

# SIGGRAPH2006

This is a typical Meta-Composition based on Meta-Phorms, and Meta-Points , all of which will be explained further on.

**B**ut for better understanding, I have to explain, I think, my overall approach in art.

In my high school years, I was struck by the fact that students, regardless of the mathematical problem at hand, unwittingly ended up making a painting of sorts when they used chalk on the black board to solve it.

On the next two pages are such "art exercises".







Fig. 1. A generic example.

**Fig. 2** The Pythagorean theorem as both a mathematical problem and a painting of sorts.

The graphs have meaning in both the mathematical sequence and as a kind of painting.



**Fig3.** The great Norbert Wiener "painting" something on the black board.



In 1967, it occurred to me, that I might make the process art specific, in other words, search for a kind of geometry dedicated to art as opposed to one meant to solve problems of measurement or engineering.

Therefore the rationale of my work became the creation of unforeseen images just out of curiosity and by use of self proposed geometrical statements.

To this end, I establish a game relationship among geometric shapes. The game is designed not to score points or pinpoint a target, but to elaborate an artistic image. While it is in process, the shapes interact with each other through various emulations of a cybernetics model (a situation in which structures or systems are interconnected by input, output, and feedback events).

**F**ollowing are a few samples of works, produced between 1967 and 1979 and exploring such propositions.





Fig. 3 Innocence, 30x23 inches, pastel and colored pencil, db92.





Fig. 4 Emerald Light, 30x23 inches, pastel, db91.







5 SIGGRAPH2006

**B**ut, obviously, this will depend on how such geometry may be made to work and therefore we must set, or establish, as a general frame of work, axioms, rules and conventions that will govern such a process.

#### Among others, the most important axiom is that,

any geometric form on a sheet of paper symbolizes an entity endowed with life, able to carry out a behavior and ready to participate in a graphic game through behavior, combination or interaction.

In the image that follows, all the points participating in the build up are supposed to feature such behaviors.







5 SIGGRAPH2006

It seemed to me that, in order to make things work, cybernetics, may be the answer because it is as a mechanism so often found functioning in many aspects of life.

Just to refresh the memory, below is the well known basic scheme of cybernetics. A black box produces an output , when exposed to an input. Both are connected through the feed back channel which balances the system.



**I** placed this model at the center of my work and this became an invitation to set up and explore self-developing procedures based on algorithms or memorized procedures.



Therefore, while interacting, the geometric forms will emulate a cybernetic model, as shown in the work on this page, where the shapes are interconnected by input, output and feedback events.



Fig. 7 Personae, 26x20 inches, colored pencils, db23

SIGGRAPH2

**B**ut, to accommodate the inclusion of behavioral capabilities, the properties and definitions of the geometric working units will be more complex than those of conventional geometry and, hence, I call them **Meta-Points, Meta-Phorms** and **Meta-Compositions.** 

Meta-Phorm comes from Meta+Metaphor+Form.

In Fig. 8 the Meta-Point is a Black Box represented by a convenient proxy graphic symbol (the cube in this instance) and a specified position in space or coordinates. The cloudy shapes stand for the input, Ii and the output, Oi; they are connected by a feed back channel.



Fig. 8 The Meta-Point.

SIGGRAPH2006

The images in Fig. 9 show examples of points in **conventional geometry**, as a set in image {1} and as part of a curve, in image (4). and as **Meta-Points**, replacing the points in the previous images, again as a set, in image {2} or as part of a curve, in image (3).





IGGRAPH2006

Next, by setting up interactions among Met-Points we arrive at the build up of Meta-Phorms. But, furthermore, we may also devise interactions among Meta-Phorms themselves, and discover other ones.

Graphically this idea is illustrated in Fig, 10.

We set an Algorithm or a Mental Rules as a hub through which a known shape 1 interacts with a known shape 2 and produces the shape 3 which is unexpected due to the huge number of random parameters involved.

In this stage we may witness the generation of originality since originality is at its maximum when the visual message is totally fresh, or unknown as opposed to one which, by virtue of being known, has nothing more to convey and is, therefore, redundant, thus devoid of originality.

Originality = Information (conveyed) - Information (assimilated by learning +understanding) / Information (conveyed) %; max = 1; (O) = ((Ic)-(Ia))/((Ic) %.



**Fig. 10** Two known shapes, Shape 1 and Shape2, interact to produce the unexpected Shape 3.

The images on this page show, as an example, the interaction of two known shapes and the resulting unexpected Meta-Phorm, (Fig. 11a). Three fine art interpretations are proposed in Fig. 11b--11d.



Fig. 11a. Two known shapes engender an unknown, unexpected shape seen on the lower right side oh the graph.

Fig. 11b--11d. Proposed fine art interpretations of the event in Fig.11a.

5 SIGGRAPH2006

In the end, the goal, is to trigger a process, which generates and regenerates itself, when one initial input cause (which I call vector or impulse) delivers a spark of will to a structure.

**S**uch self generation will develop until the algorithm/procedure stumbles on an unpredicted situation. At this point the artist needs to decide and have the process restarted.

Images in Fig. 12--13, on the next page, are a few examples.





Fig. 12 Persona, 13x10 inches, db932.





5 SIGGRAPH2006

**F**inally, lets point again to the fact that a game relationship happens among the geometric shapes.

The game is designed not to score points or pinpoint a target, but to elaborate an artistic image, as it happens between the red point and the field of circles shown in **Fig. 14**.



Fig. 14. Field of equal circles polarized by the presence of a foreign point.



All of the above being said, lets now come back to the "Cybernetic Ceremony in Black Velvet" and describe it as a Meta-Composition based on Meta-Phorms and Meta-Points.

Essentially, it is the story board of a development in two stages:

**1.** In stage one, happens the build up of the central image, outlined by the red line, **Fig. 15**.



Fig. 15. The main Meta-Phorm in the "Cybernetic Ceremony in Black Velvet".



This Meta-Phorm is the end product, (Fig. 16h), of the interaction (fig. Fig. 16g), between a default human profile, (fig. Fig. 16f) and a flux of vectors, of random frequency (Fig. 16c). which at their own turn, proceed or result, as the interactions of a constant frequency (Fig. 16a) with a frequency converter (Fig. 16b) and a one vector system (Fig. 16d) with a polygonal chain (Fig. 16e) for the generic human profile (Fig. 16f).



Fig. 16. The main Meta-Phorm in the "Cybernetic Ceremony in Black Velvet".



The scripts, graphs and formulas on the left and middle positions and the twelve profiles at the bottom of the page, describe geometrical events of the developments in the central image, and in the mean time, provide an environment to it.





#### 2. At this point we enter in the second stage of the process

when the visual content from the previous stage undergoes a global mutation and becomes a Meta-Composition.

What happens is that the graphic content in stage one, is delivered, handed over, to the mathematical operations buried deep within the technologies specialized in handling electronic images.

There the electronic and mathematical attributes, to which an image is reduced to, become a continuum of numbers and formulas.

This continuum is then exposed to various manipulations.

Color, shape, surfaces, position and texture, as part of this continuum, are handled simultaneously and, therefore, make up a new, unified and consistent Meta-Composition, which could not be invented otherwise. I call this a mutation of content and the process ads up a new layer of originality beyond the one produced in the previous stage.

What happens is that the originating Meta-Phorm, while remaining embedded and recognizable, melts inside the unexpected composition that grows out of it and which sets and assumes the final visual identity of the work.



Such a mutation becomes self evident in the following examples where the Meta-Compostion grows out of the operations made only in the first step of the generative process, around point P1 shown on pages 25 = = 34.











