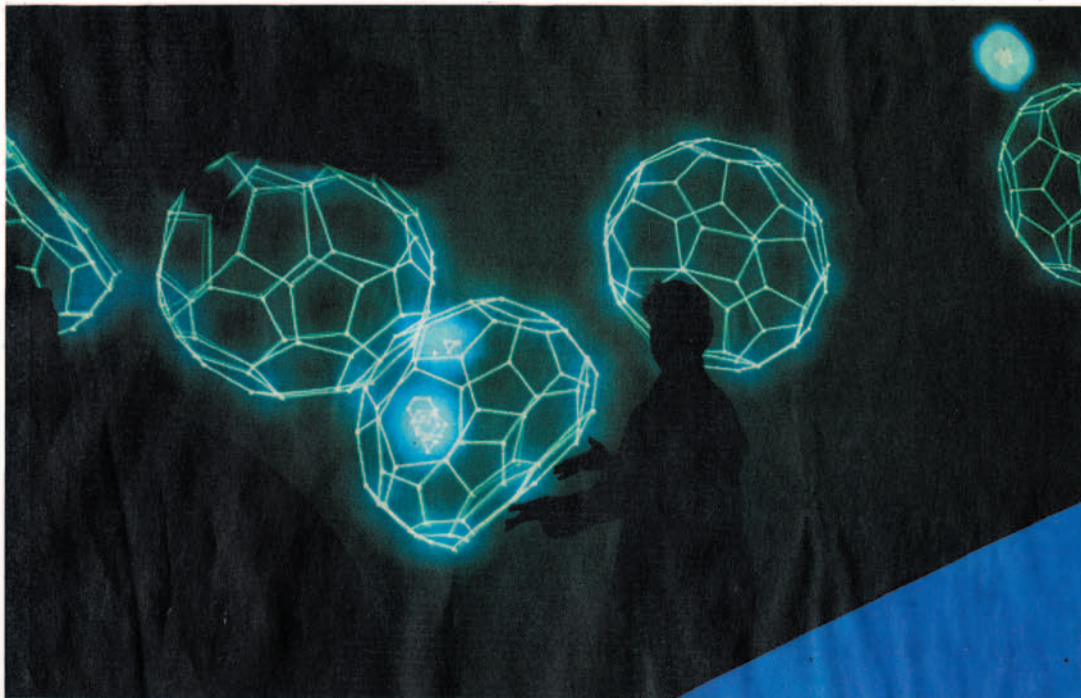


Los Angeles Times

# CALENDAR

Monday, December 22, 2003



RICK LOOMIS Los Angeles Times

**INNER CELL:** Shimmering projections of helical carbon-60 molecules flutter on the walls in the centerpiece of LACMA's new "nano" exhibition.

## ART REVIEW

# A quantum leap

The brave, new 'nano' world is explored in a multidisciplinary exhibit at LACMA.

By REED JOHNSON  
Times Staff Writer

**W**HEN William Gibson's sci-fi novel "Neuromancer" was published in 1984, it seized the popular imagination with a dazzling and dark new concept: "cyberpunk." Gibson's vision of a future society populated by noir characters that are both empowered and enslaved by cutting-edge technology crystallized the hopes and fears of the dawning "virtual reality" era.

Now, another form of technology — nanotechnology — is burrowing its way into art, literature, design, architecture and popular culture. It is searching for a set of metaphors to help illuminate it for a lay audience — maybe even an ur-text like "Neuromancer"

that would give it instant cultural cachet. So far, the leading candidate is Michael Crichton's scary best-seller "Prey," but you could just as easily go with "Alice's Adventures in Wonderland," "Gulliver's Travels," Virginia Woolf's "The Waves" or maybe Dr. Seuss' "Horton Hears a Who!" Some even predict that a "nanopunk" aesthetic will replace "cyberpunk" as the futuristic flavor of the day.

That future is probably decades away. At present, nanoscience — the manipulation of individual atoms to rearrange matter — is practically as much theory as fact. But a just-opened exhibit at the Los Angeles County Museum of Art is taking a bold first step into a brave new world [See 'nano,' Page E8]

# In nano art, believing is seeing

[*'nano,' from Page E1*]

where a handful of scientists, artists, architects and academics has begun swapping ideas about nanoscience and its potential to reshape art, language, human behavior and the way we perceive reality.

If LACMA's exhibit is difficult to describe in words, it's certainly timely. For roughly the last half a dozen years, the pop-culture buzz around nanoscience and nanotechnology has been slowly building. Eddie Bauer shoppers may be vaguely aware that their new "Nano-Care" cotton chinos have been treated at the molecular level to resist wrinkles and make it easy to sponge away pesky salad-dressing spills. Some cosmetics makers are using nano-engineering to develop sunscreens. Newspapers and magazines carry stories about microscopic machines that will scrape plaque from human arteries and course through our bodies, battling diseases.

Richard Feynman, the Caltech physicist credited with anticipating nanoscience in a famous 1959 speech, "There's Plenty of Room at the Bottom," has become a cult figure. A cluster of sci-fi novels, including "Prey" and Greg Bear's "Blood Music" (1985), have imagined the consequences of nanotechnology run amok. Crichton's book spins out a blood-chilling scenario in which tiny self-replicating robots turn on mankind.

And in perhaps the most telling sign that nanoscience has penetrated public awareness, Congress is expected to soon

send a bill to President Bush to launch the National Nanotechnology Coordination Office and authorize a \$3.7-billion, four-year funding plan for research and development, according to a report in the New York Times.

"I think that people who write about nanoscience and nanotechnology emphasize its tremendous transformative potential, that this is a kind of science that has the potential to transform the conditions of everyday life," says N. Katherine Hayles, a UCLA English professor who helped put together the exhibit, which is simply called "nano" (from the Greek word for "dwarf").

That "transformative potential" is immediately obvious in the unusual nature of the exhibit itself. Museumgoers expecting displays of art "objects," each neatly summed up by a nearby wall didactic, are in for a shock. Instead, the installations are interactive, conceptual art pieces that give physical expression to what are still mainly abstractions. They are intended to suggest — rather than to try to represent — a world that is invisible to the naked eye. After all, how do you represent something that is one-billionth of a meter, or  $1 \times 10^{-9}$ ? By comparison, a human hair is about 50,000 times thicker.

But while nanotechnology is more "a future possibility rather than present actuality," it already has become "a potent cultural signifier," according to a synopsis of a forthcoming collection of essays edited by Hayles,

"NanoCulture: Implications of the New Technoscience." In one of those essays, Hayles writes that LACMA's exhibit "takes as its throughline the idea of scale intrinsic to nanotechnology and nanoscience, creating playful interactions designed to give visitors experiences suggestive of what it would be like to be a nanoparticle subject to quantum forces, wave/particle dualities, and atomic and molecular interactions."

That may sound daunting, but the exhibit is designed to be informal, nonintimidating and, well, fun. Imagine Alice falling down the rabbit hole and swigging back that bottle labeled "Drink Me," and you'll have some idea of the fanciful, mildly disorienting environments the designers wanted to create.

The show's centerpiece is the Inner Cell, a walk-in installation that allows visitors to imagine that they're roughly the same size as carbon-60 molecules, which were discovered using nanotechniques and which have proved to be remarkably tough structures highly effective at conducting electricity. Inside the cell, infrared motion-detection devices track visitors' movements across a hexagonal-grid floor that appears to undulate. Shimmering projections of the helical carbon-60 molecules — nicknamed "buckyballs" (after the geodesic theorist R. Buckminster Fuller) — flutter on the surrounding walls and can be pushed, squeezed and flipped like beach balls by visitors' shadows. The entire installation sug-



gests a 21st century Coney Island funhouse as designed by Arthur C. Clarke. Call it "Honey, I Shrunk the Curators!"

The Nanomandala is a projection, on a circular sandbox, of a sand mandala — a symbol-laden diagram representing human and cosmological unity — that was created by Tibetan Buddhist monks for a separate exhibit at LACMA East. By shifting from wide, bird's-eye views of the entire mandala to the tiniest details of its brilliantly colored surface, it invites viewers to contemplate nature's astounding sense of proportion and balance, from the vastness of the cosmos to the infinite abundance of a handful of sand.

A third installation, Quantum Tunnel, uses cameras and microphones to create fractured sound loops and images that mimic the journey of electrons through a barrier. The tunnel's reflective floor may put some visitors in mind of Lucas Samaras' "Mirrored Room" (1966) at the Albright-Knox Art Gallery in Buffalo, N.Y., which also plays with ideas about how matter and even human identity can be sampled and splintered into a virtually infinite range of possibilities.

"I think the operative notion here is metaphor," says Carol S. Eliel, curator of modern and contemporary art at LACMA. "I think it's possible to walk into the Inner Cell or into the mandala space and to have an experience that's comparable to going and looking at a picture in LACMA East. It can be an incredible aesthetic pleasure that happens to use new media as its means, but it's not going to be about the media per se."

Robert Sain, director of

LACMALab, the museum's in-house think tank for research and development, says the "nano" exhibition dovetails perfectly with the lab's mission to provide "an environment where the visitor creates their own experience through whatever it is they encounter... If we're in the business of anything, it's about asking questions — and not providing answers."

The unusual cross-disciplinary makeup of the exhibition's design team reflects this wide-open approach. All told, the project involved more than 30 people from LACMA and LACMALab; the multidisciplinary SINAPSE (Center for Social Interfaces & Networks Advanced Programmable Simulations & Environments) at UCLA; and the L.A.-based architectural firm Johnston Marklee & Associates. The California Institute of Technology lent additional brainpower in designing some of the exhibit's installations, which were masterminded by James K. Gimzewski, a pioneering nanoscientist and UCLA chemistry professor, and Victoria Vesna, a new-media artist and chair of UCLA's department of design/media arts.

Gimzewski says that while the conventional view of how the world works is based on Newtonian physics — a machine-like model that is used to explain everything from planetary motion to the spread of viruses — understanding the nano world requires a different model. The nano model, heavily informed by quantum mechanics, emphasizes the importance of interconnectedness — among molecules in the human body, between auto emissions and the ozone, all the way from a strand of DNA to the entire universe. (In "Prey," Crichton observes that the "human body is actually a giant swarm. Or more precisely, it's a swarm of swarms, because each organ — blood, liver, kidneys — is a separate swarm.")

The application of this model, Gimzewski says, encourages a blurring of the traditional divisions between science and art. "Increasingly, we live in a world

where technology and culture are, for better or for worse, no longer separable concepts," he says. "And nanotechnology ultimately is part of that."

The rise of nanotechnology parallels other rapid developments in the fields of computer science and digital media, Vesna says. For some time in these fields, the philosophy that "seeing is believing" has been under assault. Other means of perception can guide our understanding of reality — for example, the scanning tunneling microscope, which "sees" by using a kind of mechanical feeler, "much like a blind man reading Braille" (as Vesna and Gimzewski write).

LACMA's hands-on installations underscore the idea that the nanoworld also must be accessed by means other than sight — a fairly radical notion for an art museum to promote. "The idea of feeling before you're seeing is such a huge paradigm shift in our visual culture, where we judge everything and everybody by what we see," Vesna says.

Ultimately, Hayles says, by creating a new language and fresh metaphors, nanoscience will stretch our perceptions of meaning and reality, just as art and science have always done. It was, she points out, the English Romantic poet and artist William Blake who famously challenged Newton's mechanistic view of the universe, who mused about seeing "eternity in a grain of sand / And a heaven in a wildflower" — an eloquent, pre-nano paean to the god of small things.

## 'nano'

**Where:** Boone Children's Gallery, LACMA West, Los Angeles County Museum of Art, 5905 Wilshire Blvd.

**When:** Noon-5 p.m. Mondays, Tuesdays, Thursdays; noon-8 p.m. Fridays; 11 a.m.-5 p.m. Saturdays, Sundays; closed Wednesdays

**Ends:** Sept. 6

**Price:** Admission to the exhibition is free

**Contact:** (323) 857-6000 or [www.lacma.org](http://www.lacma.org)