

Furnimals, Swarms, and Mutations

by Tara White

I entered the *Formal Mutations* Studio with minimal experience in three-dimensional digital design, having only worked for a short time with Vector Works prior to the course. I was eager to gain experience with digital tools, and interested in exploring the possibilities uniquely afforded by designing in a digital environment as opposed to using traditional methods of sketching and modeling. I dove into the first **form•Z** / Cinema 4-D exercise with what I hoped would be the kind of clueless-ness that can occasionally lead to unorthodox discoveries.

MATERIALS

Through my experiences at RISD's Interior Architecture Department, I have developed an approach to design that emphasizes materials and their inherent qualities as the inspiration for ensuing forms. I started to experiment with re-creating materials, textures, and behaviors atypical of the digital world, such as fur, faceted gemstones, and particles that demonstrate living animal behavior, including breathing and moving as a school or swarm. Immediately, the difficulties involved in mimicking the irregularities and inconsistencies of real-life matter and behavior in the digital environment become apparent. One discovers that it is often through the subtle tweaking of the multiplicity of variables for each function that "life-like-ness" can be increased. Hand drawings scanned and included in the creation of digital materials and textures also help bridge the gap between recognizably computer-generated effect and a more naturalistic or "imperfect" vision that more closely mimics our own sensory perceptions of the material world.

BIOLOGY

With my material explorations, I realized that I was attempting to move toward a kind of integration of the biological and the digital – a blurring of the dividing line between living and non-living. Challenging the perceived visual divide between, or compartmentalization of, nature and technology, and working toward blending them seam-

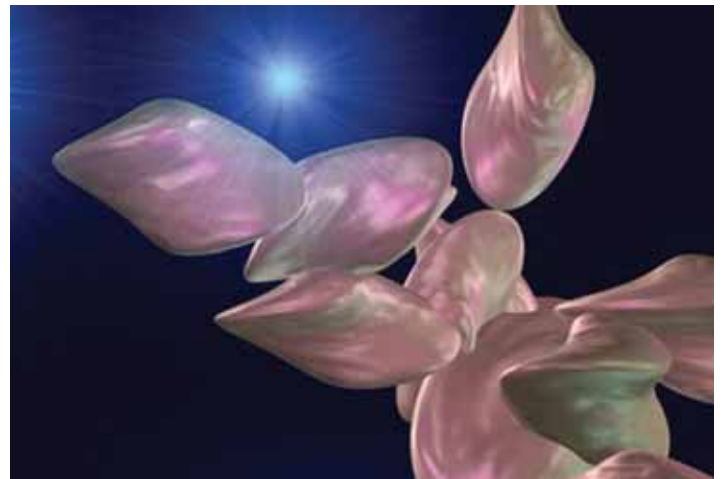


Figure 1: Experimenting with re-creating materials, textures, and behaviors.

lessly in fact reveals the connections between the two. Developers of Artificial Intelligence systems have long pondered the distance between the computer and the human mind, discussing differences in terms of knowledge and consciousness. It is no wonder that we see the same issues raised in relation to digital visualization of living forms and movements. The fact that multiple mutations of a form can be quickly generated through small changes in **form•Z** / Cinema 4-D's function variables suggests a familiar biological theory – that of evolution. In this way, digital design can mimic nature, where each occasional variation results in something that may survive if it proves beneficial to the overall design. All methods of design can be viewed as "evolutionary design" in that innovations are incorporated or excluded as the process moves forward. However, the use of digital tools has the potential to generate new and innovative design solutions through its singular and inevitable introduction of the unexpected! One of my very first experiments involved trying to achieve the effect of window blinds by manipulating existing wall surfaces. The shatter function proved useful in horizontally splintering two walls that, after applying the twisting

function, intersected beautifully with each other to form a single wall. At some point while I thought I was altering the dimensions of the shattered particles, I was actually applying segmentations to a nearby sphere, and in all three dimensions. The resulting cluster of particles, unlike the almost flat wall, looked more and more like a school or swarm the more I studied it. In pursuing the idea for the swarm, I began looking for different ways to manipulate the shape and the motion of the swarm, and discoveries were made in toying with **form•Z**'s other functions, such as how to control the effects of wind. The swarm then evolved conceptually into the living sandstorm that operates in the Desert Grave Museum space, a place of pixels and shifting impressions.

ACCIDENTS AND EXPLORATION

The term mutation itself conjures images of the biological, of spontaneous changes in a gene pool, of "error." When designing in a digital environment, instead of visualizing the end product and then working to draw or model it, the creativity lies in formulating combinations of effects and discovering the results, then differentiating between the more and less successful experiments. More and more designers are defining the design process as "finding" something or some combination of elements, rather than creating something "new" from scratch. A geometric multiplication of formal possibilities occurs with the combination of merely two functions, and many more than two functions may be utilized at one time. The element of chance is firmly re-introduced when digital experimentation derives forms outside of the visual library of the designer's mind.

The Furnimals concept originated with a folder of snapshots I was keeping on the side just because I liked the way they looked. I had been experimenting with rendering several different lighting schemes for a cluster of bubbles "growing" from the corner of a room, like beanbag chairs. I grew to appreciate the look of the first rendering pass which left its tell-tale trail of red dots in a pattern that emphasized the dimensions of the bubbles, and realized that

if I paused the rendering, I could grab screen shots of my images coated with dots like chocolate nonpareils. The quest to find digital fur began with the observation of this "by-product" of the rendering output process.

In another situation, while setting up an animation for the desert sequence, I placed a camera inside one of the clear, reflective glass bubbles to capture the warped view of the other bubbles passing outside the sphere. Only when I watched the animation did I realize that a shattering disk moved through my selected bubble just as it was shattering. The marvelous cascading effect gave such a strong impression of passing through the cloud of fragments; I then worked to amplify this effect in the animation.

Another benefit of the digital sketching process is the ease with which the designer can render, save, label, and organize snapshots of their work and of each particular set of variables used in order to map the progress of the project for later reference and recombination. And just as with a digital camera, one feels free to experiment in a three-dimensional digital space. With the camera, one is not afraid to waste film or money on developing bad shots, and one is more likely to take a risk to capture something unusual. 3D digital design also permits the designer to take risks, or rather take advantage of a chance opportunity, with the safety net of always being able to return to the previous iteration of a design if the result is unsatisfactory. The rapidity with which the designer can see the re-

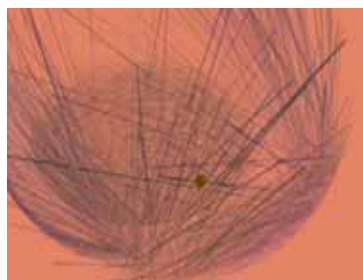


Figure 2: The Nest.

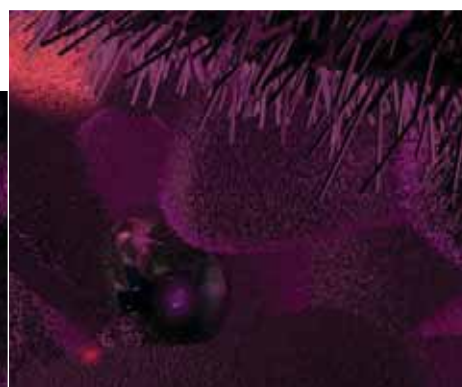


Figure 3: Furnimals: Breathing furballs suspended in space (pseudo-animals) and visceral comforts in a dark universe translate into home, protection, and self-reflection.



Figure 4: Lanternlantern: This animation puts the viewer inside a variation of Chinese carved ivory balls within balls and explores light effects. Rotations and strobe flashes mimic the workshop's trials and inspirations.

sults of these experiments leads to a multiplicity of "tests" and, we hope, broader formal explorations.

Additionally, the images saved from one's very first explorations tend to serve as a helpful reference later in the design process, and sometimes designers return to them when they feel they have lost touch with a project's essence as a record of their freshest interpretations of the design problem. An entirely overexposed rendering from one of my early radiosity experiments became the launching pad for the bleached-out, glaring white sun of the desert space. In this case the lighting mistake became a concept only after reviewing old screen shots with my professor's second set of eyes.

EXISTING CONTEXT

The Formal Mutations Studio's emphasis on starting with an existing structure (Eduardo Chillida's Mount Tindaya project) and manipulating it, rather than "inventing from nothing" proved particularly effective as it relates to the study of interior architecture, with its emphasis on renovation. Starting with "something" becomes just the type of limitation or frame that drives the most creative problem solving. Establishing certain restrictions effectively narrows the field of possible solutions to help focus the designer's attention more intensely on the remaining possible solutions. A set of "rules" or parameters gives the designer something to toy with in her mind rather than a great blank page to fill.

In the case of the Mt. Tindaya project, I was most attracted to the fact that there has been no structure built to "house" this interior space; rather it has been carved out from an existing mountain of rock. With this idea in mind as the "nugget" of what Tindaya was about for me, I went on to

develop my digital home, workshop, and museum spaces with one prominent shared element in common. Each of the spaces floats or hovers in a vast and mostly empty environment. Here the relationship between the original structure and the resulting variations is very strong and serves as an excellent example of how a design solution can easily emerge from the essential nature of an existing space.

Many designers today view the careful consideration of context as essential to any successful and meaningful project. Digital design tools throw the relationships between design and context into strong relief. In contrast with traditional rendering methods, digital designs are not born with any given conditions, such as the light in the designer's room or the space of her work area. The digital environment begins as a complete tabula rasa, for which the designer is forced to consciously select every element of their manufactured world, from the textures of the building materials to the quality of light and the topography of the building site itself. The following paragraph summarizes writer and philosopher Alan Watts' thoughts on the interdependence of objects and space:

"We supposed that solids were one thing and space quite another, or just nothing whatever. Then it appeared that space was no mere nothing, because solids couldn't do without it. But the mistake in the beginning was to think of solids and space as two different things, instead of as two aspects of the same thing. The point is that they are different but inseparable, like the front end and the rear end of a cat. Cut them apart, and the cat dies. Take away the crest of the wave, and there is no trough."

Watts' ideas can easily be applied to our discussion of digital design. There is something about observing objects in digital space that seems to have an equalizing effect upon the two. Positive and negative spaces must be considered equally at each step. The digital world seems to make space more palpable. Nothing is assumed at the conception of a project, as the glaring blackness, the lack of ground, and the absence of any orienting objects at



Figure 5: A swarm of particles.

all forces the designer to construct a context, as well as its contents, from the start.

The blank, arid distance of the desert environment is broken by the presence of hovering translucent mirrors, viewable only from certain angles, just as mirages materialize in hot sands. Arrays of small particles in the desert call attention to the air nearest the viewer, which she might otherwise look straight through. The black night surrounding the Furnimals' writhing litter

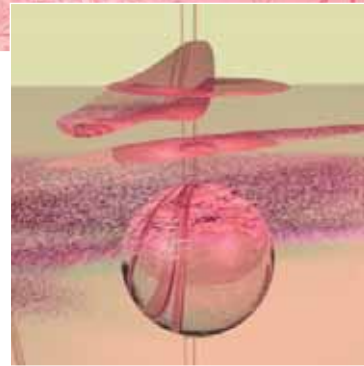
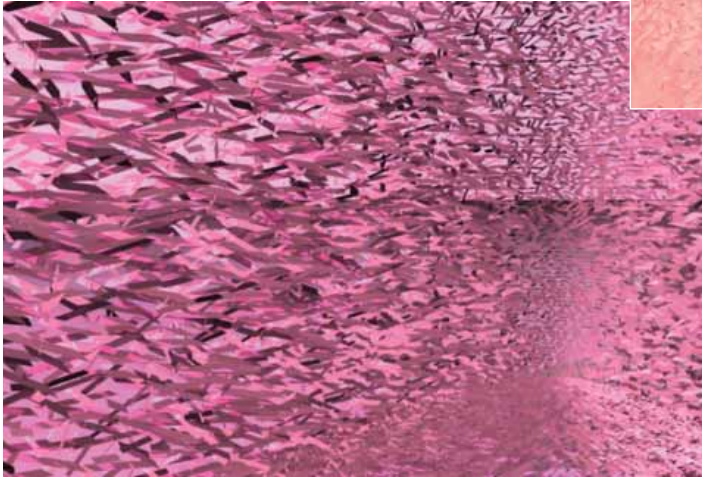


Figure 6: Desert Grave: A swarm of particles animates floating structures and demonstrates the ambiguity between hot and wet sensations in this museum. The viewer is lost in mirrors and sand, disintegration, distance.

gains depth and strangely, emptiness, when it is punctuated by a few glinting stars.

MOVEMENT

The animations a 3D digital program can produce cannot be underestimated as tools assisting in communicating the inhabitability of spaces – an absolutely essential element of architectural and spatial design. The manipulation of the camera gives the designer another level of control over the viewer's perceptions of the space. She determines the way the space is looked at as well as the nature of the spaces and forms, thus putting the viewer "inside" the project. The experience of the swarm descending as seen from inside a glass desert bubble, the shifting stenciled patterns of light passing over you as you hover between two rotating spheres that mimic Chinese carved ivory balls-within-balls, the feeling of nestling evoked by the constant "fidgeting" of densely-packed Furnimals surrounding the viewer on all sides – these are perspectives that are accentuated by animated movement through three-dimensional space versus a single rendered image from one point of view.

Movement is essential to the experience of architectural space. Through movement, the viewer registers a series of sequential experiences and time is thus incorporated

as an element of the design. However, the study of statics has long been the focus of much architectural planning, even when the effects of dynamic forces on structure are in consideration. The goal has always been to maintain the stability of the structure in the face of the variable and the unexpected. The application of animation to architectural representation appears to have introduced the concepts of growth and change associated with living organisms into the design of building forms themselves, and also into the human progression through a building's voids. A new view of architecture emerges, one that emphasizes the transient and improvisational over the static and planned. Why couldn't the walls of a building consist of rotating spheres, throwing dappled light patterns inward on themselves, and reflecting the nature of the art of the photographer who works within? Why couldn't your home and furniture be made of living, breathing furballs that calm you with their slow, sleeping rhythm?

In focusing on the sequential progression through a space, the route or path, as well as the possible ephemerality, changes, and transformations of the structure itself (generated through digital manipulation) architecture may no longer necessarily be about monuments to eternity, in which the egos of men or the all-encompassing power of God is immortalized. A new view of reality as constantly shifting, contradictory, transitory, and fluid, supported by

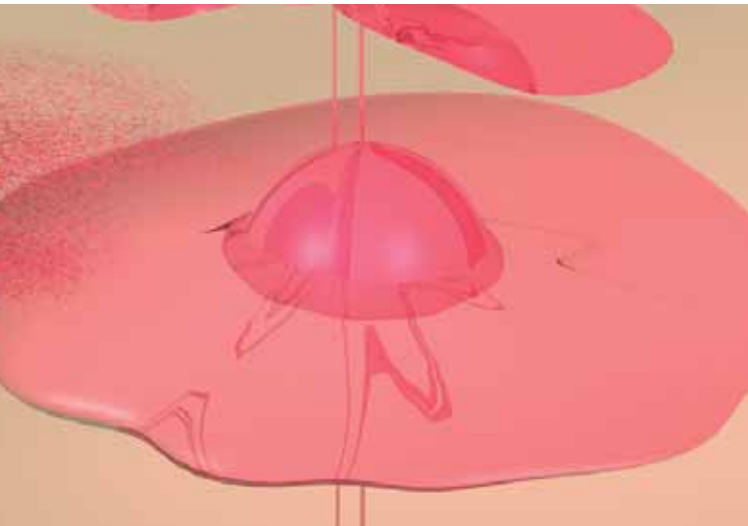


Figure 7: Animated transformations.

a physics in which light is both a wave and a particle with no fixed, observable location, has been growing in popularity and acceptance. Might such trends in physics and architecture be influencing, or influenced by, our changing conceptions of identity?

EVOCATION VS. DEFINITION

Overall, the students in the course produced a balance of work focused on both concrete and more abstract approaches to our design mutations problem. For my part, I took this class as an opportunity to work in a more abstract fashion than I had been able in my previous studios. Research for the project began with extensive lists of words conjuring associations, atmospheres, and sensations connected with my ideas about each of the three spaces. I see my designs as a series of moves intended to tighten the link between the conceptual and the real, and to translate visceral human sensory impressions and psychological metaphors into affective virtual habitats.

I could not resist the allure of “Impossible Architecture,” suggesting the dreamscape, or sensory experiences we cannot actually have in our reality, such as penetrating a

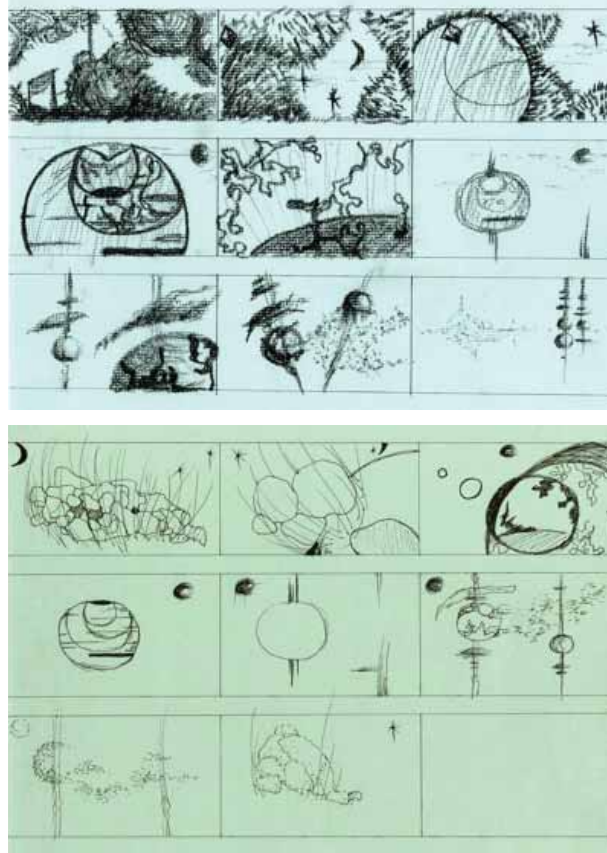


Figure 8: Storyboards.

glass bubble to enter its concave interior, the contrast of our ordinary viewpoint with the sudden shift to the warping of the curved glass. The ability to visualize so completely and clearly a design that defies the laws of gravity, structural requirements, and familiar material properties was like a window opening for me. In the history of innovation, most often the inspiration for something “new” comes first, based on a common need and a possible solution, and then the designers and engineers strive to figure out HOW to make this idea a reality. An optimistic view of digital design conceives of the computer environment as a new venue for the discovery of possibilities we can then work to materialize in the non-digital world.



Tara White holds a Master’s Degree in Interior Architecture (M.I.A.) from the Rhode Island School of Design (RISD) and a Brown University Graduate Teaching Certificate. She currently works for Abernathy Lighting Design in North Providence, RI. Tara completed her undergraduate studies in art history at Yale University, focusing on documentation as meditation in the work of several conceptual artists of 1960’s and 70’s. She has participated in international studio/study programs in St. Petersburg, Russia, Kyoto, Japan, and Dubai, UAE. She has exhibited in the RISD Graduate Student and Graduate Thesis Exhibitions (Providence, RI, 2007), the Hermitage Museum’s International Student Show (St. Petersburg, Russia, 2005), two Yale University Undergraduate Painting Exhibitions (New Haven, CT, 1994, 1995), The Yale University Women’s Center Drawing Competition Show (First Prize, 1994), and the University of the Arts National Awards Exhibition for Metalwork and Jewelry (Philadelphia, PA, Blue Ribbon and Gold Medal, 1991). Her interests include art and architectural writing, as well as reading and writing fiction (2nd Prize, RISD All-School Fiction Competition, 2006), architectural lighting and luminaire design, photography, food, lists, Japanese Shinto Shrines and bathhouses.