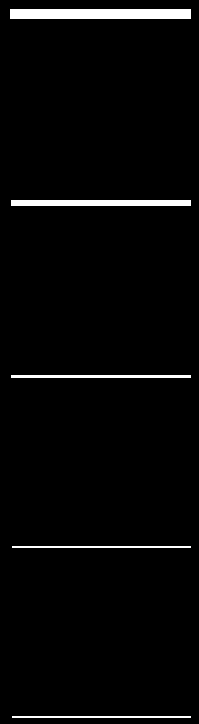
NOME

OSCILLATIONS

JORIS STRIJBOS



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JORIS STRIJBOS
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In his first solo exhibition at NOME, Dutch artist Joris Strijbos shows two kinetic light sculptures that are the result of broader research on artificial life and generative composition. The two works, *Axon* and *Homeostase*, are both inspired by early cybernetics, and the artist's concept of machine synaesthesia. Strijbos is driven by the question of how we can program lifelike behavior into a machine and where the borders between the machinic and the living lie.

Both works are robotic communities consisting of multiple equal units in which actuators and sensors are directly linked to each other. By applying algorithms and rule sets to these robotic systems, a complex and "natural"-seeming behavior is provoked. This emergent behavior is the direct result of interactions between units in the community and their response to their surroundings. The unfolding of this behavior can be seen as an abstract and generative composition in light, sound, and movement, intended as a multi-sensorial experience for the audience.

An important notion that connects the works on a conceptual level is the idea of machinic life. Strijbos encountered this concept in John Johnston's book *The Allure of Machinic Life*, in which Johnston defines it as "the forms of nascent life that have been made to emerge in and through technical interactions in human-constructed environments."[1] The combination of the idea of machinic life with an earlier interest in synaesthesia led Strijbos to investigate how synaesthetics could work inside an artificial living system. In an interview with the artist conducted for the international artistic research project "Dark Ecology", he explains his thought process:

> I think the basis of this idea comes from my time at the Interfaculty of Art-Science where I was introduced to the phenomenon of synaesthesia. The fact that the input into one of our sensory pathways can cause an involuntary experience in a second sensory pathway inside our brain, combined with my interest in relations between the natural and the machinic, made me wonder how this concept would work inside artificial living systems or machines. It's a topic I like to call 'machine synaesthetics' and with this idea in mind I've been working on a series of installations of which *IsoScope* is one. It resulted from connecting different kind of sensors, like light sensors, microphones, and pressure sensors to other actuators, like electrical motors, speakers, and light sources, to mimic the phenomenon of synaesthesia in machines. I like the fact that complex and emergent behaviour can be the result of very simple rule-sets and algorithms.[2]

The roots of Strijbos's work can be traced back to some of the earliest experiments in cybernetics and art. In the late 1960s the British cybernetician and artist Gordon Pask created an interactive cybernetic sculpture that used light, sound, and motion called *The Colloquy of Mobiles*. As digital art historian María Fernández explains, "the mobiles in *Colloquy* were tri-dimensional sculptures powered by motors, individually programmed and also partly computer driven ... alike to a group of autonomous robots."[3] The robots "had to learn to communicate, cooperate, and compete with one another" and "humans could enter the environment, interact with, and possibly alter the mode of communication of the sculptures but ultimately they were inessential to the dynamics of the group."[4] Similar intentions, implementations, and behaviors can indeed be found in *Axon* and *Homeostase*.

Another relevant example from the same era is the *Senster*, a robotic sculpture created by the engineer Edward Ihnatowicz for Philips's technological exhibition at the Evoluon in Eindhoven in 1970. The robot was a 5 meter long and 2.5 meter tall sculpture that was "made of welded steel tubes, with no attempt to disguise its mechanical features" that responded to movement and sound made by the audience.[5] It used what is now considered a "behavior-based non-information-processing scheme, as opposed to a classical knowledge based approach."[6] The control system did not try to create a top-down information overview to make its decisions, but instead relied on independent processes that were controlled by separate sensors to activate its movement. According to Ihnatowicz, "the shape and the general appearance of the structure were of very little significance compared to its behavior" and "people seemed very willing to imbue it with some form of animal-like intelligence."[7] Joris Strijbos's work emerges as a present-day continuation of the exploration of these early ideas on how to apply the theories of cybernetics in art to create a form of artificial life.

Homeostase

The installation *Homeostase* is a kinetic sculpture in which a light-based communication system reveals itself to the audience. Multiple rotating arms are programmed to perform a generative choreography based on principles found in cellular automata and the rules underlying biological systems.

The work was first realized in 2012 as a modular system and exhibited at different locations in variable set-ups. In this iteration, instead of having the units installed on the ceiling or on the ground, the installation is presented as a vertical plane in which the seventeen generative motions of the rotating arms can be seen from the top. The arms hold a light and a light sensor and are programmed to move slower when an increase in light intensity is detected. The light cast by neighboring arms influences the speed at which an arm rotates. The result is a dynamic play of attraction and repulsion emerging from the swarm's language of light.

The piece unfolds over time as the series of real-time feedback processes interact with each other to generate dynamic group behavior. The processes share some data through local interactions, but there is no central controller. At the foundation of the system's architecture is a will towards homeostasis, which works as an inner compass for every unit within the network. At a higher level there are the interactions that occur between the neighboring arms through the variation in luminance emitted by the lights and received by the light sensors. *Homeostase* possesses the qualities inherent to self-regulating systems like those that can be found in almost all organisms on earth. Propelled by a negative feedback loop, the system aims to maintain the ideal inner conditions to sustain life.

Axon

Axon is a kinetic audiovisual installation consisting of three identical robotic units that communicate with each other and their environment through light, sound and movement. The presence of an audience in the space has an influence on how this group of robots behaves.

In his book *On Intelligence* Jeff Hawkins puts forward a theory that describes how neural networks, such as the human brain, could function. His theory proposes that our entire memory is stored in time patterns, sequences of electrical impulses that shoot through our brains and enable us to analyze, repeat, and change them. According to Hawkins, approaching neural networks from this perspective could eventually lead to the creation of actual autonomous and creative machines.[8]

Hawkin's notion of memory as time patterns which are encoded as interchangeable data streams in our body formed one of the starting points in the development of *Axon*. Such patterns can be modified by sensory input while simultaneously controlling the output of an actuator. In the installation light, sound and movement are controlled and interpreted by the system itself. The resulting behavior is generated through feedback loops that are produced between the inputs and outputs of the three separate units and the simple algorithms that control them. This chain reaction sets in motion a generative composition that is written, performed, and conducted by the robotic cluster itself.

Eric Parren in collaboration with Joris Strijbos

[1] John Johnston, *The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI* (Cambridge, MA: MIT Press, 2008), ix.

[2] Nicky Assmann, "Machine Synaesthetics, Interview with Joris Strijbos," in *Living Earth: Notes from the Dark Ecology Project 2014 - 2016*, ed. Mirna Belina (Amsterdam: Sonic Acts Press, 2016), 82.

[3] María Fernández, "Aesthetically Potent Environments, or How Gordon Pask Detoured Instrumental Cybernetics," in *White Heat Cold Logic: British Computer Art 1960 - 1980*, ed. Paul Brown et al. (Cambridge, MA: MIT Press, 2008), 58.

[4] Ibid., 58.

[5] Aleksandar Zivanovic, "The Technologies of Edward Ihnatowicz," in *White Heat Cold Logic: British Computer Art 1960 - 1980*, ed. Paul Brown et al. (Cambridge, MA: MIT Press, 2008), 102.

[6] Ibid., 104.

[7] Ibid., 102.

[8] Jeff Hawkins and Sandra Blakeslee, *On Intelligence* (New York: Times Books, 2004).

JORIS STRIJBOS'S INSTALLATIONS: HOW TO REALIZE ARTIFICIAL LIFE WITHOUT INDIVIDUAL WILL?

Joris Strijbos constructs a kind of digitally directed choreography in his installations-in-motion. His work has developed from models to monumental compositions; robotic communities in conversation with the landscape. Their separate moving elements recall beacons, windmills, cranes, or machinic birds. Whether carefully performed compositions or experimental, collaborative improvisations, his installations provoke music and movement, light and sound, through processes that are the result of centuries of technology and science.

The Industrial Revolution involved a paradoxical process: machines were built to give man power over material, but it became clear that these machines work only if the machine operators adhere to guidelines and follow set procedures. Otherwise, machines exhibit unexpected, complex or chaotic behavior, as if they have an unruly will of their own. As the Czech-Brazilian philosopher Vilém Flusser stated, you don't use an apparatus or a machine, but rather you operate it. The unpredictability of some machines leads us to speak of "behavior", as though we are confronted by "living" organisms with their own plan. Such behavior occurs if the machine makes unexpected movements or leads to incomprehensible actions; it resembles real life.

Although technology can be used to control events, it can also be unpredictable. This dynamic between the potential for control versus unpredictable outcomes has long fascinated Joris Strijbos. When experimenting with the complex electronics of sound equipment at the beginning of his career, he learned that by "incorrectly" operating the switches or by rewiring cables differently, he could produce chaotic sound effects. In other words, feedback leads to unpredictable events that, although not strictly planned, may lead to something beautiful. Indeed, the unexpected outcomes of not following the rules may be more exciting and more engaging than the products of "correct" operation. To create such events, you need to use equipment that can observe signals and then (re) transmit them - for example, something that makes a sound and simultaneously records it. As soon as the machine begins to observe its own signals, feedback is created: unexpected events arising from simple actions.

Strijbos continues to ask new questions in a series of projects that, despite their similarities, come out of fundamentally different enquiries. In this sense his work is always research-based: the questions asked form the incentive for the subsequent steps. Moving beyond sound stimuli was a logical consequence of this approach, as he incorporated kinetics and light into his works.

Another important discovery for the artist was the realization that every event can be both steered by an electric impulse and translated into such an impulse. In the structures created, it is possible to let the units communicate with one another by means of electric signals, thus forming networks. Although the fields consist of separate units, they seem to react as one living entity, and diverse elements such as wind, light, sound, and movement can be translated into one another. Machines can react to light by making movements or sound, and that sound or movement can, in turn, cause a change in the light. The units react as living beings to complex impulses.

Strijbos is equally inspired by the surprises of nature. Macroscopic processes provide ideas for new projects: how the wind plays amongst reeds, the movement of clouds or the rolling surf. These phenomena all display both forms of regularity and elements of chaos, resulting in a poetic play or dance. Strijbos is fascinated, for example, with the phenomenon of birds flocking. A large number of similar individuals behave as a whole, as if there were a collective thought driving the total movement; a driving thought that is unseen and unpredictable yet clearly visible in the birds' movements.

The idea of the flock or swarm continues to influence Strijbos's thinking, as he translates this into a "field" of units - identical machines whose repetition forms a system aesthetic. The swarm and the field are important arrangements for Strijbos, along with the network model, originating in cybernetics, in which all of the units are connected to one another and can exchange information.

The composition of identical elements, the austerity of the design, and the monochromatic scheme bring to mind the work of the Zero group, founded by Otto Piene and Heinz Mack with

collaborations with artists across Europe in the 1960s, as a reaction to Abstract Expressionism. There too color played almost no role in comparison to material, repetition, light and shadow. Installations, paintings and sculptures, held stationary in time, with the only possible evolution coming from changing light.

What results are poetic installations of fields composed of many identical units, which react to their surroundings and/or to one another. Their collective behavior creates patterns bigger than each individual element - like gusts of wind, a veering swarm, or rising dust particles. In addition to the well-considered placement of the elements in space, these fields appear to react as a whole. Moreover, Strijbos's installations reflect a sense of scale. They are artificial landscapes that, in many cases, react actively to outside elements and to one another - like weather systems whose movements are quickened or whose characteristics are intensified.

In each installation Strijbos searches for a new approach so that the total movement is steered by a more sophisticated process: from the internal programming of a machine to incidental external influences, and from there, to how the elements react to one another. Is the field steered by a computer? Or do the elements move independently of one another, causing a pattern to emerge? Are there any external influences? And if so, are these real or simulated?

For example, in *Drifting Patterns*, created together with artists Jeroen Molenaar and Marco Broeder, the wind makes organ elements emit sounds, spontaneously producing a composition. In other installations, movement is created by a pre-programmed composition defined in a computer program and expressed in a series of movements like in a piece of music. The resulting choreography brings the virtual wind of a computer program to life, such as in *Phase=Order*, in which ninety-six screens react to a virtual wind. A third possibility is where the units of the installation react to one another, continually creating new configurations, as in *Homeostase*, where lights react to one another by searching for each other. The "life" that Strijbos aims for manifests itself in one installation in the behavior of its separate components and, in another, in the whole as one living field - again, like flocks of birds that seem directed by one will, even though the movement could be explained by how the birds react autonomously to one another.

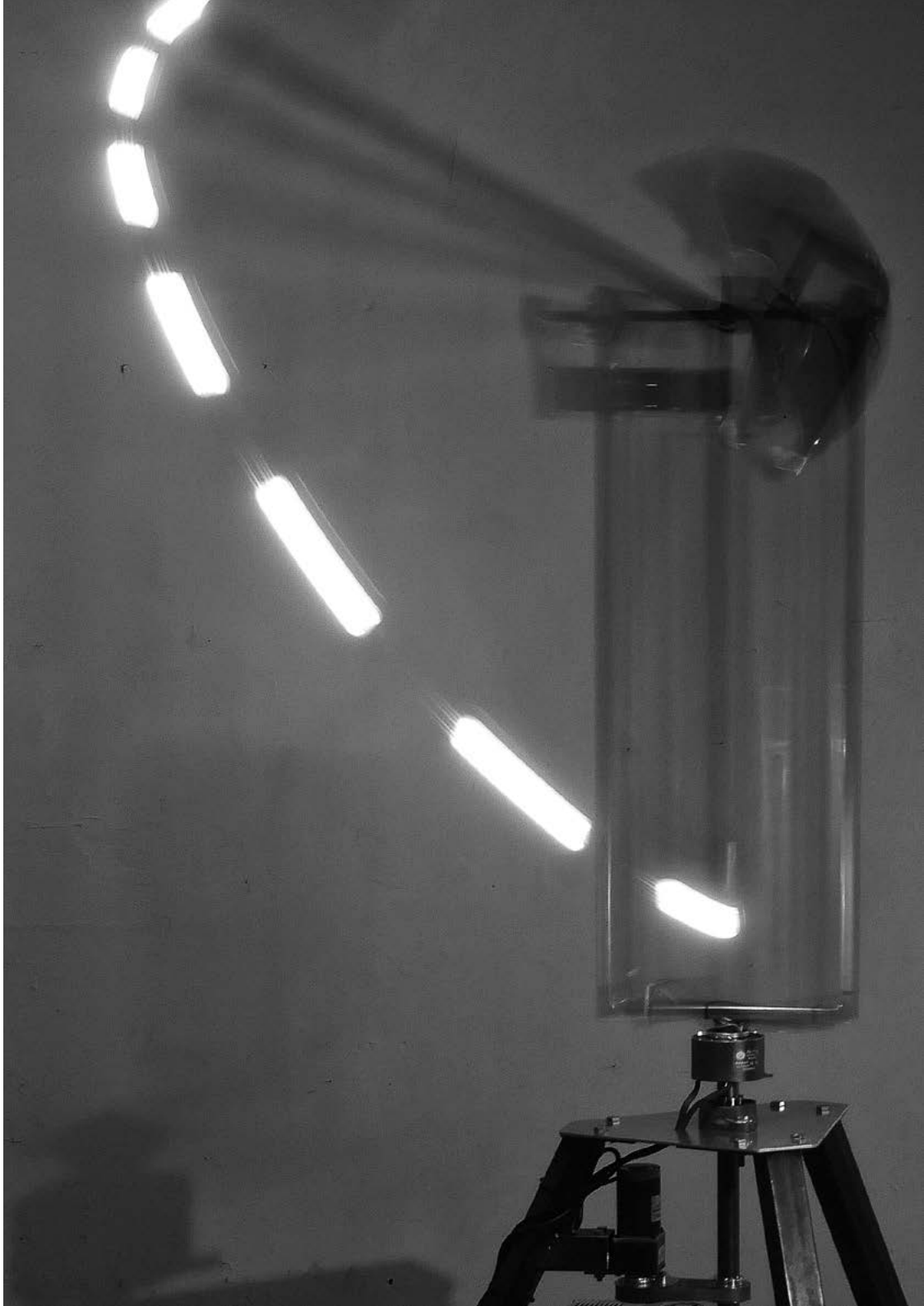
These landscapes of robots that move together and conduct dialogues seem to be steered by a hidden intelligence, a process that is related to life (or science) itself. As we have seen, the installations simulate living processes in their balance between regularity and unpredictability. There is no individuality or individual in these movements; the elements are not autonomous, but neither is the field as a whole steered by one program. Strijbos's work presents artificial life without individuality. The separate elements cannot move through space; rather, the movement they contain replicates and moves itself. The movement itself is the defining characteristic, not the fixed elements or the field as a whole. As a result of viewing these installations, we may more easily experience other "fields" around us as "living": fields of reeds, urban processes, or a coral reef. Joris Strijbos's installations make us look again at the world and its borders: the borders between life and death, the organic and the mechanical, chaos and order.

Michael van Hoogenhuyze

A R T W O R K S

OSCILLATIONS

Axon, 2016
Joris Strijbos
Steel, electric motors, electronics, LED lights, variable sizes



OSCILLATIONS

Homeostase, 2016
Joris Strijbos
Steel, electric motors, electronics, halogen lights, variable sizes

JORIS STRIJBOS

The artistic research of Rotterdam-based artist Joris Strijbos focuses on cybernetics, swarm intelligence, communication networks, and emergent systems. Through his kinetic installations he develops complex immersive and synaesthetic landscapes in which image, sound and light continually intertwine in a synchronized choreography. Several of his artworks are programmed with algorithms to reflect specific organic structures and "natural" behaviors like selforganization, which are then revealed to the audience in the movements and abstract light patterns of the machine.

Joris Strijbos is part of Macular, a collective of artists researching the interplay of light, sound and motion. Their practice focuses on the programming and manipulation of emergent systems and properties as well as on the constant observation of natural phenomena and dynamic processes. They create large-scale multisensory installations of minimalist aesthetics that often address humans' relationship with the natural world, such as *Drifting Patterns* (2014), *Windweld* (2011), and *Phase=Order* (2010). Strijbos's recent works include *Parsec* (2013), with coauthor Daan Johan, and *Revolve* (2011), with the collective Macular, two kinetic light sculptures that perform a generative composition based on swarm synthesis. Both artworks explore the fringes of human visual and aural perception, and produce a relentless sensory overload through stroboscopic pulses and light, inducing hypnagogic states in viewers.

Joris Strijbos studied BA Arts and Sciences at the Royal Academy of Art in The Hague, with a Masters degree from the Royal Conservatory of The Hague. His work has been presented at Ars Electronica (Linz), Sonic Acts (Amsterdam), TodaysArt Festival, STRP (Eindhoven), DEAF Biennale (Rotterdam), Wood Street Galleries (Pittsburg), Atonal Festival (Berlin), WRO International Media Art Biennale (Wroclaw), and the Van Gogh Museum (Amsterdam).

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