Department

Making the Invisible Visible

Gary Singh

For artist Victoria Vesna, nano art makes the invisible visible and the inaudible audible. Currently, she teaches in the Department of Design Media Arts at UCLA, where she also directs the Art | Sci Center and the California NanoSystems Institute. Her project Blue Morph (see cover image and Figures 1 and 2) is one of her adventures with nanotechnology exploring the ways in which Eastern perspectives might share mutual inspiration with the process of scientific inquiry.

With Blue Morph, it all began with yeast. In 2002, nanoscience pioneer Jim Gimzewski and his Ph.D. student Andrew Pelling discovered that yeast cells vibrate at a nano level. Pelling, already an audiophile, converted the vibration data into sound files, which produced haunting results. Vensa, who is also Gimzewski's partner, used the audio in various projects and the research wound up in several posters and papers presented and/or published around the world, to huge success, resonating with those in the fields of medicine, biology, media arts, audio engineering, and fringe spiritual esotericism.

"The press run was from nanoscientists to New Age people freaking out, like, 'Oh my God, this is the future of medicine,'" Vesna said.

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Then came the butterflies. After his success with yeast cells, Gimzewski used atomic force microscopy and optical beam deflection to extract raw data from the developmental stages of butterfly metamorphosis. He acquired data from vibrations of the caterpillar membrane, which his team then likewise converted to audio. They also captured imagery from both the surface and internal wing structure of the butterfly, all of which took place on a nano scale (see Figure 1).

Gimzewski's priority was not with the creative use of the data, so he gave Vesna the results and she ran with it. What started out as cutting edge nano research was now up for artistic reinterpretation.

"We got these incredibly amazing hi-res images, where you see that the blue is actually not pigment at all," Vesna said. "Our eyes are seeing that. It really blows you away. And then, on top of it, this butterfly's endangered. So it really became this layered thing of discovery, from thinking about the chrysalis metamorphosis, to the pigment, the nano-patterns that make us see certain colors, the Brazilian forest, nature, all of this just kind of layered on to this complexity texture."

To Vesna, butterflies were somewhat overused as a creative metaphor, so the next predicament was how to use the material in a unique interactive multimedia environment. She did not want to project audio and video from butterfly

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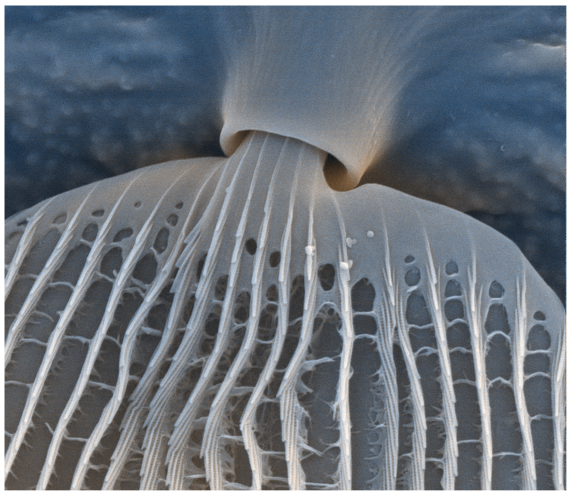

Figure 1. Wing structure of a butterfly.

metamorphosis into a gallery space so that visitors could simply walk in, enjoy the idea, and then leave. She needed to go deeper. As with many of her other projects, she turned to Eastern philosophy and meditation techniques for inspiration.

"Both of us practice kundalini yoga, and we started thinking, how about if you immerse people in the sounds of metamorphosis and these abstract images, so they're not necessarily thinking about the butterfly, but about their own metamorphosis," Vesna said.

As a result, Vesna developed an environment that worked in the opposite way that most interactive installations operate. Usually, a person's motion triggers the sound or visuals to do something in the space. A person moves more, and then more happens. Blue Morph works the other way around. In order to create a more meditative, contemplative experience, Vesna wanted people to sit on the floor, in the middle of the space, surrounded by lights and sound, so that most of the audio and visuals become active when the viewer is motionless. The interactivity is experienced depending on how much the person sits still and/or moves from their center. It almost becomes an installation triggered by meditation (see Figure 2).

Vesna debuted Blue Morph in 2007 at the infamous Integratron, an esoteric occult site in the Southern California desert built by Ufologist George Van Tassel. From there, the idea took many other forms. Vesna still installs Blue Morph in various spaces all over the world, metamorphosing the project as she sees fit, as the situation arises.

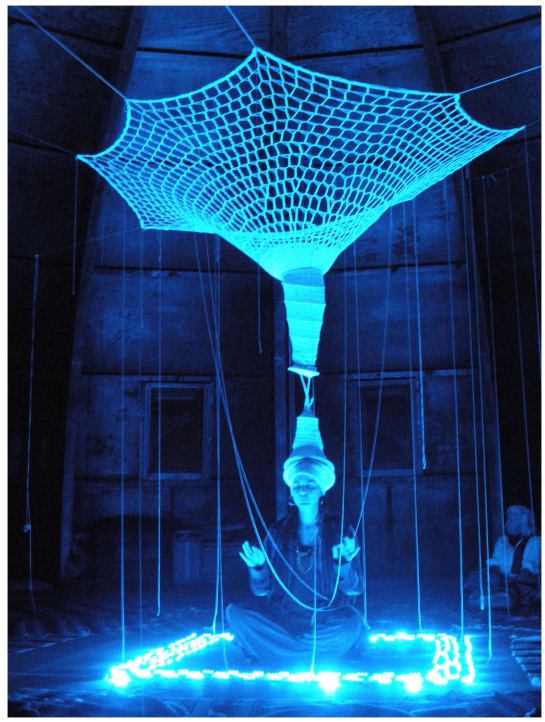

Figure 2. Viewer/participant experiencing Blue Morph at the Integratron, Landers, California.

"Wherever it goes, it takes on a different form, which is also part of the idea," Vesna said. "So depending on the space, the budget, the people, the vibration of the space, I work with it to create a different type of thing. I'm trying to do projects that have a life of their own."

Another one of Vesna's projects, Nanomandala (see Figures 3 and 4), likewise took on various forms, in this case, Buddhist impermanence. At the Los Angeles County Museum of Art, Tibetan monks spent days making a multicolored sand mandala eight feet in diameter—a project designed to be ritualistically destroyed, illustrating the transitory aspects of life. Once they finished it, Gimzewski captured video of the completed mandala. He also brought the monks into his lab so they could recreate the center of the mandala, after which he then used a scanning electron microscope (SEM) to zoom in on the molecular structure of single grains of sand (see Figure 3).

Then, later, for Vesna's installation in the museum, a pool of white sand was placed into a gallery space, allowing visitors to walk up and

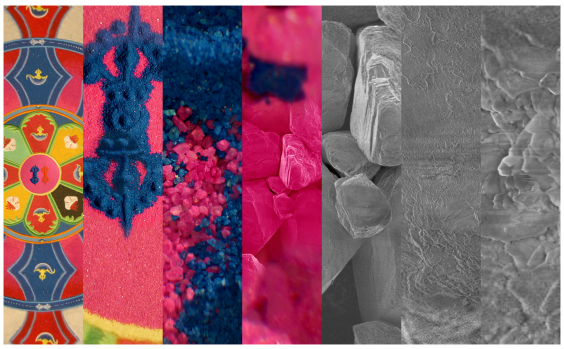

Figure 3. Zooming in on a sand mandala, from several feet in the air all the way down to the molecular level.

touch the sand while video projections dropped onto the installation, that is, video of the original multicolored Tibetan sand mandala, but in a continuous evolving scale from the molecular structure of a single grain of sand to the recognizable image of the completed sand mandala, and then back again. In other cases, dancers even improvised with the video projection (see Figure 4).

As an artist, Vesna perceived a similarity between the meticulous patience of the monks creating the sand mandala and the meticulous patience required by Gimzewski as he manipulated information the atomic level. Complex views of the world thus emerged from both Eastern and Western perspectives.

Although some scientists bristle at the mention of anything "Eastern," Vesna said her collaborators are different. Ultimately, as the earth gets dragged into oblivion, she said, it is about changing our value systems and finding common ground.

Figure 4. Dance performance improvising with the nanomandala projection.

"If somehow, artists and scientists can contribute to changing the perception of what's important and what's valued in life, that's really the key," she said. "Scientists are important to participate in this discussion because they have the facts. They can actually show that this is the way it is, and give it some solidity. Otherwise it's: 'Oh, you're just a crazy artist.'"

Gary Singh lives and writes in San Jose, California. Contact him at http://www.garysingh.info/.