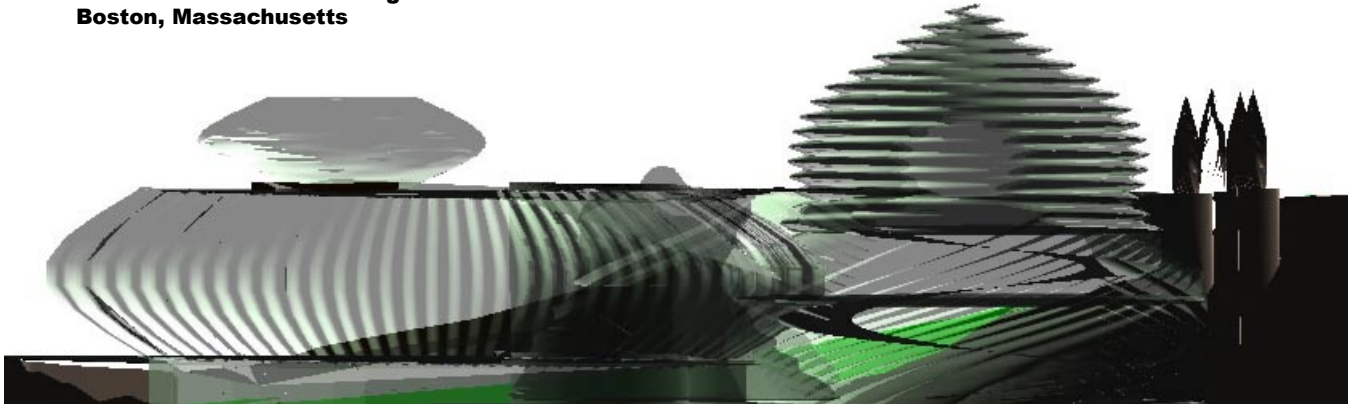


# Underworld Form Exploration

A Studio Diary

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*Dancer: o you transposing  
of all transience into stepping: how you presented it!  
And the whirl at the close, that tree out of movement,  
did it not take full possession of the hard swung year?  
Did not its crown, that your swinging of a moment ago might  
swarm around it, suddenly bloom with stillness? And above,  
was it not sun, was it not summer, the warmth,  
that immeasurable warmth out of you?*

Second Part, Sonnet 18, Rilke's Sonnets to Orpheus

## Studio Project

In Fall 2009, I participated in Concrete Thinking, a graduate level architectural studio at the Boston Architectural Center, taught by Kevin Losso. The project for the studio was a concrete crematorium in Cambridge's historic Mount Auburn Cemetery, replacing the currently existing building on the site. Students began the design process by reading Rilke's Sonnets to Orpheus and individually selecting passages we found inspiring. Next, we distilled imagery from these passages.

## Concept and Technique

I limited myself to the use of silhouette, color, and gradient for this exercise. I felt that the subject matter lent itself to a high degree of abstraction. I explored the ideas of expressing the movement of dance in still graphics and the metaphor of the "tree out of movement." The silhouette in front of the evergreen is of the yoga "tree pose." The rays and glows express the idea of a dark radiance from a negative, or shadow. The dancers are absent. In choosing the silhouettes, I realized that in order to demonstrate motion in a still image, poses had

to be unsustainable without momentum. I attempted to express the spinning movement in a succession of still graphics, without the use of motion blur. The fading rows of silhouettes become more ghostly as they recede. A spin can resemble stillness by either "spinning to a stop," or by appearing to stop by spinning more quickly. Another graphic explored the idea of a "tree out of movement," with the ephemeral positions of a spin creating the metaphorical branches. A final image explored an alternate interpretation of the text, representing the "tree out of movement" as the maypole. The finished, bare pole at the center of the image separates one of the dancers from the rest, foreshadowing the approach of death within this fertility rite.



Figure 1



Figure 2



## Site Analysis and Use

The new crematorium would replace the pre-existing sixties-era crematorium on the site. The site occupies a hill above the cemetery entrance. I chose to create an entry sequence from the back of the forested hillside in order to utilize the interior space of the hill. A semi-concealed entrance and its implied privacy was appropriate to the memorial program. The new crematorium will be visible both behind the trees and more dramatically at the crown of the hillside.

Based on my initial poetic inspiration and concept, I wanted to create a processional sweep through the program that ended with an ascension toward natural light. The interior was designed to represent the movements of an absent dancer, expressed within the negative space left by her passage. These decisions were also influenced by precedent analysis of the controlled use of light and dark in several ancient, sacred spaces including the Temple of Amon at Karnak and the Lycaean Tombs of Myra, Greece. The natural box canyons of the American Southwest (such as Zion Narrows) were another inspiration. Many people find these natural canyon spaces both soothing and inspirational.

The site design concept depends on controlling sources of natural light from the side and from above throughout the memorial procession. The original site and processional concept sketch is shown below. Mourners enter through the back of the hillside behind tall evergreens through an indirectly side-lit and top-lit memorial space, and then proceed through a narrowing transitional space. Next, the more private crematory area below is encountered indirectly and entered by family members and close friends, if desired. Then the mourners ascend a spiral ramp that parallels the upward path of the smoke and commemorates the path of the life of the deceased along the way. Vertical transportation to each level of the ramp provides accessibility to those with mobility impairments as well.

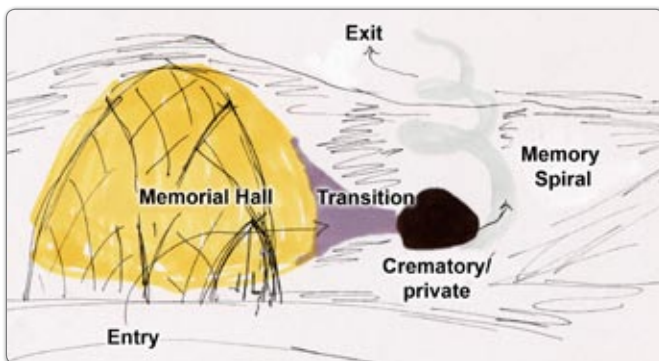


Figure 3



- Site Boundaries
- Entry from Mount Auburn
- Upper Entry Sequence to Site
- Lower Entry Sequence to Site

Figure 4: Mount Auburn Cemetery. Existing Site Entry Diagram.

## Form Development

Based upon my site observations and original sketch explorations, I decided to pursue the “absent dancer.” I sketched many different static poses within dance choreographic sequences (example, figure 5), which leave an implied negative space imprint by their motions (figure 6). I also wanted to try a slightly more formal and three-dimensional exploration by photographing a wooden figure model (figure 7). Then I decided that I would be better off trying to explore my concept using 3D modeling, due to the difficulty of complete representation of a mostly submerged negative space via conventional hand techniques at this stage.



Figure 5

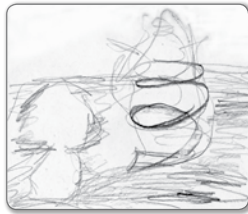


Figure 6



Figure 7

I used form•Z Macro Transformations of models and images of dancers to see what sort of negative space could be created via translation and rotation of figure models. In the end, I chose the more literal interpretation of that negative space of a single dancer for the project, however, this was part of my process of exploration.

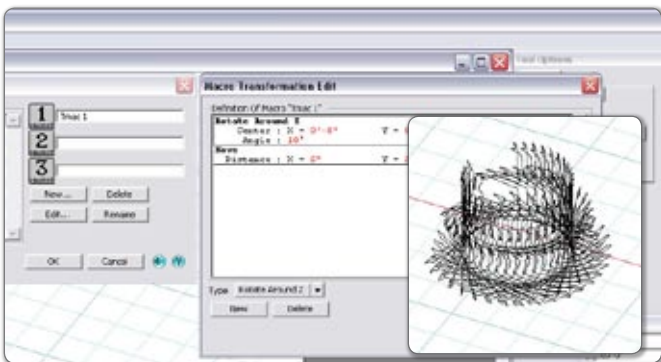


Figure 8: Applying Macro Transformation in form•Z.

Below is a SketchUp massing draft model I made quickly based on a CAD file containing topological information and a base file showing site boundaries and paths on the ground plane. The goal was to discover how a building might interact with the topology, and to illustrate for myself the spatial boundaries of the hill given my project's scale. I also performed a daylighting and orientation analysis using the massing model.

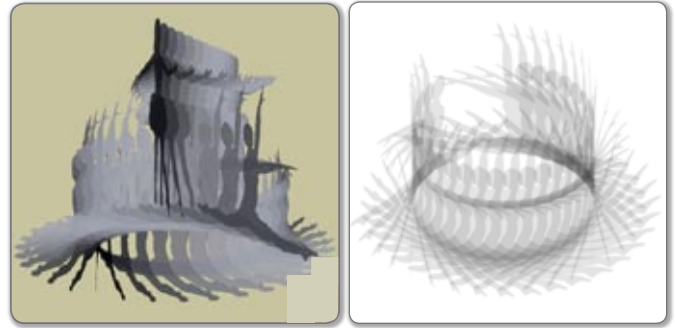


Figure 9

The macro models gave further inspiration to carve the fine movements of the dancer and her costume upon the concrete walls in fine detail, which would lead to a striated model similar in texture and in spirit to Zion Narrows canyon (Figure 10). Once I determined the choreographic sequence, the volume of the hillside site, and the finely carved, curvilinear spatial concept for the model, I realized that I would need the complex modeling capabilities of form•Z with its meshes and deform tools.



Figure 10: The Zion Narrows canyon.

(Image from: <http://justinsomnia.org/2007/10/penetrating-the-virgin-narrows/>)

The next step for the project was to create basic plan boundaries in AutoCAD following the topological boundaries of the hillside. The basic plans were then extruded and exported to form•Z for further alteration to fit the topography, to create the desired continuities among the plan shapes, and to begin to create nuance in the forms.

Each cylinder, cone, or extrusion was altered using the deform tool to better fit the site and the project concept. The typical deformation process used first a bulge, then a linear wave, a horizontal or vertical disturb, then a shear and/ or twist. The process required many iterations in order to create the proper effects, interactions among objects, and correct degree of exposure from the site's topography. There was also an additional revision to accommodate specific information about cremation equipment, programmatic refinement, and code requirements.

The next segment of form development was spent exploring ways to use the form•Z deform tools to modify my basic shapes to fit my concept and to express the negative space of the absent dancer, as well as the nuanced striations and lighting of narrow stone canyons.

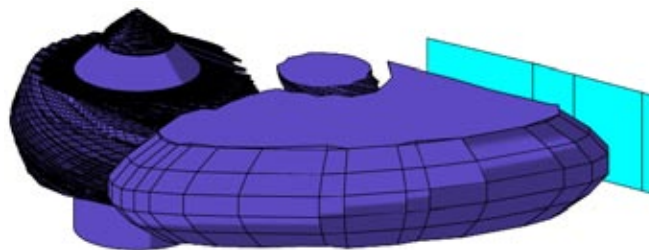


Figure 11

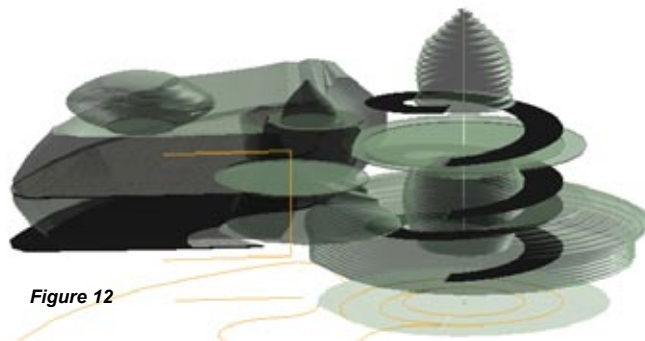


Figure 12

The tools were generally used in the order of bulge, taper, linear wave, and then twist or shear. Altering the magnitude of the deformations or the order of operations achieved different effects.

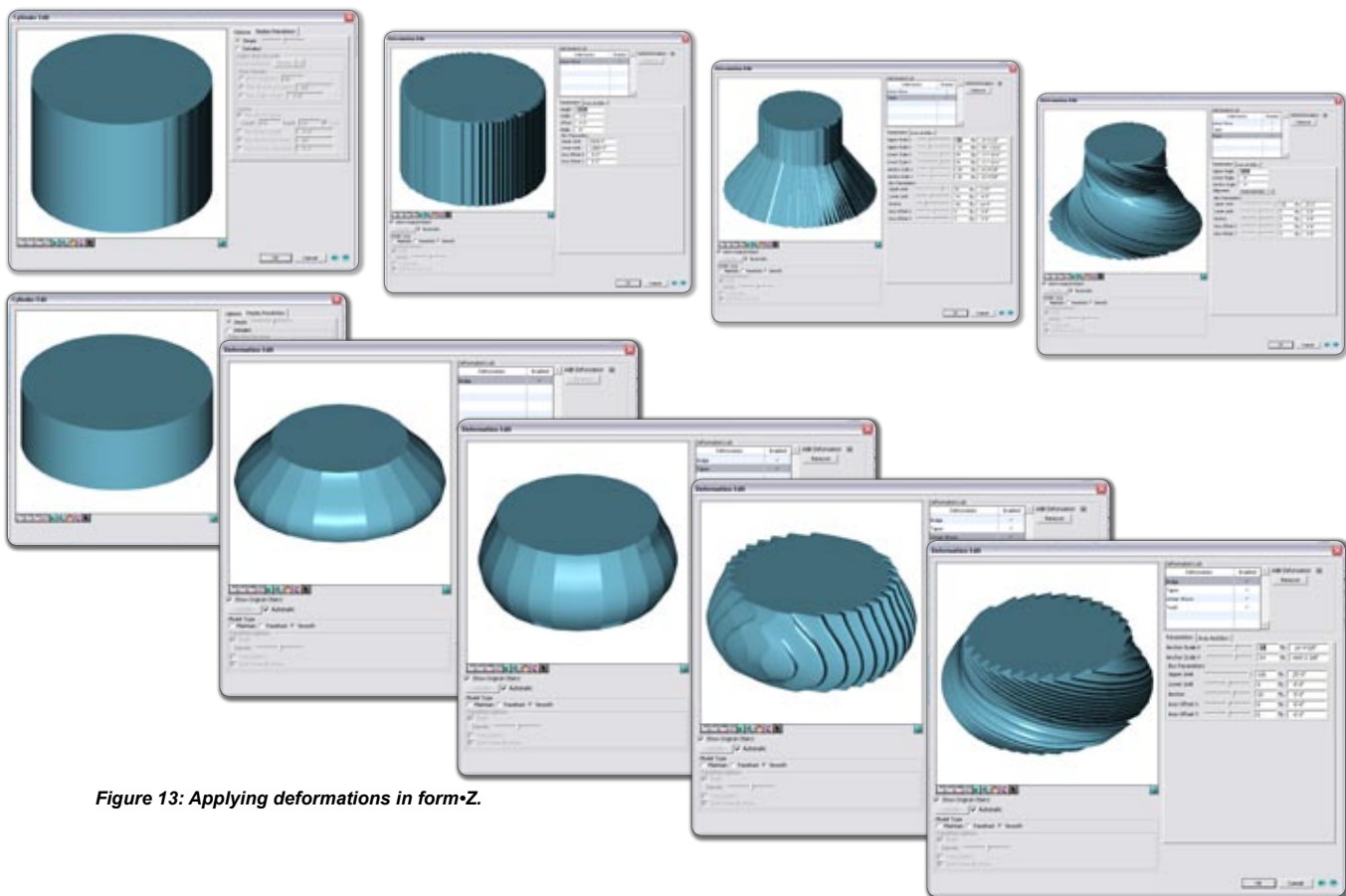


Figure 13: Applying deformations in form•Z.

## General

The below ground portion of the crematorium will be constructed of ferrocement, with a wire mesh reinforcing frame that will be coated with concrete mixture from both sides by masons. The handcrafted nature of the construction process allows for hand-texturing and for the detailed variations in striation as modeled. Structural steel reinforcing back-up can be provided behind the concrete if necessary, before earth is backfilled around the project. Above ground portions of the project can either be curtainwall with steel, or reinforced concrete with cast-in frames for frequent glazing panes. Figure 14 shows the construction process of an above-ground ferrocement house by Gregorio Vittorio (image from *Ferrocement: building with cement, sand, and wire mesh*, Stanley Abercrombie, 1977).

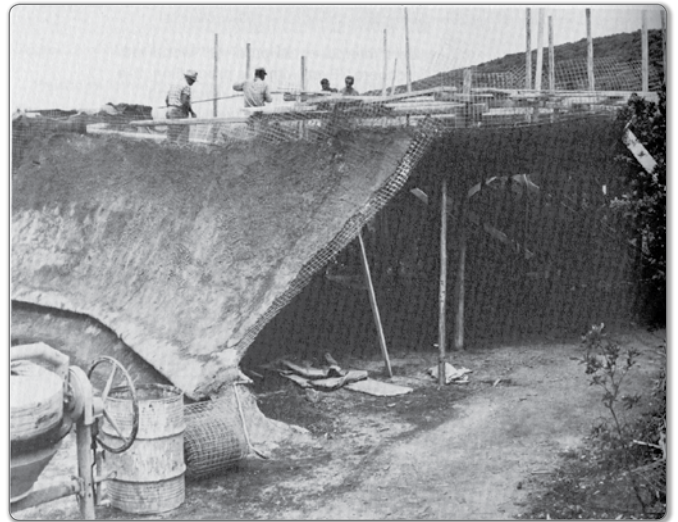


Figure 14: The ferrocement construction process.

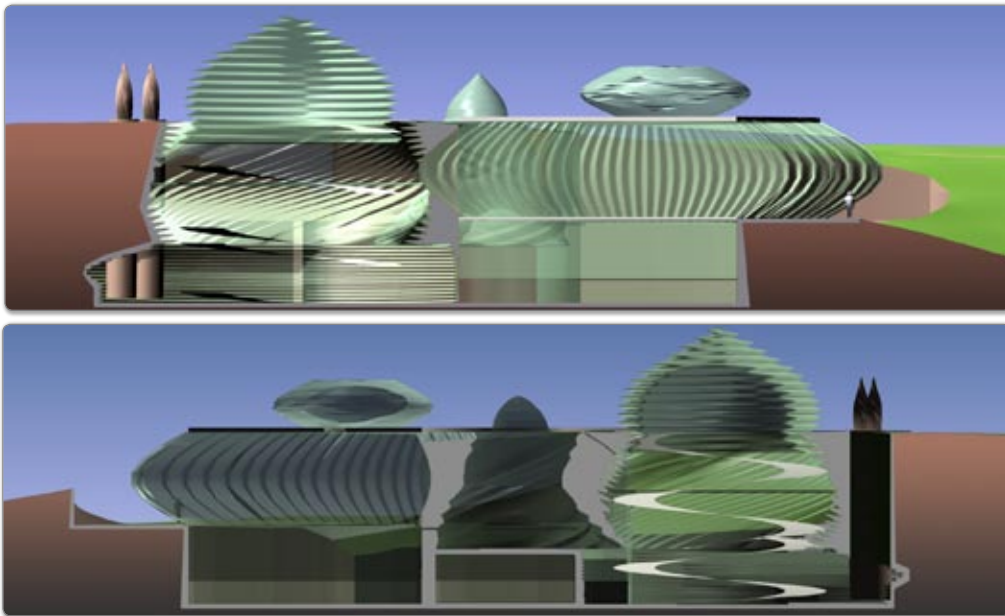


Figure 15: Sections.



Figure 16: The building on the site.

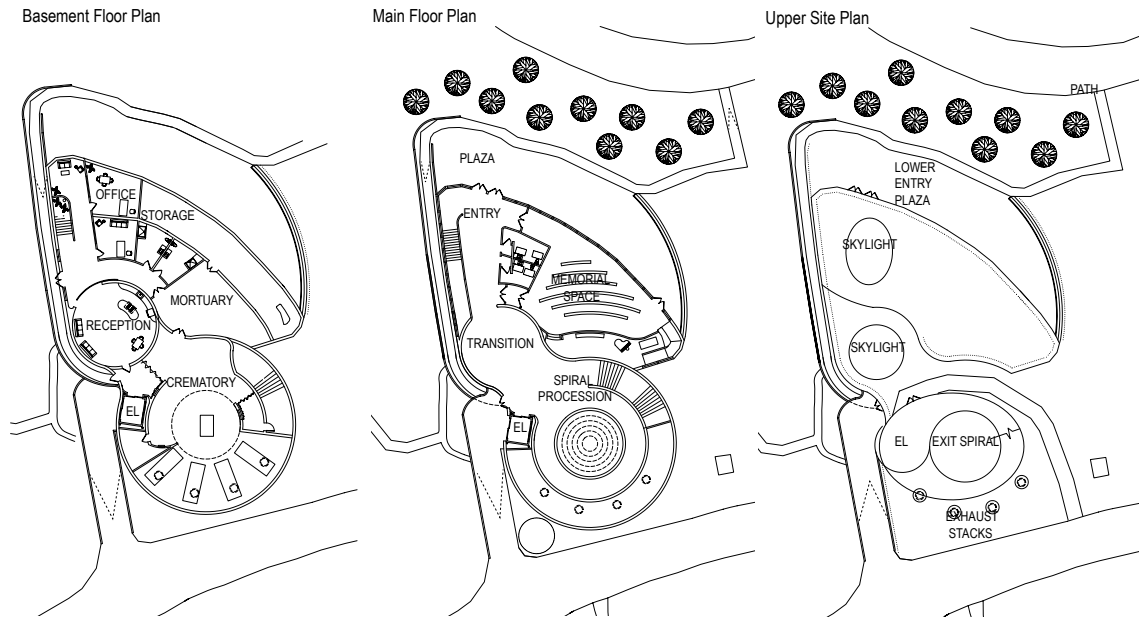


Figure 17: Plans.

The plans above show the programmatic requirements. The basement level includes a staff area comprised of offices and administrative spaces, a mortuary, and four cremators. There is also a private reception or gathering space. The main floor has an outdoor plaza, a memorial hall, and a transitional space that leads past the private cremation area below and up a ramp, along which the timeline of the life of the deceased can be commemorated through images, with gatherings of friends from each time period, and through reminiscence. Mourners exit toward the sunlight at the top of the spiral path.

The interior rendering (Figure 18) illustrates the transient path of the absent dancer carved into concrete and shows the spiral of the memorial ramp proceeding upward toward the light. The rendering demonstrates how the project receives light from above during the day, while at night it emits light from below. It is never passive or completely dark.

The crematorium combines both fantastic and constructible elements of design. It incorporates manmade and natural sources of inspiration to synthesize a new and unique memorial service based within a physical procession through the space.

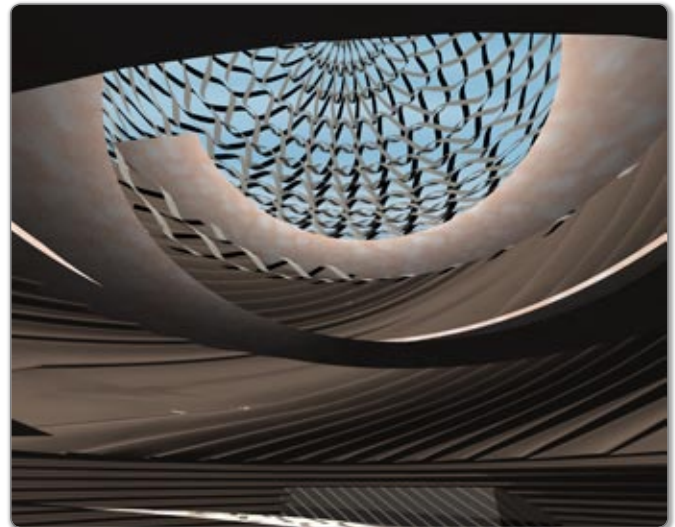


Figure 18: Interior.



**Tamara Suderman** graduated from Amherst College in Biology and has been pursuing a Masters of Architecture at the Boston Architectural College with a personal focus on sustainable design and urban agriculture. She is a LEED Accredited Professional who has worked at a major architectural firm in Boston for several years, in the biological sciences at Harvard University, and in the clinical biotechnology industry.