

# Deformable & Performative Space

by George Katodrytis

The proliferation of information technologies and their global trajectory have created new approaches to architectural design and production. Emergent practices of genetic algorithms, parametric design and topological modeling are now incorporating mimetic and behavior techniques as well as “performative” models. The generation of form follows a morphological process in which geometry coded with behavioral intelligence becomes responsive to fields of influence. The parametric model developed in such project utilizes scripts to trigger and define its deformation, developing a certain level of cognitive response within the geometry. This creates a new immersive experience, as porous and sponge-like spaces.

From its inception, digital media were considered as a discipline external to architecture. By definition the digital in architecture does not exist. Despite this, architecture would seem to be the medium that truly lends itself to digi-

tal exploration, both in physical and psychical structures. It manifests itself in the most ambiguous element—space—within which any projection moves freely and without fixed boundaries. What the new technology of the digital media has managed to achieve is to unravel the repressed condition and abandoned projects of 20<sup>th</sup> century architecture. In the space of digital media, the boundaries between organic and inorganic are blurred; the body itself, invaded and reshaped by technology, in turn invades, permeates the space outside, even as this space takes on dimensions that themselves confuse the inner and the outer, visually and physically. Digital technology attempts to reincarnate this “mythological configurations”, repressed by modernism, with the monstrous and anamorphic merging of animal and house as an oneiric machine, a machine for dreaming. After all, there is no architecture without dream, myth and fantasy.



Figure 1: Project by author.

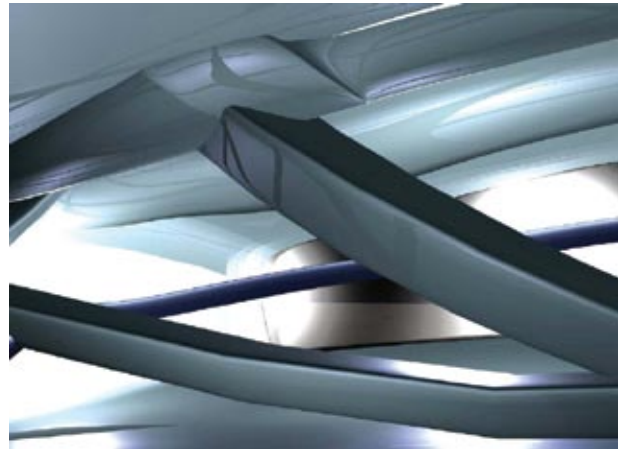


Figure 2: The act of mimesis.

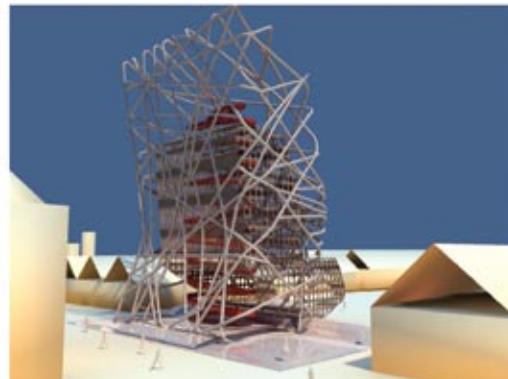
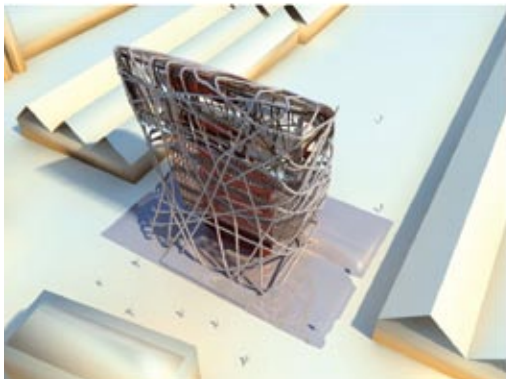
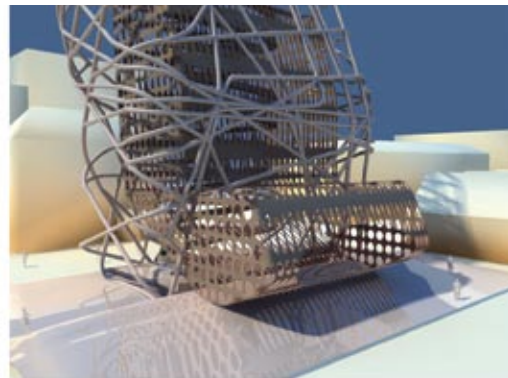
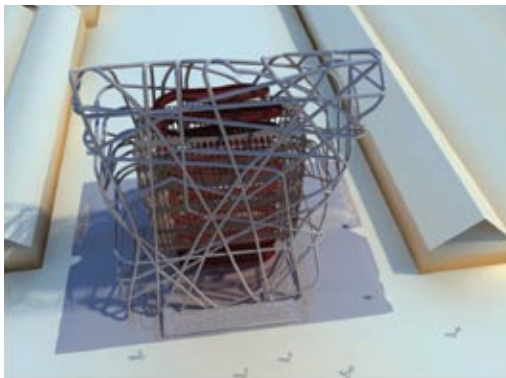
When the fusion between the organic and the inorganic takes form a mimesis takes place. Digital technology mimicking architectural space, so much that it becomes believable so that organic and inorganic matter, animate and inanimate forms becoming indistinguishable. Form becomes malleable and changeable and interactive, as though it imitates its occupants. The body fuses with its surroundings. Through physical and bodily acts of mimesis (i.e. the chameleon blending in with its environment), the distinction between the self and other becomes porous and flexible. Rather than dominating nature, mimesis

as mimicry opens up a tactile experience of the world in which the Cartesian coordinates of subject and object are not firm, but rather malleable.

Any discussion of mimesis originates in a biological context in which mimicry (a mediator between life and death) is a zoological predecessor to mimesis. Animals are seen as genealogically perfecting mimicry (adaptation to their surroundings with the intent to deceive or delude their pursuer) as a means of survival. Survival, the attempt to guarantee life, is thus dependant upon the identification



Figures 3, 4, and 5: Project by author.



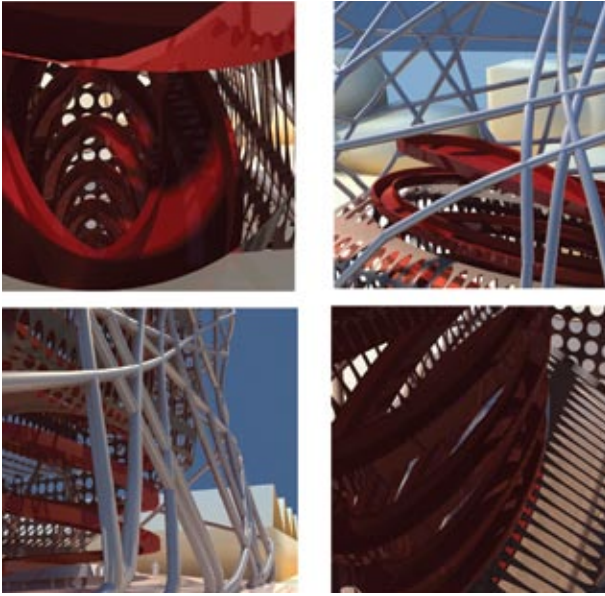


Figure 6: Project by author.

with something external. The manner in which mimesis is viewed, as a correlative behavior in which a subject actively engages in “making oneself similar to another”, dissociates it from its definition as merely imitation.

To understand the meaning of mimesis we must recognize its origin in the process of modeling, of “making a copy of.” In essence it refers to an interpretative process that relates not just to the creation of a model, but also to the engagement with that model. In mimesis, imagination is at work and serves to reconcile the subject with the object. This imagination operates at the level of fantasy, which mediates between the unconscious and the conscious, dream and reality.

Architecture along with the other visual arts can therefore be viewed as a potential reservoir for the operation of mimesis. In the very design of buildings the architect may articulate the relational correspondence with the world that is embodied in the concept of mimesis. These forms may be interpreted in a similar fashion by those who experience the building, in that the mechanism by which human beings begin to feel at home in the built environment can also be seen as a mimetic one.

The new digital approach to architectural design is based on computational concepts such as topological space, isomorphic surfaces, parametric design, and genetic algorithms. Architecture is recasting itself, becoming—in part—an experimental investigation of topological geometries. Digital media is employed not as a representational tool for visualization, but as a generative tool for the deri-

vation of form and its transformation—the digital morphogenesis. It explores the possibilities of the “finding form”, that the emergence of various digitally based generative techniques seem to bring about. Topological space opens up a universe where essentially curvilinear forms are not stable but may undergo variations, giving rise to new possibilities, i.e., the emergent form.

The computer simulation of evolutionary processes is already a well-established technique for the study of biological dynamics. This is based on mimesis and on evolutionary simulations to breed new forms rather than specifically design them. This algorithm searches needs to be sufficiently rich for the evolutionary results to be truly surprising and for exploration of space rich enough so that all the possibilities cannot be considered in advance. This unpredictability of the new, like an outcome of a design process, makes genetic algorithms useful visualization tools.

The employment of generic design strategies develops autonomous architectural concepts, which replace the traditional hierarchical processes of production known as “cause and effect,” with generative systems of reciprocal and interdependent relationships: new organizational patterns and weavings and performative morphologies that can modulate and differentiate the environment. In doing so, we have suggested alternative forms of habitation: interlacing and networking lines into complex configurations. This morphogenetic process includes pattern, repetition and permutations.

Current experimental work focuses on issues of organizational complexity (layering, interpenetration of domains), the production of diversity (iteration vs. repetition), the spatial recognition of fuzzy social logics (smooth vs. striated space), and ways of coping with uncertainty (virtuality vs. actuality), and engagement with new production technologies.

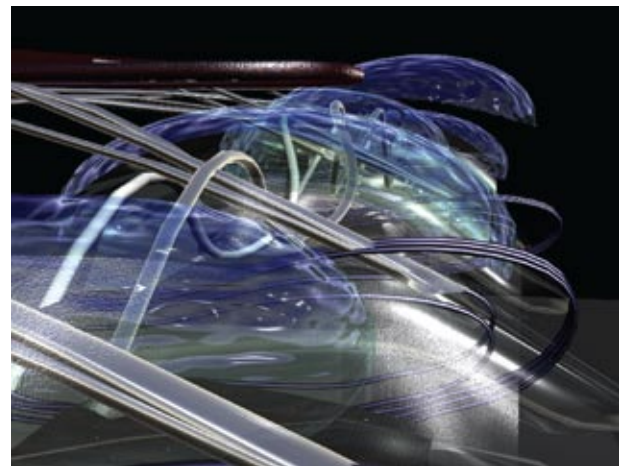


Figure 7: Project by author.

It is time to move from theorizing forms to structuring them. The new space is the outcome of the synthesis between space-oriented and structure-oriented models, developing self-regulatory patterns in which potentialities are regulated by the developing structure itself. These techniques result in the simulation of evolutionary and environment based three-dimensional structures and surfaces. This results in high-speed generation of formal systems. The new research in architecture involves structural morphology, generative modeling of architectural form. The design process now has turned from mimetic into one of growth, based on given data (directions or restrictions). Algorithmic structure represents abstract patterns that are not necessarily associated with experience or perception. Algorithmic processes result from events that are often

neither observable nor predictable and seem to be highly intuitive. In this sense, algorithmic processes become a vehicle for exploration that extends beyond the limits of perception.

One example of fusing surface and structure is the production of weaves, a tool that generates woven meshes. This script uses a grammar capable of describing and generating woven strands to a user-defined surface. It allows the user to explore patterns that can be either used to generate the building morphology or be applied to a shape established by other parameters.

The architectural process is now evolutionary, intuitive and performative.

*Figure 8:* Project by author.



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