

# Eduardo Kac: Challenging Norms through Art

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*Eduardo Kac has presented the world with increasingly controversial pieces of art. He has transformed Biblical passages into genetic code and then purposely mutated them, and he has even transformed a cute little bunny into a living glow-stick. Is this what happens when modern art and science go awry? Or has this challenging artist produced genuinely laudable art? While traditional art may be valued for the beauty of the object itself, the true significance of Kac's work is in the dialogue it initiates. He forces us to take a fresh look at the relations humans have created among themselves, animals, and machines. In order to understand Kac's works, we must abandon our preconceptions and reevaluate what it means to be human.*

**“Eduardo Kac forces us to take a fresh look at the relations humans have created among themselves, animals and machines”**

Calling Eduardo Kac (pronounced “Katz”) unconventional is an understatement. His artwork challenges traditional notions about science, art, ethics, and just about anything else one can imagine. A superficial view of Kac's works may lead to quickly dismissing them as trite or downright offensive. On September 25, 2000, *The San Francisco Chronicle* published some of the responses that it had received concerning GFP Bunny, one of Kac's recent works involving genetic engineering. Those writing to the paper called the work, “some kind of twisted statement about technology” and also commented, “Mr. Kac has been visiting too many new age galleries.”<sup>1</sup> Yet, thoughtless iconoclasm and esotericism are not Kac's way; he has consistently challenged norms with flair and provocative genius. Some of the responses to *The Chronicle* were positive, however. One reader insightfully commented: “Like many unforgettable artists before him, Kac has managed to shake up a jaded world which believes it has seen it all.”<sup>2</sup> Shaking up the world can either be negative, if it causes damage to no end, or positive, if it dislodges anachronistic

viewpoints. Kac is successful at accomplishing the latter.

It is useful to group Kac's artwork in two categories. The first group is composed of works that explore the relationships among humans, animals, and plants via the medium of telecommunications. The second category is so-called “transgenic” art: art that involves DNA manipulation and even the creation of new forms of animal life. Analyzing a sampling of Kac's art from each of these two categories reveals that through these works he asks us to rethink fundamental assumptions concerning what it means to be human, animal, robot, computer, and hybrids of each.

In Kac's 1989 interactive exhibit, Ornitorrinco, a one-eyed robot is remotely controlled through the use of a telephone and modems (utilizing the tones generated by the keys on the keypad as directional commands) in an environment set up by another group of artists. Ornitorrinco was one of Kac's earliest forays into telepresence, “the experience of presence in an environment by means of a communication medium.”<sup>3</sup> Through its use of a remote control robot, Ornitorrinco was designed to explore

the possibilities of the rapidly developing telecommunications system and its impact on society as well as the extension of the human body. Oliver Grau, a new-media art historian at Humboldt-University of Berlin, claims, "Telepresence unites three themes with deep roots in intellectual history: automation and the search for artificial life, illusion in art, and the rejection of the body in favor of a spiritual or mentalistic conception of the human self."<sup>4</sup> Kac's experiment addresses all three of these themes. Automation and artificial life are represented in the one-eyed robot itself, the camera mounted in the robot gives the illusory feeling that one is actually present in the robot's environment, and the concept of the expression of the controller's will through the remotely located robot illustrates what Grau calls the "mentalistic conception"<sup>5</sup> of self as opposed to a physical conception.

Specifically addressing Grau's second theme, illusion's role in telepresence, Judith Donath, Director of the Sociable Media Group at MIT, states, "As the virtual world grows to encompass all aspects of our lives and on-line interactions shape our communities, influence our politics and mediate our close relationships, the quality of being real, which is accepted and assumed with little thought in the physical world, becomes one of the central questions of society."<sup>6</sup> Communication over long distance is fraught with a much increased possibility of deceit compared to face-to-face interactions. Online chatroom impostors, misleading online message board postings, and webcams falsely labeled as "live" have become commonplace.<sup>7</sup> This fact implies that we must enter into telepresence experiences with a

degree of skepticism that is not necessary in our everyday interactions. This new skepticism, this new concern with the definition of what is real, pushes us not only to redefine our online lives, but also rethink our physical lives.

Kac also deals with Grau's third theme, the mentalistic conception of self. He writes, "The question is not how do these technologies mediate our exploration of the world, local or remote, but how they *actually* shape the very world we inhabit." [emphasis added]<sup>8</sup> Both Grau and Kac believe that telepresence experiences, although not real in the physical sense, can have *actual* or real impacts on our sense of self and the world around us. This presents us with what seems to be a contradiction: Can remote experiences be as rich and effectual as physical experiences? This question causes us to rethink some of our most common activities, such as remote communication, which tends to be either non-interactive, like television, or one-dimensional, like a phone conversation. In his essay "Telepresence Art," Kac comments:

*I see telepresence art as a means for questioning the unidirectional communication structures that mark both high art (painting, sculpture) and mass media (television, radio)... To me telepresence art creates a unique context in which participants are invited to experience invented remote worlds from perspectives and scale different than human, as perceived through the sensorial apparatus of telerobots.<sup>9</sup>*

In this statement, Kac also raises the notion of perception from the viewpoint of the robot. One would normally not attribute a human characteristic, such as possessing a viewpoint, to a robot, but Kac is very much concerned with the perspective of the other, which may be a robot, animal, computer, or anything else. Kac bestows the distinction of artificial life upon the robot, even though it has no true life without the presence of the human controlling it.

Kac engaged the idea of giving life through robots more directly in his 1996 exhibit Teleporting An Unknown State. The work hit upon the concept of biotelematics, or "art in which a biological process is intrinsically connected to computer-based telecommunications work."<sup>10</sup> Teleporting An Unknown State is perhaps more aptly described by the classic definition of experiment rather than that of art. It weaves together computing, telecommunications, biology, and humanity. A plant was placed in a box without any source of light, except for a projector which only functioned as long as light was transmitted to it from a series of remote webcams operated by independent participants. The plant was literally dependent on the Internet and on collective human support for its life, a truly global affair. Paravathi Narayan from *The Singapore Business Times* exclaimed, "The Internet, a virtual and non-real world, here became one that was quite literally life supporting!"<sup>11</sup> Where Ornitorrinco explored the boundary of communication and artificial life, Teleporting An Unknown State raised the stakes to real life, albeit plant life. The experiment placed the plant's life at risk, but in doing so, actually raised human awareness of the importance of that particular

plant's survival. Teleporting made it clear that all life is becoming increasingly both interdependent on mutual cooperation and dependent on telecommunications.

Associate Professor Machiko Kusahara of Kobe University Graduate School of Science and Technology in Japan was particularly intrigued by Kac's and others' experiments with "telegardens." Ken Goldberg produced the first telegarden in 1994. Plants were arranged under a growth lamp and around a robotic arm capable of dispensing food and water. The arm was then remotely controlled by a human at a computer. Comparing Ken Goldberg's experiment to Tamagotchi, toy digital pocket pets, Kusahara comments, "The problem with Tamagotchi is that it has nothing to do with real life, and it was a simple and poor simulation of life's complexities. Telegarden [by Ken Goldberg] is based on life in a real (but remote) physical space."<sup>12</sup> Kusahara's point is clear: telegardens present more of a challenge to our concept of what is real as opposed to artificial life than even objects, such as Tamagotchi, which were intended as A-Life (the practical challenge of producing artificial life, especially through computer programs) itself. For Teleporting, this implies that the experience of the garden conveyed by the Internet and computers is an accurate form of A-Life. The plant was actually coming alive on-screen for the individuals controlling the light projector. However, some might argue that the medium of a computer screen severely limits the range of interactions possible, making the entire experience seem less than genuine.

Kac decided to make the interaction as real as possible in 1997 with A-Positive. The exhibit

brought an entirely new meaning to human-machine interaction. A-Positive links a human and robot through an intravenous needle [Figure 1]. The needle draws blood from the human and transfers it to the robot (or "biobot" as Kac calls it) and the robot extracts oxygen from this blood which it uses to maintain a small flame (the symbolic flame of life), while the robot donates dextrose back into the human. Kac is conspicuously making a provocative statement about the ties between humanity and our creations. Describing A-Positive in his own words, he states:

*A-Positive does away with the metaphor of robotic slavery and suggests a new ecosystem that takes into account the new creatures and organic devices that populate our postorganic pantheon, be they biological (cloning), biosynthetic (genetic engineering), inorganic (android epistemology), algorithmic (a-life), or biobotic (robotics). We have always asked what can machines do for us. Now might be the right time to ask what we can do together.*<sup>13</sup>

Does A-Positive achieve its goals or is Kac alone in his interpretation of his art? Narayan reflects, "A-Positive also shows a symbiotic relationship between human and machine, which is very different from the popular notion of a master-slave relationship between man and robot."<sup>14</sup> A-Positive forces us to reconsider our assumptions concerning humans and robots. No, hooking a human up to a machine intravenously was not a novel idea. In fact, it happens every day in hospitals across the world. However, making the human-machine relationship unambiguously synergistic and then asking what it means to our culture is creative genius. Will all human-machine interactions in the

future be the unidirectional experiences we normally assume them to be? No, the line in the future between man and machine will be blurred more than ever before. In order to be prepared, we must envision the likely future, when machines will be physically inside of almost everyone and human tissue will be used in machines.

Finally, before moving onto Kac's transgenic art, is his 1999 Darker Than Night interactive exhibit, which is a culmination of the works examined thus far. It brings computers, robots, animals, and humans together and asks them all to communicate with each other. Kac placed a robotic bat ("batbot") in a cave with over three hundred Egyptian Fruit Bats in a zoo. The robotic bat was equipped with the ability to convert real bats' high-frequency calls to within the audible range of humans and also rotate its head, where the sonar microphone was located. Human listeners could then remotely, via a virtual reality headset, turn their head to control the batbot's microphone and immerse themselves in the world of the bat. Darker Than Night asks the human species to experience, to the best of our ability, the world of another species. Our vehicle for understanding the bat is a robot aided by a computer, suggesting a tie not merely between humans and animals, but among humans, animals, robots, and computers

While Darker Than Night asks questions about the boundaries between humans, animals, computers, and robots, Kac's transgenic art crosses them, blurring the human-animal-robot-computer distinction. Through the use of genetic engineering, Kac has recently produced two pieces of art that have excited a good deal of controversy. Kac's first transgenic work, Genesis [Figure 2], was initially exhibited in 1999.

Kac translated a sentence into Morse Code from the Bible's book of 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." Then, using a special computer program created for the event, the Morse Code was translated into genetic base pairs. This message was inserted as an artificially created segment of DNA into a group of bacteria that were colored to make them easily identifiable. As the bacteria propagated, the message was transcribed and copied but also sometimes mutated. In addition, both local and remote users (via the Web) had the ability to control a UV lamp that would increase the rate of genetic mutation. Every click changed the message more and more. The original sentence grants man power over the animal kingdom, but Kac's twist grants man power over the Bible itself. Kac claims that the ability to alter the Bible's word implies that we do not have to be bound to its original meaning, and that we must continually reinterpret it.<sup>15</sup> He uses the Bible, which many consider the ultimate source of tradition, and transforms it in order to elicit a response from his viewers. He wants members of his audience to think for themselves about the issues he raises, rather than passively receive the art. The dialectic nature of Kac's work is vital to understanding this purpose and message.

Kac's seminal transgenic artwork is *GFP Bunny* [Figures 3, 4]. In 2000, Kac incorporated a fluorescent jellyfish gene (green fluorescent protein or GFP) into the genes of an albino rabbit. With the ability to glow green under UV light, Alba became the world's first glowing bunny [Figure 4]. As a living piece of art, the work explicitly integrates the notion of dialogue into its form. Kac states,

"*GFP Bunny* comprises the creation of a green fluorescent rabbit, the public dialogue generated by the project, and the social integration of the rabbit."<sup>16</sup> He presents us with a challenging concept. The art is not simply the object, but also includes the public reaction and the future life and socialization of the rabbit. Kac insists, "Transgenic art is not about the crafting of genetic objects d'art, either inert or imbued with vitality. Such an approach would suggest a conflation of the operational sphere of life sciences with a traditional aesthetics that privileges formal concerns, material stability, and hermeneutical isolation."<sup>17</sup> Kac wants to make it clear that *GFP Bunny* is not like a traditional piece of art such as a painting; it is about much more than a fluorescent rabbit. He did not create Alba because he thought a glowing bunny would please the eye. Kac could have painted a rabbit if he had wanted to do that. Kac wanted to both make a statement and raise questions about genetic engineering. He argues, "Contrary to popular notions of the alleged monstrosity of genetically engineered organisms, her body shape and coloration are exactly of the same kind we ordinarily find in albino rabbits. Unaware that Alba is a glowing bunny, it is impossible for anyone to notice anything unusual about her. Therefore Alba undermines an ascription of alterity. It is precisely this productive ambiguity that sets her apart: being at once same and different."<sup>18</sup> Alba presents the viewer with a paradox. She is a genetically altered "creature," yet she is no Frankenstein. She is a cuddly white bunny! Kac deliberately chose an animal that would not seem grotesque, but rather something that the audience could relate to. Thus, Kac

suggests to us that we cannot categorically reject genetic engineering, we must look at it on a case-by-case basis. In a world in which there are sharply contrasting viewpoints on genetic engineering, a subtle approach is a welcome remedy. Surely Kac realized the humor in the notion of shaking up the scientific, political, and art worlds with a white bunny.

Kac views himself as an artist who "literally becomes a genetic programmer who can create life forms by writing or altering this code,"<sup>19</sup> not unlike a computer graphics artist. At first, this statement seems callous, arrogant, and even perverse, yet it is a statement of fact. Kac is presenting his scientific powers void of all euphemism. Many others do not see it as that clear-cut. For instance, Arthur Caplan, Director of the Center for Bioethics at the University of Pennsylvania, said, "Ethically I don't think we should use genetics simply for artistic exhibitionism. I think that is an abuse."<sup>20</sup> Caplan's statement reflects the view that art is intended "simply" to please the eye. From this perspective, Kac's works are an abuse! However, not all art is purely decorative; that art is shallow is a sadly prevalent misconception. If one is willing to look at either of Kac's transgenic works presented here with open eyes, it is apparent that Kac is no whimsical designer. He is a scientist making an appeal through a creative and thought-provoking approach. He wants us to continually grapple with the difficult issues where science and ethics are irreversibly bound. Eduardo Kac's artwork in telepresence, biotelematics, robotics, and transgenics all cross boundaries. They confound the traditional meanings of human, animal, robot, communication,

and computer. Works such as A-Positive and GFP Bunny are unconventional, but were not designed merely for “shock value,” but rather to jolt us into reevaluating our norms. Kac is asking important questions about genetic and cybernetic engineering that our society will need to face in the near future. In *NY Arts Magazine* Ulli Allmendinger wrote, “To ask questions, to pose the issues that are rumbling through culture right now, and doing it in a way that

gives it a visual form, that gives it a way that people can talk about, that’s part of what Kac is doing and that’s what good artists do.”<sup>21</sup> Although Kac’s artwork challenges traditional values, it is not destructive of them because it constructs a framework for future conversation. Cloning and genetic engineering are progressing much faster than the public’s ability to comprehend the moral and ethical implications of these technologies, especially since scientific research is usually done out of public view.

Society will need more men like Kac who can make complex scientific issues sensible to the average person and can offer their opinions from as close to an objective perspective as possible. Otherwise, it will only be extremely biased groups, such as pharmaceutical companies and religious organizations, that challenge our points of view. A glowing green bunny might just prove to be one of our most valuable guiding lights into the future of genetic research.

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For more images, see <http://www.ekac.org>