

# fringecore<sup>R</sup>

beyond transgression

## The Techropolis Issue

Science Art Collision

Cyberfeminism with a Difference

Critical Art Ensemble

Masami Akita (Merzbow)

The Films of Raymond Pettibon

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## ● ● ● The Techtropolis Issue

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**Telepistemology: the study of how distance influences belief, truth and perception** is a label that Ken Goldberg, a roboticist and artist, has applied to his projects, which question how we make sense of our world when our senses are unreliable guides and what we trust as real complies with no fixed measure of reality.

Ken, whom we mentioned in Issue 2 of FringeCore in regard to his work with Eric Paulos on the Legal Tender project which addressed the question of authenticity, by allowing remote users to closely examine a pair of \$100 bills, is Associate Professor in the Industrial Engineering and Operations Research (IEOR) Dept. at the University Of California at Berkeley. His Telegarden project which was shown at the SIGGRAPH Interactive Communities Program won him the Kobe Prize at the Interactive Media Festival in L.A. Ken also started the "The Art, Technology and Culture Colloquium" at Berkeley.

Ken is an artist with a day job as a robotics engineer, which gives him access to robots and computers. Robots play a key role in his artwork, which approaches technology with an underlying sense of irony. Ken is interested in what Gerfried Stocker calls the "Fleshfactor", what happens when computers interact with the physical world. In particular when this interaction occurs over a network.

His research centres on geometric algorithms for robotics and industrial applications, but he tests it in the realm of art. He is a leader in his field and he established a new standard for human control of robotic motion via the Web. A key concept in his art is the idea of feeling directly connected to the activity and knowing that as the viewer you can actually alter the remote site.

Ken is best known for his Telegarden project, which is a living space tended by a robot arm, controlled by users via the Internet. It is a real garden of petunias, peppers, marigolds at the Ars Electronica Center in Linz, Austria which Net gardeners can work in and nurture. Anything from seeding to watering, to deciding on the type of plants.

However, there are a number of other significant projects which he has developed, including the Mercury Project (1994), which is an archaeological site based around a puzzle, drawn from the literary classic, Jules Verne's "Journey to the Centre of the Earth", and inter-relates the past with the future. The Invisible Cantilever (1996), based on Frank Lloyd Wright's "Fallingwater" which deals with the question of distance between the viewer and what is being viewed and its influence on belief, truth and perception. The Shadowserver (1997), an apparatus housed in a lightbox that contains physical objects, some of which move on their own accord within the apparatus. The viewer can interact with these objects via a combination of five buttons and then cast a shadow, which activates a combination of lighting devices and returns a digital snapshot of the resulting shadow.

All of these projects are reachable via his home page: [www.ieor.berkeley.edu/~goldberg/art/](http://www.ieor.berkeley.edu/~goldberg/art/)

I spoke to Ken about the essence of his art.

**Through much of your research you have tried to develop the perfect robotic hand based on the assumption that the shape of the human hand is imperfect. What approach have you taken and how have the results affected performance?**

**Ken:** Actually the human hand works pretty well. Some researchers claim that the best robot hand will be a mechanical version of the human hand. I disagree. Like most engineers, I'm a minimalist. Perhaps the simplest robot hand is the parallel jaw gripper: basically a clamp that can open and close. Yet this gripper is incredibly general and is used everyday in factories around the world. Chopsticks are the best proof that you don't need complex hardware for manipulation.

**The Mercury Project (1994) was the first telerobotic system on the WWW. It involved a mythical quest - a virtual archaeological exploration of a mythical place - which if you explore further unfolded a mystery. What are the broader implications of this project, beyond it being a stimulating, interactive game?**

**Ken:** For us, the Mercury Project was both a robot feasibility study and an art installation. We had to decide what to bury in the sandbox, and wanted all the objects to be related. We drew the objects from Jules Verne's book but only told participants the objects were from some 19th century novel. Their challenge was to figure out which one. After 7 months and over 2000 pages of log entries, only one person had figured it out; he left a very cryptic message so as not to spoil the secret for everyone else. Our motive for the secret was to engage participants in an ongoing puzzle.

**The Telegarden (1995) has been referred to as "a search for the soul; of gardening". As such it has been essential to the "gardeners" that they believe it is a real garden which they can access through the Net, not just a set of pre-programmed computer images. How is this project structured and nurtured and what real life changes have the gardeners been able to create?**

**Ken:** We're hoping the search for the soul of gardening will lead people to log off the net and go outside for some fresh air. The idea of a robot garden is absurd. Some people assume it's a virtual garden, some assume it's real, and the rest suspect we're pulling their legs. People on the net don't believe there's a real garden, and when my friend Florian Brody visited the Ars Electronica Center the robot was moving around watering a plant and a guy him asked why the robot moved. Florian explained that a person over the net gave the command and the guy didn't believe it! So the sense of doubt is bi-directional. This should give us hope. The Telegarden was developed with a group of collaborators including Joey Santorromana, Jeff Wiegley, Steven Gentner, Rosemary Morris, Carl Sutter, Erich Berger and George Bekey.

## art meets Out of the Telegarden

## Dee interfaces with



**One of the key differences between your computer art and the genre in general is the degree of interaction involved, which demands that the viewer is forced to bring his / her body and senses into play. Is this a key issue for you?**

**Ken:** Definitely. I'm trying to understand how the body helps us determine what is real and what isn't. One of the best introductions to this topic is Benjamin's "Art in the Age of Mechanical Reproduction", a 1936 essay on cinema and photography that is completely relevant to digital media. He proposes the concept of "aura": that which cannot be reproduced.

**How do you explain the difference between telepresence and virtual reality?**

**Ken:** VR is simulacral; telepresence is distal. VR is based on illusion while telepresence at least claims to be based on reality. And that brings up the big question: what's reality?

**Your latest project is the Shadowserver which you describe as a WWW-based telerobotic camera obscura aims to answer the question "What is real?" and addresses the issue of telepresence from a different perspective. Again it demands a lot of interaction and reintroduces the concept of contemplation. It has direct links to art history and finally questions the motto of electronic art of making the invisible, visible, by turning it on its head and making the visible, invisible, into shadows, hiding the object. What are your thoughts on reality and illusion?**

**Ken:** When do we get to the easy questions?... Okay, philosophers have been thinking about epistemology - how do we know? - for 2500 years. In the Republic Plato proposes the parable of the cave, where a bunch of prisoners spend their life watching shadows on the wall. That's all they know. Plato uses this analogy to suggest that there is a higher reality and that we are only capable of seeing a part of it. I designed the Shadowserver with Bob Farzin to illustrate this idea on the net.

# Telerobotics into the Shadows

**The pictures created from the Shadowserver have been referred to as "Rayographs", because they resemble the photographs of Man Ray when he placed items on photographic sheets and exposed them to light. Is there a real similarity? Tell me about your links to Marcel Duchamp.**

**Ken:** All contemporary artists owe a debt to Duchamp. His 1916 sculpture, Ball of Twine with Hidden Noise, is a ball of twine sealed at both ends with something inside that rattles. No one knows what that thing is. But to find out means destroying the sculpture. Duchamp transformed Plato's concept into the realm of art and had a good laugh at the same time.

**The question of distance, in particular that between the viewer and what is being viewed, is the subject of your Invisible Cantilever Project which is 1/1 millionth scale version of Wright's original "Fallingwater" and is invisible to the naked eye. Fabricated from silicon, it demonstrates how discontinuities induced by the WWW undermine what Husserl calls the inner and outer horizons of experience. In which way does this project help to study how distance influences the fundamental notions of how we perceive things?**

**Ken:** I like that expression: the "naked eye". In some sense there is always distance between us and what we see. But when we insert a piece of technology, such as eyeglasses, in front of the naked eye, then we have to ask in what sense are we seeing reality? When Galileo claimed that he had discovered moons around Jupiter, scientists doubted him, asking: how do you know that your lens is accurate? This question inspired Descartes' Meditations and in some sense underlies all of modern science. The IC, built with Karl Bohringer, attempts to provoke

this sense of doubt in the viewer by presenting a familiar form just on the threshold of perception.

**Tell me about the new book you are currently working on, The Robot in the Garden, which I believe is due to be published by MIT Press in 1999? I understand that it gives a more detailed insight into your thoughts on the question of "what is real" when viewed from a distance. What new paradigms are you introducing?**

**Ken:** The book will be co-edited with Jeff Malpas, a philosopher from Australia. Epistemology is one of the oldest branches of philosophy. It has fallen out of favor since Wittgenstein, since it was seen as focused on scientific apparatus rather than everyday life. But since then scientific instruments in the form of cell phones, pagers, personal organizers, laptops, wearable computers etc. have invaded everyday life. Our hunch is that it may be time to reconsider epistemology. Our goal with the book is to introduce the technology of WWW telerobotics to philosophers, the subject of epistemology to engineers, and both to the persistent non-specialist. It will include six articles on telerobotic sites and six essays on the philosophical implications.

**Who else are you collaborating with on your new projects and who are the other leading personalities currently involved with the fusion of art and robots?**

I've been lucky to work with some of the best robot artists in the world. You've featured Mark Pauline and Eric Paulos in past issues; I'm also inspired by the work of Eduardo Kac, Peter Lunenfeld, Lev Manovich, Roger Malina, Susan Collins, John Canny, Judith Donath, Ken Feingold, Scott Fisher, Greg Garvey, Emily Hartzell, Perry Hobermann, Rafael Lozano-Hemmer, Steve Mann, Michael Naimark, Michael Rodemer, Julia Scher, Nina Sobell, Stelarc, Gerfried Stoker, Richard Wallace, and Steve Wilson just to name a few. We've only scratched the surface, so stay tuned.