

## Bioart: Transgenic art and recombinant theatre

Bioart centres on the artistic investigation of biotechnology and raises complex ethical issues, such as, those relating to the patenting and sale of genes. At the same time genetic engineering is continually transforming our notions of and relationships to life forms including own. Moreover, the discipline of biological studies is increasingly changing from a life science into an information science. For instance, “biosemiotics” is an interdisciplinary science that studies communication and signification in living systems. Contemporary artists have responded to these changes by working with transgenics, cloning, inter and intraspecies communication, reproductive technologies, genotype and phenotype reprogramming, tissue culture engineering, and hybridisation techniques that reconfigure the borders of artwork and life.

One such artwork is Alba the GFP (green fluorescent protein) Bunny (2000), a genetically engineered rabbit that glows green when illuminated with the correct light. For artist Eduardo Kac, ‘transgenic art ... is a new art form based on the use of genetic engineering techniques’ (1998). Kac concentrates on exploring the ‘fluidity of subject positions in the post-digital age’, by means of a combination of ‘robotics and networking’, ‘telepresence’, ‘biotelematics’, and ‘transgenics’ (Kac 2005a).

Critical Art Ensemble (C.A.E.) are bioartists, who through their ‘recombinant theatre’, have made technology, wetware, and transgenics, the focus of their work. As tactical mediaists the group have presented various interactive performance projects. These projects are underpinned by their concerns with the representation, development, and deployment of social policies regarding this technology. One of their works, *Flesh Machine* (1997-8), focuses on eugenics in the discourse and practice of current reproductive technologies. Their more recent performances have attempted to critically evaluate and respond to concerns regarding genetic engineering and the creation and release of new life forms into the ecosystem. For further information and images relating to these works see respective websites. For Eduardo Kac <<http://www.ekac.org/>> and for Critical Art Ensemble <<http://www.critical-art.net/>>

This topic will be discussed in more detail in my forthcoming book, *Digital Practices: A Critical Overview and Neuroesthetic Approach to Performance and Technology*, University of Michigan Press, 2006. We at *BST* appreciate that Bioart in all its various configurations is an important issue with serious ethical implications and we would welcome further debate in this area

### Eduardo Kac

Organisms created in the context of transgenic art can be taken home by the public to be grown in the backyard or raised as human companions. With at least one endangered species becoming extinct every day, I suggest that artists can contribute to increase global biodiversity by inventing new life forms ... Ethical concerns are paramount in any artwork, and they become more crucial than ever in the context of bio art.  
(Kac 1998)

I will never forget the moment when I first held her in my arms, in Jouy-en-Josas, France, on April 29, 2000. My apprehensive anticipation was replaced by joy and excitement. Alba [the GFP Bunny] ... was lovable and affectionate

and an absolute delight to play with. ... She immediately awoke in me a strong and urgent sense of responsibility for her well-being.  
(Kac 2003, 97)

For Eduardo Kac, 'transgenic art ... is a new art form based on the use of genetic engineering techniques to transfer synthetic genes to an organism or to transfer natural genetic material from one species into another, to create unique living beings' (1998). Kac (pronounced 'Katz'), whose works date from the 1980's when he pioneered telecommunication art (pre-internet), has over the years concentrated on exploring the 'fluidity of subject positions in the post-digital age', by means of a combination of 'robotics and networking', 'telepresence', 'biotelematics' (combining networking with a biological process), and more recently 'transgenics' (Kac 2005a).

Originally from Rio de Janeiro in Brazil, Kac is currently based at the School of the Art Institute of Chicago. In Rio, he worked as an interventionist performer, protesting against the military dictatorship that ruled the country at the time before concentrating on telecommunications as a form of art practice. He studied philosophy, semiotics, and linguistics at universities in Rio de Janeiro and later gained an MA in Fine Arts from Chicago. He presented his first telepresence performance 'Ornitorrinco, the Webot, travels around the world in eighty nanoseconds going from Turkey to Peru and back', shown at the Otso Gallery, in Espoo, Finland in 1996 and his first transgenic performance 'Genesis', at Ars Electronica, Linz, Austria, in 1999.

The primary emphasis throughout Kac's work has been an investigation of the philosophical and political aspects of communication, both verbal and non-verbal. He explores and examines linguistic systems, human communicative interaction, and communication with and between species. Multimedia and biological processes are combined to create hybrids from existing communication systems. Frequently linking virtual and physical spaces, Kac questions how processes of communication help create shared 'realities'. Rejecting closure, his work encourages active audience participation and confronts issues concerning identity and agency (Kac 2005a).

In such works as Kac's, as with other digital practices, the physical and virtual are emphasised and therefore, current theory needs to be adjusted to allow for this technical interface and accompanying corporeal prominence. It is my belief that effective critical theorisation in the area of non-verbal signification is inadequate. I am suggesting that this can be remedied by a retheorisation using an intersemiotic approach, that is, a signifiatory practice which involves such non-linguistic modes as those provided by the semiotics of body gesture (virtual, human and/or animal) and thus provide an appropriate interpretation of such digital practices as Kac's biotechnology artworks.

Kac's work has been exhibited internationally at venues such as Exit Art and New York Media Arts Centre, New York; InterCommunication Centre (ICC), Tokyo; Chicago Art Fair and Julia Friedman Gallery, Chicago; and Museum of Modern Art, Rio de Janeiro. He has also published widely in various journals such as *Leonardo*, MIT Press, where he is a member of the editorial board and has been featured in such contemporary art publications as *Flash Art* and *Artforum*, and also in the mass media: ABC, BBC, *New York Times* and many others. However, it was with Alba, the transgenic GFP (green fluorescent protein) Bunny that Kac made his mark on the contemporary bioart scene by provoking heated debate relating to the socio-cultural and ethical concerns resulting from his controversial creation of a living art work

One of Kac's early biotelematic works was an interactive installation, titled *Teleporting an Unknown State* (1996) that linked a presentation at the New Orleans

Museum of Contemporary Arts to the Internet. The installation consisted of a seed planted in soil in a completely darkened room with the only means of light emitting from a video projector that received its lit image from the Internet. That light allowed the seed to photosynthesise and grow; the Internet becoming a 'life-supporting system' sustained by the real-time interaction of remote individuals as they logged in to the installation website. These individuals had captured images of the sky and transmitted the sunlight via cameras to produce a steady flow of photons aimed at the developing plant. The videoed images were converted into 'actual wavefronts of light' (Kac1999, 90-91). The growth of the plant was in turn captured and transmitted via the internet so that the participating audience could view the plant's growth which they had enabled. For Kac the piece operated as a reversal to the normal unidirectional image broadcast by regulated media where the audience passively receives a specific message; instead the audience of *Teleporting an Unknown State* actively transmitted light by their videoed image, at the same participating in the growth and development of a life form. According to Kac, 'the exhibition ended on August 9 1996. On that day the plant was 18 inches tall' (91).

This installation consisted of Kac's key investigative concerns such as, interaction (in this instance interspecies), issues of identity, and the very possibility of communication. It also demonstrated other traits in common with digital practices, such as, indeterminacy, contingency, and active audience participation.

Kac's first transgenic performance work was *Genesis* and premiered at the O.K. Centre for Contemporary Art, Linz, Austria, September 4 to 9, 1999 as part of Life Science, Ars Electronica 99.<sup>1</sup> It is Kac's belief that in recent years, art has progressively moved 'away from pictorial representation, object crafting, and visual contemplation', instead there is now a more direct response to social transformations that emphasise 'process, concept, action, interaction, new media, environments, and critical discourse' (Kac 2003, 100). Transgenic art whilst acknowledging this shift in emphasis offers a radical departure by 'placing the question of actual creation of life at the centre of the debate' (100). As such it accentuates the social existence of organisms by reminding us 'that communication and interaction between sentient and nonsentient actants lies at the core of what we call life' (101).

*Genesis* explores issues that relate to the cultural impact of biotechnology. Taking the biblical sentence from the 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,' as a starting point, Kac investigates 'the intricate relationship between biology, belief systems, information technology, dialogical interaction, ethics and the Internet' (1999). The above sentence from Genesis, which signifies a 'dubious' divinely ordained 'humanity's supremacy over nature', was chosen since it reflects a key concern of Kac's relating to interspecies relations. Thus echoing Deleuze' and Guattari's belief that, 'in a way we much start at the end: all becomings are already molecular. That is because becoming is not to imitate or identity with something or someone' (1999, 272).

*Genesis* was intended to 'playfully' consider the 'ambiguity of the Genesis gene itself', at the same time it reflects the absurdity of reducing human life and choice to 'a simple DNA sequence' (Kac, 2001). It also explores the belief that biological processes can be 'writerly and programmable' and can 'store and process data' in a similar way to computers (Kac 2005b). The project centres on the production of a 'synthetic artistic gene' that was created by Kac after translating the above biblical sentence into Morse Code and then converting the Morse Code into

DNA base pairs, according to a conversion principle specially developed for this work. The gene was cloned into plasmids and transformed into bacteria that coded for cyan fluorescence (Enhanced Cyan Fluorescent Protein or ECFP). Another form of bacteria without the synthetic gene was also used in the performance, a plasmid that coded for yellow fluorescence (Enhanced Yellow Fluorescent Protein or EYFP). The two types of bacteria, one containing the 'Genesis' gene and one without, grew and mutated in Petri dishes, exposed intermittently to ultra violet light and observed by the audience by means of a digitally enlarged video projection. The audience was able to view the various new colour combinations of the mutating bacteria since as they make contact with each other, plasmid conjugal transfer took place and new colour combinations occurred as a result of this intraspecies communication (Kac 2005b).

The display was also made available to the Internet by means of two computers located in the installation space. One computer was interactive allowing observers to increase the UV light leading to accelerated mutation rates of the Plasmids due to the disruption of their DNA sequencing. The other computer synthesised music that was transcribed from the physiological processes of the DNA by means of a software programme that responded to the growth rate of the bacteria. In effect, the audience to a certain extent controlled the development and mutation of the bacteria but at the same time the music which was played to the audience was created by those same bacteria creating a real-time dialogic interaction between two diverse species. On the last day of the exhibition Kac took the altered code back to the lab, translating the DNA back into Morse Code and then into English, and posted the translation on the Genesis website. The new sentence read: 'LET AAN HAVE DOMINION OVER THE FISH OF THE SEA AND OVER THE FOWL OF THE AIR AND OVER EVERY LIVING THING THAT IOVES UA EON THE EARTH' (Kac 2005b), thus leaving Kac's audience to contemplate the consequences of interfering with evolution.

Transgenic artworks underscore the underlying concerns relating to genetic engineering and raise questions that are moral, ethical, and political. For instance, although genetic changes to humans can correct various genetic disorders that may be life threatening, at the same time this process can also be used for selective breeding. As a result of genetic coding, individual traits can now be identified, such as, intelligence, behaviour, and race, that can potentially lead to the undermining of 'concepts of equality of opportunity'. For example, policies could be adopted that would prevent the birth of children with genetic disorders with the risk that parents who do not terminate such a pregnancy would be liable to be prosecuted for child abuse. Such a legal case has already been heard in California in 1980 where the court decided that 'a child could bring suit against her parents for not undergoing prenatal screening and aborting her' (Andrews 1999, 91-92).

Kac's more recent transgenic event, Alba the *GFP Bunny* (2000), is an ongoing project that has intentionally provoked intense international scrutiny centring on the creation of a living artwork in the form of a transgenic albino rabbit.<sup>2</sup> According to Kac, although Alba is a 'very special animal', her genetic makeup is only one element in this artwork. Rather, the project is 'a complex social event that starts with the creation of a chimerical animal that does not exist in nature (i.e., 'chimerical' in the sense of a cultural tradition of imaginary animals, not in the scientific connotation of an organism in which there is a mixture of cells in the body)' (2003, 97).

For this project, Kac collaborated with geneticist Louis-Marie Houdebine to create a 'GFP rabbit', whose genetic makeup is altered with a gene obtained from a

Pacific Northwest jellyfish (*Aequorea Victoria*) that contains green fluorescent protein. The phenotype<sup>3</sup> expression of this is that the albino rabbit would glow green when illuminated with blue light (maximum excitation at 488nm). In fact, Alba was created with a 'synthetic mutated' form of the gene known as GFP which enhances the original gene and gives greater magnitude to the fluorescence in order to increase the observable green glow in the rabbit. This protein has already been used in experiments in the past to track genetic changes in mice and frogs. Originally, Kac wanted to create a 'GFP K-9', a dog that would have similar observable traits. However, he faced several obstacles in trying to accomplish this, the chief one being that as yet the dog genome has not been mapped (Kac 1998). Therefore, Kac decided to pursue the same idea with a rabbit since the Institut National de la Recherche Agronomique-INRA (National Institute of Agronomic Research) had already integrated GFP into rabbit DNA.<sup>4</sup> Alba is not the first transgenic rabbit since several have already been created in laboratory conditions but she is the first one to be created as part of an artwork. Kac emphasises that the alteration to Alba's genetic makeup has no detrimental effect on the rabbit whatsoever and 'she is healthy and gentle' and it is 'impossible for anyone who is not aware that Alba is a glowing rabbit to notice anything unusual about her' (2003, 100). Kac also notes, that the human role in rabbit evolution is a natural element and domesticity is 'bidirectional' since, 'as humans domesticate rabbits, so do rabbits domesticate their humans' (100).

The first phase of *GFP Bunny* was completed in February 2000 'with the birth of 'Alba' in Jouy-en-Josas, France' (2003, 97). Alba's name being chosen by Kac's family. However, the second and third phases of the project have not turned out so well. It was intended that Alba would be taken home and become part of Kac's family since what is most important for Kac is not 'the creation of genetic objects, but the invention of transgenic social subjects' (98-99). In short, the 'completely integrated process of creating the bunny' and 'bringing her to society at large' by means of providing her with a 'loving, caring and nurturing' family (99). However, Kac was thwarted in this ambition when the then director of INRA, Paul Vial, refused to allow him to take Alba home. According to Vial, the rabbit belonged to INRA and Kac had nothing to do with the 'research object' (Allmendinger 2001). Since then a wide debate has ensued as to the implications of creating a living artwork, with Kac carrying out an extensive media campaign to draw attention to Alba's 'situation and to obtain her freedom' (Kac 2003, 102). At the same time the international press were outraged by an artwork that 'fuelled existing fears of global genetic mutation'. More importantly: 'Was Alba Art? What did she mean?' (Allmendinger 2001).

Kac believes that art can assist in revealing the cultural implications of genetic engineering and offer 'different ways of thinking about and with biotechnology' (2003, 101). He cautions that there is a difference between using biotech tools and adopting the 'corporate biotechnology worldview' (2001). However, Kac's approach reflects the notion that complicity goes hand in hand with critique since we can never escape being complicit with that which is being argued against without also giving up that same critique (Derrida 1978, 281).

For Kac, biotechnology operates through sign systems that are not verbal or visual but are all the same changing the way we see the world and when these tools are appropriated and other views are added then instead of merely 'illustrating the world of biotech', more complex issues are brought to the fore (2001). In any artwork, ethical concerns are crucial and they become even more so in the context of bioart. Transgenic art by integrating the 'lessons of dialogical philosophy' and 'cognitive

ethology' is obliged 'to promote awareness and respect for the spiritual(mental) life of the transgenic animal' (Kac 2003, 99).

In assessing our relationship with animals it is important to think about agency without anthropomorphising it. In this project the relationship with Alba moves from one of interactivity into one of intersubjectivity, which for Kac is to acknowledge 'the social dimension of consciousness' and 'the complexity of animal minds' since each individual is 'unique' (2003, 100). In detailing particular physical and intellectual traits of Alba and rabbits in general,<sup>5</sup> Kac believes that this should provide some understanding on how a rabbit sees the world though not 'enough to appreciate its consciousness' (100).

Since the exploration of consciousness may well be the final frontier of our very human need to both understand and to be meaningful; in short, to make sense of ourselves and by implication our world, what does this mean for a rabbit? Does it too have consciousness? If so how would a rabbit's consciousness manifest itself? Would it be able to think in first person and experience 'qualia', that is, the subjective quality of a mental experience, such as, 'the redness of red' (given that rabbits like most mammals see solely in monochrome we already know it would only be able to see various shades of grey).<sup>6</sup> In exploring intersubjectivity between various species questions like these need to be taken into account in order to fully appreciate each individual life form. As Kac argues, 'molecular biology has demonstrated that the human genome is not particularly important, special or different' and can only 'be seen as part of a larger genomic continuum rich in variation and diversity' (2003, 100) Artworks, such as *GFP Bunny* reminds us of this, bridging the gap between humans and other species. As Ulli Allmendinger very aptly remarks:

One small hop for Alba, one large hop for mankind  
(2001)

### **Critical Art Ensemble**

RH: Do you believe in originality?

SK: No, only recombination and invention.

(Steve Kurtz from CAE interviewed by Hirsch 2005, 30)

When we do projects concerning transgenics, one of the most common questions participants ask is whether CAE is for or against genetically modified organisms (GMOs). The reply from group members is always the same: We have no general position ... The real question of GMOs is how to create models of risk assessment that are accessible to those not trained in biology so people can tell the difference between a product that amounts to little more than pollutants for profit and those which have a practical and desirable function, while at the same time have no environmental impact ... individuals are left with the implied obligation that they should just have faith in scientific, government, and corporate authorities that allegedly always act with only the public interest in mind.

(Critical Art Ensemble 2002b, 3)

Critical Art Ensemble (CAE.), through their 'recombinant theatre' have made technology, wetware, and transgenics, the focus of their work. For CAE, recombination 'typically denotes esoterica pertinent to molecular biology',<sup>7</sup> whereas

the digital is associated with 'information and communications technology'. However, for CAE both are not specialised and are in fact 'the foundations of a new cosmology' (Critical Art Ensemble 2000a, 151). They maintain that digital cultural resistances have evolved over the last century that use 'recombinant methods in various forms of combines'. For instance, 'sampling', 'detournement', 'bricolage', 'readymades', 'plagiarism', the 'theatre of everyday life', and so on (152). For CAE, recombinant theatre denies the privileged position of the auteur, director, genius or any other 'reductive, privatising category' (158).

Although originally working with multi-media, CAE since 1996 have concentrated on responding to the debates surrounding biotechnology. As 'tactical' mediaists the group have presented various interactive performance projects. These projects are underpinned by their concerns with the representation, development, and deployment of social policies regarding this technology. For CAE, tacticality includes a willingness to be amateurs, to try anything, and to resist specialisation. They see all media as useful as each mode can be effective within a given context (Critical Art Ensemble 2000b, 144). They propose that individuals will be empowered by gaining experiential knowledge of routine scientific processes that are central to biotechnology and performativity plays a key role (142).

CAE is made up of a transient collective of artists with diverse specialisations, for instance: performance, book art, text art, film, video, computer graphics, and critical theory. Their work draws inspiration from such resistance practices as Dada, Guerrilla Art Action Group, the Living Theatre, Rebel Chicano Art Front, and the Situationists; 'performances that invent ephemeral, autonomous situations from which temporary public relationships emerge, whereby the participants can engage in critical dialogue on a given issue' (Critical Art Ensemble 2000a, 157). For instance, CAE claim that their interest in the Living Theatre stemmed from a belief that it offered:

A proto-postmodern model of cultural production. The group quite consciously located itself in the *liminal* position between the real and the simulated. The Living Theatre ... contributed to the conceptual foundation now used to understand and create virtual theatre. It helped make it clear that for virtual theatre to have any contestational value, it must loop back into the materiality of everyday life.  
(Critical Art Ensemble 1997; italics mine)

CAE was founded in 1986 by Steve Kurtz and Steve Barnes, they met whilst at film school in Tallahassee, Florida. Other members have included Hope Kurtz (Kurtz's late wife), Dorian Burr, Claudia Bucher, George Barker, Ricardo Dominguez, and Bev Schlee. The present members are Kurtz, Barnes, and Schlee. Kurtz is an Associate Professor of Art at the University of Buffalo, Barnes runs a media centre at Florida State University, and Schlee works in a bookbindery. For Kurtz, the formation of CAE was a response to a perceived 'localised problem of cultural alienation' (Hirsch 2005, 28-29).

Through the years, CAE have sought to address concerns regarding the commodification and consumerism of technology owned and provided by national and multinational corporations by attempting to critique the dominant means of digital representation. They claim that digital technology has allowed power itself to go 'nomadic' through electronic networks. Therefore, resistance must go digital too (Critical Art Ensemble 1994). Deleuze influenced by Nietzsche posits the nomadic as an anti-dialectical tool to refute the Hegelian recuperation of negation and difference.

An approach that is rhizomatic (root-like) rather than arboreal (tree-like) (Deleuze 1999a, (11-12). According to CAE:

As the electronic information-cores overflow with files of electronic people (those transformed into credit histories, consumer types, patterns and tendencies, etc.), electronic research, electronic money, and other forms of information power, the nomad is free to wander the electronic net, able to cross national boundaries with minimal resistance from national bureaucracies. (1994, 16)

CAE's primary resistance strategy consists of making art that intersects with activist practices. In resisting naming locations in relation to their performance work, together with identifying genres, and even participating artists, their work interrogates politics of identity and authorship. However, as I have argued elsewhere, such blurring of the boundaries of performance points to a more general problematisation of genres since the stipulation of an 'open genre' makes demands which neither heterogeneity nor an emphasis on the local are able to meet (1999, 20). A work of art cannot be identified unless it carries the mark of some genre since there can be 'no genreless text ... yet, such participation never amounts to belonging' (Derrida, 1980: 211-12). In a similar way, CAE's individual performances participate in various performance genres, such as - bioart and digital performance, whilst not completely belonging to those genres.

Another strategy practiced by CAE is to disseminate their works as widely as possible by publishing collectively and anonymously in order to underline their resistance to privatisation. Although not against revealing their names they do not use their signatures in relation to their works. In the same way they feel they are free to plagiarise other artists' work. Between 1988 and 1994, they published five artists' books containing plagiarised poetry which have been sold to various libraries, universities, and museum collections (Schneider 2000, 124). A precursor to this strategy was the development of collage and cut-up techniques by Andre Breton and William Burroughs, where pre-existing texts or artwork were cut, re-ordered, and juxtaposed to create new works with new meanings, all aimed against the privatisation of art and cultural practices.

CAE's works consist of various configurations even for the same event, for example, lecture presentations, performances that are participatory, and books that contextualise their particular area of interest. For instance, one of their projects, *Flesh Machine* (1997-8), focuses on eugenics in the discourse and practice of current reproductive technologies. It features the genetic screening of audience members, the diary of a couple going through in vitro fertilisation, 'embryo murder', and involves lecture presentations, participatory performance, and a published book, *Flesh Machine: Cyborgs, Designer Babies, and New Eugenic Consciousness* (1998), which contextualises and critically analyses 'reprotech'. Although the book functions well in this capacity, for CAE it can not solve 'the problem of there being no lived experience – critical texts have very definite limits' (2000a, 164). Therefore, a means was devised to present accessible and comprehensive information relating to this subject under performance conditions.

*Flesh Machine* was first presented at Public Netbase in Vienna (1997), followed by performances in Ljubljana, Graz, Brussels and Helsinki. It begins with a lecture that discusses and explores various socio-cultural issues, particularly in relation to women, concerning reproduction and reproductive technologies. This is



followed by a section of the performance where the audience members become far more active in their participation. For example, they take part in laboratory experiments and are introduced to various sexual reproductive models and technology. For this event CAE created its own cryolab to accommodate living human tissue for possible cloning purposes – leading to performers and audience alike taking up roles as genetic engineers. The audience members were genetically screened to assess their suitability for surrogacy and/or donating DNA and cytoplasm - the donor-screening test was appropriated from an actual clinic. Computers were used to deliver and seductively display information on medical procedures by means of a CD-Rom. Unsurprisingly, the individuals that were allowed to reproduce themselves were consistent in regards to appearance, sex, and socio-cultural background; being mainly white, middle class, and usually male. For CAE, a result that underscores the political and social inequalities implicated in eugenics.

As a culmination of the performance, donations were requested from the audience to continue to allow a frozen embryo to remain in its cryotank. A life size video image of the embryo was projected together with a clocked countdown of the time left for the embryo to remain in the cryotank. If no payment is received, which has been the usual practice to date, the embryo is removed from the tank and allowed to defrost and as a result dies. An event that has been repeated during each performance, the audience in effect participating in the ‘murder’ of an embryo. A consequence that for CAE ‘speaks for itself – though on more than one occasion CAE has had to speak in the wake of their actions ... debating the ethical implications of “embryo murder”’ (Schneider 2000, 123).

Another work, *Society for Reproductive Anachronisms* (1999), also engaged the audience in dialogue about the problems of medical intervention in reproduction. However, CAE’s more recent performances have attempted to critically evaluate and respond to concerns regarding genetic engineering and the creation and release of new life forms into the ecosystem. One such work is *GenTerra* (2001-5), which addresses the creation of genetically modified organisms (GMOs).<sup>8</sup> For this project CAE collaborated with Bob Ferrell from the Department of Genetics, University of Pittsburgh; Linda Kauffman from the Department of Molecular Biology, the Mellon Institute; and Beatriz da Costa from the University of California, Irvine, an interdisciplinary artist, robotic art researcher, and co-founder of Preemptive Media – an art, activism and technology group.

The aim of the work was to do a ‘participatory theatre project’ that would allow individuals to be involved in the clinical production of transgenic organisms. Transgenics is the recombination of genetic material at a molecular and cellular level and as a result new entities are created which cross previous species boundaries. The release of transgenics into the environment raises wide spread concerns relating to ‘authority, nature, purity, danger, and profit’. The performance’s primary goal was an attempt to dispel the fear of GMOs within the general community, which for CAE is non-conducive to resistance. It was intended at the same time to empower people to assess for themselves which GMOs were essentially good and which were pollutants. Therefore, *GenTerra* which focuses on a fictional biotechnology company, was to do with creating ‘those dialogues around policies that deal with transgenics’ (Critical Art Ensemble 2002a). In short, by setting itself up as a profit driven corporate company which is also socially responsible, CAE’S *GenTerra* accentuates the conflicting debates which surround transgenics research.

At the performance I attended, which was at the Working with Wetware forum, organised by The Arts Catalyst (the science art agency) in London (2003),

there were apparent laboratory technicians wearing white coats (CAE and collaborators), a plastic tent containing lab equipment including microscopes, together with machines and paraphernalia to store and release transgenic bacteria. There was also a video playing on a monitor and computers presenting various 'pedagogical' multimedia. For CAE, pedagogical and political actions are not identical since 'pedagogy requires performance, spectacle, and *presence*. You want people to see it and then talk about it' (Critical Art Ensemble 2000b, 144; italics mine).

There is the assumption that pure expression can be present in an unmediated and therefore certain way as expressed by CAE in the above quote. However, Derrida denies this possibility with its belief in a single definable moment. For Derrida, the trace is 'the *pure* movement which produces difference' (1976, 62). The problematic of the trace articulates the recognition of a privileged term (presence) in a difference of opposition that could not appear as such without the opposition that gives it form (absence). In other words there can be no presence without absence. Therefore, the trace explains why a concept of plenitude of presence can be thought only within binary conceptual structures.

On entering *Genterra's* performance space, audience members are introduced to the facts and issues surrounding transgenics by the 'technicians'. They are also provided with containers and materials that allow them to make and store their own transgenic bacteria, later becoming actively involved in the area of risk assessment by deciding whether or not to release bacteria from the individual Petri dishes. The majority of the dishes had non-transgenic bacteria samples taken locally but one contained the transgenic bacteria. If the dish with the transgenic bacteria was chosen, a robotic arm would pick up the lid of the dish, leave it open for about five seconds to allow the bacteria to be released, and then replace the lid on the dish. As an audience member, I chose to release the bacteria which turned out to be the transgenic bacteria. I have to admit I was relieved to be later reassured by Kurtz that the bacteria were harmless.

In their latest publication *The Molecular Invasion* (2002), CAE claim that 'the power of transgenics and its knowledge base remains in the hands of bureaucrats (the regulating agencies) and the scientists and, therefore is outside democratic process' (65). Since they believe that the biotechnology industry is impervious to traditional forms of resistance they argue for a 'contestational biology', which involves participatory, pedagogical performances that combine everyday experience with critical reflection on the socio-economic and political issues concerning biotechnology. Their aim for cultural resistance is to create temporary public spaces where education and 'intersubcultural labour exchange' can take place with the key intention of 'opening knowledge bases' and 'dissolving boundaries of specialisation'. And in order for this to occur the 'hierarchy of the expert over amateur' must be suspended (2002, 65-66), that is, no longer should the scientists' discourse take precedence over that of the layperson. According to Michel Foucault, 'discourse is not the majestically unfolding manifestation of a thinking, knowing, speaking subject' but 'a space of exteriority in which a network of distinct sites is deployed' (1972, 49-55); the subject's position is a '*vacant*' place that may in fact be filled by different individuals. CAE in their performances problematise subject positions and challenge who is speaking and who is allowed to speak. They also reject transcendental categories and call for a Deleuzian rhizomatic model of resistance that harmonises visual pleasure with critical discourse and does not need 'to exist at the expense of the transparent representation of power relationships within a given process/object' (Critical Art Ensemble 2002, 71).

CAE's most recent performance *Free Range Grain* has added another unplanned dimension to their intention of creating a 'theatre of everyday life', in as much as they have found themselves in the midst of an aggressive investigation launched under bioterrorism laws. As Alisa Solomon writes, 'no doubt members of the Critical Art Ensemble had no desire to prove their point by personal example when they wrote ... "In the era of pancapitalism, only the corporations have the right to manage and control the food supply. If anyone else intervenes, it's terrorism"' (2005). Kurtz himself has been fighting bioterrorism accusations following the tragic death of his wife Hope on May 11 2004. Police were called to investigate the circumstances surrounding the death mainly due to it being sudden and unexpected. When police found what they believed at the time to be questionable scientific material Kurtz was arrested on suspicion of bioterrorism. In reality what they had found was equipment and materials that were to be used in a performance/exhibition of *Free Range Grain* as part of *Interventionists: Art in the Social Sphere* at the Massachusetts Museum of Contemporary Arts (opened May 30 2004). Although it was soon realised that the sequestered materials were harmless, charges were brought against Kurtz. The charges have since ranged from bioterrorism to 'mail fraud' and now apparently to bioterrorism once more, with others being implicated including Bob Ferrell who allegedly helped Kurtz obtain \$256 shipment of scientific supplies. Subpoenas have been issued to various theorists and artists including: Beatriz da Costa; Steven Barnes; Dorian Burr; Beverly Schlee; Claire Pentecost; Julie Perini; Adele Henderson, Chair of the Art Department, University of Buffalo; Andrew Johnson Professor of Art, University of Buffalo; and Paul Vanouse, Professor of Art, University of Buffalo. Authorities have also subpoenaed Autonomedia, CAE's publisher.

*Free Range Grain* was a collaboration with Beatriz da Costa and Shyh-shiun Shyu,<sup>9</sup> and had already been presented to a European audience at Schirn Kunsthalle, Frankfurt, Germany (September 2003). CAE's aim in this project was to test foods for the more common genetic modifications. In order to do so they constructed a portable, public laboratory where people could bring in foods that they found suspect for whatever reason and CAE would test them. CAE's intention was to create a forum where issues of food purity and global trade could filtrate into the realm of public discourse.

Following the arrest and confiscation of the project's equipment, the planned performance for the Mass. MOCA was abandoned. Over the last twelve months there has been widespread international support for CAE from a diverse range of areas including scientific journals such as *Nature* whose front page notes that:

As with the prosecution of some scientists in recent years, it seems that government lawyers are singling Kurtz out as a warning to the broader artistic community. Kurtz's work is at times critical of science, but researchers should nevertheless be willing to support him .... Art and science are forms of human enquiry that can be illuminating and controversial, and the freedoms of both must be preserved as part of a healthy democracy — as must a sense of proportion.

('On with show' 2004, 685)

Since the above event, CAE have spoken about their ordeal at many conferences and symposia around the world to raise awareness at the attempted suppression of artistic freedom, including at a Defence Fund arranged by the Arts

Catalyst at the Royal Institution of Great Britain in London in February 2005, which I attended. It is still unclear what charges if any will ultimately be laid against Kurtz and others as a result of a certain State implemented paranoia following the attacks on New York in 2001 and the ensuing military operations in Afghanistan and Iraq. However, what is certain in this instance is that CAE have blurred the distinction between performance and everyday life and in keeping with all their projects have also endeavoured to open up dubious government practices to public scrutiny.

## **ENDNOTES**

<sup>1</sup> For further information see 'Genesis' (2005b).

<sup>2</sup> For further information see 'GFP Bunny' (2005c).

<sup>3</sup> Phenotype is the outward, physical manifestation of an organism; in short, its observable traits. In contrast, genotype is the internally coded, inheritable information carried by all living organism and is used as a set of instructions for building and maintaining all living creatures. These instructions are found within almost all cells, they are written in a coded language (the genetic code) and they are copied at the time of cell division being passed from one generation to the next.

<sup>4</sup> The method of integrating the GFP into the rabbit's genotype has been by direct microinjection of DNA into the male pronucleus of a rabbit zygote. The zygote is the fertilized cell formed by the union of two gametes or reproductive cells (male sperm and female egg). See Kac (2005c, n.18) for more detailed information and references.

<sup>5</sup> See Kac (2003, 100).

<sup>6</sup> David Lodge (2002, 8)

<sup>7</sup> Recombination is the rearrangement of the genes in a chromosome of an organism that differs from either of that of its parents.

<sup>8</sup> GenTerra has been performed at several venues worldwide including the Magasin, National Centre for Contemporary Art, Grenoble, France (2001); twice in Winnipeg, Canada, at St. Norbert Centre for the Arts and a farmer's market (2001); at the Adelaide Biennial of Australian Art (2002); at the Henry Art Gallery, Seattle (April 2002); at the Oldham Gallery, Manchester, UK (October 2002); and at Working with Wetware: a forum on art using living biological systems, organised by The Arts Catalyst (the science art agency) as part of *CLEAN ROOMS: Art meets biotechnology*, National History Museum, London (2003)

<sup>9</sup> See Critical Art Ensemble (2004)

## **REFERENCES**

Allmendinger, Ulli. 2001. 'One small hop for Alba, one large hop for manking'. Eduardo Kac's website (Originally published in *New York Arts Magazine* 6, no. 6 (June 2001))

<<http://www.ekac.org/ulli.html>>, accessed August 20 2005.

Andrews, Lori B. 1999. 'Genetic Predictions and Social Responses'. In *Electronica 99: Life Sciences*, ed. Gerfried Stocker and Christine Schopf. New York: Springer Wein.

Broadhurst, Susan. 1999. *Liminal Acts: A Critical Overview of Contemporary Performance and Theory*. London: Cassell/New York: Continuum.

Critical Art Ensemble. 1994. *The Electronic Disturbance*. New York: Autonomedia.

- . 1997. 'Conversation between CAE and Mark Dery - Part 1'. Critical Art Ensemble interviewed by Mark Dery. Net Theory. <<http://old.thing.net/wwwboard1/messages/415.html>>, accessed August 18 2005.
- . 1997-98. *Flesh Machine*. Public Netbase Museumsquartier, Vienna; Beursschouwburg (Art and Science Collusion), Brussels; Kiasma Museum of Contemporary Art, Helsinki; Labor Gallery, Graz; and Kapellica Gallery, Ljubljana.
- . 1998. *Flesh Machine: Cyborgs, Designer Babies, and New Eugenic Consciousness*. New York. Autonomedia
- . 2000a. 'Recombinant Theatre and Digital Resistance'. *The Drama Review* 44, no. 4 (Winter): 151-65.
- . 2000b 'Critical Art Ensemble: Tactical Media Practitioners'. Interview by Jon McKenzie and Rebecca Schneider. *The Drama Review* 44, no. 4 (Winter): 136-50.
- . 2001-5. *GenTerra*. A live performance in collaboration with Bob Ferrell from the Department of Genetics, University of Pittsburgh; Linda Kauffman from the Department of Molecular Biology, the Mellon Institute; and Beatriz da Costa, an interdisciplinary artist, robotic art researcher, and co-founder of Preemptive Media. Presented at Magasin, National Center for Contemporary Art, Grenoble, France (2001); other venues include St. Norbert Center for the Arts, Winnipeg, Canada, the Henry Art Gallery, Seattle (April 2002); the Oldham Gallery, Manchester, UK (October 2002); and Working with Wetware: a forum on art using living biological systems, organized by The Arts Catalyst (the science art agency) as part of *CLEAN ROOMS: Art meets biotechnology*, National History Museum, London (2003)
- . 2002a. 'Critical Art Ensemble: GenTerra'. Interview with Steve Kurtz. from CAE. *Creative Capital Channel: Granting Innovation in the Arts* <[http://channel.creative-capital.org/project\\_69.html](http://channel.creative-capital.org/project_69.html)>, accessed August 10 2005.
- . 2002b. *Molecular Invasion*. New York: Autonomedia.
- Critical Art Ensemble, Beatriz da Costa, and Shyh-shiun Shyu. 2004. 'Free Range Grain' <<http://www.critical-art.net/biotech/free/index.html>>, accessed August 10 2005.
- Deleuze, Gilles, and Felix Guattari. 1999. *A Thousand Plateaus: Capitalism and Schizophrenia*. Trans. Brian Massumi. London: Athlone.
- Derrida, Jacques. 1976. *Of Grammatology*. Trans. Gayatri Spivak. Baltimore: Johns Hopkins University Press.
- . 1978. 'Structure, Sign and Play in the Discourse of the Human Sciences'. In *Writing and Difference*, trans. Alan Bass, 278-93. Chicago: University of Chicago Press.
- . 1980. 'The Law of Genre'. 1980. Trans. Avital Ronell, *Glyph* 7: 202-32.
- Foucault, Michel. 1972. *The Archaeology of Knowledge*. Trans. Alan Sheridan. New York: Random House.
- Hirsch, Robert. 2005. 'The Strange Case of Steve Kurtz: Critical Art Ensemble and the Price of Freedom'. *Afterimage* (May-June): 22-32.
- Kac, Eduardo. 1998. 'Transgenic Art'. *Leonardo Electronic Almanac* 6, no. 11, <<http://mitpress.mit.edu/e-journals/LEA>>, accessed August 20 2005.
- . 1999. 'Genesis'. Life Science: Ars Electronica 99 Website <<http://www.aec.at/lifescience/>>, accessed August 27 2005.
- . 2001. 'Trans-Genesis: An Interview with Eduardo Kac'. Eduardo Kac interviewed by Lisa Lynch (originally published in *New Formations* 2001). Kac's website <<http://www.ekac.org/nabout.html>>, accessed August 28 2005.
- . 2003. 'GFP Bunny'. *Leonardo*. 36, no. 2: 97-102.

- . 2005a. 'Eduardo Kac: Biographical Note'. Eduardo Kac's website <<http://www.ekac.org/kacbio600.html>>, accessed August 20 2005.
- . 2005b. 'Genesis'. Eduardo Kac's website <<http://www.ekac.org/geninfo.html>>, accessed August 27 2005.
- . 2005c. 'GFP Bunny'. Eduardo Kac's website <<http://www.ekac.org/gfpbunny.html>>, accessed August 28 2005.
- Lodge, David. 2002. *Consciousness And The Novel*. London: Secker & Warburg.
- 'On with the show: Why scientists should support an artist in trouble'. *Nature* 429, no. 6993: 685.
- Schneider, Rebecca. 2000. 'Nomadmedia: On Critical Art Ensemble'. *The Drama Review* 44, no. 4: 120-31.
- Solomon, Alisa. 2005. 'Terror Hysteria gone Absurdist'. *The Nation*. <<http://www.thenation.com/doc/20050801/solomon>>, accessed August 10 2005.
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## **BIOG**

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