

## GENETIC ART & CULTURE

ANDRE ´ BRODYK

Name: Andre ´ Brodyk, Artist.  
E-mail: [andr@ozemail.com.au](mailto:andr@ozemail.com.au).  
Web site: [www.ozemail.com.au/~andr/](http://www.ozemail.com.au/~andr/).

This paper considers the value to art, science and culture of contextualising a form of contemporary art with genomic science and biotechnology as presented from the perspective of an artist. As an artist I am interested in the interpretive, metaphoric and transformative qualities of art practices and art works informed by genomics and biotechnology. I propose that art based on a genetics metaphor, not only translates art in terms of the way art is made and thought about, but also serves another creative function culturally. This is in terms of the transformative effects that such art has upon the way genomic developments are considered, understood, shaped and incorporated into society, specifically as a consequence of the transformational and interactive qualities of such art. This impacts on the development and direction of genomic research and biotechnology.

Art based on a genomic metaphor is therefore, not merely illustrative of and subordinate to genomic scientific inquiry. "Art does not reproduce the visible it makes visible",<sup>1</sup> this pithy quote by Paul Klee epitomizes such a position for contemporary art relative to genomics. In this paper I propose instead that, such art be imagined as a fictional equivalent to the operations of genetic material within a living organism. By conceiving of art and science metaphorically, as being analogous to the composition and functioning of genes comprised of DNA, one finds their ultimate expression in the character/composition of a larger form, a living organism. Culture can be thought of as such a living organism. Since culture like art and science is neither fixed nor static, but a complex arrangement possessing the attributes of living matter it is appropriate to consider culture in this way.

Art and Science are like genes comprised of DNA in that neither Art, nor Science function in isolation, but are intrinsically part of a larger complex and multileveled networked, living system. Both have the capacity to combine with and be recombined within kinetic situations including the connecting of evolving events, whereby elements which would otherwise not exist or be unconnected are brought together, thereby generating new genetic material. Such events include society's changing relationship to new developments in biotechnology and genomic research. In relation to an art gene, it is specifically these transformative and interactive metaphoric DNA, which form the peculiar composition of such an art gene. Seen this way these art genes will be by association, both affected by as well as affecting of, the DNA of other genes, including science and therefore the complexion and character of the whole organism, culture.

Art based on a genomic metaphor therefore, has the capacity to transform the overall composition of the genome of the organism culture specifically through the genetic composition of this art, which gives it an ability to respond to, interact with and to affect perceptions and understanding of genomic science and biotechnology. The creative capacity of this art acting as a transformative medium makes creative connections possible in relation to a broad range of issues centred on genomics and biotechnology and elicits such connections in the mind of the viewer of such art. Such issues, moral and ethical include; the co modification of biotechnology, eugenics, identity, interspecies trait transference and communication, ideological reassessments of species

taxonomies and the convergence of computer technology and IT with micro biology for example. Art practices and art works based on a genetics metaphor therefore offer both a valuable means of interpretation, as well as a critique of such aspects of genomic research developments and biotechnology. It is specifically because of this connection to biotechnology and genomic modelling that such transformative qualities can be seen as being metaphoric art based equivalents to the transformative and re-organisational quality inherent within living matter.

The following quotes by Jack Burnham<sup>2</sup> are worth considering here.

“While survival, adaptation, and regeneration form the cornerstones of biological existence, it may be that culture is fundamentally a means for implementing, qualitative transformations of man’s biological status.”

“Art then, and the whole image making drive may be means for preparing man for physical and mental changes which he will in time make upon himself.”

“If man is approaching a time of radical change, one not controlled by natural selection and mutation, what better non scientific way exists for anticipating self and regeneration (not procreation) than the spiritually motivated activity of artificially forming images of organic origin?”

Art based on genetic models and processes represent a relatively recent development of the early 1990’s. This art may be considered to be **Genetic Art** and the artists who create this art can be considered to be **Genetic Artists**. American artist and writer George Gessert is credited as being the first to make reference to Genetic Art in 1993.<sup>3</sup> My use of this descriptor differs from that used by Gessert, since I equate Genetic Art and its functioning to that of genes and as I state later in this paper I have developed five categories of Genetic Art. In 1998 American economist Jeremy Rifkin<sup>4</sup> whom I will paraphrase, proposed that recent developments in biotechnology and genetics have provided the occasion by which qualitative realignments of the human psyche could occur in response to such developments. Furthermore those societal responses in turn would affect the character and direction of such technology and research. Rifkin maintains that societies’ concepts of nature and the view of existence are being changed, to accommodate new organisational relationships with all other species. He suggests that new organisational relationships are being brought about by biotechnological transformations and “are being accompanied by an equally significant philosophical transformation” which he refers to as a new form of alchemy called Algeny. Rifkin uses his theory of Algeny to identify and explain the new philosophical perspectives and developing new consciousness of contemporary society in the light of new biotechnological developments. Such philosophical transformations are according to Rifkin, attributable to the practitioner of Algeny, the Algenist. Genetic art and Genetic Artists are not part of this philosophy or equation. What I see, in terms of a genetic make up. Of course, developments in genomic research and biotechnology cannot reside in isolation in scientific discovery. The fact that geneticists and micro biologists are members of subcultures and culture overall does not in itself facilitate the means by which such developments become part of broader cultural discourses. I suggest that it is the intervention and operation of Genetic Art works and processes within the cultural genome and the philosophical re-contextualisation afforded by Genetic Art, which makes possible the engagement of both broader as well as transformative discourses. In so doing, this also prevents idiosyncratic interpretations and assumptions from occurring within a specifically scientific culture, thereby also enabling scientists revisualizations, which might otherwise become myopic.

Seen this way, in addition to affecting the composition of the genome of culture, Genetic Art therefore also affects the psychological and philosophical health of both individual gene segments, as well as the whole of the organism culture. This paper introduces examples of Genetic Art works and processes.

A recent example of international tendencies in Genetic Art was held in New York last year at the "Exit Art" Gallery with a comprehensive contemporary survey exhibition entitled "Paradise Now".<sup>5</sup> This exhibition featured the work of 39 international artists, working across a diverse range of media, a number of whom are presented in this paper.

Exhibitions such as this have demonstrated that genomic research implications and the potential applications of biotechnology and biomedicine have inevitably become ensconced within mainstream cultural discourses. The art based cultural application described in this paper, reinforces the proposition that the biological function of genomics has been usurped, in favour of the sociological function of genomics as is articulated by Dorothy Nelkin and M Susan Lindee.<sup>6</sup>

## Genetic Artists:

Through my studio based research I have developed five categories of Genetic Art and Artist. This work is manifest as follows:

(1). Virtual sense (2). Physical sense (3). Biotechnology with living (4). Merger of Biotechnology and living with digital technology. (5). Synthetic organic/inorganic recombinant ready mades.

In the following section of this paper I will be referencing art and artists primarily from category no. 2 of my classification type with the exception of one artist, Eduardo Kac whom I recognise from category no. 4. The following information is presented as examples of Genetic Art via a brief survey of some work by these artists. The information presented is assembled from various accounts by the artists themselves, or from what has been stated about their work by others rather than by myself. As I indicate in the concluding part of this paper, it is not my intention to offer a critique of this work individually, but rather to suggest the function of a contemporary art form within contemporary society and culture. In paraphrasing the contents of each, I hope to assist with the reading of the visual material presented with this paper.

Catherine Wagner is a San Francisco based artist photographer whose visual investigations employ the medium of photography. Several insight full accounts<sup>7</sup> of Wagner's work is to be found in her 1996 monograph which I draw upon and paraphrase herein along with statements made by the artist herself, to reference some of her works which specifically deal with genetics. Such accounts indicate that Wagner constructs "still life's" found in laboratories she has visited, using methodologies which in many respects quote those used by scientists. Each image is characterised by careful organization. Wagner manipulates scale, orientations and engages in the isolation of an object/form/ specimen from its surrounds to focus in on particularities and specific qualities/properties. The intensity of scientific research, its rigorous attendance to technical requirements is evident in her approach to her work. Seeing, which is very important to both art making and to scientific research, is evident in the quality and approach to her work. Processes, substances, phenomena's and their actions, properties and qualities must be ascertained by careful analysis and observation. The conceptual basis of Wagner's work is evident in her selection of subject matter and the knowledge of the power of alluding to what is not represented. The type is emphasised not the individual. To this end she carefully avoids any inclusion of people in her photographs. For example in the piece entitled "Glove Box", Wagner draws the viewer's attention to the absence of any person or human form by the selection of a machine, which comprises latex rubber gloves. This machine's gloves not only mimic the form of human hands but also demonstrates that it only functions by being worn by a human operator. Wagner has achieved this by utilising a frontal and up close orientation.

"-86 degree freezers (12 areas of concern and crisis)" contains the archives of twelve different diseases including alcoholism, Alzheimer's, aids and breast cancer. The anonymity of her samples and the crispness of her photographs emphasis the technical environment and absence of human life. In this work " -86 degree freezers (12 areas of concern and crisis)" this occurs by the references to the human diseases contained inside as well as the opened rather than closed/sealed door.

The pristine quality the analytical clarity of her imagery reflects a work process analogous to the analytical methodologies orderliness, precise recording of data and experiments and the controlled and sterile quality of the laboratory environment. Genetic engineering and the attempts to influence the genetic structure of the body is the scientific activity being reflected upon.

**Eduardo Kac** is a Chicago based artist and writer who is concerned as much with the social aspects of communicative processes as he is concerned with creating and considering new dimensions of aesthetics. Eduardo Kac's work deals with communicative processes on both an interspecies level as well as on an intraspecies level, which includes human, animal and machine interaction. According to Kac he created an art form based on the use of genetic engineering techniques to create unique and living beings, which he refers to as "Transgenic Art"<sup>8</sup> (and which I include as an example of my category no. 4. of Genetic Art/Artist). Detailed description of the artist's work referenced in his web site and paraphrased herein, reveals a process which merges multiple media and biological processes to create living hybrids in which dialogical interaction /communication between the life forms is a key element in the work. His work includes pieces in which actions carried out by Internet participants have a direct physical manifestation in a remote gallery space. As Kac elaborates throughout, such art assists in the contextualising of the notion of DNA perceived as the master molecule, by shifting the emphasis onto the whole organism and its environmental context.

"Genesis" created in 1998/9, is a multi media work comprised of a gallery display with a petrii dish containing bacteria, a flexible micro video camera, a UV light box, a microscope illuminator connected to a video projector and two networked computers. One computer worked a Web server (streaming live video and audio). The other computer was responsible for DNA music synthesis. The local video projection showed a larger than life image of bacterial division and interaction, which is occurring in the petrii dish and seen through the micro video camera. The left and right walls contain large-scale text applied directly onto the wall, the text on the left wall is a sentence extracted from the book of Genesis and is presented again but in an altered form on the right wall. The gallery display enabled local as well as remote (Web) participants to monitor and participate in the evolution of the work. This was possible because the remote participants on the Web could interface and intervene in the process of creating the art by turning a UV light on and off each time they clicked onto the site. This action had a direct effect upon the bacteria in the petrii dish. The energy impact of the UV light is such that it disrupts the DNA sequence in the plasmid, accelerating the mutation process. The bacteria have been genetically modified by the insertion of enhanced versions of a fluorescent jellyfish gene. Kac's bacteria had also been genetically altered in another and very important way.

The key element in this work, involves the creation of an "artist gene", a synthetic gene that Kac invented. The synthetic gene was made by translating a sentence from the book of Genesis firstly into Morse code and then converting this into the acronyms for the DNA base pairs according to a conversion principle specially developed by the artist for this particular work.

The sentence in the work from Genesis reads as follows, "Let man have domination over the fish of the sea, and over the fowl of the air, and over every living thing that moves upon the earth".

According to the Artist, this sentence was selected for its contentious nature and the implications of a divinely sanctioned humanity's supremacy over nature. The text, from the book of Genesis appears on the left gallery wall and on the right wall the text appears in altered version. This altered version derives from the altered gene (biblical) sequence, which had been extracted from the bacteria plasmid and eventually decoded back into English again at the end. Because of the mutation that occurs, the gene sequence was also mutated, as such when it is translated back into English the text is altered. The second computer, which formed part of this installation, was responsible for the synthesis of DNA music. This music was composed from the same synthetic DNA gene whereby the DNA base pairs were converted into musical notes rather than into Morse code. The boundaries of interaction between carbon based life forms and silicon based digital data are shown as permeable membranes.

**Karl Mihail and Tran T Kim –Trang** are Los Angeles based Artists who co- founded Gene Genies Worldwide ©. GGW© is the vehicle used by Tran and Karl for addressing issues involving

the co modification of genetic discoveries. Reference to their own promotion literature<sup>9</sup> found both in electronic form on their web site or in publications which accompany their exhibitions and paraphrased herein, reveals that their work poses questions using a satirical discourse. Such a discourse concerning the consumerist nature of new discoveries in biotechnology touches on notions of eugenics, morality and the funding bias imposed by the international corporate sector on Genetic research. As their promotional material reveals, Gene Genes Worldwide© have embraced the notion that Genetic engineering provides the technological foundation for a commercial eugenics market, a consumer option beyond the consideration of desirable physical characteristics to include desirable psychological traits, designer personalities. GGW© critiques of Genetic engineering involves the use of strategies which entail their complicity in the process they are critiquing. In 1998, as part of their strategies, to address these issues, GGW©, created a unique interactive exhibition located in the heart of a commercial shopping precinct in Pasadena California. The installation, which ostensibly took on the guise of a brand new boutique, comprised of Tran and Karl attired in white laboratory jackets, along with assorted paraphernalia and vestiges of biotechnology. According to Mihail and Kim Trang,<sup>7</sup> GGW© clients were afforded the unique opportunity to acquire personality traits normally associated with creatures from the animal kingdom. As appears in their promotional literature and part of the installation transgenic traits on offer include; the cunning of a fox, canine loyalty, feline intuition, reptilian cool, survivalist properties of a cockroach and the harmonious sisterhood traits of honey bees. The creation of designer personas, the ideal human, has led them to adopt the methodologies and rhetoric of a mass consumerist culture. As Mihail and Kim-Trang acknowledge in their work, GGW© critiques use the pervasive methodologies of advertising and the persuasive authority of marketing strategies to influence an individual's perceptions and desires to attain socially arbitrated standards of perfection. Both physical and psychological. The persuasiveness of exaggerated claims, the ability to lure with the promise of something new and better, the use of the spectacle of hype through advertising publicity and self-promotion, is carefully orchestrated through books, pamphlets glistening shop front window and floor displays and the launch of new desirable products as traits.

The Creative Gene Harvest Archive", mixed media work, comprised of plexiglass, glass vials, human hair and text. GGW© has us believe that each of the glass vials contains hair purportedly derived from "some of the most creative individuals in the arts and sciences", with each glass vial having the name of the creative person inscribed on plexiglass in front of each one. GGW© maintains that this work began with the intent "to harvest, store and utilize the genetic codes for creativity collected from some of society's most exemplary and recognised creative individuals in order to design and imbue future personalities with these same traits."

Susan Rankaitis is a Los Angeles based artist whose work from the early 1990's focuses on the abstraction of genetic codes and structures as metaphors for worlds both physical and metaphysical. Rankaitis' describes her work based on genetics as hybrids, involving an aesthetic derived from the combining of the languages of painting photography, drawing and monoprinting. What has been stated about her work by the artist herself and from various sources,<sup>10</sup> a number of which I paraphrase throughout, is that her work is characterised by indeterminacy, fragmentation, collage, montage, layering and experimentation. Her work seeks to unfold before the viewer and to reveal gradually the interconnectedness of all things in nature. Rankaitis does this by creating mixed media hybrids within which she hides and reveals clues, traces, diagrams and maps to the human biochemical blueprint a form of internal micro landscape. While her inclusion of maps and diagrams refers to the factual and to scientific information, Rankaitis ensures that they are never complete, only fragments, partial information, visual clues which offer the viewer the opportunity to reconstruct, and compile the content and the meaning. Rankaitis's pieces operate as internalised landscapes the terrain is the domain of the genetic structure of an

organism. Her strategy involves creating surfaces which reflect and recede into layers of visual data, bringing together parts momentarily in space and time, thereby fusing imagination and cognition in to poetic metaphors of understanding. Her alchemic use of photographic processes and chemistry involves bleaching, tinting and brushing rubbing and staining photographic chemicals and emulsions onto the large sheets of light sensitive photographic paper. Using multiple projections, printings and negatives, and imagery and text appropriated from journals books and newspapers, she slices, arranges and structures her fragments in ways, which allude to genetic methodologies involving recombinant processes. In addition to her 2 dimensional work Rankaitis has also created large sculptural forms, which provide 3D interpretations of fragments, the building blocks of physical being.

**Susan Anker** is a New York based sculptor and theoretician whose work is based on, the textual/ scriptural nature of genetics, and specifically the potential of the imagery of karyotypes to evoke a language. As she states ,<sup>11</sup> her work “investigates the semiotics of the genetic code and its conjunction with other forms of language systems”. Susan Anker has stated previously <sup>12</sup> and as is paraphrased herein, that her interest in the karyotypes’ structure, which is organised from, left to right, parallels the way text is read in western culture. For Anker changing the karyotype to a form that’s read up and down evokes another language system perhaps suggestive of Chinese calligraphy. Since chromosome means "coloured body" in Latin, she has included the chromosomal composition of whole bodies in wall charts representations making three-dimensional objects out of signs from biological diagrams. According to her the methodology she employs, “ is reminiscent of a laboratory technician who fashions a chart, matching identical pairs of chromosomes in their places, like a shorthand language”. For Anker, looking at images of DNA, and focusing on the chromosome was like experiencing a different picture each time, each photograph evoking a different kind of conceptual material. She has made a series of sculptures out of natural sponges suggestive of the sponge-like character of the chromosome, sugar crystals, because of the chemical composition of the helix, in which there is always a sugar molecule present and steel wool, which was chosen as medium to replicate the hairy properties of the chromosomes Susan Anker observed under magnification. In looking at her work one becomes aware that the “pictogrammatic” signs of the karyotype are used as abbreviated blueprints, a code script for the materialization of ideas into abstract visual and three-dimensional form. Anker’s work is according to the artist an acknowledgement that Science has always represented itself metaphorically since an experiment is only a representative of a natural process. Science has also continually diagrammed itself. Models, maps, charts, and schema are an integral part of scientific communication. Such representations however, which ostensibly appear objective, are in fact anything but neutral and are revealed as such through the work of artists dealing with visual abstractions of systems, rather than outward appearances.

**Gail Wight** is an interdisciplinary conceptual artist who lives and works in Berkeley California. Wight’s artistic repertoire has involved the use of multimedia installations, electronic media, text, industrial ready mades as well as live animals. Wight creates and executes conceptual experiments bringing together art and science to critique aspects of genetic engineering and biotechnology. In paraphrasing what the artist has said of her work previously, <sup>13</sup> the work references biotechnology as part of the expanding history of scientific impacts and effects on concepts of health and humanness. In the following two works a new form of eugenics is being referenced. “Future Fight” is a work comprised of an archetypal blackboard, covered with drawings and descriptions of existing drosophila mutations. Inserted into the blackboard were two monitors. On one, a video of a woman who is a geneticist is seen shuffling through a big red book that is the bible of fly mutations and is giving genetic counselling to two drosophila that are on a video playing on the other monitor. They are seen circling in a courtship dance and eventually engage in sexual intercourse, while the female geneticist is talking to them. Another work this time from 1998 entitled “Zoo Kit”, contains a ready-made aged wooden children’s microscope box inside of which are four racks of test tubes as well as a single tube in the centre. Each tube has dissipated DNA in a liquid solution. One rack contains land animals, another sea creatures the third air born creatures the fourth rack contains DNA from flora. The central tube contains the

DNA for a zoo keeper (human). Such works as these exemplifies Wight's ability to meld a satirical discourse, together with informed scientific research into works, which have a beguiling curiosity engagement for the viewer.

The work of these artists is neither a comprehensive representation of the many issues, implications and applications of genomic research, nor a representation of the multifarious ways in which art can be made based on a genetics model. In presenting the work of these artists I do not offer a critique of their individual work nor do I offer a critique of genetic engineering or biotechnology. Instead I have proposed a metaphoric equivalent to genes and their genetic properties and processes, which comprise an organisms' genome from the perspective of an artist (Genetic). I have presented this through the example of a contemporary form of visual language called genetic art as is manifested in some of its various forms, evidenced through the work of several Genetic Artists. I have proposed that culture can be thought of in terms of a living organism, comprised of (amongst others) art and science genes and DNA. Furthermore, that it is specifically the genetic composition of genetic art comprised of transformative and interactive DNA, which enables genetic art the ability to affect the character and composition of both the segments (other genes), as well as the whole of the genome of culture. I have focused on an intersection of contemporary art and genomic science and technology, to reveal a reciprocal relationship, which exists in the form of value to art, culture and genomic science, seen in terms of the state of psychological health of human culture. This paper offers a critical perspective of the role of contemporary art in culture, based on a genomic metaphor as revealed through the work of Genetic Artists. Through Genetic Art one becomes aware of the idea that it is more a matter of the cultural use and applications derived from any genomic research than the scientific veracity of such research.

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