

# Genes on Display

## DNA becomes part of the artist's palette

By JOHN TRAVIS

**A** TIME magazine cover featuring geneticists Francis Collins and J. Craig Venter. The box for an adult videocassette, entitled "Designer Genes," showing a buxom blonde in a revealing lab coat. A comic book called "The New Mutants." One of James Watson's original wire-and-metal models of the double-helical DNA structure, which he and Francis Crick discovered. This odd assortment of objects, reflecting both genetics' history and its influence on culture today, greeted visitors this fall at Exit Art, a gallery in the heart of New York's Soho neighborhood.

The eclectic collection was part of the introduction to an art exhibit called *Paradise Now: Picturing the Genetic Revolution*. The show presented works by several dozen artists, all reflecting on genetics or biotechnology. It closed in October, but pieces from *Paradise Now* will go on display at other sites next year, and the exhibit remains on the Web (<http://www.geneart.org/pn-home.htm>).

Much of the artwork expresses concern about the so-called genetic revolution. Several works challenge the wisdom of using bioengineering to create foods—one painting depicts square tomatoes and six-winged chickens. Other works, such as a satirical video advertising a biotechnology mutual fund, question gene patents and biotech commerce.

"We barely knew what the genome was when we started [*Paradise Now*]. We did this show to, in a sense, wake people up," says Carole Kismaric. She and Marvin Heiferman, both New York curators, organized the exhibit.

Artists often comment on the issues of

their times. A more curious trend, reflected in the *Paradise Now* exhibit, is a small movement some people have dubbed genetic art. The artists in this genre have turned the tools of molecular biology into their paint brushes or chisels.

viewing at [www.kevinclarke.com](http://www.kevinclarke.com)).

"I do not arrive at this image by putting the person in front of the camera, rather, I allow the genetic depiction to refer to their physicality. This frees me to make the image with the person in mind. The

work becomes a visual elucidation of my musings about the person," writes the artist, who has a six-panel portrait in the *Paradise Now* exhibit.

The depiction of a subject's DNA starts with a blood sample, which Clarke sends off to a genetics laboratory for sequencing. The lab sends back a printout of the letters A, T, C, and G, which scientists use to signify the four building blocks of DNA.

Meanwhile, Clarke spends time with his subject to develop a sense of the person and come up with additional images for the portrait. In one work, Clarke superimposed part of the genetic sequence of a woman on images of floating balloons. In another portrait, he merged the genetic alphabet with a stylized photograph of a slot machine.

The Clarke portrait series chosen by *Paradise Now* has an additional connection to genetics. Its subject is James Watson, now president of Cold Spring Harbor Laboratory in New York. The series of pictures shows empty laboratory shelves, slowly collapsing, with Watson's DNA sequence written on or above them.

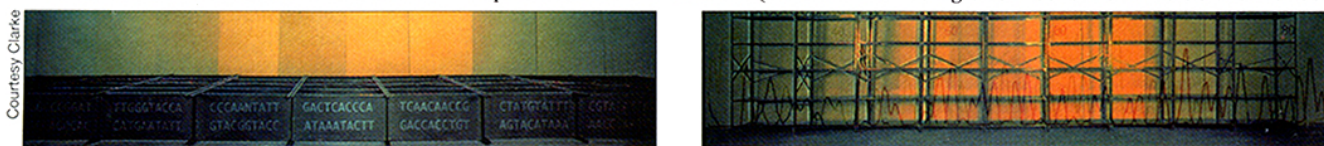
Clarke says that his portraits "focus on the invisible" and "contradict notions of biological determinism." He's now working on a Web site that would allow visitors to manipulate images of their own DNA or chromosomes, which they would supply by plucking a few hairs or swabbing a few cells from inside their cheek



Steve Miller's "Genetic Portrait of Isabel Goldsmith," 1993.

Some use techniques of geneticists or collaborate with them to produce portraits containing depictions of chromosomes or DNA sequences. Others have drawn upon living organisms, including genetically modified bacteria and cloned trees, to express themselves.

**S**lightly more than a decade ago, veteran photographer Kevin Clarke turned to DNA. Inspired by a chat with a Boston geneticist, Clarke began doing portraits that are made up solely of a representation of a person's unique DNA sequence and an object or scene that captures his or her essence (available for



Four of six panels that make up Kevin Clarke's portrait of James D. Watson, codiscoverer of DNA's structure. The letters and wavy



and then sending them to a laboratory.

Several other artists are also creating what some people call genetic portraits, though Clarke personally doesn't like the term. Steve Miller in the early 1990s began using medical images—X rays, sonograms, and electrocardiograms, for example—in his portraiture. He then tried genetic imagery in 1993, in a portrait of art collector Isabel Goldsmith. She had asked Miller to do a traditional portrait, but he convinced her to let him depict her DNA instead.

After receiving a sample of her blood, a geneticist used an electron microscope to photograph and identify Goldsmith's chromosomes. Miller then created a colorful, four-panel portrait of her DNA strands.

**S**ome artists have gone beyond depictions of chromosomes and DNA to incorporate living organisms into their works. Take Natalie Jeremijenko, a design engineer and artist at New York University's Center for Advanced Technology, who has launched an ambitious project she calls "One Tree" (<http://www.cat.nyu.edu/natalie/>).

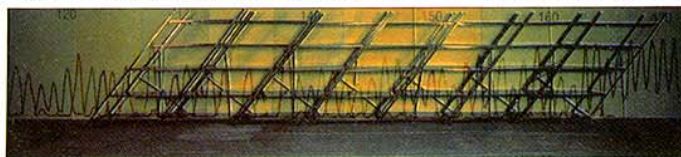
To challenge popular fears about cloning and genetic determinism, Jeremijenko in 1998 worked with plant scientists to create thousands of genetically identical seedlings of the paradox walnut tree. Derived from cell cultures of a single plant, the clones were initially grown in the laboratory, where they would experience virtually the same environmental conditions.

Next spring, the artist intends to plant the trees in public sites throughout the San Francisco Bay area. There, she says, features of local microenvironments—such as weather, lighting, and pollution—will shape each tree into a unique reflection of its surroundings.

Jeremijenko placed six saplings from the project on display in the Exit Art show. Visitors could see that despite their genetic identity, the trees have already developed distinguishing features. Brown leaves marred some but not all, for example.

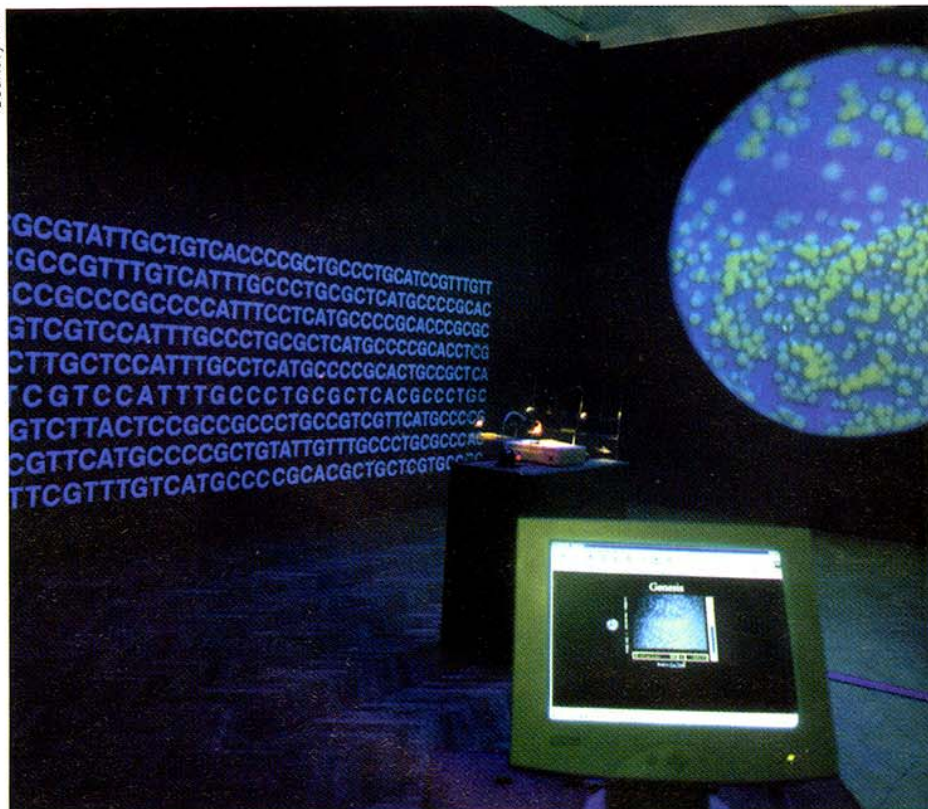
"You can't help but see that they're different. They have different leaf numbers, branch patterns, et cetera. There is a profound limit to genetic heritage," says Jeremijenko.

To her dismay, however, some art critics have missed or ignored those differences, viewing her trees instead as a sign that cloning threatens to homogenize the world. She notes in exasperation that a review of her piece in the Oct. 2 *THE NEW YORKER* commented, "Clones are spooky."



lines represent Watson's DNA.

Courtesy Kac



Eduardo Kac's "Genesis": In the center of the room, genetically engineered bacteria grow under video microscope, which displays their images on one wall. Another wall shows the DNA sequence of the gene that Kac has added to the bacteria.

**O**ne of the most colorful figures in the genetic art scene is Eduardo Kac of Chicago. In a project he calls "GFP Bunny," Kac intends to adopt an albino rabbit that French scientists genetically engineered to glow green under blue light. The project includes the animal's creation, the public debate generated by it, and the "social integration of the rabbit" into his family household, says Kac.

The researchers created Alba—Kac's name for the animal—by introducing into rabbit embryos a jellyfish gene encoding a molecule called green fluorescent protein (GFP). Kac, who visited the rabbit in France when it was born this spring, claims that the scientists created it at his request. They, however, contend that it was created for research purposes, and they have so far declined to release the animal to the artist.

The genetic modification performed isn't novel. Scientists have previously added the gene for GFP to mice and fish in order to follow the fate of cells during development (SN: 10/18/97, p. 247).

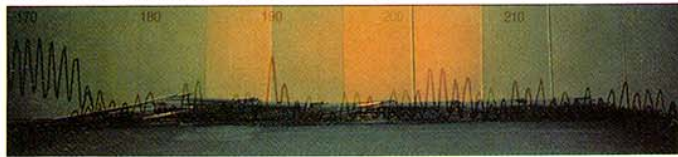
Alba isn't Kac's first brush with genetically modified organisms. He has an elaborate work called "Genesis" that has toured the country and will next appear

in January at Woodstreet Galleries in Pittsburgh. Kac describes it as a "transgenic artwork that explores the intricate relationship between biology, belief systems, information technology, dialogical interaction, ethics, and the Internet."

As installed at Exit Art, "Genesis" focused the visitor's attention on a petri dish at the center of a small, barren room. Growing in the dish were bacteria into which geneticists had added a gene whose DNA sequence was determined by a line from the Bible's *Genesis*: "Let man have dominion over the fish of the sea and over the fowl of the air and over every living thing that moves upon the Earth." Kac had translated the text into Morse code and then represented the code's dot, dash, letter space, and word space as C, T, G, and A, respectively.

The scientists assembled the resulting DNA sequence into a gene that they added to the bacteria. The gene encodes a protein not normally made in nature, yet the bacteria making that protein seem to grow normally.

Kac used a video microscope to display pictures of the living microbes on one of the walls of the room in "Genesis." In the background, synthesized music generated from DNA sequences serenad-





## Criticism splatters genetic art

The *Paradise Now* exhibit in Soho offered works—such as food containers labeled “greed beans,” “made from bacterial genes,” and “randomly mutating food”—that were critical of genetically modified plants and animals. Nevertheless, one of the artists in the exhibit was still dismayed by what she contends was the show’s overly optimistic spin on biotechnology. At a panel discussion at the gallery, Natalie Jeremijenko presented her own version of the show’s advertising poster, one bearing the title “Invest Now” and listing the corporate sponsors instead of the artists ([www.cat.nyu.edu/investnow/](http://www.cat.nyu.edu/investnow/)).

“We’re not in the middle of a genetic revolution. Transgenic animals are not inevitable,” she protested.

In “The Industry behind the Curtain,” an online commentary about the exhibit, political scientist Jackie Stevens, a visiting professor at Pomona College in Claremont, Calif., also questions the corporate funding of genetic art.



Alexis Rockman's “The Farm” speculates how future farm animals might look. This painting appears both on the poster announcing the *Paradise Now* exhibit and on the parody protesting what one artist sees as the show’s optimistic spin on biotechnology.

Stevens writes: “Art about biotechnology, especially with a critical edge, serves to reassure viewers that serious concerns are being addressed. Even more importantly, biotech-themed art implicitly conveys the sense that gene manipulation is ‘fact on the ground,’ something that serious artists are considering because it is here to stay. Grotesque and perverse visuals only help to acclimate the public to this new reality.”

Whether or not biotechnology is here to stay, genetic art presents a separate issue. Some art critics have their doubts about its longevity. In his review of the Soho exhibit in the Oct. 2 issue of *THE NEW YORKER*, Peter Schjeldahl contends that theme-based art “has the shelf life of milk. If you wish it would go away, you’ll be gratified anon. ‘Paradise Now’ typifies a recurrent phenomenon, whereby denizens of the fragmented and generally aimless art world jump on a breaking story in the culture at large.” —J.T.

ed the visitors with a New Age sound. An ultraviolet light, which can mutate bacterial DNA, shined on the microbes whenever someone clicked a button on Kac’s Web site ([www.ekac.org](http://www.ekac.org)).

At the end of each showing of “Genesis,” Kac has the added gene’s DNA sequence reanalyzed by scientists and he translates it back into Morse code and then English. Mutations have usually altered the original Bible verse, creating gibberish or converting, for example, *fowl* into *foul*. “The words of *Genesis* have changed,” remarks Kismaric.

Kac isn’t the only artist to employ bacteria in his craft. *Paradise Now* also contains a work by David Kremers, a conceptual artist in the biology department at the California Institute of Technology in Pasadena. Among his many projects concerning biology, Kremers has created abstract paintings by growing bacteria on clear acrylic plates. The microbes are genetically modified to produce enzymes of different colors.

Heiferman and Kismaric note that the response to the Soho showing of *Paradise Now* was strong enough that they’re forming a traveling exhibit. Pieces from 15 artists will go on display this spring at the University of Michigan’s Museum of Art in Ann Arbor, and the Tang Museum in Saratoga Springs, N.Y., will host the full show next September.

Kismaric says, “This is the imagery of our times.” ☐

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