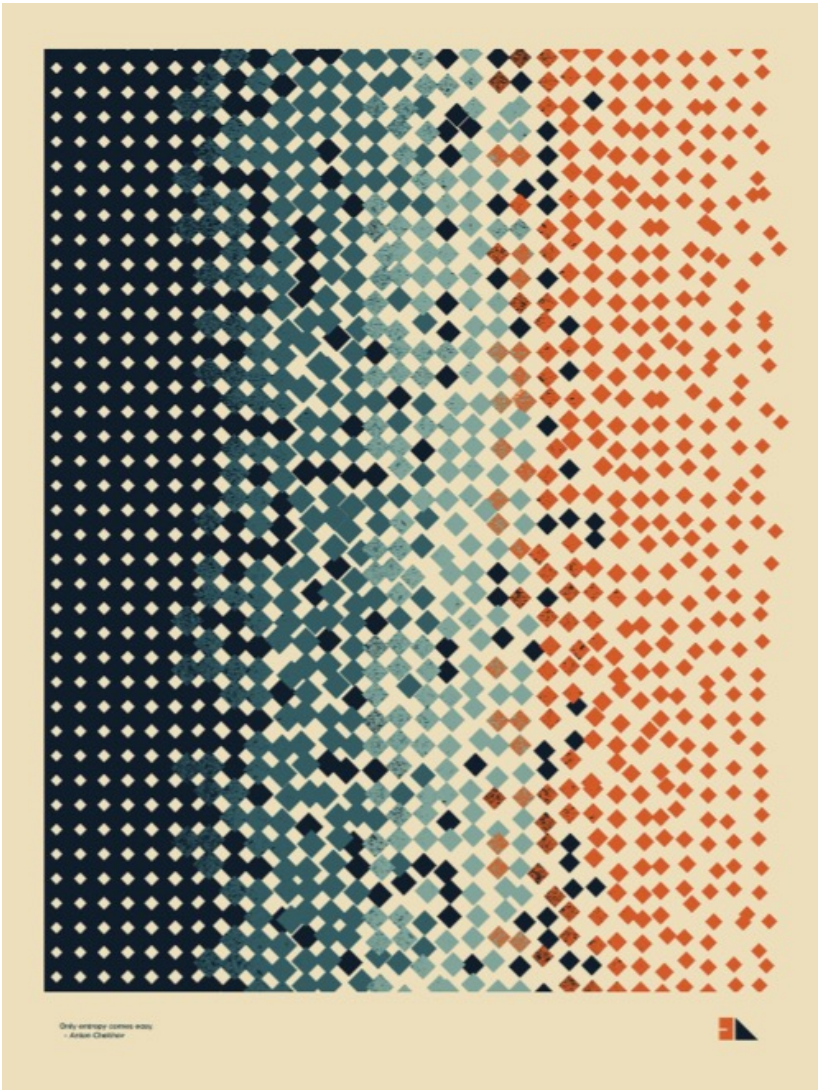
Order and chaos are the basis of human suffering.

Nietzsche associates order and chaos with the gods Apollo - order and Dionysus - chaos. Therefore human existence is tragic.





Entropy — The Pillar of both Thermodynamics and Information Theory



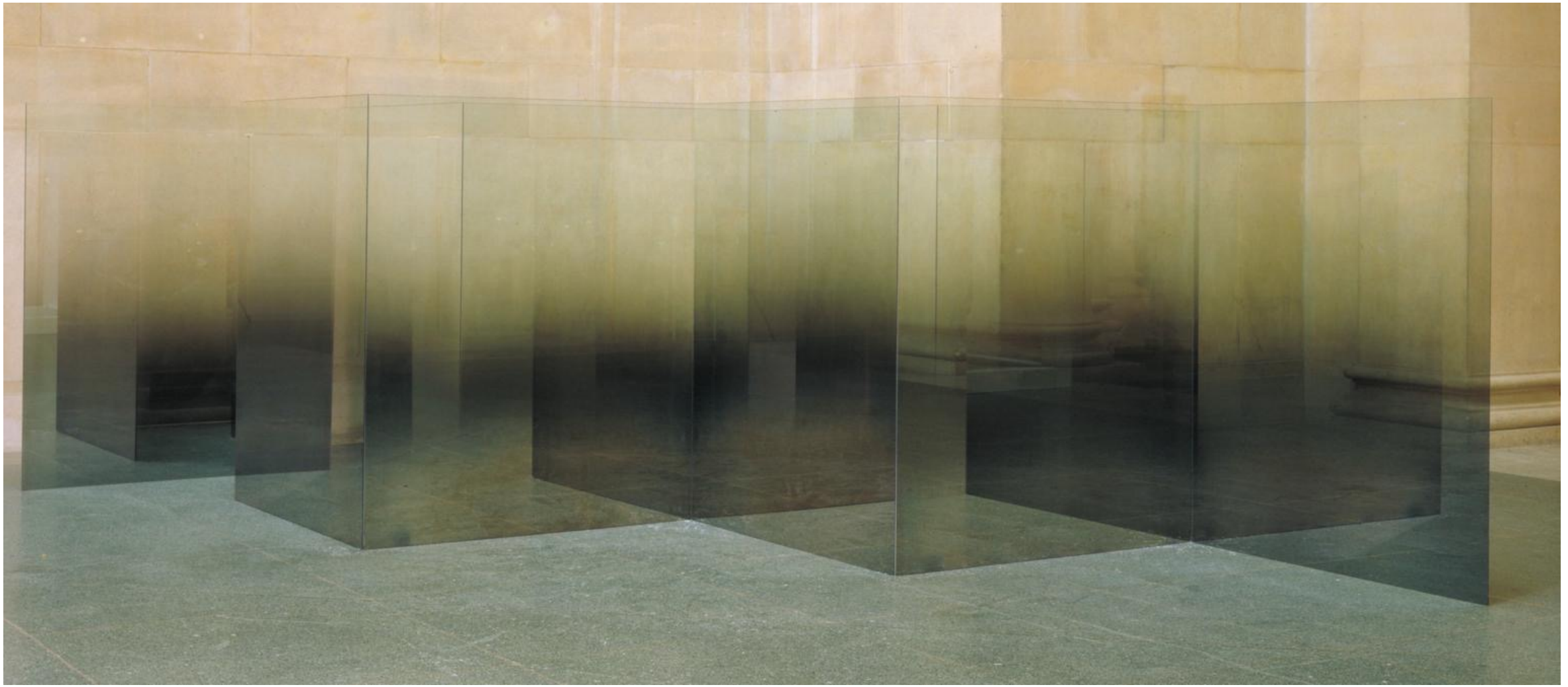
“Only entropy comes easy”-Anton Chekhov

Robert Smithson

In a 1966 essay entitled **“Entropy and the New Monuments,”** the artist Robert Smithson argued that a number of contemporary works of sculpture and architecture embodied a dullness and an absence of energy; blank forms and listlessness struck him as recurrent features. Such works thus recalled, to the erudite Smithson**, the Second Law of Thermodynamics**, which he read as implying that the entire universe is undergoing an inevitable loss of energy and a corresponding drift towards **homogeneity.**



Spiral Jetty (1970) | earthwork sculpture | Robert Smithson



Entropy is the inevitable and steady deterioration of a system or society

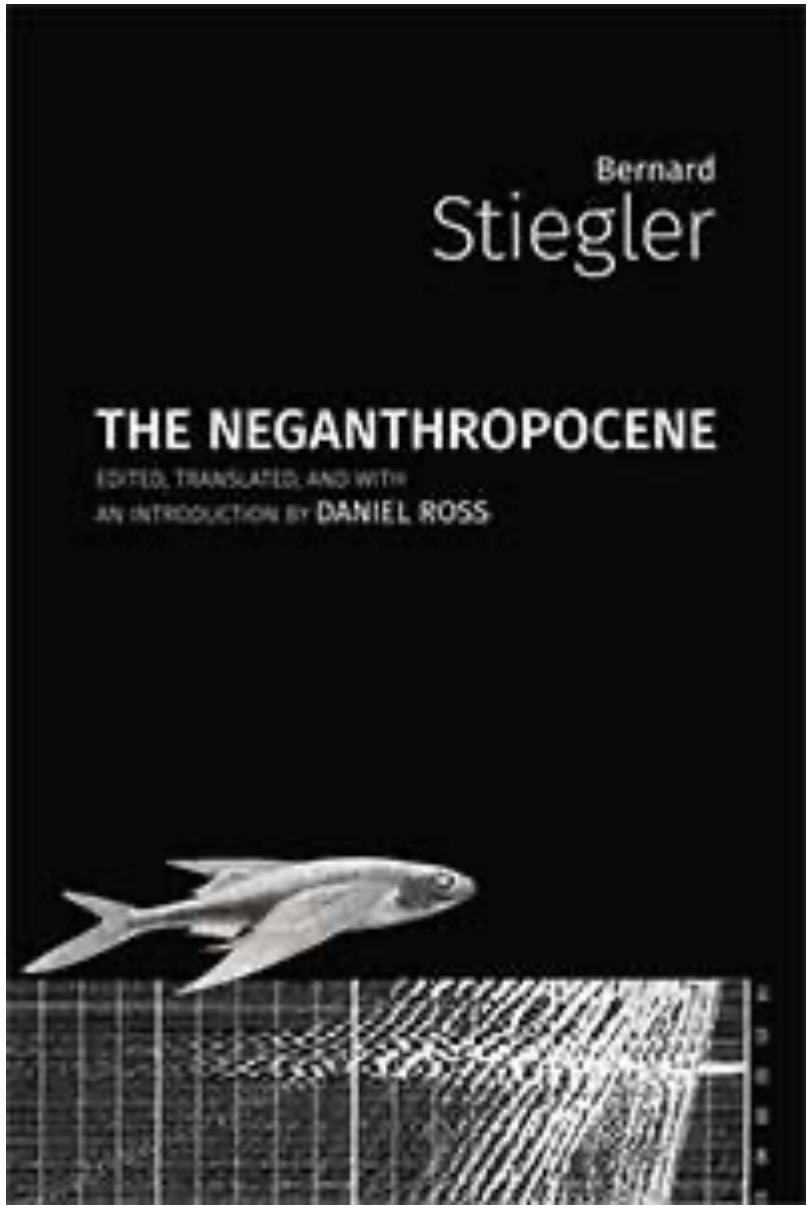
Larry Bell Untitled 1971

negative entropy

Mika Tajima







In the essays and lectures here titled Neganthropocene, Stiegler opens an entirely new front moving beyond the dead-end "banality" of the Anthropocene. Stiegler stakes out a battleplan to proceed beyond, indeed shrugging off, the fulfillment of nihilism that the era of climate chaos ushers in. Understood as the reinscription of philosophical, economic, anthropological and political concepts within a renewed thought of entropy and negentropy, Stiegler's 'Neganthropocene' pursues encounters with Alfred North Whitehead, Jacques Derrida, Gilbert Simondon, Peter Sloterdijk, Karl Marx, Benjamin Bratton, and others in its address of a wide array of contemporary technics: cinema, automation, neurotechnology, platform capitalism, digital governance and terrorism. This is a work that will need be digested by all critical laborers who have invoked the Anthropocene in bemused, snarky, or pedagogic terms, only to find themselves having gone for the click-bait of the term itself—since even those who do not risk definition in and by the greater entropy.

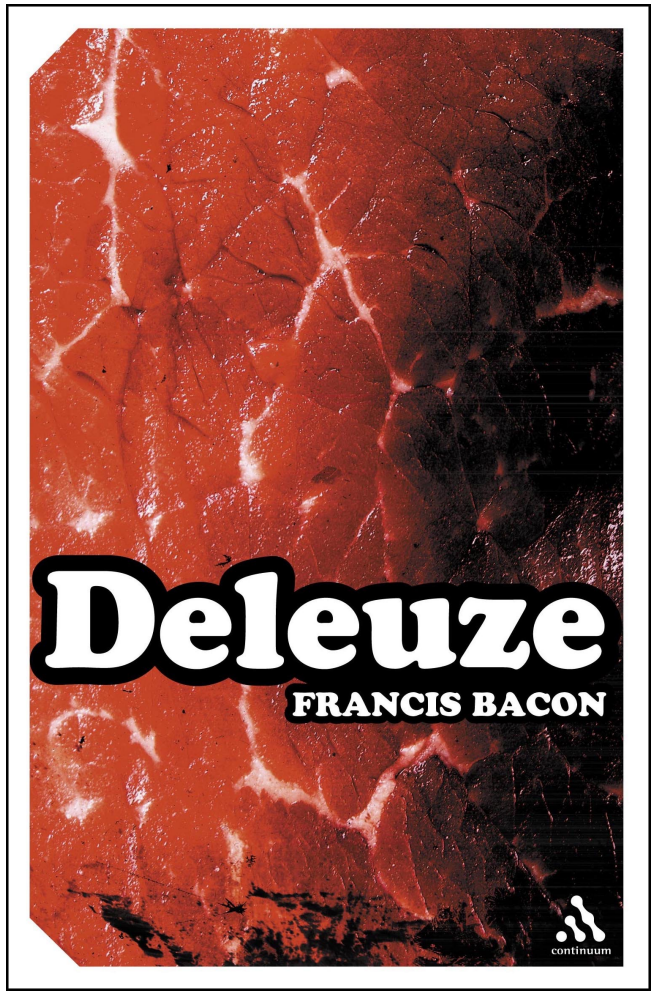




Shocking Masterpiece | from a logic of representation toward a pure logic of sensation



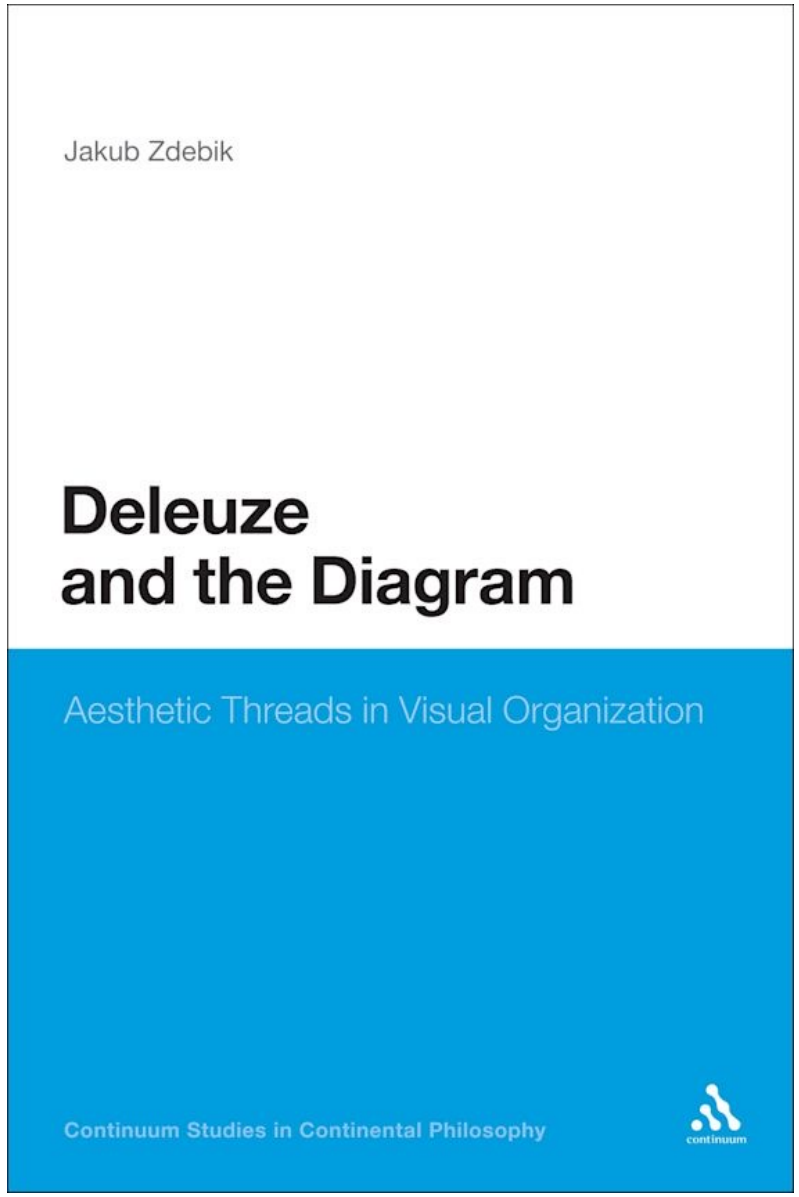
Three Studies for Figures at the Base of a Crucifixion (1944)



Francis Bacon: The Logic of Sensation (1981)

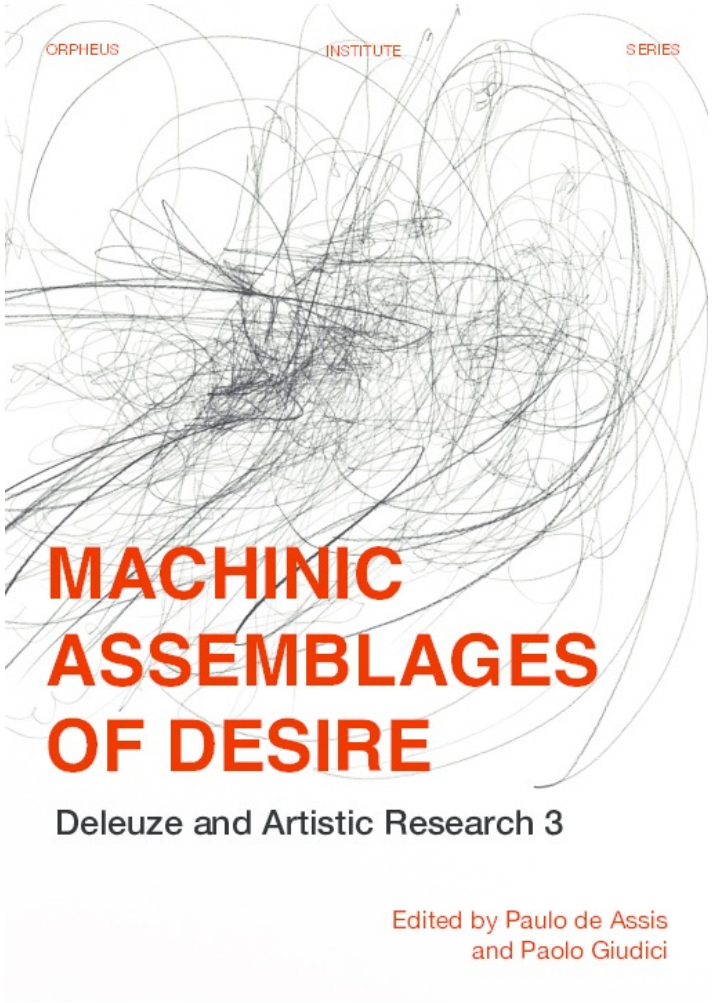
The ‘Diagram’, whilst a chaos, a catastrophe, is also a germ of order or of rhythm.

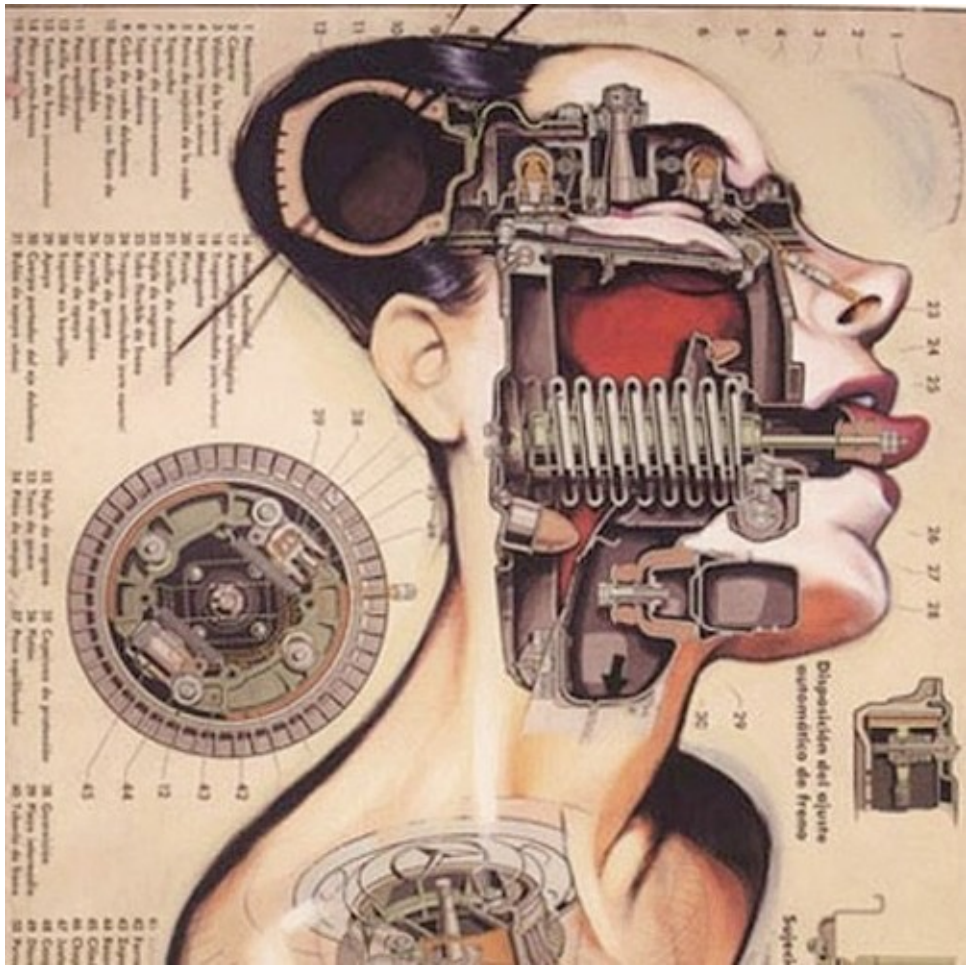
O'Sullivan, S., 2009. From stuttering and stammering to the diagram: Deleuze, Bacon and contemporary art practice. *Deleuze Studies*, *3*(2), pp.247-258.



- Gilles Deleuze's concept of the **diagram** is a way of thinking about the relationship between form and content, or structure and meaning, in various fields such as philosophy, art, and science. **The diagram is a non-representational or non-iconic way of representing concepts or ideas that cannot be easily represented through traditional means of expression such as language or imagery.**
- Deleuze's idea of the diagram emphasizes the connections between elements, rather than their individual characteristics. It is a way of thinking about systems that are constantly changing and evolving, rather than static and fixed. For Deleuze, the **diagram** is a tool for exploring the relationships between different elements in a system, and for discovering new possibilities for connection and creation.
- Deleuze's diagram concept has been applied in a wide range of fields, from architecture and design to social and political theory. It has been used to explore the dynamics of power relations, the nature of creativity and innovation, and the complexity of social and biological systems.
- Overall, the diagram is a powerful tool for understanding and engaging with the world around us in new and creative ways.

The ‘Diagram’, whilst a chaos, a catastrophe, is also a germ of order or of rhythm.

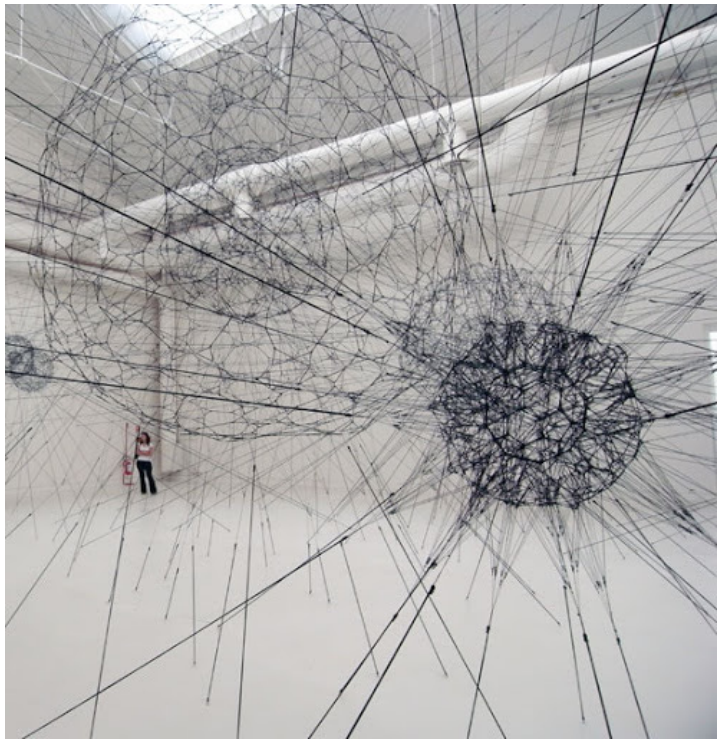


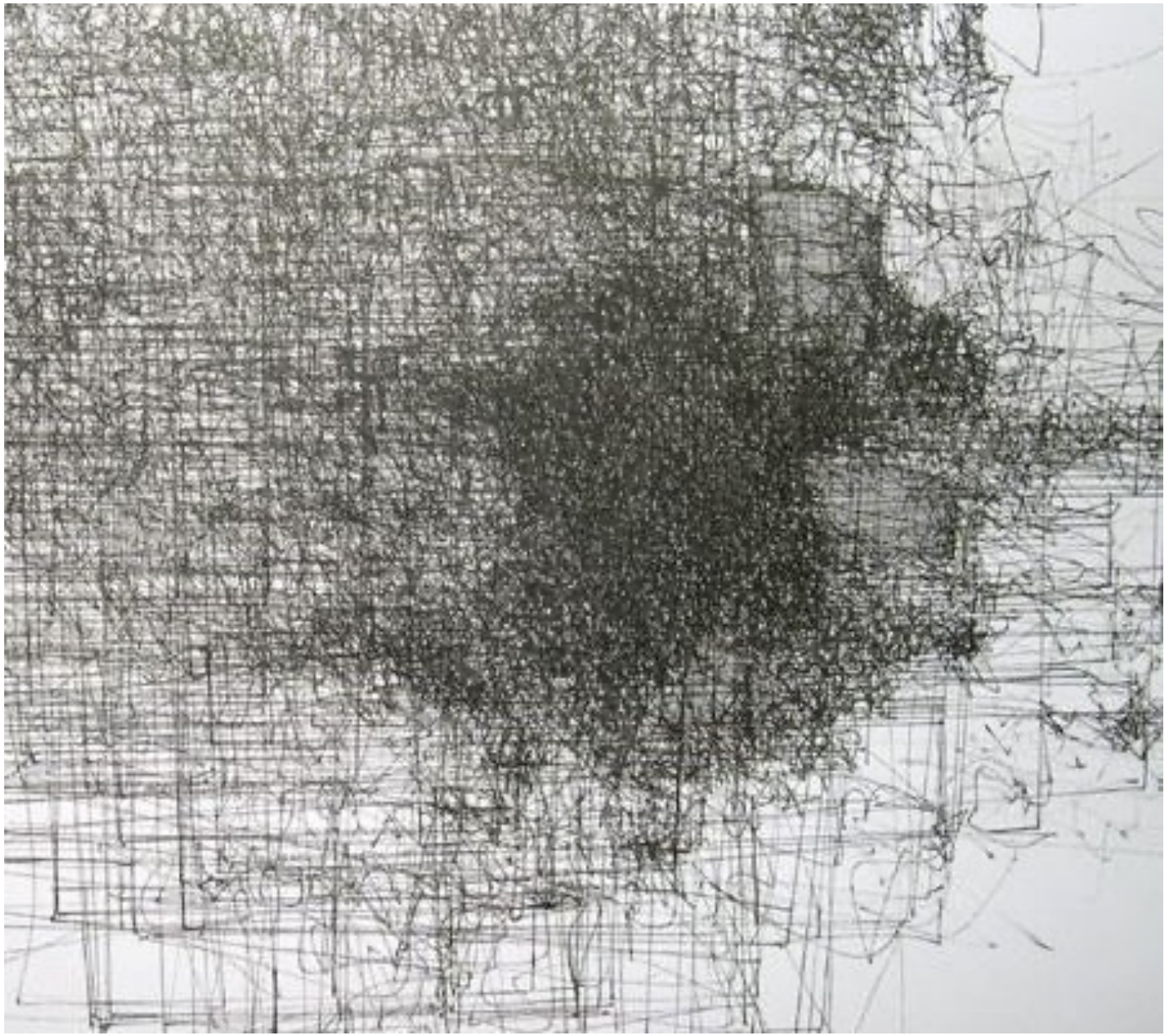


Desiring machines are the site of that production. For Deleuze and Guattari, every machine is **a machine connected to another machine**. Every machine functions as a break in the flow in relation to the machine to which it is connected, but is at the same time also a flow itself, or the production of a flow.

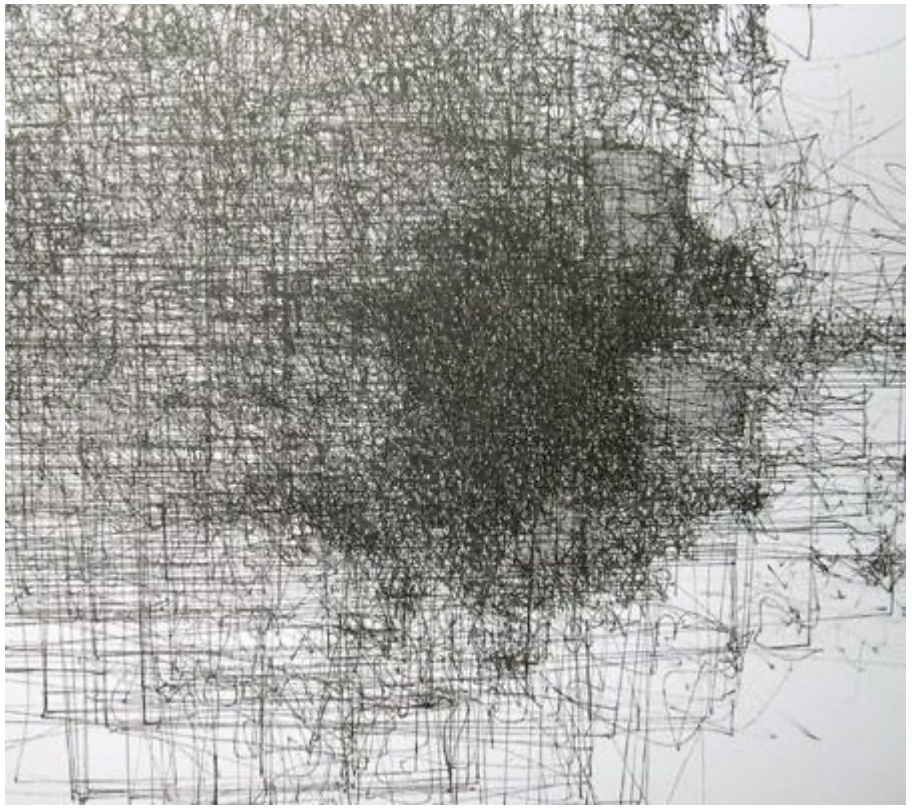
complexity

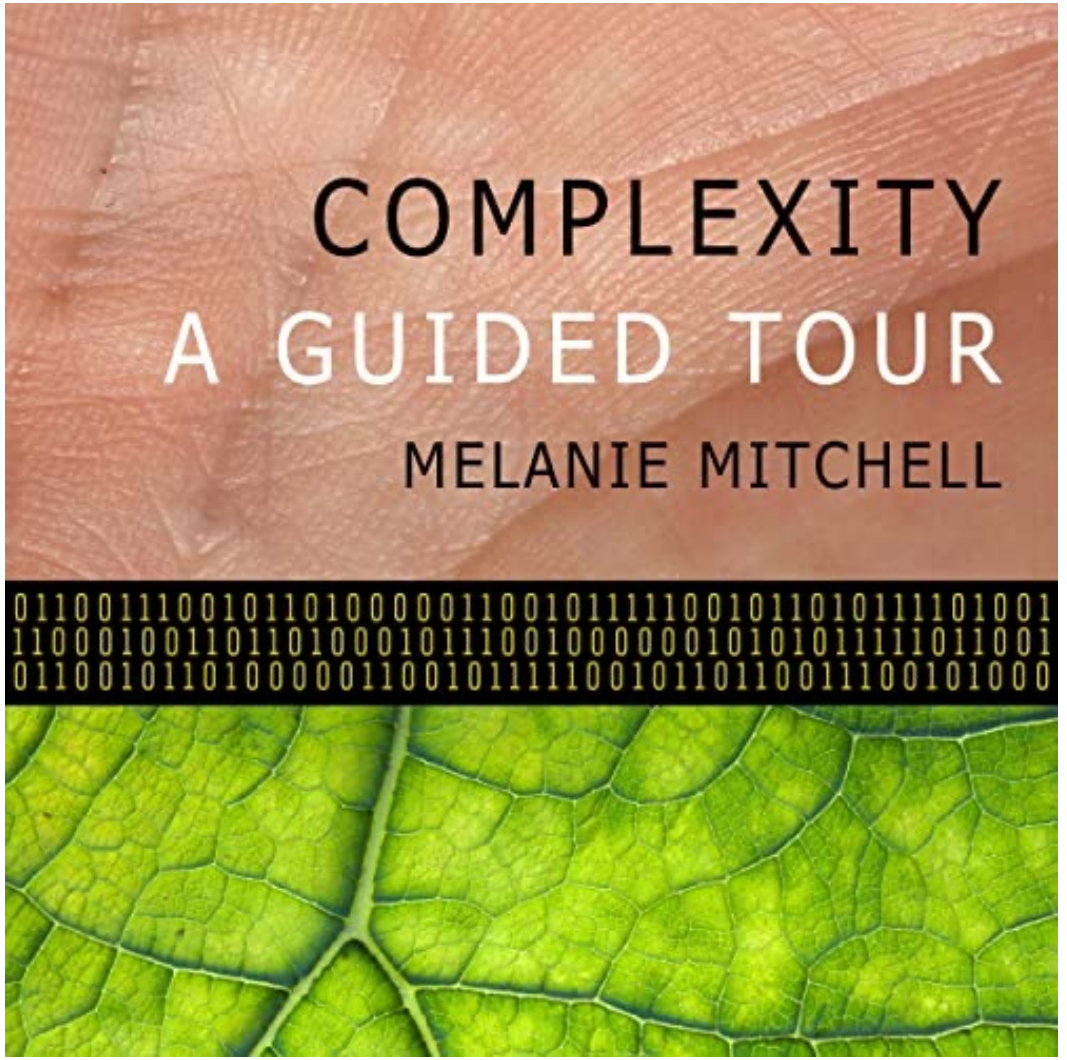
Complexity, Systems, and Generative Art



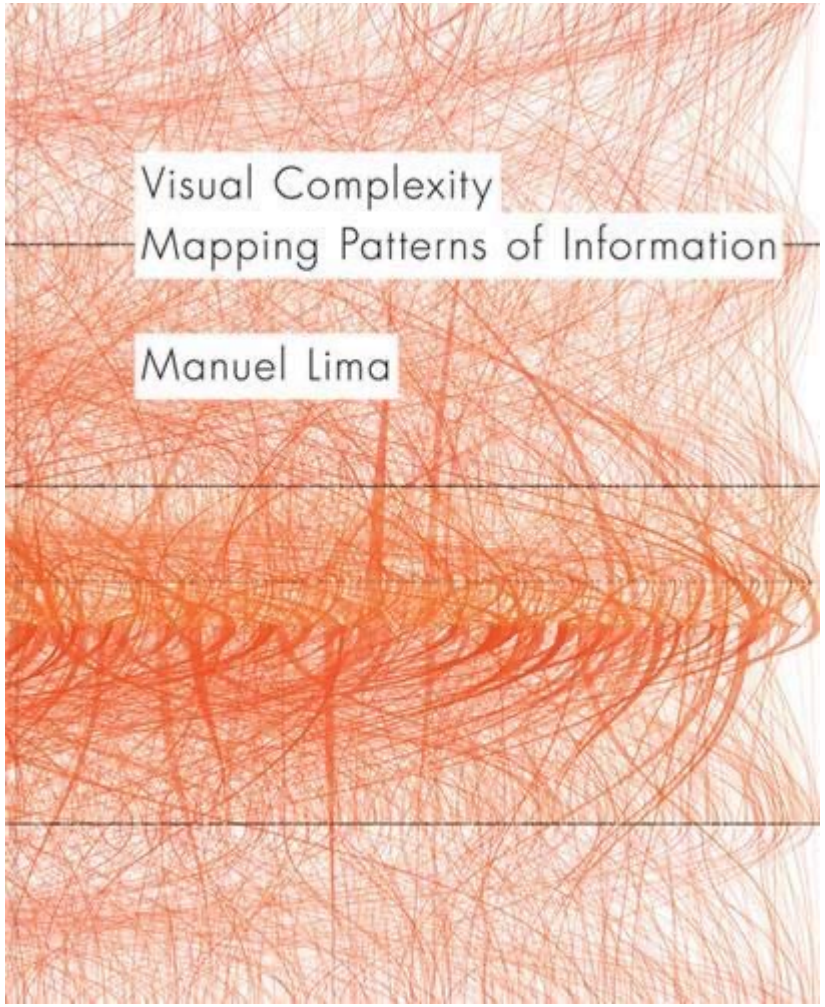


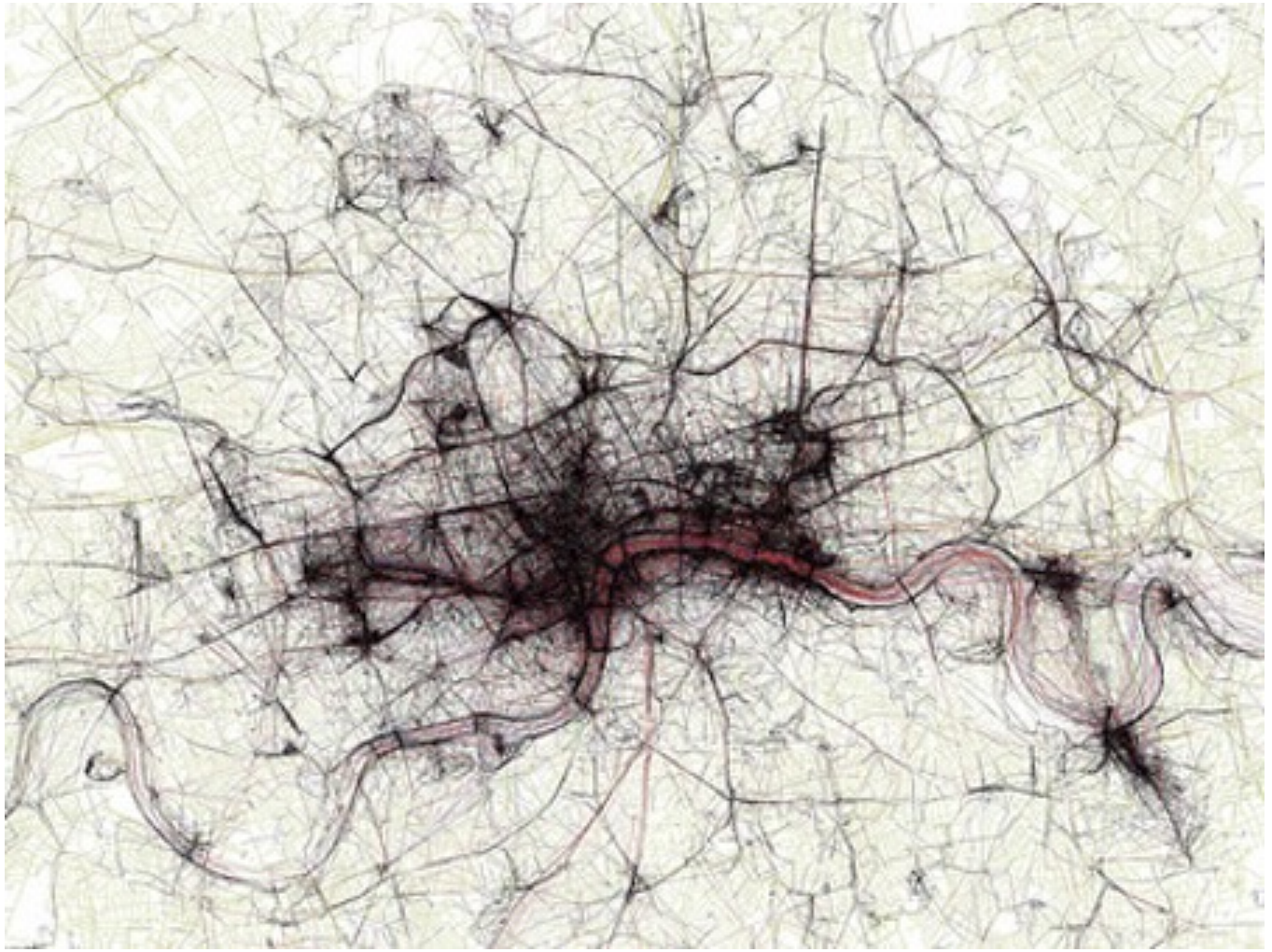
complexity





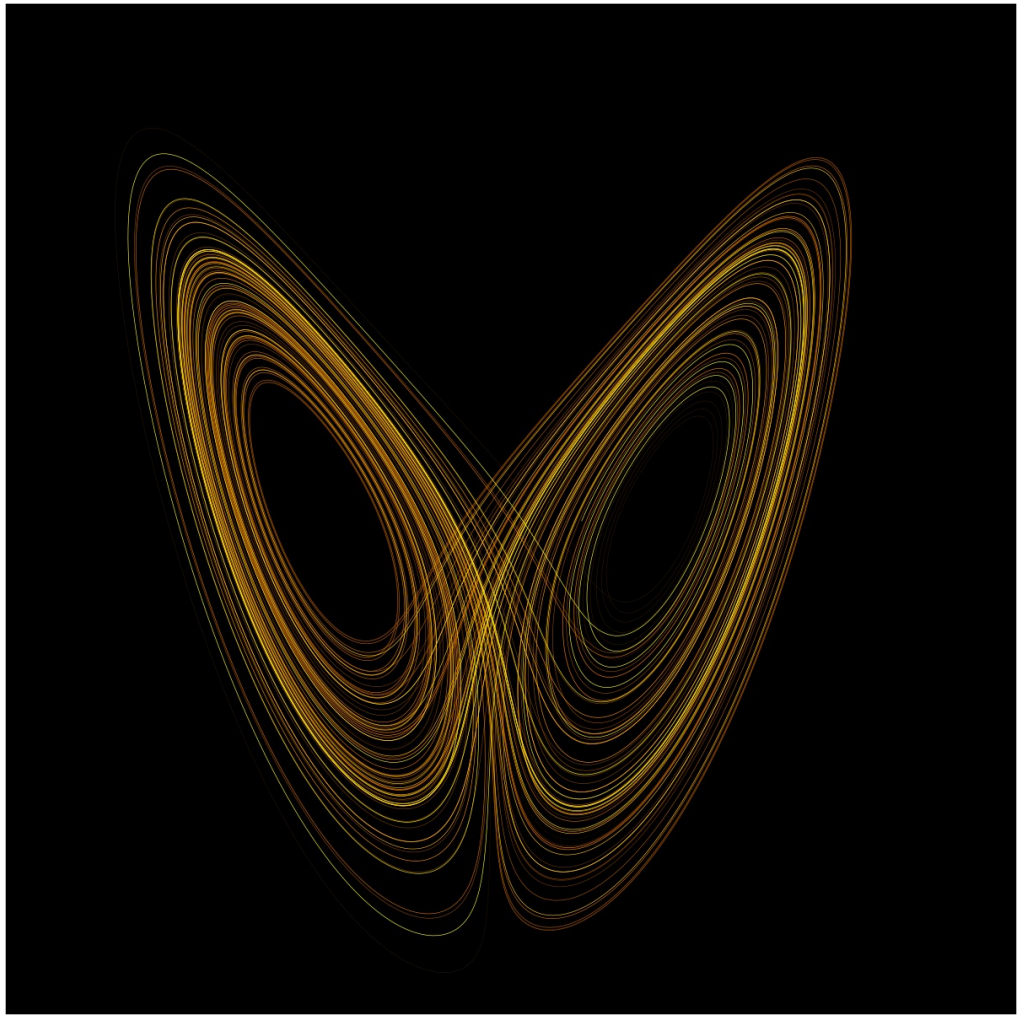
Modernism	Postmodernism	Complexity
Absolute	Relative	Distributed
Progress	Circulation	Emergence and Coevolution
Fixed	Random	Chaotic
Hierarchy	Collapse	Connectionist Networks
Authority	Contention	Feedback
Truth	No Truth	Statistical Truth Known to be Incomplete
The Author	The Reader	The Generative Network
Pro Formalism	Anti Formalism	Form as a Public Process Not Privilege

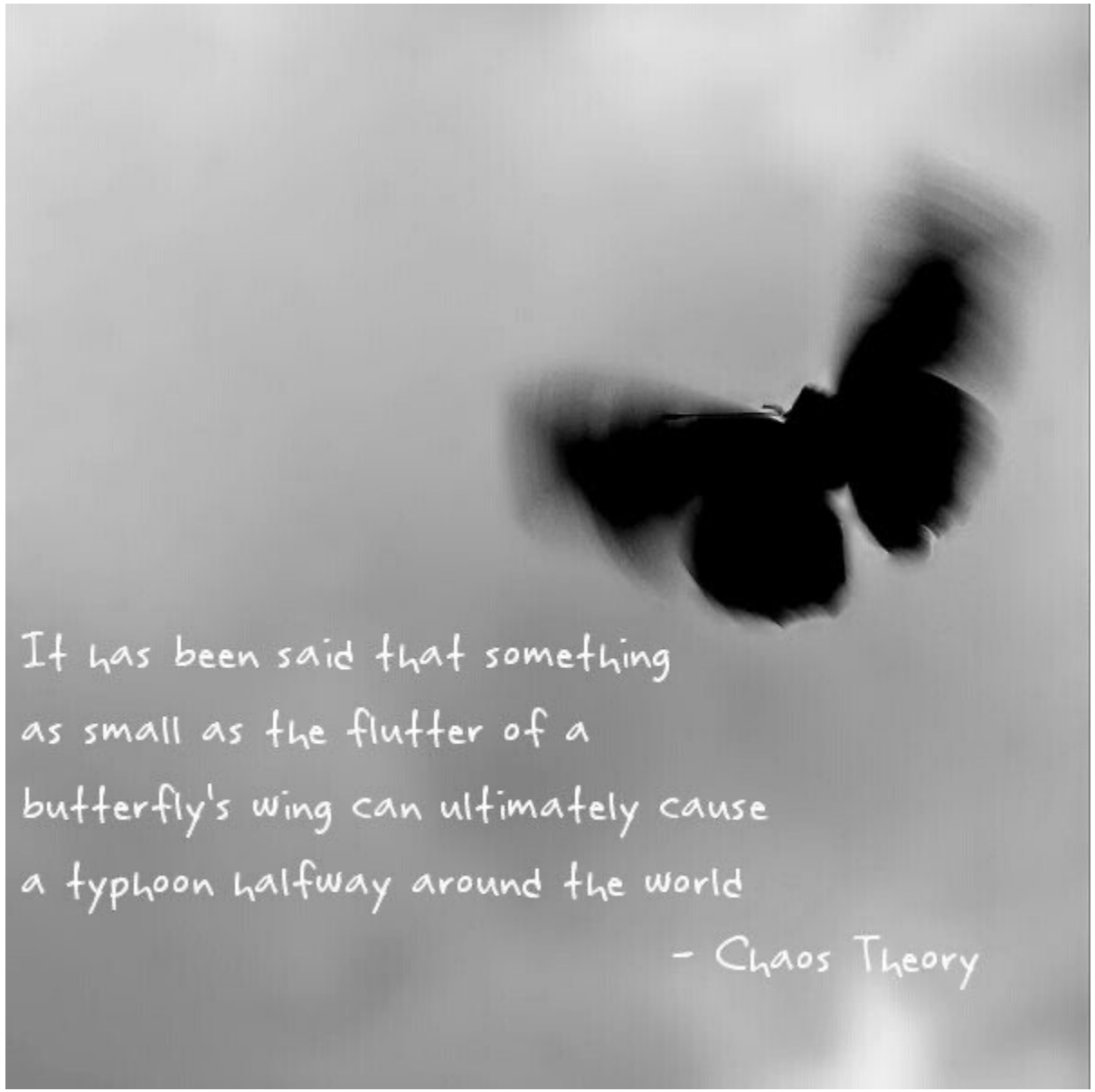




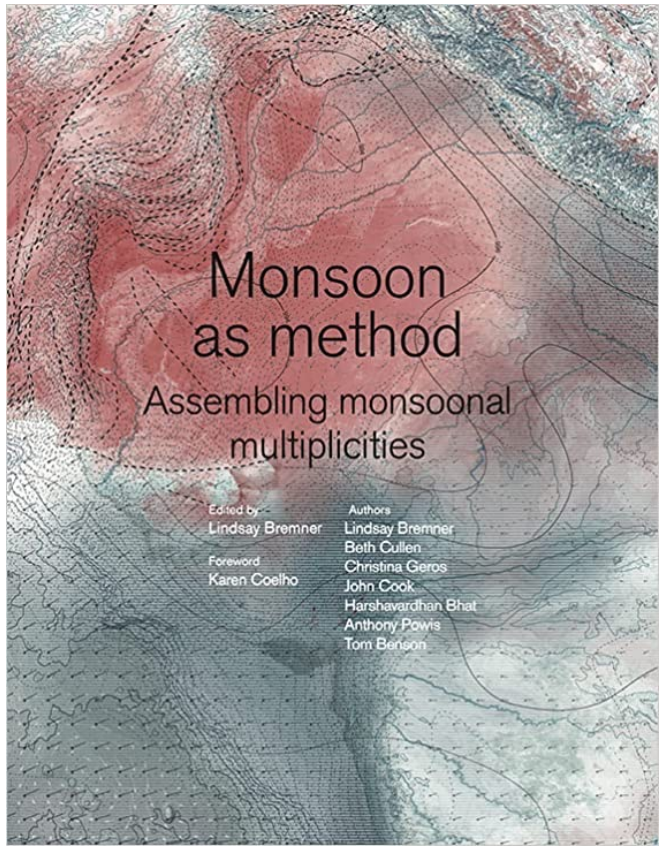
In *Visual Complexity: Mapping Patterns of Information*, Manuel Lima collects and presents almost three hundred of the most compelling examples of information design — everything from representing networks of followers on Twitter and the eighty-five recorded covers of Joy Division's "Love Will Tear Us Apart" to depicting interconnections between members of the Al Queda network and interactions among proteins in a human cell. Lima also looks at the long tradition of mapping complex networks, offering the first book to integrate a thorough history of network vizualization with an examination of the real-life situations from which these graphics are generated.

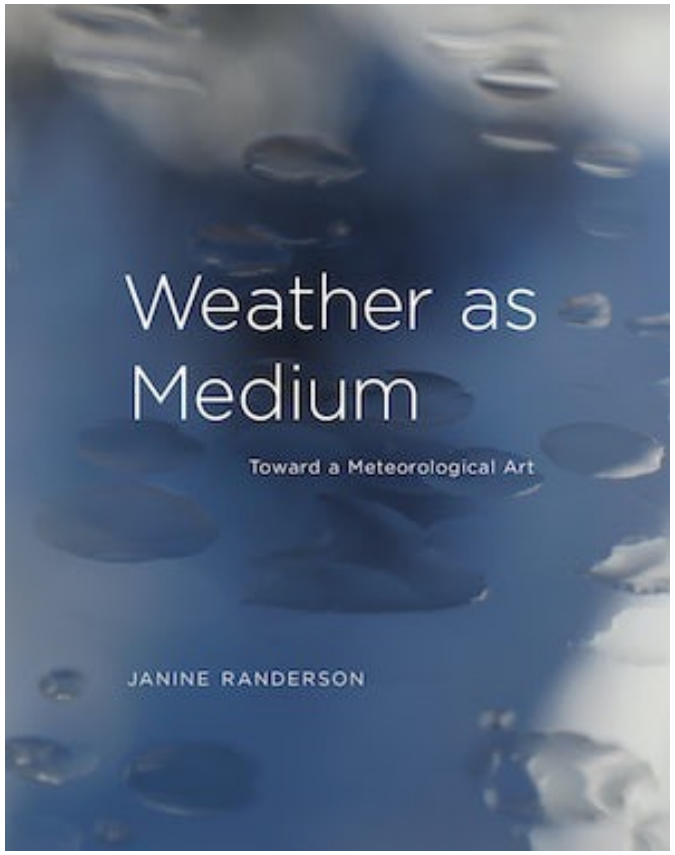
chaos theory





Weather as Medium - Toward a Meteorological Art





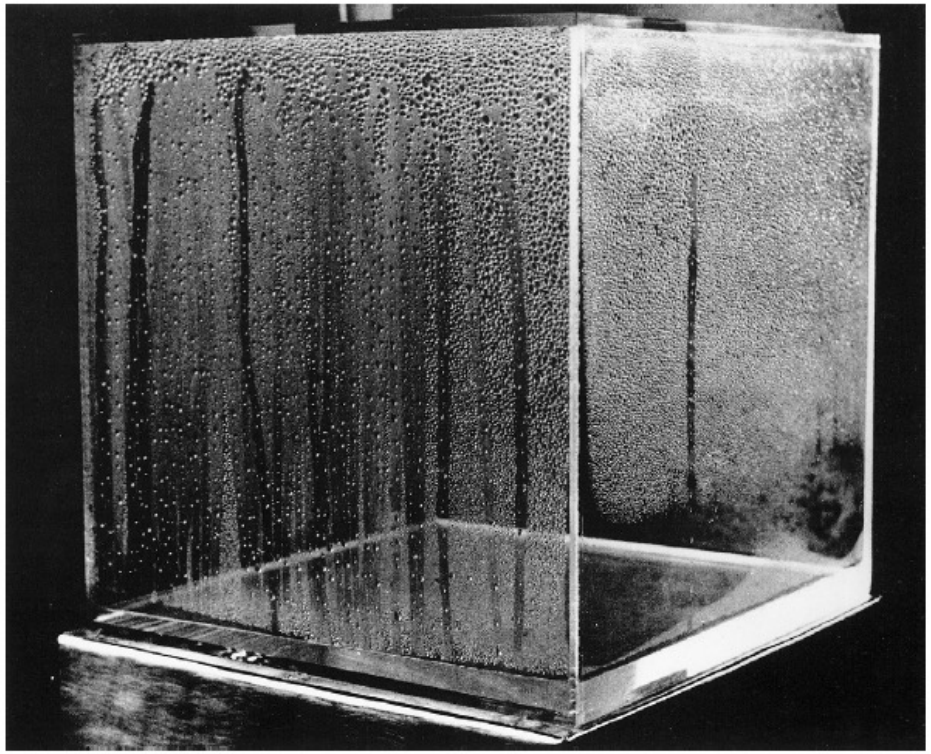


Figure 1.2
Hans Haacke. *Condensation Cube*, also known as *Weather Cube*. 1963–1965. Plexiglass and water, 76 × 76 × 76 cm. © Hans Haacke. VG Bild-Kunst, licensed by Viscopy, 2017.

An exploration of artworks that use weather or atmosphere as the primary medium, creating new coalitions of collective engagement with the climate crisis.

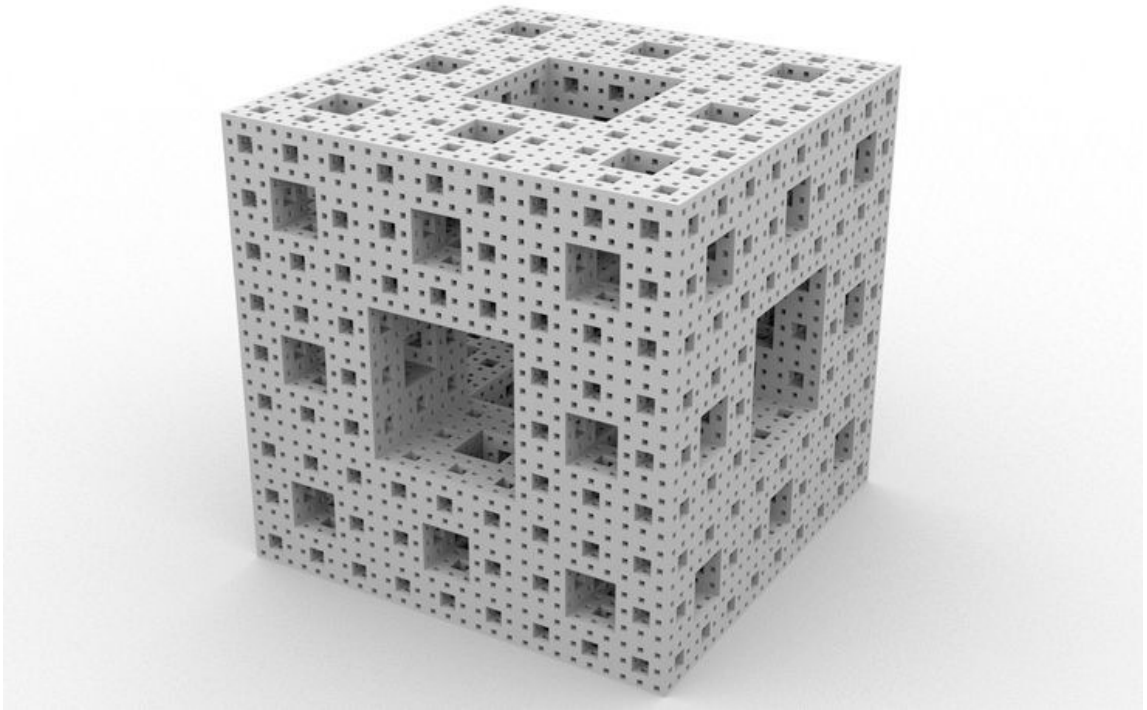
generative design

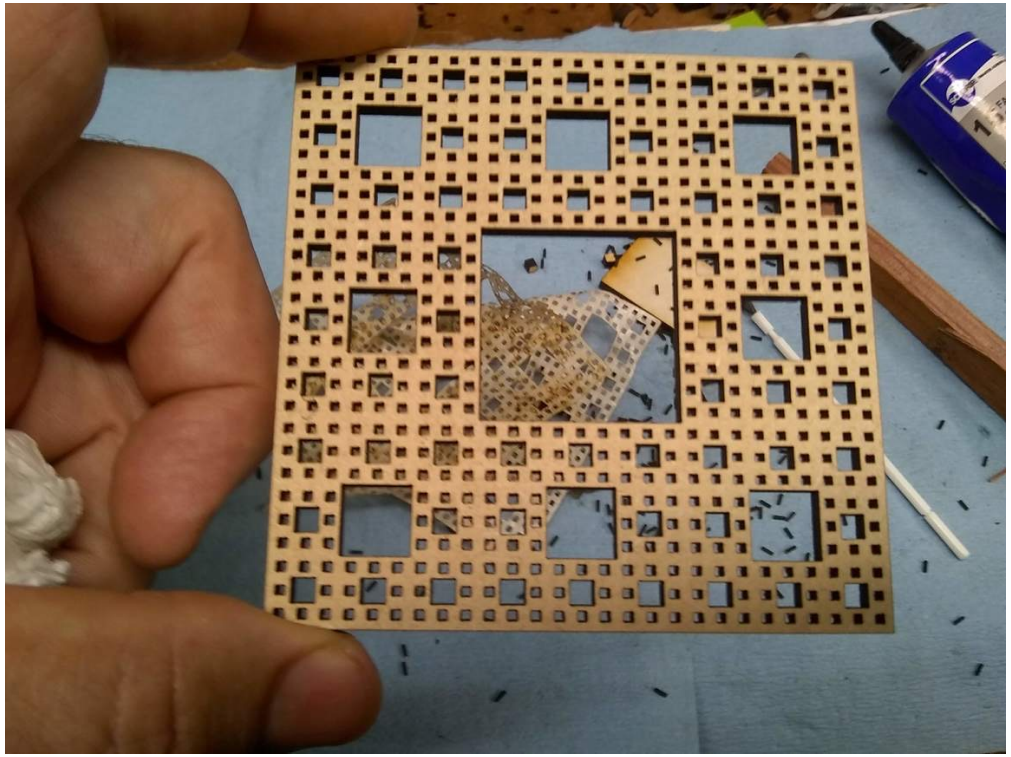
procedural algorithms

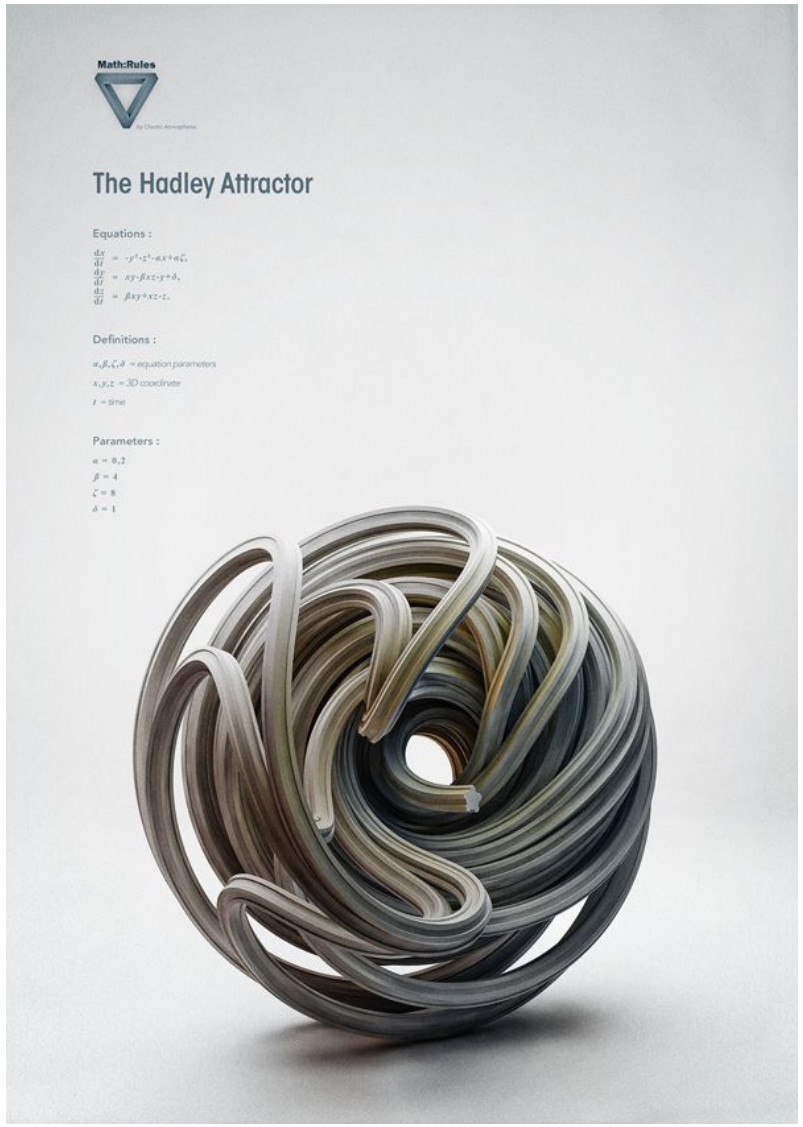
iteration and recursion

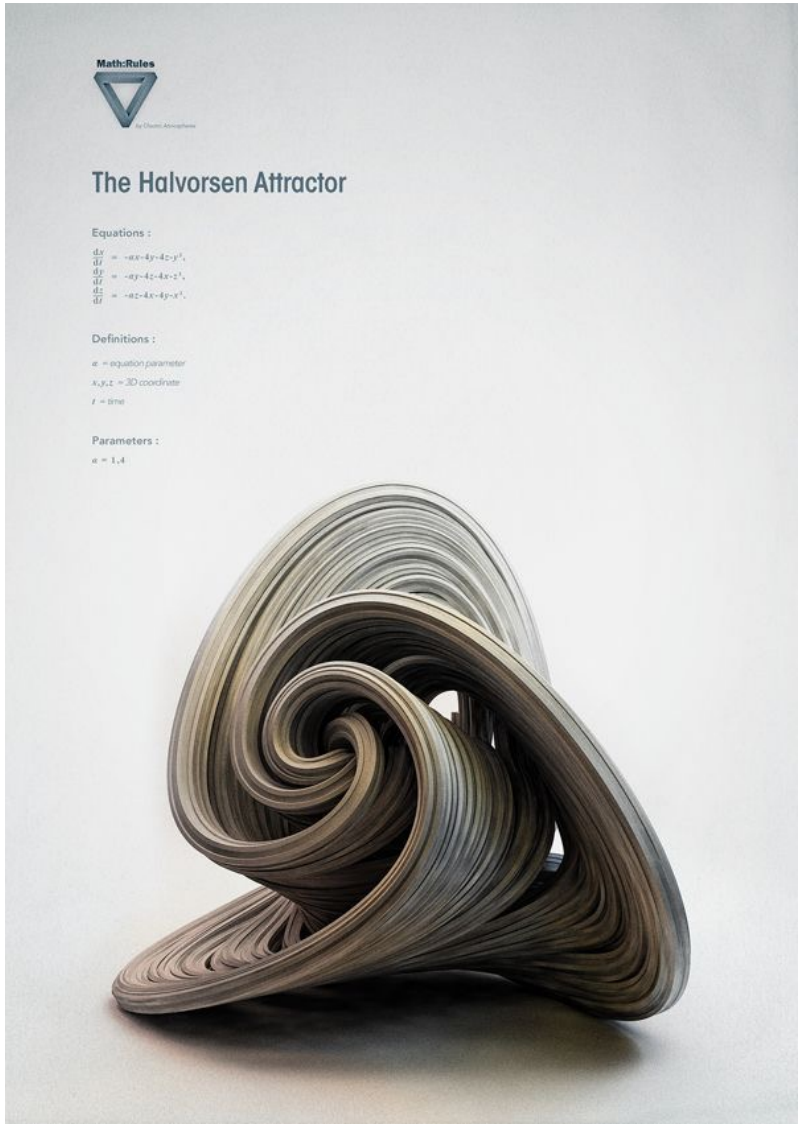
$$Z_{n+1} = Z_n + C$$

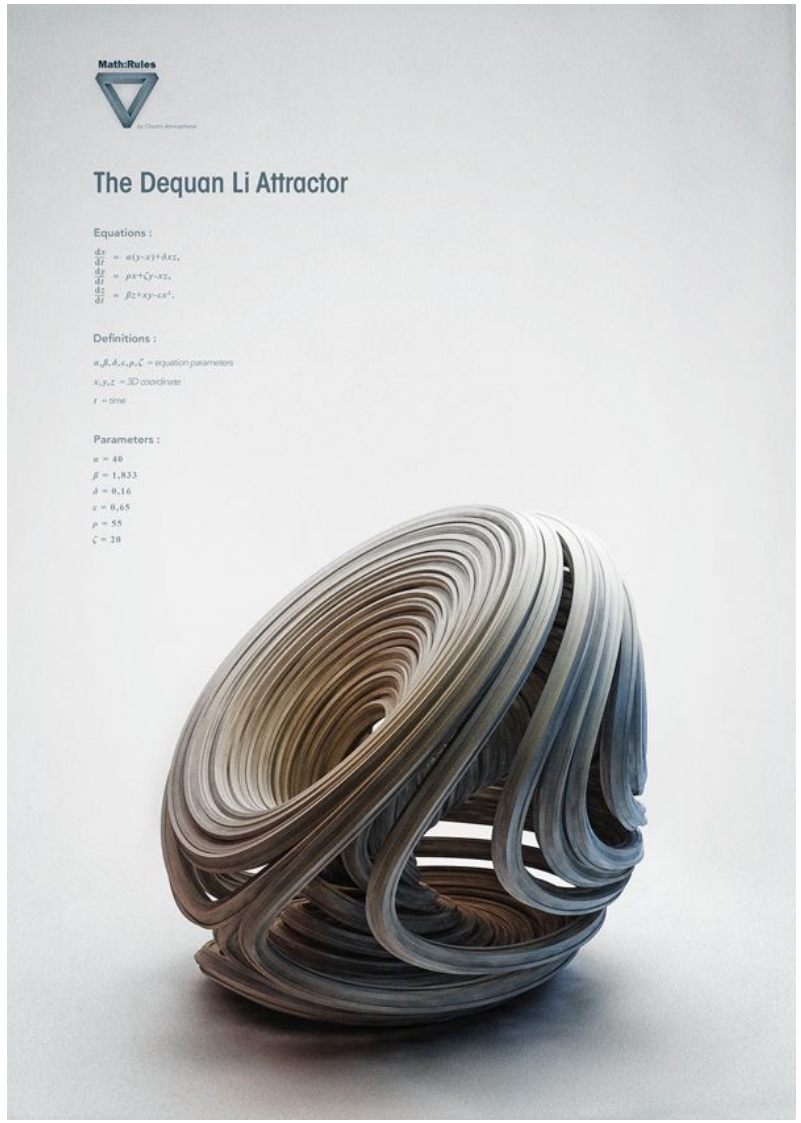












Strange Attractors

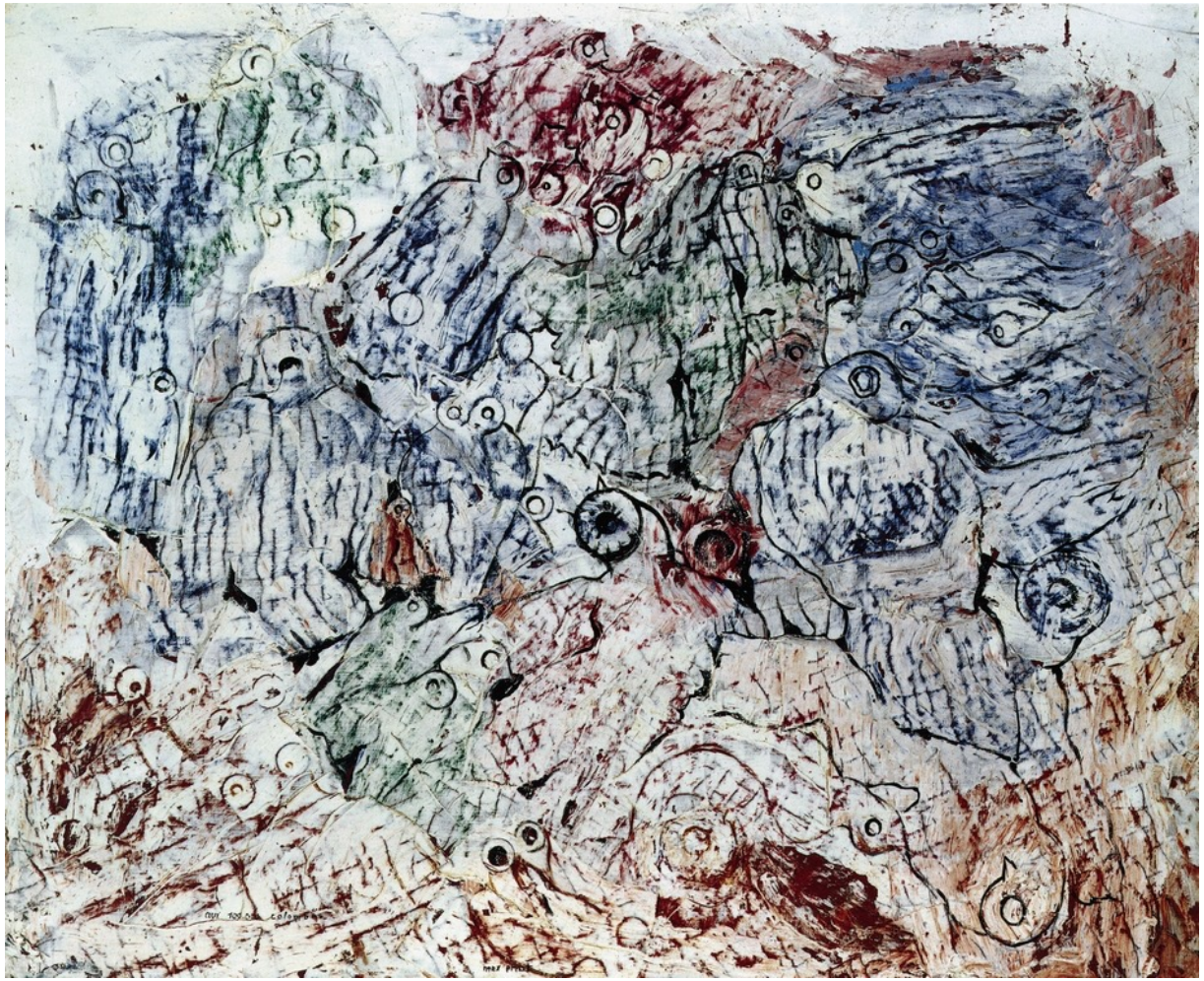
art of chance

random

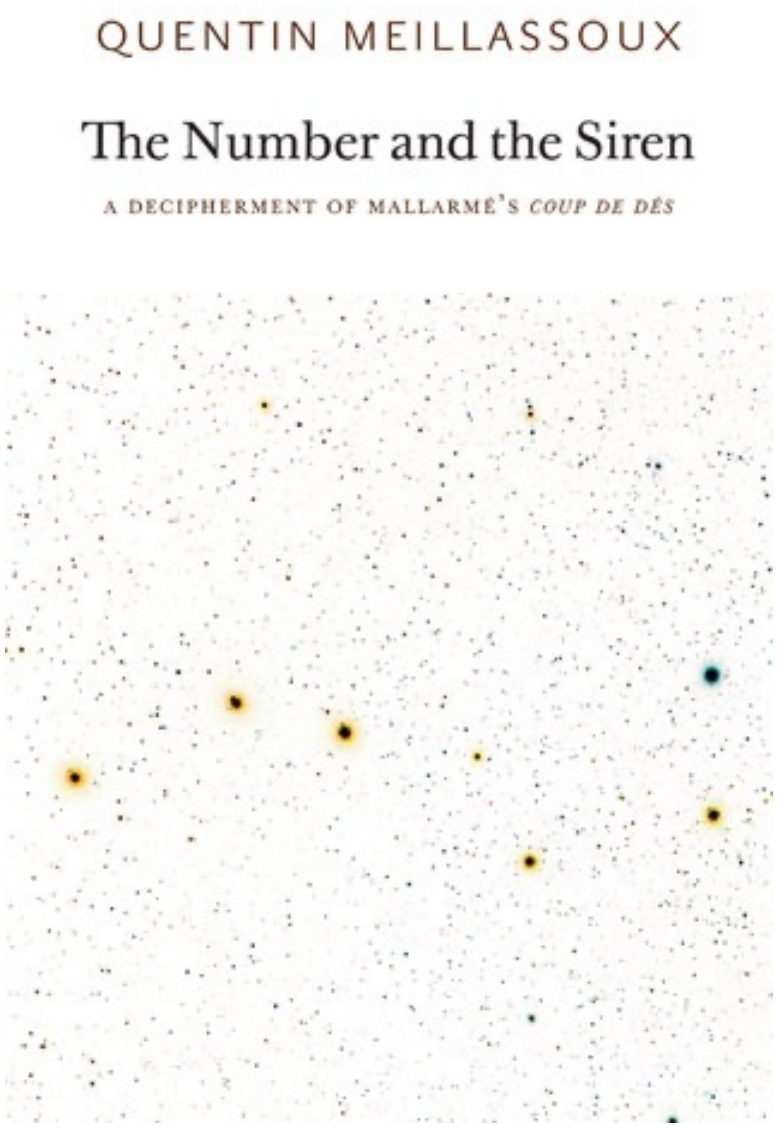
aleatoric

indeterminacy

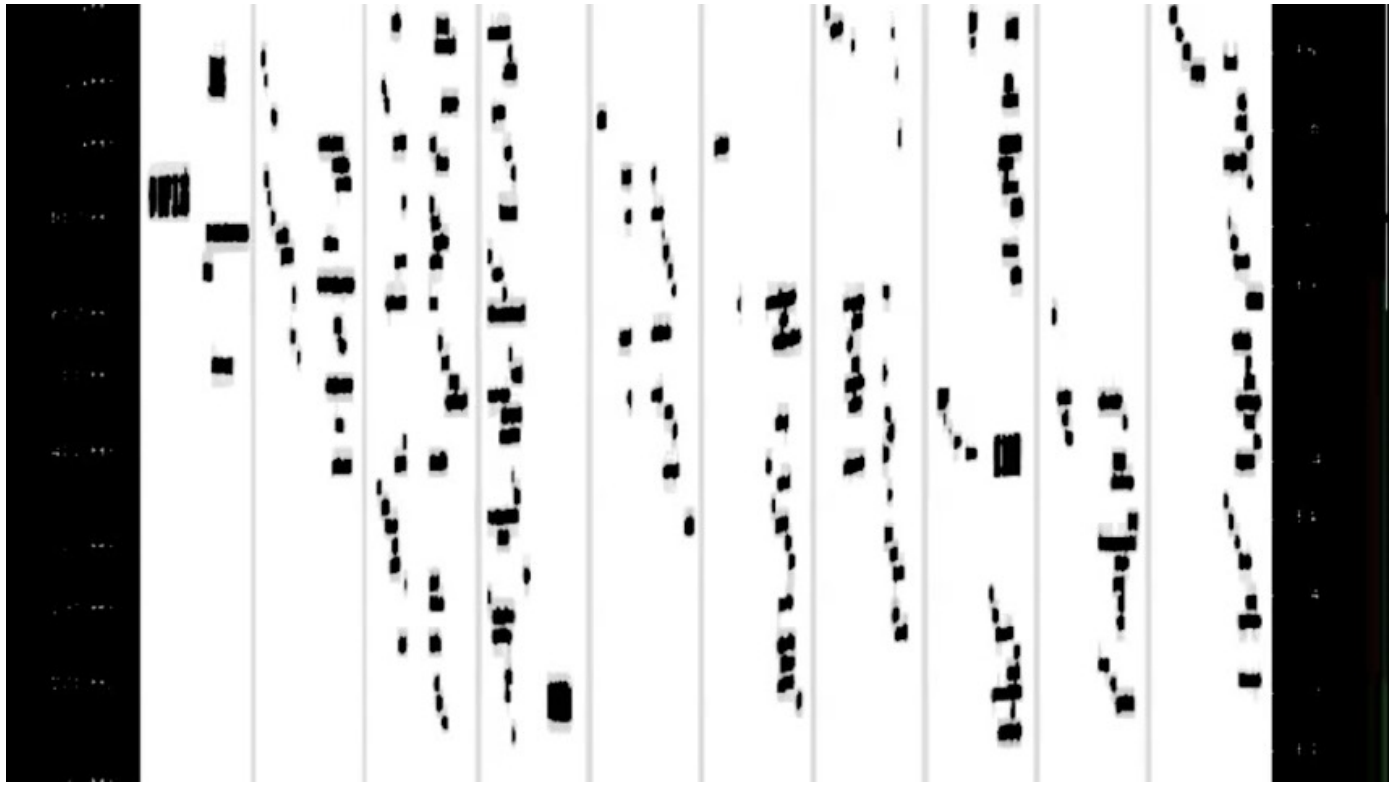
stochastic



Free as a Bird – Max Ernst, Lop Lop and the Art of Chance



un coup de dés mallarmé



A phono-graphic translation of the Stéphane Mallarmé poem "Un coup de dés jamais n'abolira le hasard" ("A Throw of the Dice Never Will Abolish Chance").

John Cage Music of Changes and the I Ching

ORIGINAL HEXAGRAM

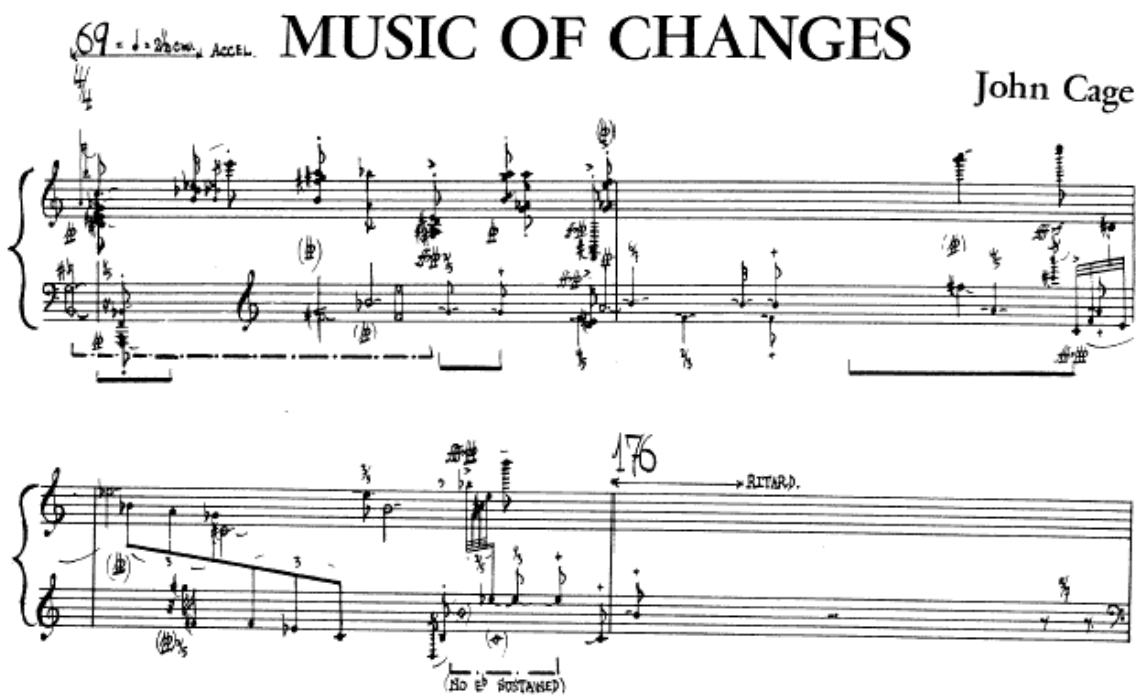
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---  - -  - -  ---  - -  - -  -o-  - -  ---  ---  -x-  ---  ---  ---
-x-  - -  - -  - -  - -  ---  -o-  -o-  - -  -o-  ---  - -  - -  ---
- -  -o-  - -  ---  -o-  - -  - -  - -  -x-  -o-  -x-  -o-  ---  - -
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CHANGED HEXAGRAM

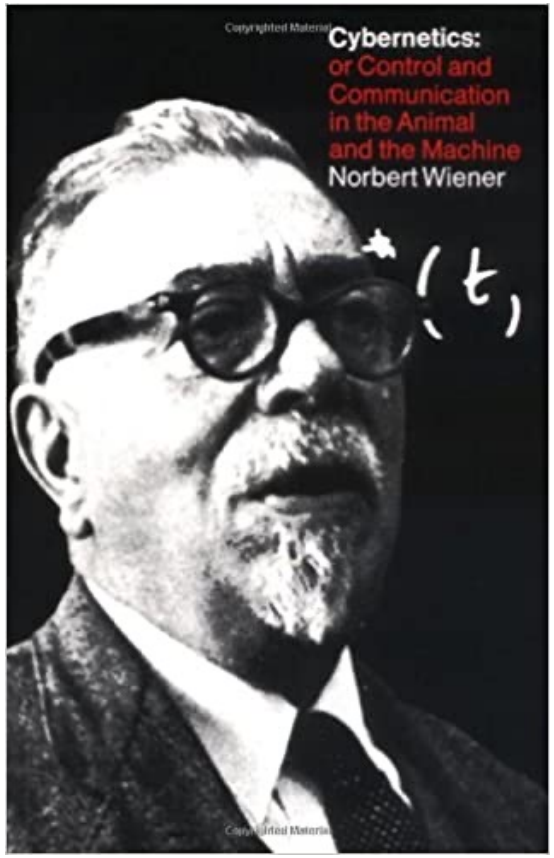
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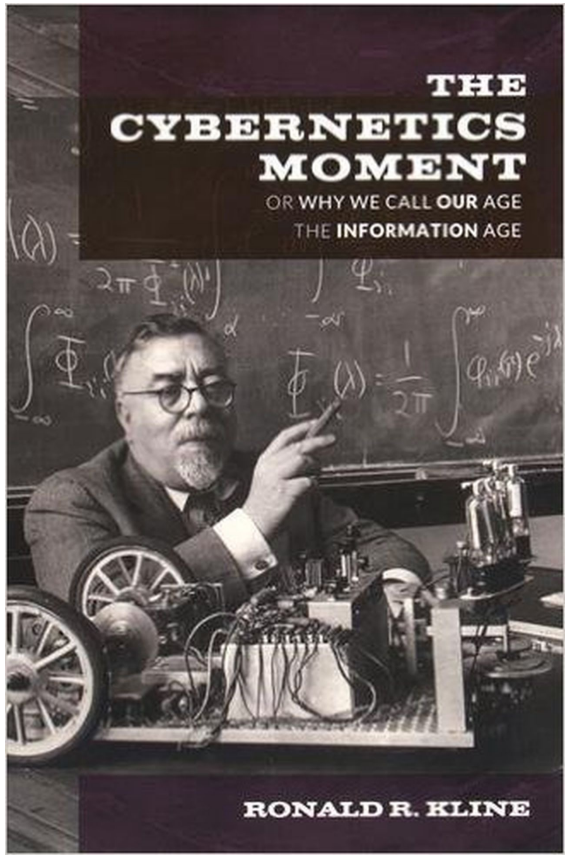
KEY FOR IDENTIFYING THE HEXAGRAM

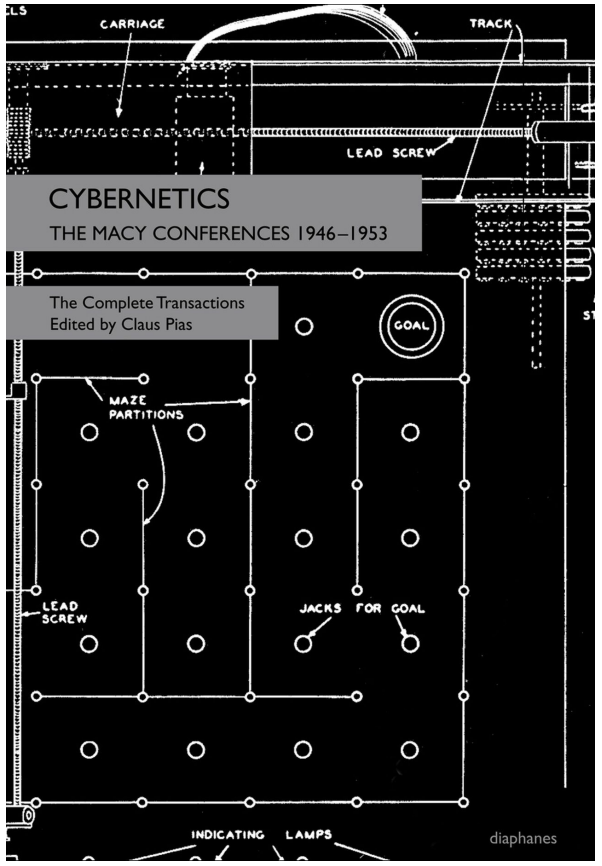
17	29	42	64	41	39	62	63	21	32	36	40	58	1
49	8	42	40	24	39	8	3	38	16	34	45	47	1

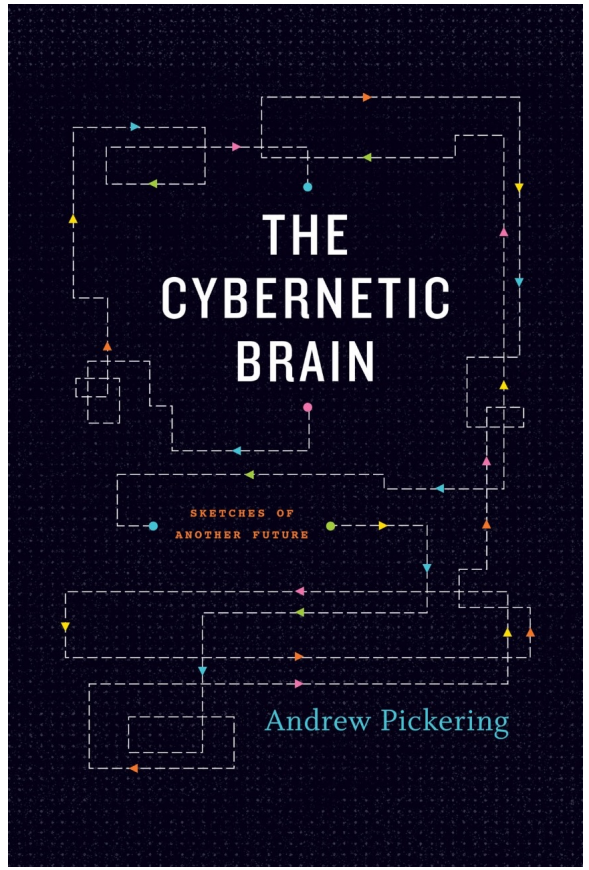


Cybernetics: Or Control and Communication in the Animal and the Machine





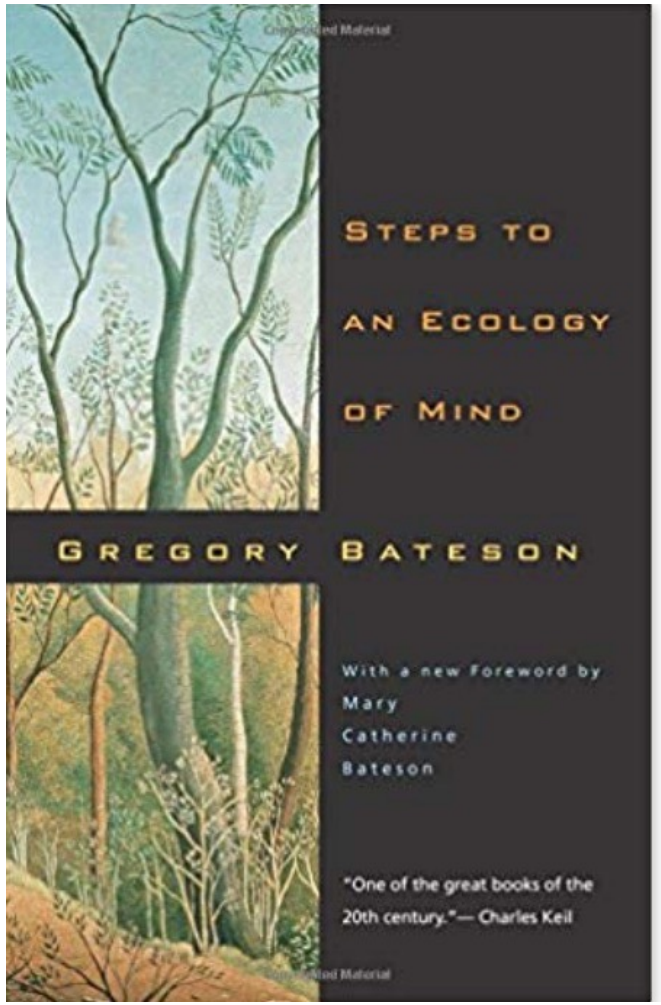




Cybernetics is a **transdisciplinary** field of study that encompasses the study of systems and their behavior, as well as the design and control of those systems. It was first introduced by the mathematician Norbert Wiener in 1948 and has since developed into a broad field with applications in engineering, biology, psychology, and more. At its core, cybernetics is concerned with understanding the feedback and control mechanisms that enable systems to maintain stability and adapt to changing conditions. These mechanisms can be found in a wide range of natural and artificial systems, from biological organisms to machines and social organizations. Overall, cybernetics provides a powerful framework for understanding and controlling complex systems, and has applications in a wide range of fields, from engineering and robotics to biology and social sciences.

Gregory Bateson

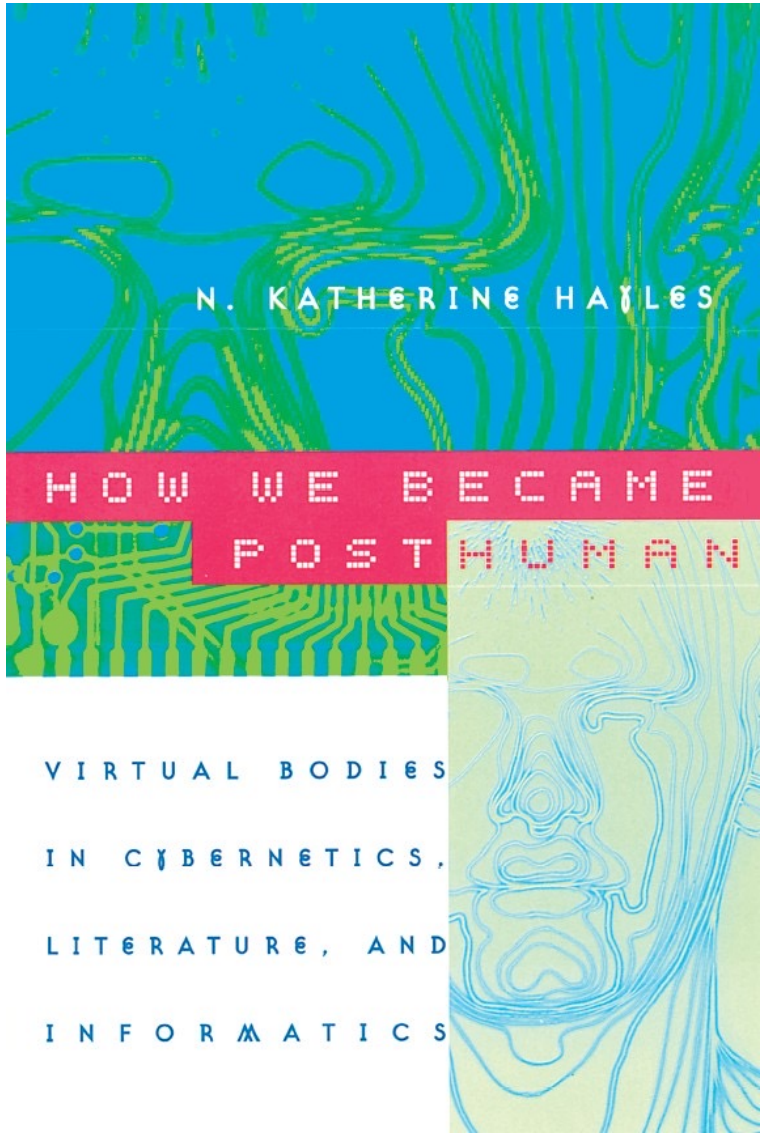
Gregory Bateson was a prominent anthropologist, philosopher, and cybernetician who made significant contributions to the development of cybernetics. He is best known for his work on communication, ecology, and systems theory, which he applied to a wide range of fields, including anthropology, psychiatry, and biology. Bateson's work in cybernetics had a profound impact on our understanding of communication, systems, and the interconnectedness of the natural world. His ideas continue to influence research in a wide range of fields and have helped shape our understanding of complex systems and their behavior.





N. Katherine Hayles

three waves of cybernetics



- Katherine Hayles is a prominent scholar in the field of cybernetics, and she proposed the idea of **"three waves" of cybernetics** in her book ***How We Became Posthuman*** **(1999).** According to Hayles, these three waves represent distinct periods in the development of cybernetics and reflect changes in the field's focus and approach.
- **The first wave of cybernetics emerged in the 1940s and 1950s** and was primarily concerned with developing new techniques for controlling and automating machines. This wave focused on using feedback mechanisms to regulate the behavior of machines, and it laid the groundwork for the later development of computer science and artificial intelligence.
- **The second wave of cybernetics emerged in the 1960s and 1970s** and was characterized by a broader, more interdisciplinary approach. This wave saw cybernetics applied to a wide range of fields, including biology, ecology, psychology, and social systems. It also focused on exploring the **relationship between systems and their environment**, and it developed new methods for modeling and simulating complex systems.
- **The third wave of cybernetics emerged in the 1980s and 1990s** and was characterized by a more critical and reflexive approach. This wave saw cybernetics turn inward, **examining its own assumptions and limitations**, and it explored the ways in which cybernetic systems could be used to **critique and subvert dominant power structures.** It also focused on the relationship between humans and machines, **exploring questions of embodiment, consciousness, and identity.**
- Overall, Hayles' three waves of cybernetics provide a useful framework for understanding the evolution of the field and the changing ways in which cybernetic ideas and techniques have been applied.

cybernetics

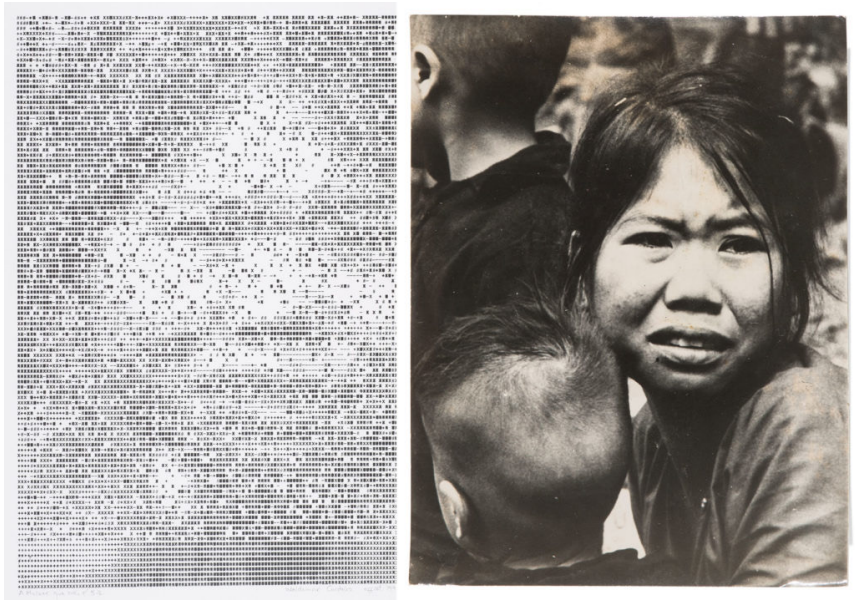
Contemporary Art and Cybernetics
Waves of Cybernetic Discourse within Conceptual, Video and New Media Art

Period	Player	Homeostasis	Reflexivity	Virtuality	Artifacts	Skeuomorphs
Homeostasis *1945*	Shannon MacKay McCulloch Pitts Kubie von Foerster	feedback loop information as signal/noise circular causality instrumental language			electronic rat homeostat electric tortoise	man-in-the-middle
Self-Organization *1960*	von Foerster Maturana Varela	quantification	reflexive language autopoiesis structural coupling system-environment		frog's visual cortex	homeostasis
Virtuality *1985*	Varela Brooks Moravec			emergent behaviour functionalities computational universe	simulation mobile robot	self-organization

Fig. 1. Three Waves of Cybernetics, adapted from Katherine Hayles's *How We Became Post-human*, MIT Press, 1995. (© Katherine Hayles)

cybernetics

writing new codes



Waldemar Cordeiro, *The Woman that is Not B.B. (Brigitte Bardot)* (1971).



Retrato de Fabiana | Waldemar Cordeiro



Art in the Age of Emergence

emergent systems emergent art

"Emergence, which describes the characteristics of forms that come out of complex systems, could apply especially well to how we experience art, how we understand aesthetics in relation to our evolving mind, and how we understand the creative process of making representational art… I suddenly realized that considering the relationship between emergence and consciousness could lead to a description of what distinguishes art objects from other things as we perceive them through our senses. Emergence allows us to define art!" (Michael J Pearce)



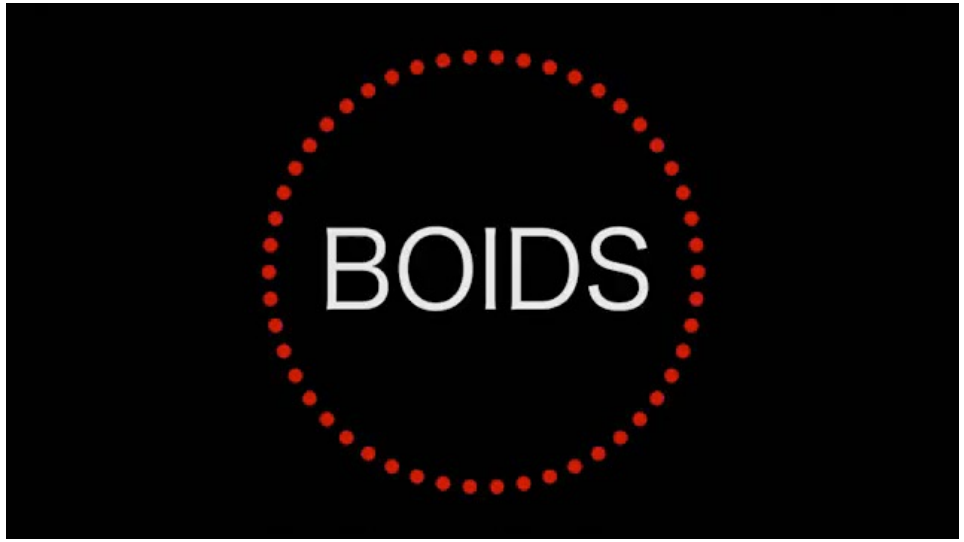
A murmuration of starlings over Brighton's West Pier, photographed by Kevin Meredith

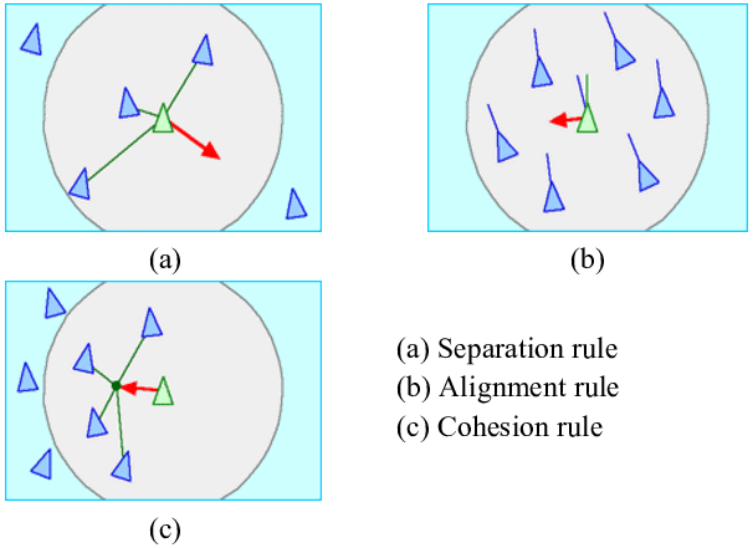


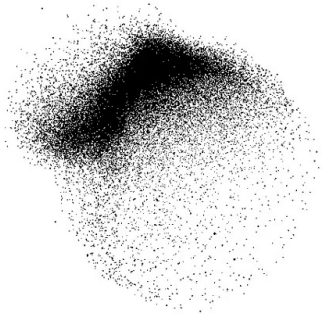


Emergent Systems and the ‘hidden’ Rules of Behaviour

Flocking Systems - Boids and Swarms







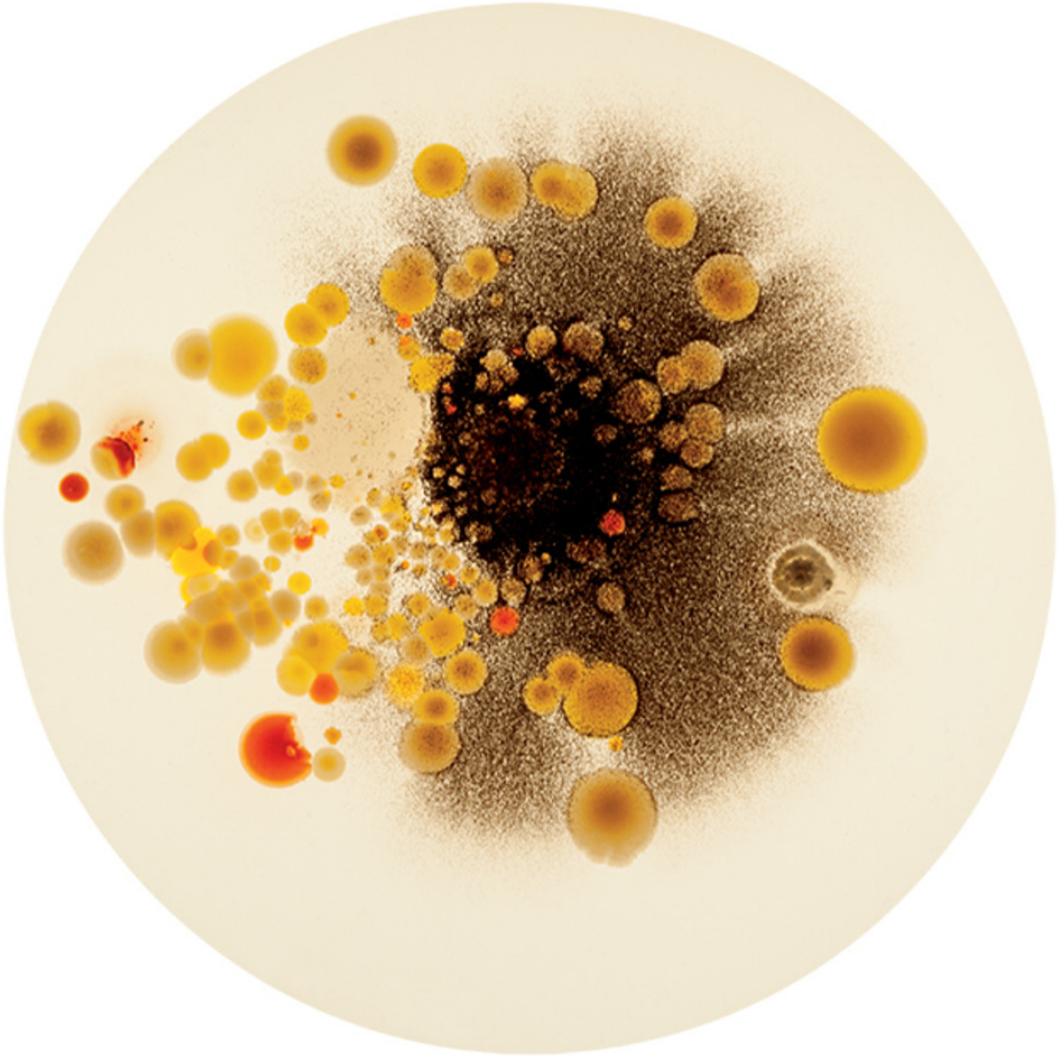
Flocking systems can be used in various applications, such as robotics, swarm intelligence, and animation. For example, in robotics, flocking algorithms can be used to coordinate the movements of multiple robots to perform tasks such as search and rescue, surveillance, and exploration. In animation, flocking algorithms can be used to create realistic simulations of crowds, schools of fish, and flocks of birds.



Cai Guo-Qiang: The Transient Landscape (2019)

form in **nature**

nature in **form**



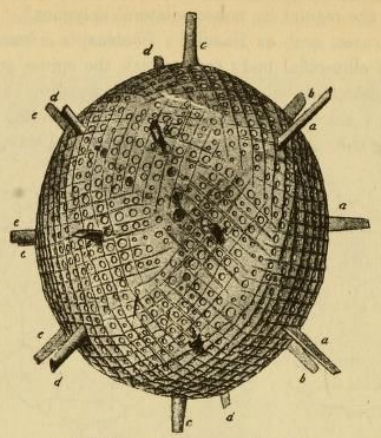


Fig. 342 A. *Phatnaspis cristata* Hkl.

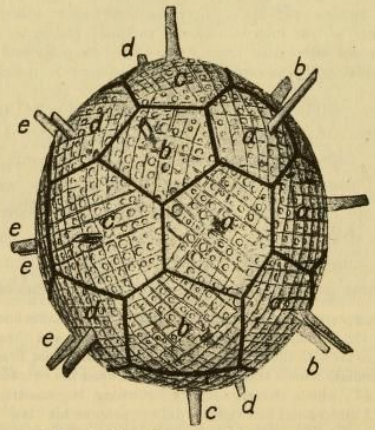


Fig. 342 B. The same, diagrammatic.

try to construct a plane-sided polyhedron of this kind, we find it to be impossible; for into the angles between the six equatorial

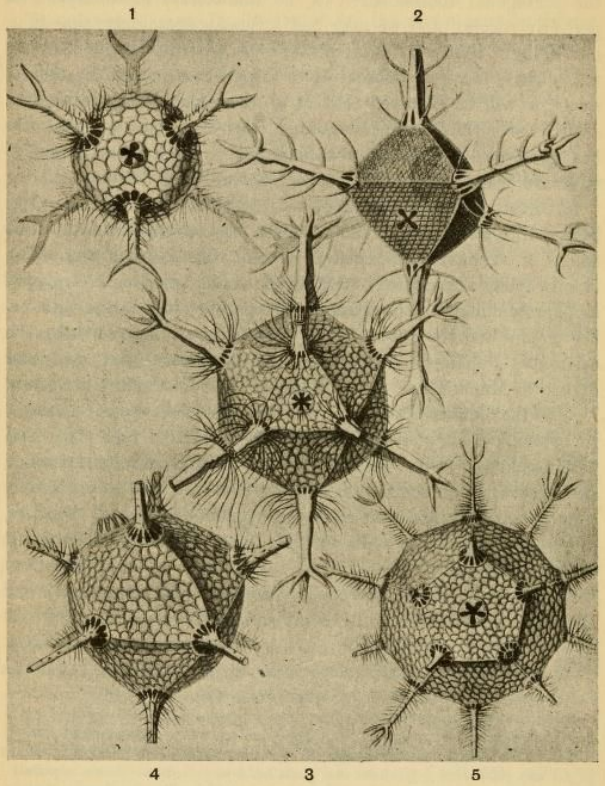
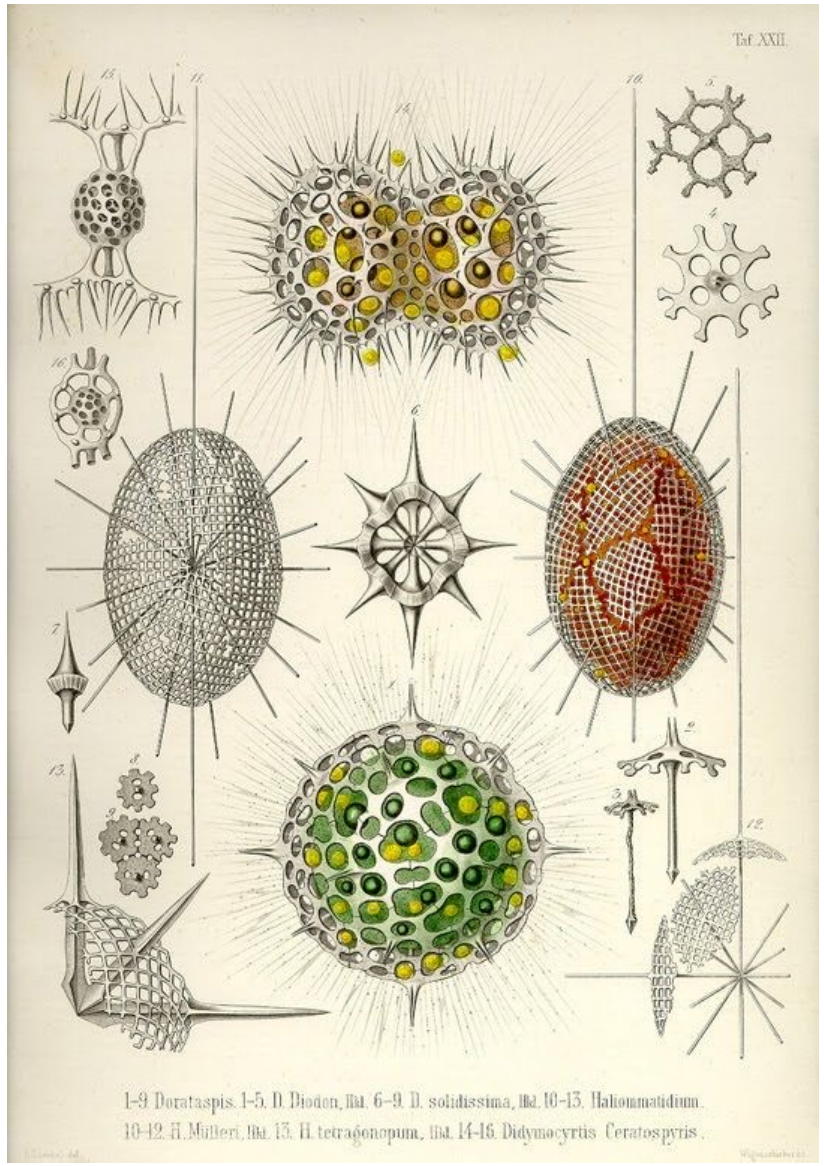


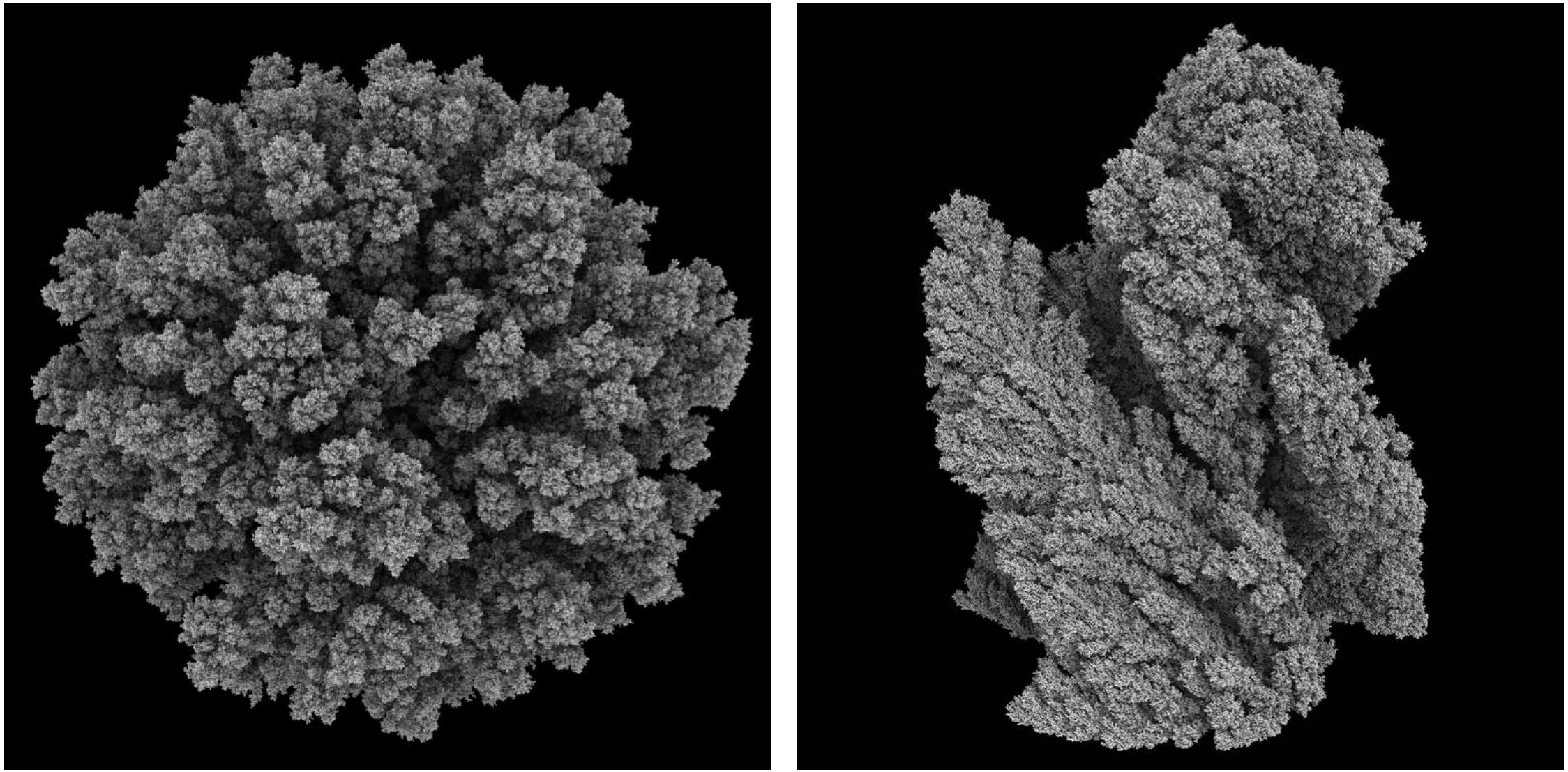
Fig. 340. Skeletons of various Radiolarians, after Haeckel. 1, *Circoporus sexfurcus*; 2, *C. octahedrus*; 3, *Circogonia icosahedra*; 4, *Circospathis novena*; 5, *Circorrhegma dodecahedra*.

regular hexagons six regular pentagons will not fit. The figure, however, can be easily constructed if we replace the straight edges



On Growth and Form – D'Arcy Thompson

Ernst Haeckel



Aggregation (2007) | Andy Lomas

Anicka Yi

on
nonhuman ecologies and
embodied machines





Anicka Yi, Biologizing the Machine (tentacular trouble) (2019)

Anicka Yi

Biologizing the Machine
(terra incognita), 2019.

Installed at the 58th International Art Exhibition – La Biennale di Venezia.

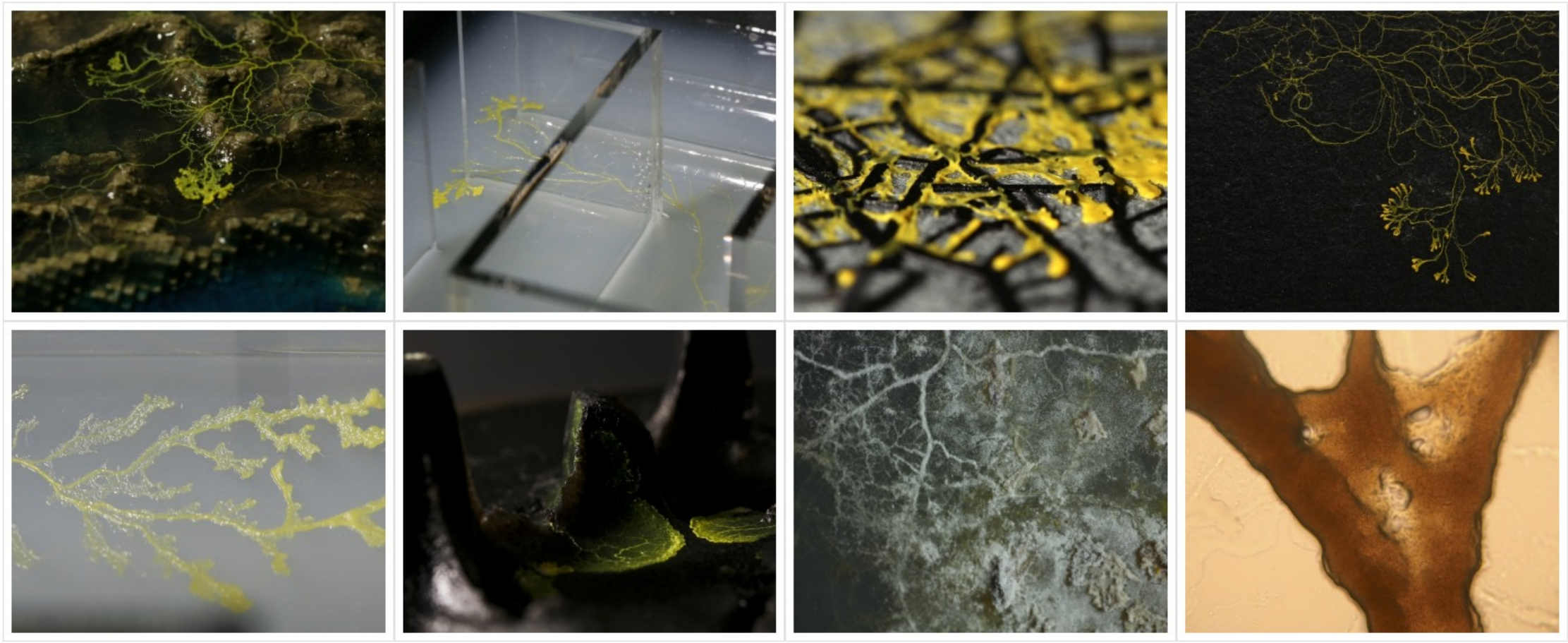


Biologizing the Machine (terra incognita), Anicka Yi, Biennale 2019



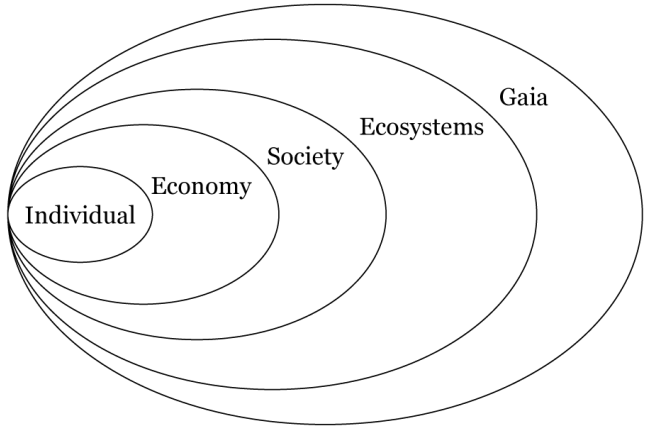
Installation view of Anicka Yi’s “You Can Call Me F” at the Kitchen, 2015

The Physarum Experiments| Heather Barnett

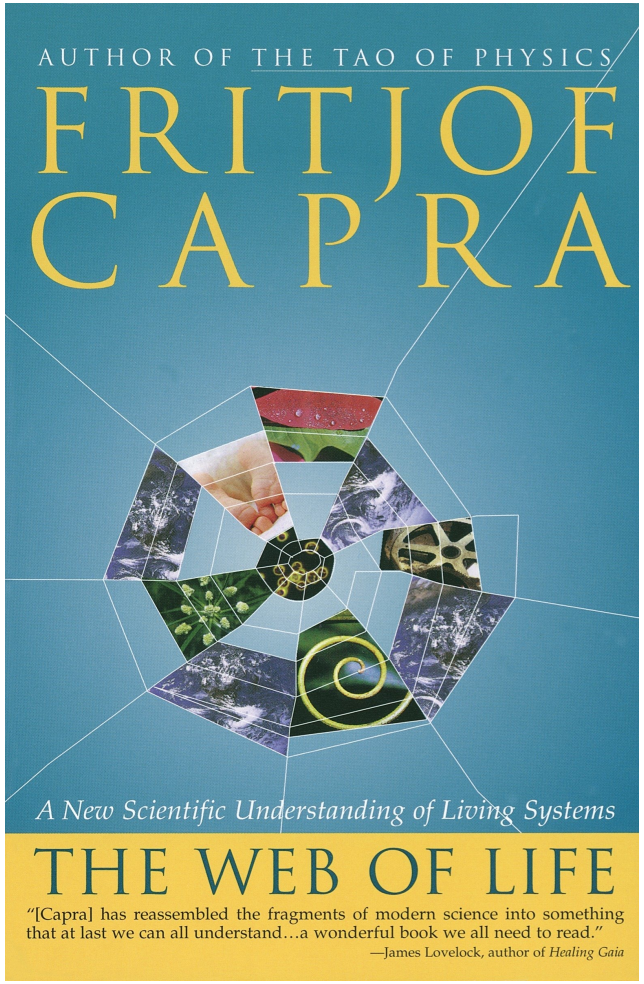


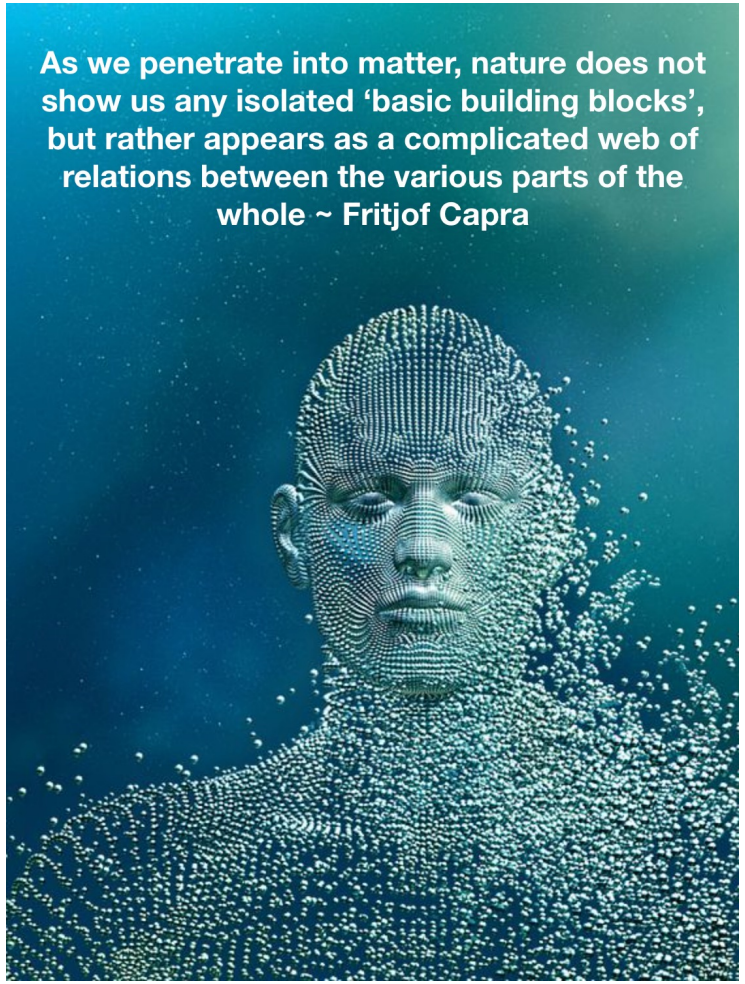
Creeping Garden

systems theory



In the ***Web of Life,*** Capra offers a scintillating synthesis of scientific breakthroughs in cybernetics, information theory, chaos theory, Gaia theory, and systems thinking, all the while expatiating on a deep ecological vision of reality.

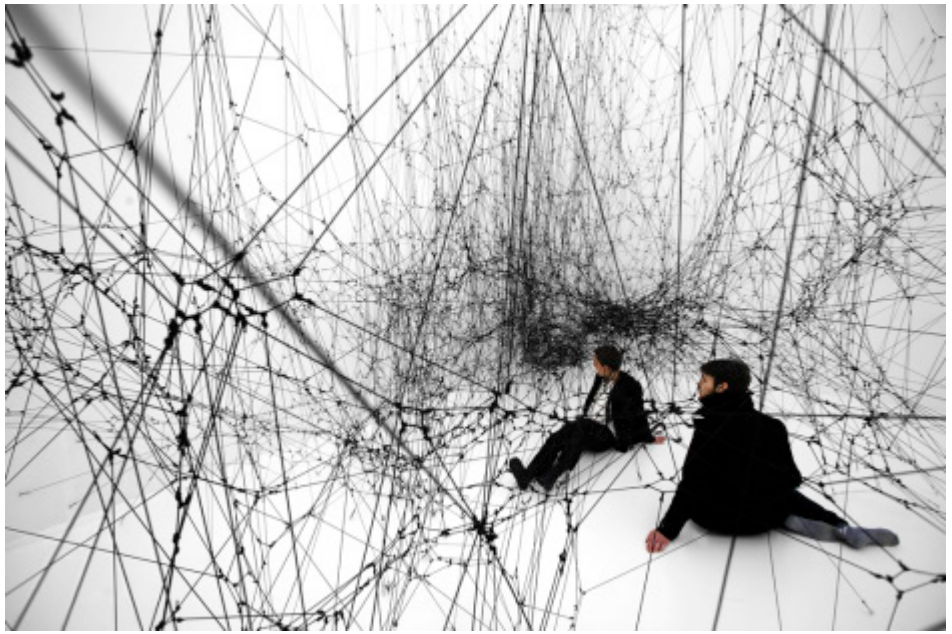


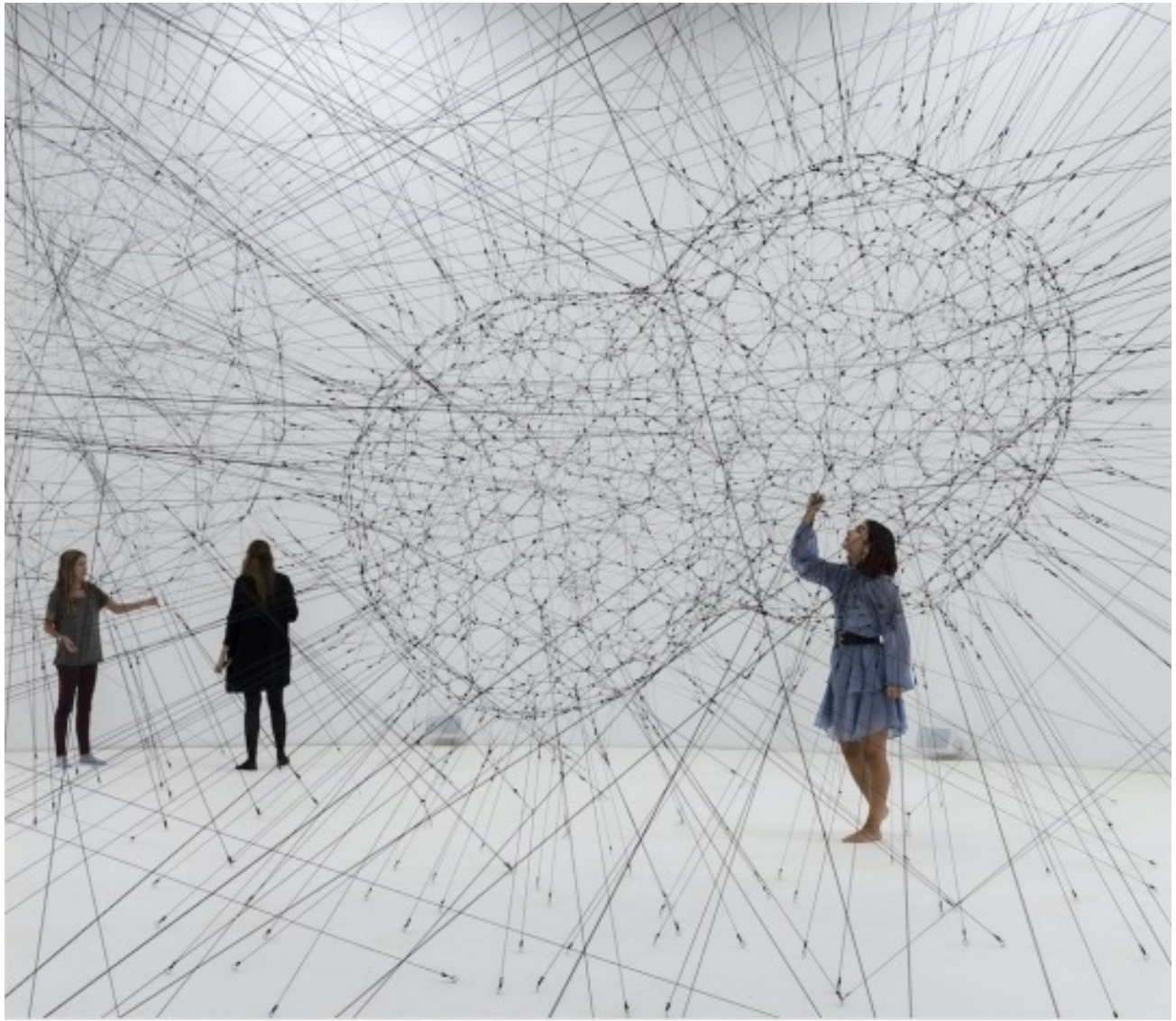


Understanding of life begins with the understanding of patterns.

Tomás Saraceno

Hybrid Webs



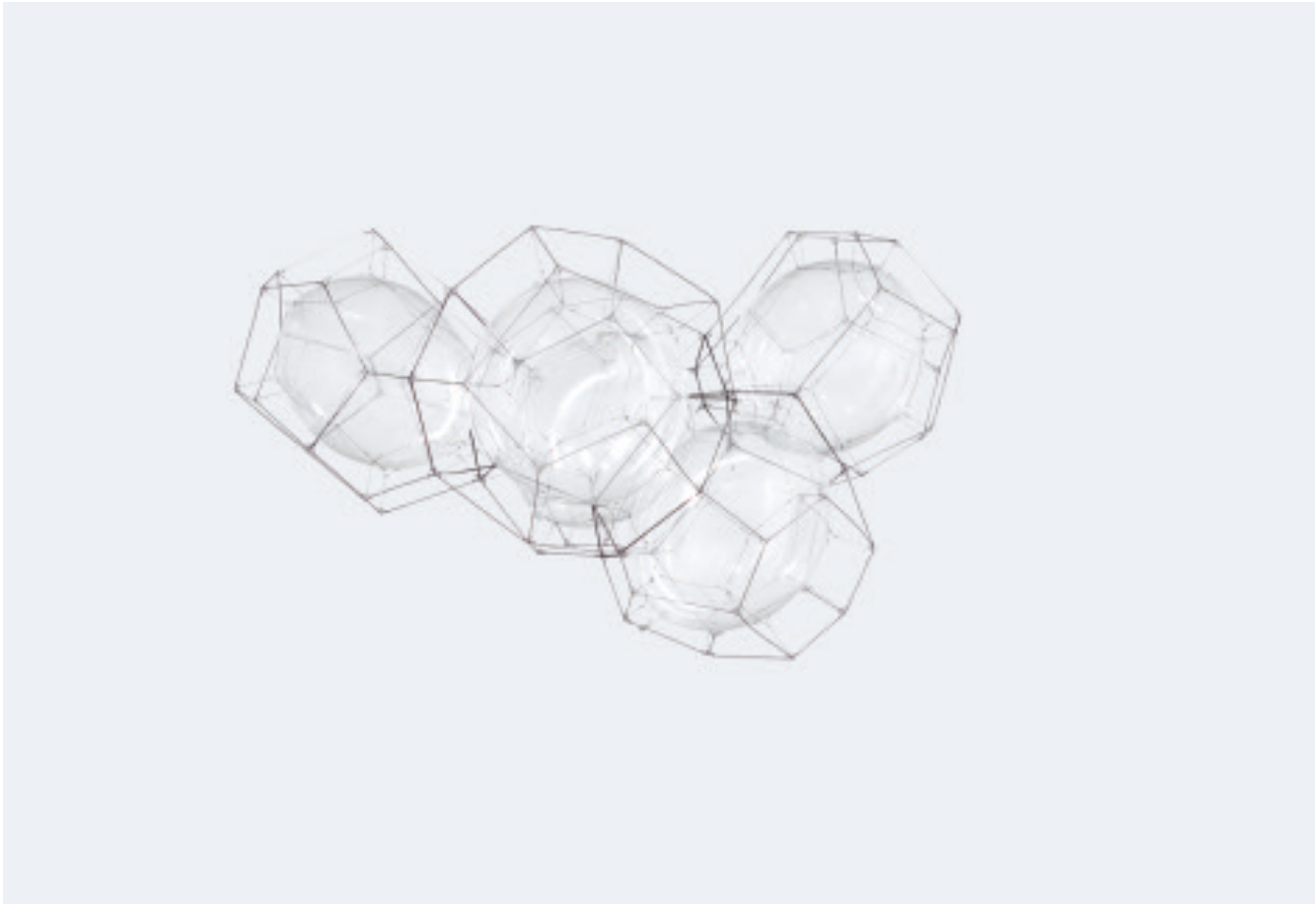


Cloud Cities

Stillness in Motion — Cloud Cities is about becoming airborne, not to fly but to float in the air at the speed of solar aerostatics, from cumulonimbus cities to the cosmic web.

Aerocene is an invitation to shape a post fossil-fuel epoch, in a cloudscape of interconnected spheres of practices that include open, participatory platforms of knowledge production and distribution; models; data; and sensitivity to the more-than-human world.

These airborne cities floating among the clouds (just as Earth floats in the cosmic plane) call for scalable mental, social and environmental ecologies.



Tomás Saraceno, Cloud Cities Thermodynamics of Self-Assembly/005, 2015; San Francisco Museum of Modern Art, Accessions Committee Fund purchase; © Tomás Saraceno; photo: courtesy the artist and Tanya Bonakdar Gallery, New York

SF MOMA

A Recursive Web of Models: Studio Tomás Saraceno's Working Objects

Jussi Parikka
University of Southampton and FAMU, Prague

ABSTRACT: This article addresses contemporary artist-architect Tomás Saraceno and his studio team's work in the context of art and science collaborations. The text pays special attention to how their artistic practice deals with questions of environmental formations and agency. Besides a context in speculative architecture, this article approaches Saraceno's material engagement as *working objects*, borrowing the term from Lorraine Daston and Peter Galison's work. The studio's engagement with images, sculptures, and other material objects is relevant to a broader set of discussions about materiality and the modelization of and through living beings. The article argues how spatial (spider) web constructions and sculptures work as diffractive yet productive models, concluding with how these models engage with larger questions of environmental humanities and practice-based art methods.



The artist 'most likely to change the world'? Tomás Saraceno on making art from dust, webs and pollution

generative art





LIMITS OF CONTROL
RAIN ROOM (2012)

AND

IMMERSIVE ENVIRONMENTS





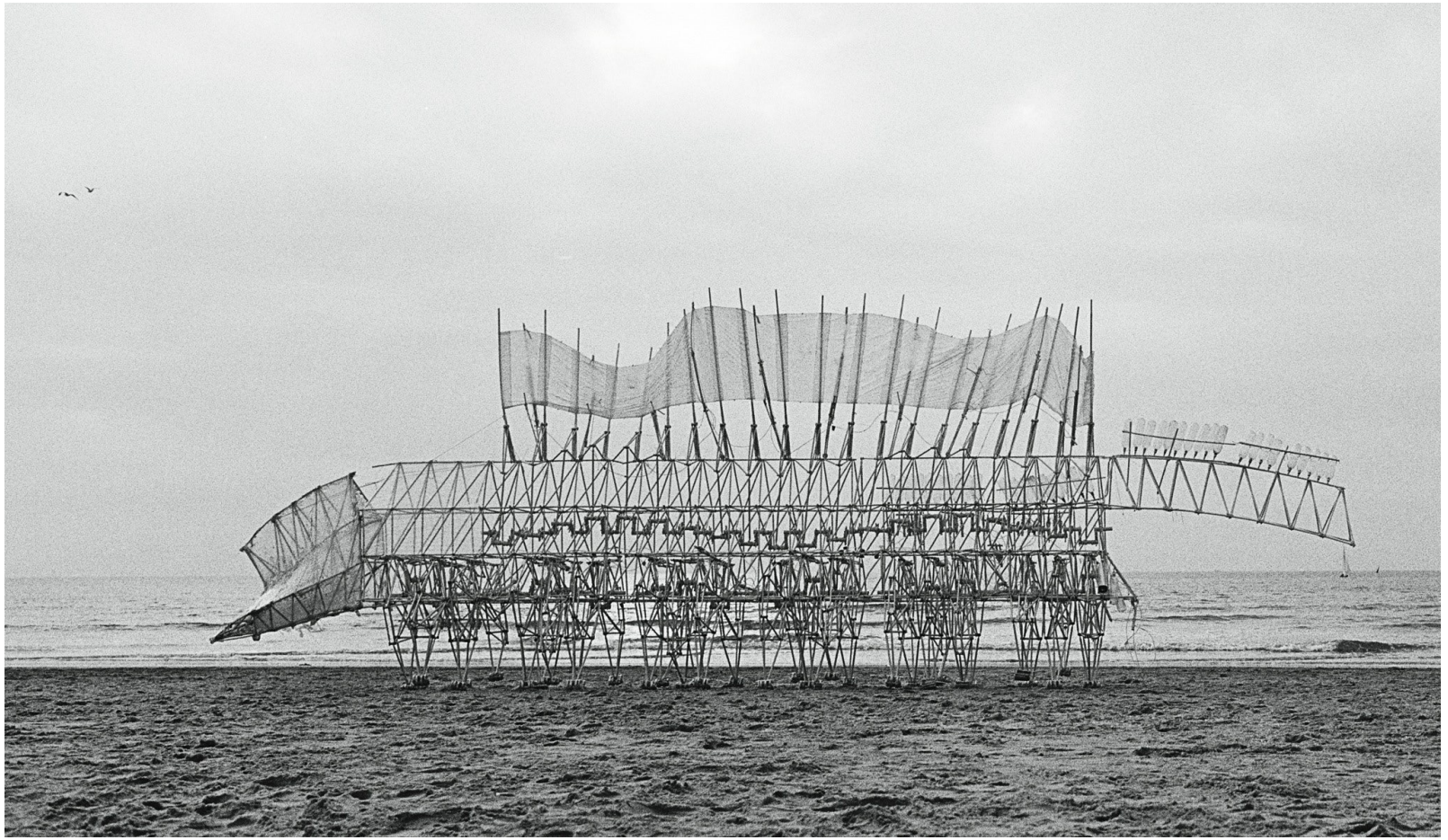
Random International, *Rain Room*, 2012, water, injection-molded tiles, solenoid valves, pressure regulators, custom software, 3-D tracking cameras, steel beams, water-management system, grated floor. Installation view, Museum of Modern Art, New York, 2013.

barbican

4 Oct 2012 - 3 Mar 2013

Random International
Rain Room

kinetic art



Jansen's Strandbeests—"beach animals," in Dutch—are essentially accumulations of stiff plastic tubes, but, animated by the wind, they assume a shiver-inducing air of autonomy. "The Strandbeests themselves have let me make them," Jansen says.

Strandbeests
wind-powered sculptures

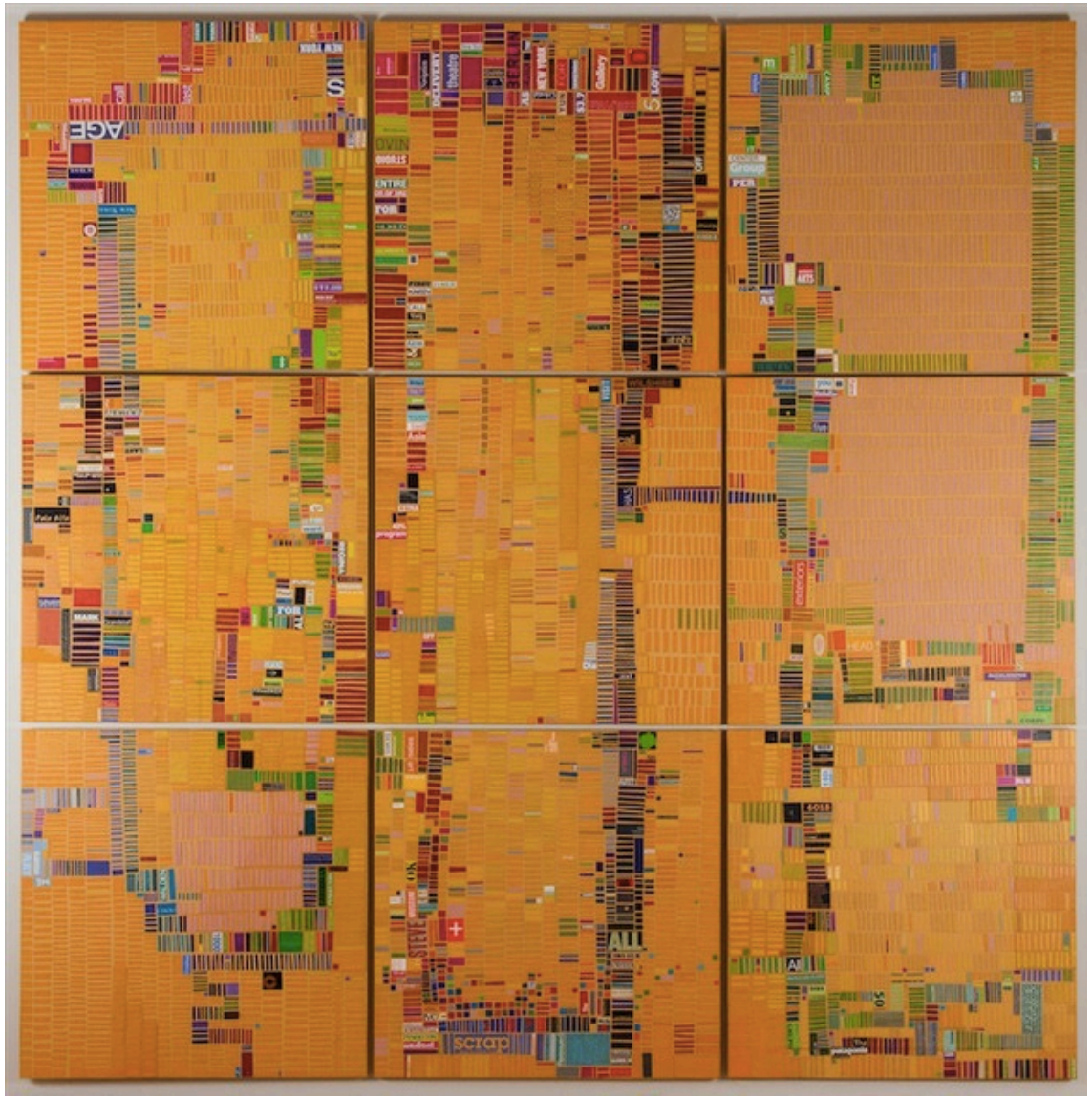
Theo Jansen



Data Art

From Paint to Pixels

A growing number of artists are using data from self-tracking apps in their pieces, showing that creative work is as much a product of its technology as of its time.

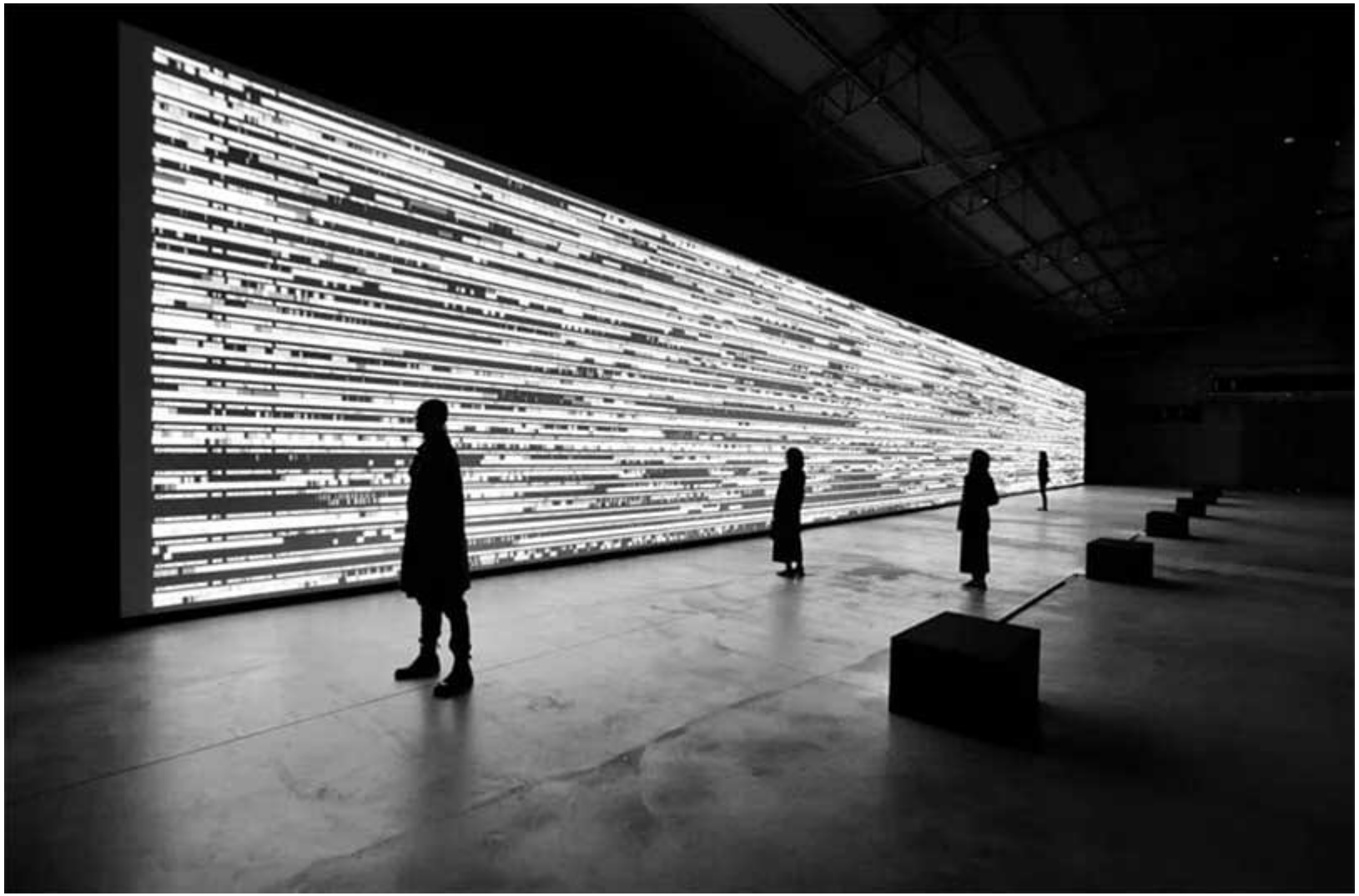


Austin, Week 47, 2015. Three walking tracks in Austin, light and color to match the heat of central Texas. Cut found paper and handmade paper on 9 panels, 2015.

ryoji ikeda

artist and data scientist

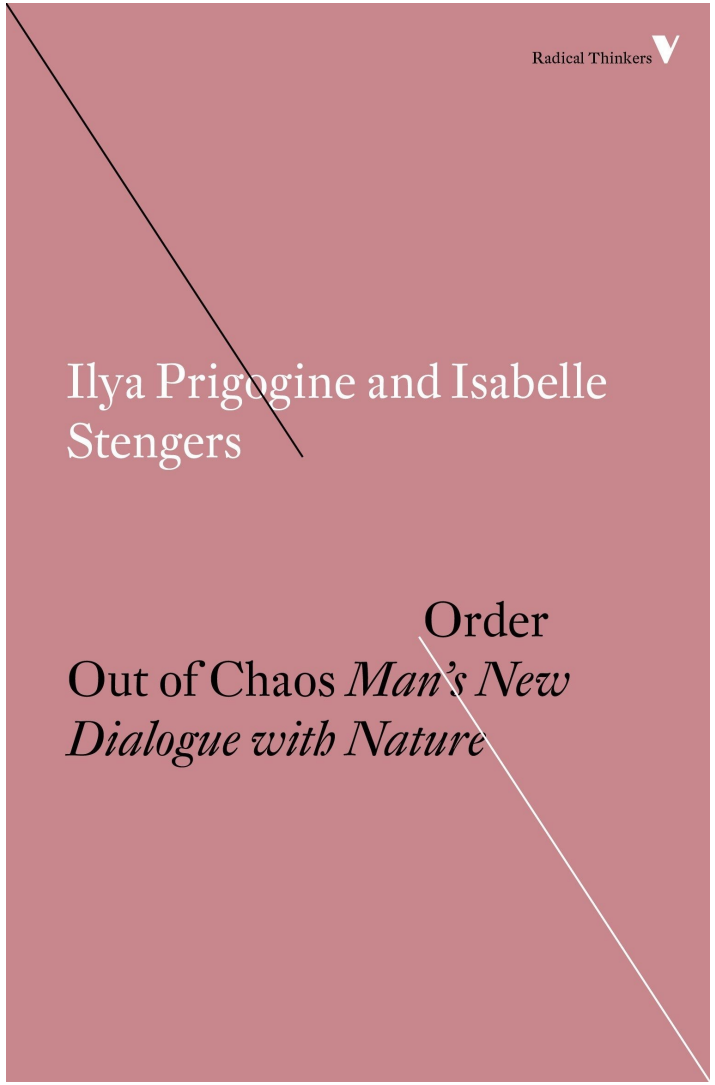
abstracted raw data

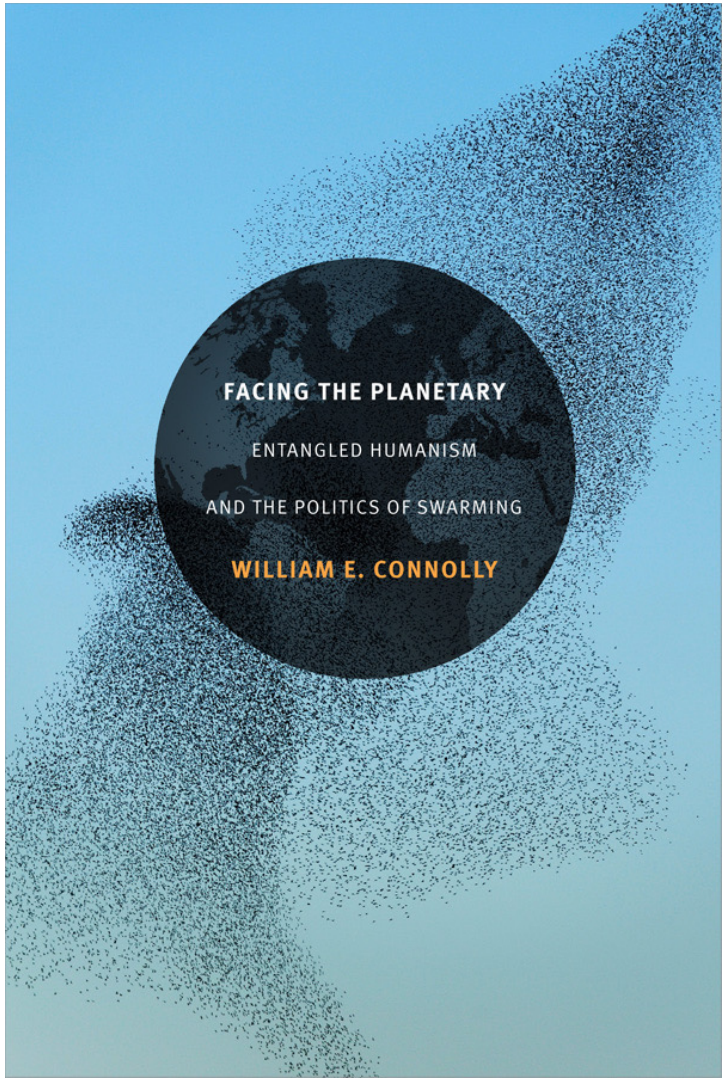


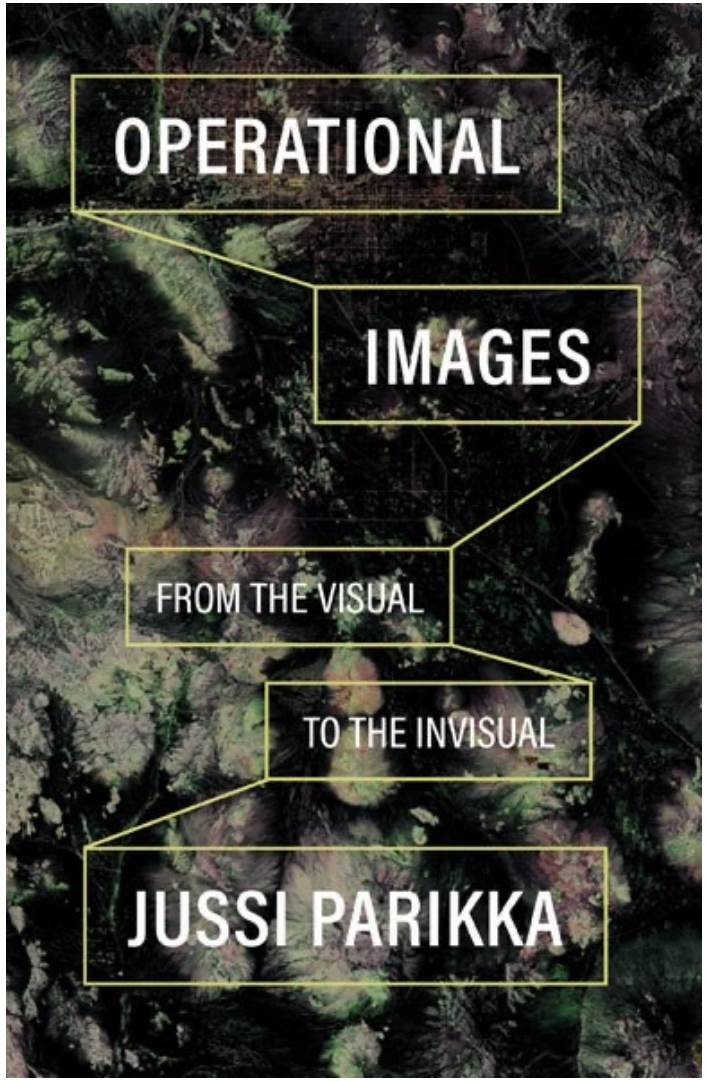
Dataverse (2019)

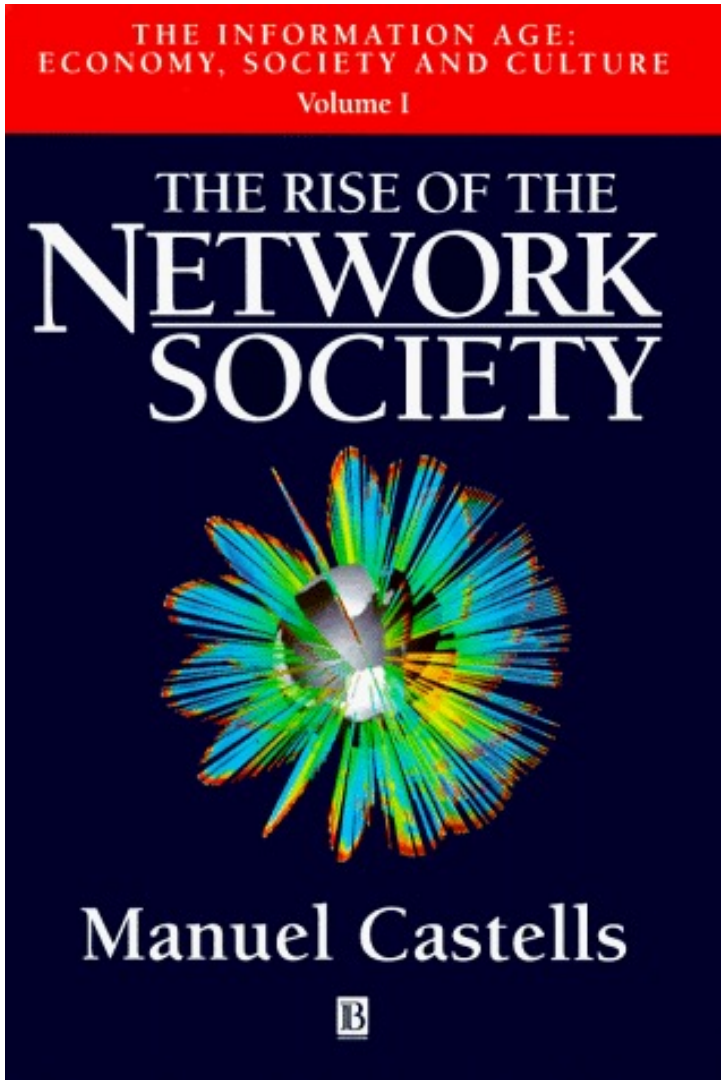
RYOJI IKEDA
DATA-VERSE TRILOGY

SUPPORTED BY
AUDEMARS PIGUET


Radical Thinkers
Ilya Prigogine and Isabelle Stengers
Order Out of Chaos *Man's New Dialogue with Nature*


FACING THE PLANETARY
ENTANGLED HUMANISM
AND THE POLITICS OF SWARMING
WILLIAM E. CONNOLLY


OPERATIONAL
IMAGES
FROM THE VISUAL
TO THE INVISUAL
JUSSI PARIKKA



- Manuel Castells' book **The Rise of the Network Society** is a seminal work in the field of sociology, in which he examines the ways in which digital technologies have transformed the social, economic, and political landscape of the world.
- Castells argues that we are now living in a new kind of society, which he calls the **network society.** In this society, the key social and economic actors are no longer individuals or even institutions, but rather networks of actors that are connected through digital technologies. These networks are highly dynamic, constantly shifting and evolving in response to changes in the environment, and they are characterized by a high degree of flexibility and adaptability.
- According to Castells, the rise of the network society has been driven by a number of key factors, including the development of digital technologies, the globalization of the economy, and the shift from an industrial to an information-based economy. He argues that these factors have led to the emergence of new forms of social and economic organization, in which networks of actors play a central role.
- One of the key implications of Castells' analysis is that power is now distributed much more widely and diffusely than it was in the past. Rather than being concentrated in the hands of a few individuals or institutions, power is now distributed across a complex network of actors, including individuals, corporations, and governments.

Bruno Latour
A lecture at Harvard University Graduate School of Design
February 17, 2009, immediately after the preceding lecture by Peter Sloterdijk

SPHERES AND NETWORKS: TWO WAYS TO REINTERPRET GLOBALIZATION

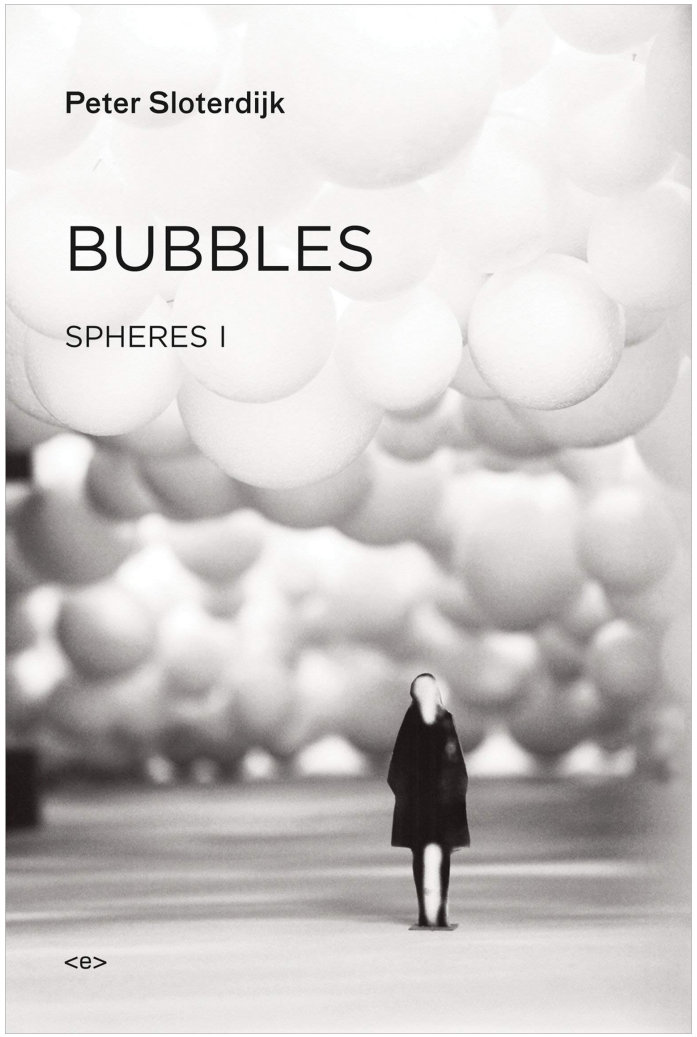


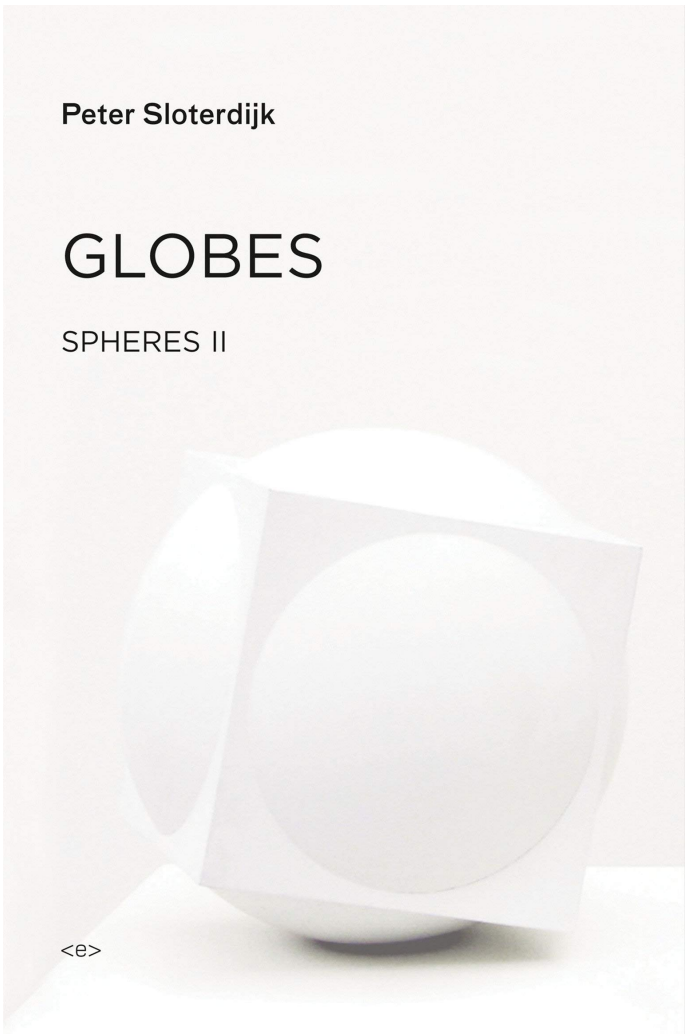
In his lecture "**Spheres and Networks: Two Ways to Reinterpret Globalization**," **Bruno Latour** discusses two different approaches to understanding globalization. The first approach, which he refers to as the **"sphere" model,** sees globalization as the expansion of a single, homogeneous sphere of influence. This model assumes that there is a dominant global culture that is spreading to all parts of the world, erasing local differences and creating a global monoculture.

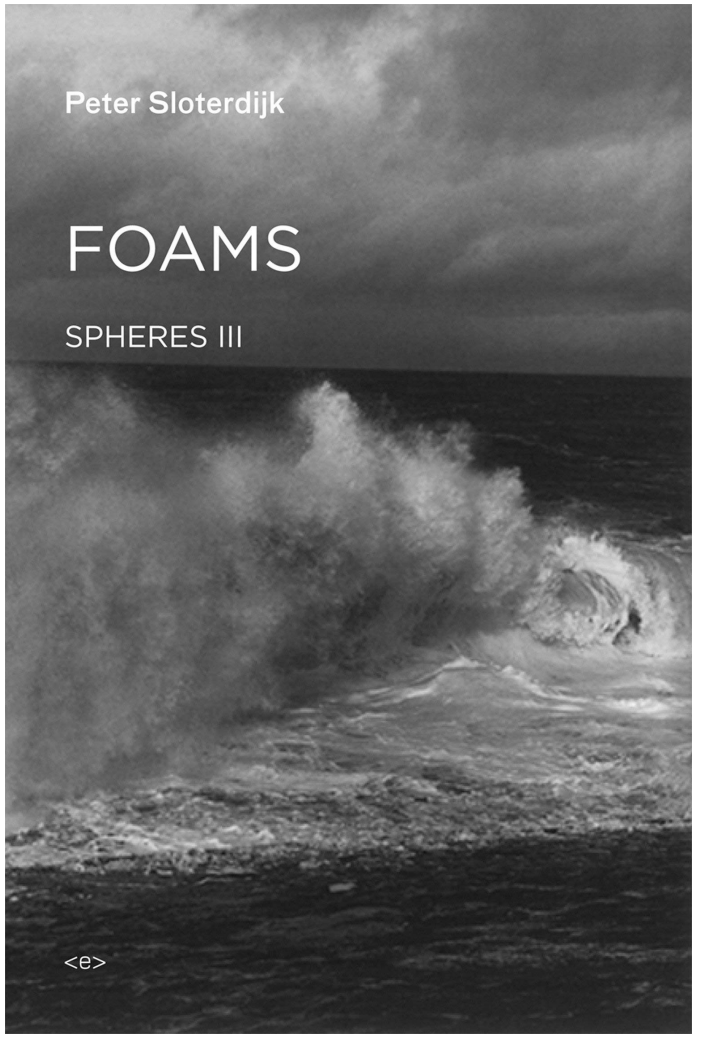
Latour argues that this model is inadequate because it fails to account for the diversity and complexity of the world. Instead, he proposes a second model, which he calls the "network" model. In this model, globalization is not the result of a single dominant sphere, but rather a complex network of interconnected spheres that are constantly interacting and influencing each other. Each sphere has its own unique identity and culture, and the global system is the result of the interplay between these diverse spheres.

According to Latour, this **network model** is a more accurate and useful way of understanding globalization because it recognizes the importance of diversity and the complex interconnections between different cultures and identities. He argues that by embracing this model, we can develop a more nuanced and inclusive understanding of globalization that takes into account the richness and complexity of the world we live in.

Peter Sloterdijk – Spheres Trilogy







Sloterdijk's Spheres trilogy offers a profound and wide-ranging analysis of the ways in which human beings interact with their environment, and the complex relationship between individuals and the larger systems and structures in which they exist.

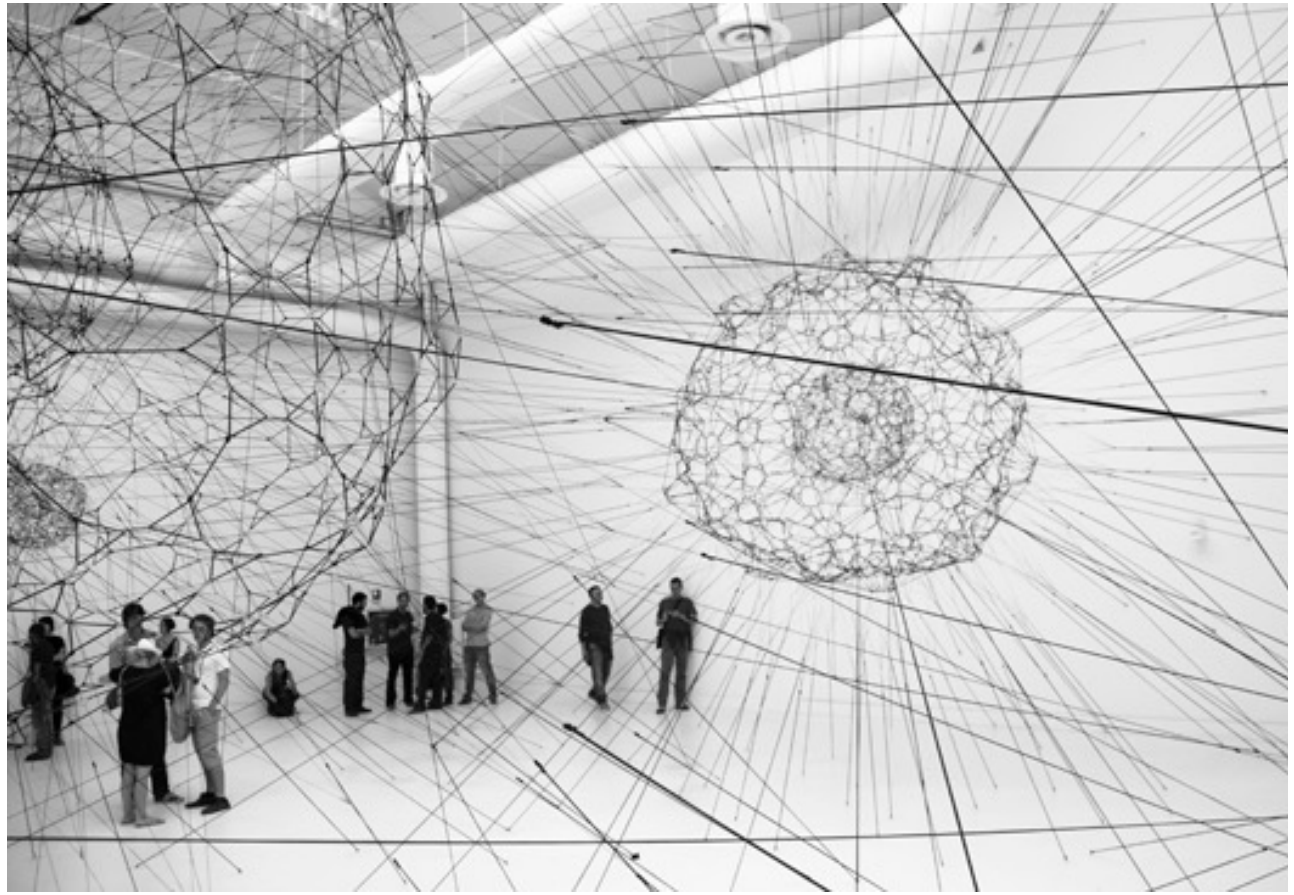
Spheres and Networks: Two Ways to Reinterpret Globalization

Bruno Latour's lecture "Spheres and Networks: Two Ways to Reinterpret Globalization" explores two competing interpretations of globalization: the **"sphere" and the "network."**

The "sphere" interpretation sees the world as divided into distinct, bounded spheres such as nations, cultures, and religions. This view emphasizes the importance of maintaining these boundaries and preserving the unique identities of different spheres. However, Latour argues that this view can lead to rigid and exclusionary thinking, as well as a lack of understanding of how spheres interact and overlap.

In contrast, the "network" interpretation sees the world as a complex web of interconnected nodes, with no clear boundaries between spheres. This view emphasizes the importance of understanding the relationships and connections between different spheres, and recognizing the ways in which they influence and shape each other. Latour argues that this view is more accurate and useful for understanding contemporary global issues, such as climate change, migration, and technological innovation.

Overall, Latour suggests that a more nuanced and flexible understanding of globalization is needed, one that acknowledges both the importance of spheres and the reality of networks. By recognizing the complex interactions and relationships between different spheres, we can better address the challenges and opportunities of a rapidly changing world.



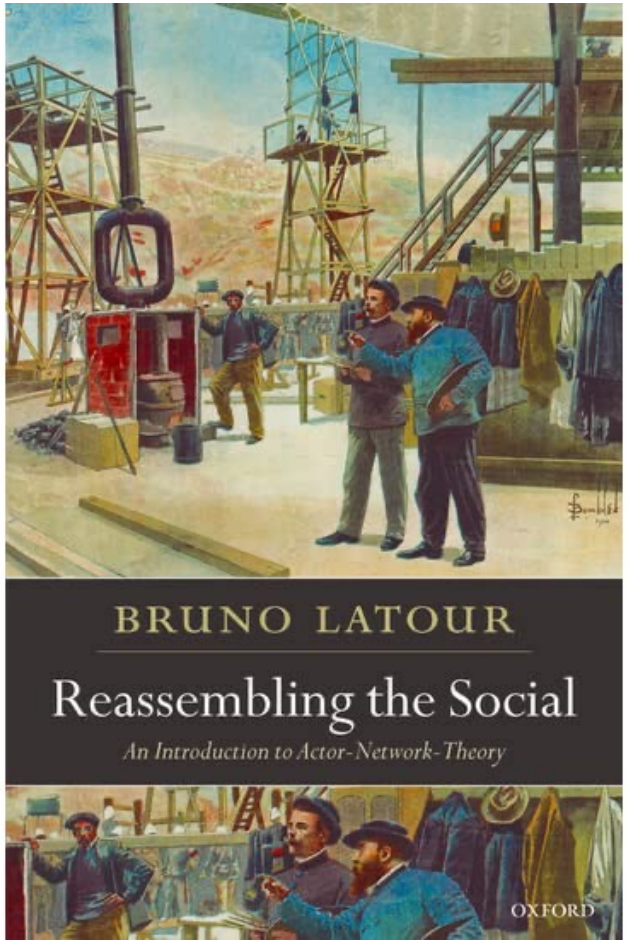
Networks of Relations - Actor-Network Theory and Assemblage Theory

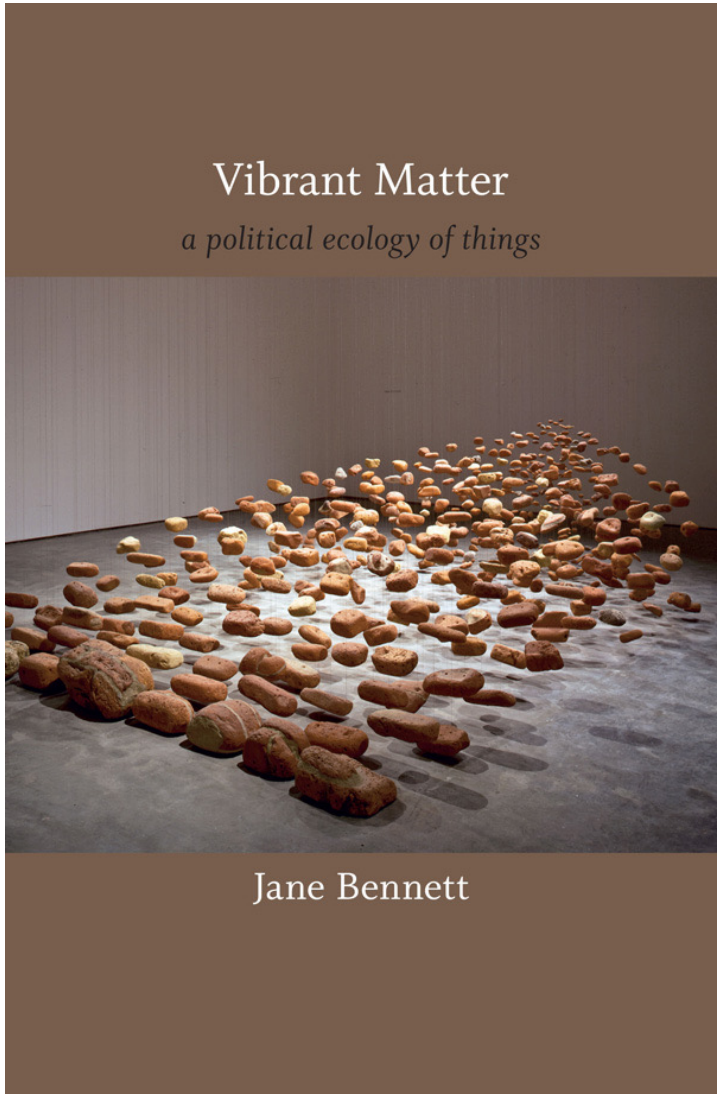
Actor-Network Theory is a theoretical framework that originated in the field of **science and technology studies.** It seeks to understand the complex interactions and relationships between humans and non-human entities (such as technologies, objects, animals, and institutions) by treating them all as "actors" that have agency and can influence the course of events.

Actor-Network Theory and Assemblage Theory share some similarities and have influenced each other. Both theories are concerned with the ways in which complex systems are formed through the interactions and relationships between heterogeneous elements.

Like **Actor-Network Theory, Assemblage Theory** emphasizes the importance of understanding the specific connections and relationships between different elements of a system, and views power as distributed across networks of actors rather than being concentrated in particular individuals or institutions. However, **Assemblage Theory** differs from **Actor-Network Theory** in that it places greater emphasis on the materiality and physicality of the elements that make up a system, and on the ways in which these elements are assembled or configured in specific ways to produce particular effects.

Overall, while there are some differences between **Actor-Network Theory and Assemblage** Theory, both approaches are concerned with understanding the complex relationships and interactions that characterize contemporary society, and both offer useful tools for analysing the networks and assemblages that shape our social and cultural landscapes.





“The Agency of Assemblages”

Notes taken from Jane Bennett, “The Agency of Assemblages,” in *Vibrant Matter: A Political Ecology of Things*, Durham, N.C.: Duke University Press, 2010, pp. 20-38.

Focus: to move agency “beyond human bodies and intersubjective fields to vital materialities and the human-nonhuman assemblages they form” (30)

Assemblage

- Reconceptualises the “part-whole” relation.
- “Assemblages are ad hoc groupings of diverse elements, of vibrant materials of all sorts. Assemblages are living, throbbing confederations that are able to function despite the persistent of energies that confound them from within” (23-4).
- “The effects generated by an assemblage are…**emergent** properties, emergent in that their ability to make something happen… is distinct from the vital force of each materiality considered alone… an assemblage is never a stolid block but an open-ended collective, a “non-totalizable” sum” (24).
- An electoral power grid is the exemplar of an assemblage. It includes very active and powerful non-human parts.



Relational Aesthetics as Network of Social Interactions

- Relational aesthetics can be seen as a way of creating a form of network in the sense that it facilitates social interactions and relationships among participants. By creating situations or experiences that bring people together and encourage collaboration and dialogue, relational art can foster connections and relationships that extend beyond the artwork itself.
- In this sense, relational aesthetics can be seen as creating a network of social relations and interactions that exists both within and outside of the artwork. The artwork serves as a catalyst or framework for these interactions, but the relationships and connections that are formed can extend beyond the physical boundaries of the artwork and continue to develop and evolve over time.
- However, it's important to note that relational aesthetics does not necessarily create a network in the traditional sense of the term, which typically refers to a complex web of interconnected nodes or entities. Rather, relational art creates a network of social interactions and relationships that are grounded in the specific context of the artwork and the people who participate in it.

Research Methodologies applied in arts and design practice to systems

Research methodologies applied in arts and design practice to systems involve approaches that examine, critique, and creatively engage with complex systems, whether social, ecological, technological, or otherwise.

By combining these and other research methodologies, artists can develop nuanced, multifaceted understandings of systems and create artworks that engage audiences in thought-provoking explorations of complex phenomena.

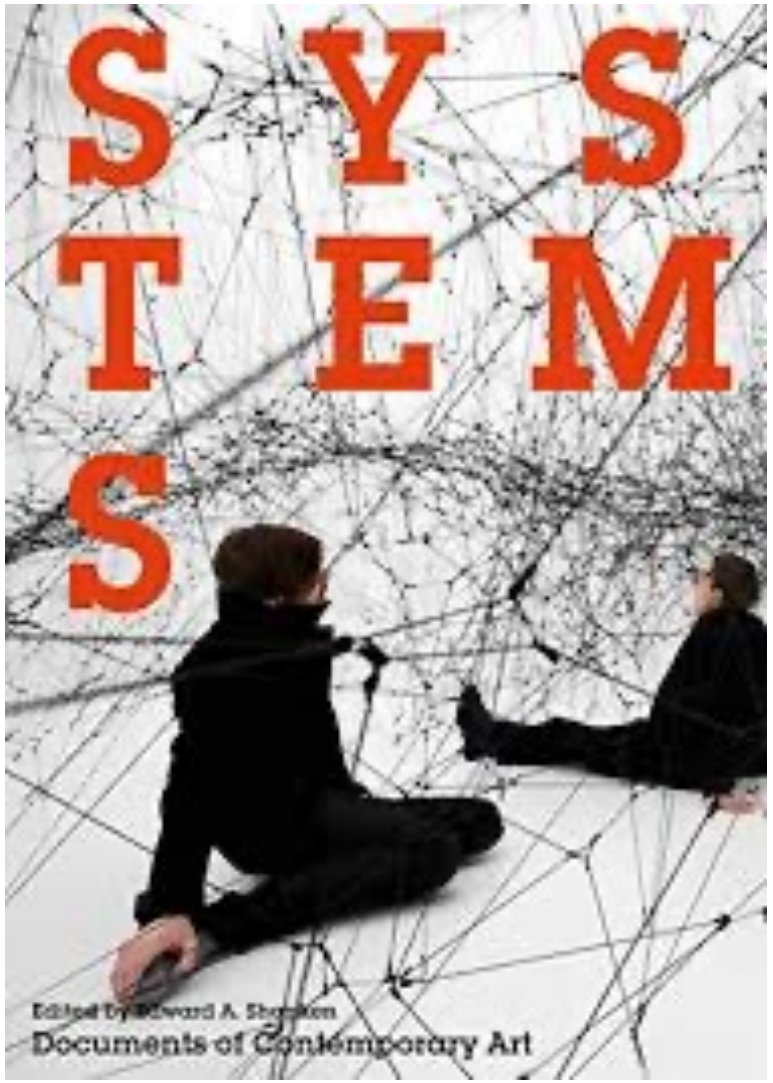
- **Systems Mapping**: Artists can create visual representations of systems, mapping out the interconnected elements, relationships, and feedback loops. This process helps to understand the structure and dynamics of the system and identify potential points of intervention or disruption.
- **Interdisciplinary Collaboration**: Working with experts from diverse fields such as science, engineering, sociology, or ecology can enrich artistic inquiry into systems. Collaborators can provide insights, data, or methodologies that deepen the understanding of the system and inform artistic expression.
- **Site-Specific Research**: Conducting research directly within the context of the system being studied allows artists to immerse themselves in its unique characteristics, histories, and dynamics. Site-specific research can involve observation, interviews, archival research, and other methods to gather insights and inspiration.
- **Ecological or Environmental Research**: Artists interested in ecological or environmental systems may employ research methodologies such as fieldwork, ecological surveys, or data analysis to investigate the interactions between organisms, environments, and human activities. This research can inform artworks that raise awareness of ecological issues or propose alternative ways of relating to the environment.
- **Historical and Cultural Studies**: Examining the historical and cultural contexts in which systems have emerged and evolved can provide valuable insights into their dynamics and significance. Artists may conduct archival research, analyze cultural artifacts, or study historical texts to understand how systems have shaped and been shaped by human societies over time.
- **Experimental Inquiry**: Artists can use experimentation as a research methodology to explore the behavior of systems under different conditions or interventions. Through hands-on experimentation, artists can generate new knowledge, test hypotheses, and provoke unexpected outcomes that inform their artistic practice.
- **Social and Political Analysis**: Critical analysis of power dynamics, inequalities, and social structures within systems is central to many artistic inquiries. Artists may draw on methodologies from sociology, anthropology, or political science to investigate how systems reinforce or challenge existing social norms and hierarchies.
- **Speculative Design and Futurism**: Speculative design involves creating provocative scenarios or artifacts that imagine alternative futures or possibilities for existing systems. Artists can use speculative design methodologies to envision and critique potential trajectories of technological, social, or environmental change, prompting reflection and debate.
- **Participatory Research and Co-creation**: Involving stakeholders or community members in the research process can foster collaboration, empathy, and mutual learning. Artists may facilitate workshops, focus groups, or participatory art projects that engage participants in exploring their experiences of systems and imagining alternative futures.
- **Reflective Practice**: Reflective practice involves ongoing self-reflection and critical analysis of one's own artistic process and assumptions. Artists can use reflective methodologies to interrogate their motivations, biases, and ethical considerations in relation to the systems they study and represent.

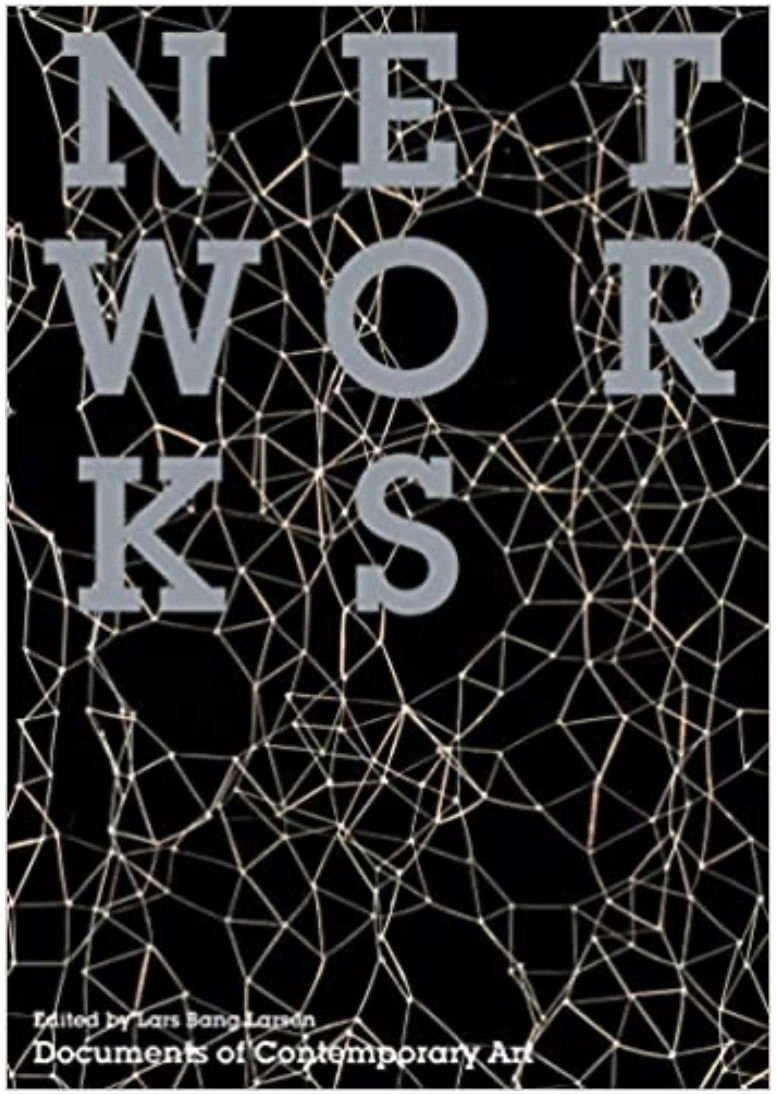
Research Methodologies applied in arts and design practice to ***networks***

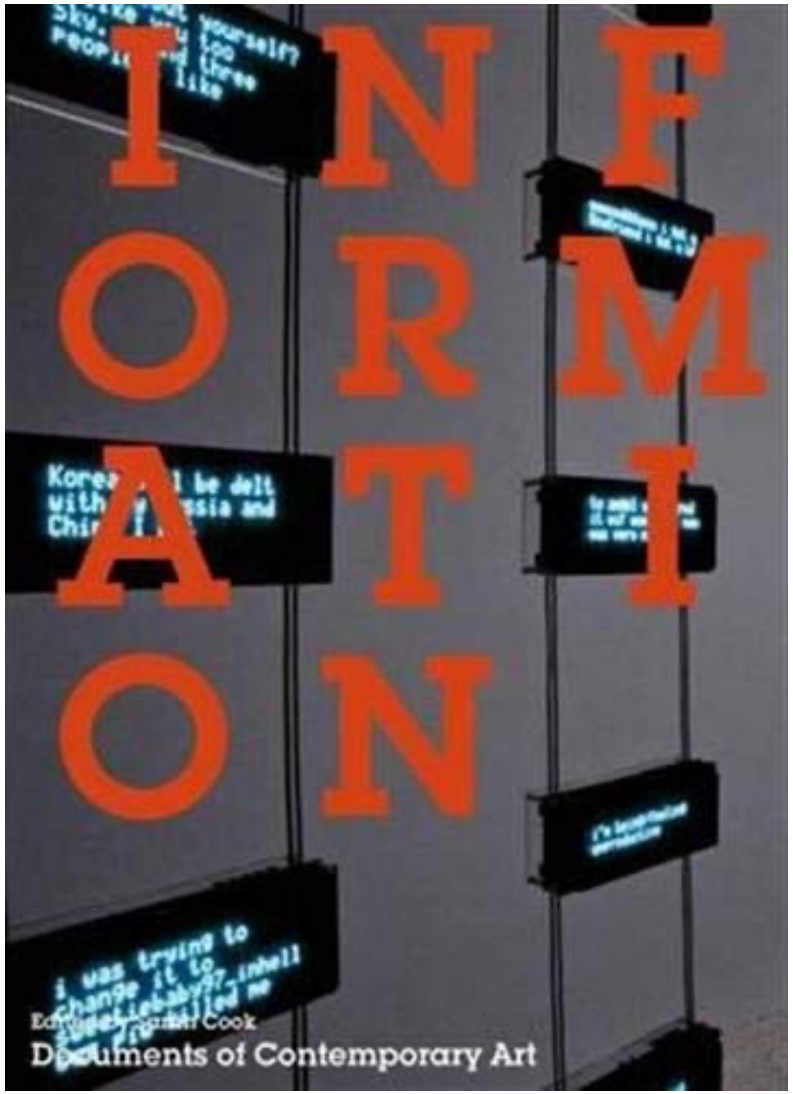
Research methodologies applied in arts and design practice to networks involve approaches that investigate, interpret, and creatively engage with the interconnected relationships and flows within various types of networks, including social, technological, and ecological networks.

By combining these and other research methodologies, artists can develop critical insights into the nature of networks and create artworks that provoke reflection, dialogue, and engagement with contemporary networked cultures.

- **Network Analysis**: Artists can employ network analysis techniques to study the structure, dynamics, and patterns of connections within networks. This may involve mapping relationships, analyzing network topology, and identifying central nodes or clusters. Network analysis can provide insights into the underlying organization and emergent properties of networks.
- **Social Network Analysis (SNA)**: Social network analysis focuses specifically on the relationships and interactions between individuals or groups within social networks. Artists may use SNA methodologies to investigate social structures, communication patterns, and information flows within online communities, social media platforms, or other social networks.
- **Data Visualisation and Sonification**: Visual and auditory representations of network data can offer new ways of understanding and experiencing complex network phenomena. Artists may create visualizations, interactive installations, or sonifications that translate network data into aesthetic forms, allowing audiences to perceive patterns, connections, and dynamics in intuitive ways.
- **Participatory Mapping and Storytelling**: Artists can engage participants in mapping their own networks of relationships, experiences, or affiliations. Through participatory workshops or digital platforms, participants can contribute personal stories, memories, or data points that collectively reveal the interconnectedness of their social or cultural networks.
- **Critical Cartography and Geospatial Analysis**: Critical cartography involves interrogating the power dynamics and social constructions embedded within maps and spatial representations. Artists may use geospatial analysis techniques to map networks of power, privilege, or resistance within physical or virtual spaces, uncovering hidden narratives and contested territories.
- **Performative Ethnography**: Performative ethnography combines ethnographic research methods with performative elements such as storytelling, movement, or ritual. Artists may conduct ethnographic fieldwork within specific communities or networks, documenting and embodying the embodied experiences, rituals, and social dynamics of networked cultures.
- **Critical Media Archaeology**: Critical media archaeology involves excavating and recontextualising historical media artifacts to uncover alternative histories and futures. Artists may investigate the material infrastructures and discursive formations underlying contemporary networks, tracing their historical antecedents and speculative trajectories.
- **Networked Performance and Interactive Art**: Artists can create performances, installations, or interventions that engage with the live interactions and feedback loops within networked environments. By incorporating elements of interactivity, real-time data processing, or distributed communication, networked artworks can blur the boundaries between performers and audiences, connecting participants across physical and virtual spaces.
- **Hacktivism and Tactical Media**: Hacktivism involves using digital technologies and media interventions to subvert or critique dominant power structures. Artists may engage in hacktivist practices such as culture jamming, data activism, or networked protest to disrupt conventional narratives and amplify marginalized voices within networked environments.
- **Speculative Design and Futures Studies**: Speculative design methodologies can be used to imagine and prototype alternative futures for networked societies. Artists may create speculative scenarios, artifacts, or narratives that explore the potential consequences of emerging technologies, social trends, or environmental crises on the structure and dynamics of networks.


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