

# Immersive Worlds, Artificial Life, and Systems in Unstable Equilibrium

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Immersive Worlds put forward a relationship with the sciences of complexity, that is to say, the sciences of systems which are not in equilibrium, which are based on the concept of emergence. This is understood as the way in which these systems are created; not from intuition, nor from any human intervention, but from computational instruments denoting independence from who ever generates it. We are dealing with different heuristics, the autonomy of the machine which systematically reorganizes information to produce the idea that something new has been created: artificial life.

Appealing is the relationship between the scientist and the artist, who share the same interest in the emergence of new realities, the creation of new forms of life. Artists propose new meanings starting from new instruments, the goal is to create new realities through new questions and new processes, allowing the artist to experiment with science by means of symbolic operations.

How can new and different realities emerge? To what extent is the world recreated with each interaction or intervention? The system would not be a representation of the world's evolution in compressed time, but rather a question as to how the world could be. Artificial life does not attempt to describe the world but rather to intervene in it by creating other realities from new instruments. Whenever this happens, immersive worlds acquire autonomy to modify themselves according to the dynamics of inhabiting a place.

In the *OP\_ERA* installation created by Rejane Cantoni and Daniela Kutschat<sup>1</sup> exhibited in Brazil in 2003, they experimented with the possibilities of an abstract form of space and time based on the theories of fractal geometries and life sciences. "It is a CAVE for multisensory experimentation, designed as an inter-active immersive environment for virtual reality systems".<sup>2</sup> One of the main objectives is to design a multisensory experiment with different dimensions, focussing in the convergence of science and art. It is a form of experimentation and also a conceptual way to think scientifically the space and the time.

## The four different dimensions of *OP\_ERA*

The *OP\_ERA* installation involves a universe made of four different dimensions.

The first one is a sound-based environment in which one enters blind, dependent for mobility and sensory experience on the sound interface. The second puts forward a geometric relationship in which the sound interface allows the creation of lines in the sense of length and width, creating planes which may be identified both visually and tactilely. The inter-actor (the spectator/observer/visitor) changes the environment with his/her movements and gestures which are connected to the sensors.

Whenever a visual or tactile inter-action takes place within the interface, a plane of concentric lines moves gently, outlining and opening a point of access, a small dislocation in the continuity of the visual space defined as a spatial border.

The concept of Kantian space (space with no limits), disappears or is transformed into the concept of inter-action with planes of light that defines the changing space. This planes are flexible and changing, however, the whole space is not completely transformed. It changes just enough to underline the possibility that it can be opened to intervention, the same as to a return to its initial state.

The third dimension relies on geometric shapes which dislocate one from each other in relation to the basic square in which they are immersed. The experience is based on a matrix of three basic forms: the square, the triangle and the circle, floating in a cubical space. A relationship is established between the geometric shapes, their mobility and the dislocation of them in the real space of the CAVE, which is geometrized as a geodesic shape. This, in turn, proposes a relationship with the mentioned cube and the geometric shapes moving around as a result of the interventions made by the participant and traced by the interface.

## The Lorenz Atractor in the fourth dimension of *OP\_ERA*

The first three dimensions are generated with Euclidian geometry, however the fourth one is created using the Lorenz Atractor, which claims to have all dimensions including that of time. "Perception consists in the understanding that the visitor is just a point in the space and time in motion, a single particle in the Lorenz Atractor."<sup>3</sup> The Atractor condenses the three earlier dimensions as well as their colours, moving like codes in fluctuating lines which mix and oscillate. This allows the visitor to perceive how his/her own body is drawn towards the Atractor, as if the inter-actor were just a point within this chain of dimensions.

The Lorenz Atractor is a mathematical non-linear model which shows the complex transformations of space and time arising from the self regulated and dynamic non-linear system (which is also non-deterministic). In this system the periodicity of repetition of events is neither evident nor causal. In this model, any insignificant external event can produce huge changes. This is a multisensory experience of one of the symbols of the theory of chaos which measures the movements of an inter-actor in a multidimensional space and time system. The main characteristic of this space and time system is the availability of the human interaction on a 1:1 scale, in other words, at the scale of human perception

*OP\_ERA* fourth dimension is a representation of mathematics in movement, where the inter-actor understands him/herself as a part of the system. Although the visitor may try to operate the system to produce one effect or another, the visual presence of the Atractor produces an all encompassing perception which is further enhanced with the change in scale, including close and long approaches. An abstract mathematical representation, becomes here something to be experienced spatially, meaning that we can experience it with our entire body and with all our senses. This is possibly the greatest achievement of this work, as it expands the limits of human cognition through the use of science, technology and art working together and conducting us to a deeper search.

The Lorenz Atractor is used to measure a non linear dynamic system, in this case the human interaction. In other words the Atractor shows the pattern of the visitor's movements inter-acting with the experiment. A process of self transformation is undertaken with each interaction in real time. The system becomes a mathematical mirror image of these interactions from

the sensorial point of view and according to the original programming. It becomes a mirror of the human being and an element capable of measuring his/her interaction, recreating permanently some images in an infinite fluctuation cycle. Thus, it records different periods of change, which are not evident to the human eye, but when they are examined closely, they reveal patterns of interaction.

It is interesting to observe how this is not about producing changes of an image which is external to the observer through interactive actions of perception and immersion, it is about creating a mathematical model of individual human interaction in specific conditions of a space and time such as a CAVE type installation.

In *OP\_ERA* all events represent the human interaction but they do not show the visitor exact image in terms of shape, colour and texture. The case of *OP\_ERA* is not a picture or a speculative image (in the optic sense), nor is it a mimetic or simulated image created by an avatar which performs human actions in a virtual world, and it is not a mathematical clone of human actions either. It is an image created on a mathematical model based on an equation in operation, it measures in real time the human movements in the same space and time framework.

The formal quality of the Atractor is not indifferent to the visitor. Here, there is a paradox: the Atractor, which is a measuring tool, a mathematical instrument is now presented to the observer also as an image with formal characteristics of colour, texture and movement. The Atractor presents a dichotomy: it is sensitive and formally impactful and at the same time it is an intelligible, abstract, mathematical, operational and purely functional model.

At this point the issue is not about measurement, it is about meaning. An Atractor does not only represent something but also operates in real time. It measures one of the most radical and dynamic systems known so far: the human actions. What it is really doing is displacing its function in order to liberate the sensorial experience in correspondence with a socio-cultural and aesthetic idea of the universe.

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1 See <http://www.op-era.com>

2 Ibid.

3 Cantoni, Rejane and Daniela, Kutschat. 2007. "Proyecto OP\_ERA." In *OP\_ERA: el cuerpo como interfase*, edited by Espacio Fundación Telefónica. Buenos Aires: Telefónica, p. 18.