

# The Artistic Characteristics of Biological Art

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**Abstract:** The new application scenarios and technology applications of biological art provide people with new ideas and ways of expression. In this space, biologists and artists can conduct more levels and richer research from different perspectives and in different ways. Biological art has made great progress in breaking through the rigid "dialogue" between biological artists and organisms to the flexible application of biological materials, the aesthetic paradigm of ecological art, and the bold expression of biological images, so that this complex has a wider tolerance. In this context, art and biotechnology in the traditional sense are converging and merging, and the cross penetration of biotechnology and art industries is spawning a new trend that is redefining design and its future. In their mutual cooperation, they try to find more and deeper cultural problems, so as to obtain more accurate and novel artistic expression.

**Keywords:** Biological Art; Aesthetic Appreciation; Artistic Concept; Interdisciplinary.

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## 1. The Origin and Development of Biological Art

In Edward Katz's 1997 work *Time Capsule*, the artist first proposed the concept of "Bio Art": the creation and manipulation of life based on the latest biotechnology. Katz is also the artist who first proposed the concept of "biological art". He not only limited the media of biological art, and determined that only living life is the object of biological art, but also limited the application technology of biological art, and determined that biological art should use genetically modified biotechnology or cloning biotechnology. However, with the development of biological art, the public has questioned the definition of Katz's biological art, believing that it has certain limitations. Because Katz's definition of biological art can be applied to a small range, the narrow concept of biological art limits the creation of some biological artists.

In recent years, the creation of biological artists is no longer limited to the transformation of living life, and there are more and more lectures and exhibitions about biological art. Artists, critics and many people in society gradually pay attention to biological art. Based on this development status, curator Wei Ying proposed in 2018 that the concept of "pan-biological art" is innovative to a certain extent, providing an open proposition for the in-depth development of biological art. The word "pan" indicates that it is not necessary to do living works, which enriches the selection of biological art creation media. Wei Ying's definition of biological art is relatively broad, which is the extension of the concept of biological art, and the category of biological art has been further expanded and iterated.

## 2. The Artistic Characteristics of Biological Art

### 2.1. The Dissolving Subjectivity

In biological art, people artificially confuse the boundary between the work and the real existence, dissolve the subject-object relationship between the artist and the audience, and weaken the subjective status of the artist and the audience. On

the one hand, the artists' subjectivity disappeared. Biological art, as a new art practice, has multiple factors influencing the formation of biological art works in the process of formation, and it is these factors that constitute the complex form of biological art works. Therefore, the finished product of biological art is also unpredictable. Therefore, for the biological artists, they cannot impose their will on the biological art works, they do not have a decisive role in the art works. The multiple influencing factors are mainly reflected in the following three aspects: First, the biological media used by artists, such as plants and animals used by artists, have autonomy and are not subject to the will of artists; The second is the biological technology of transforming life, such as artificial gene editing, artificial intelligence, brain-like research, etc. These technologies have intelligence; Third, the impact of the current environment on living organisms also has its own rules. On the other hand, the audience's subjectivity disappears, and with the expansion of art works in time and space, the boundary between audience and artist becomes more and more blurred. From the perspective of aesthetic experience, the theme of biological art works is often the unity of uncompletion and openness, which needs to be jointly constructed by the audience in the process of aesthetic experience. In the process of appreciating the works, the audience can not only perceive the life dynamics of the biological works, but also perceive the transformation of the living bodies in real time, providing new creative materials for the biological works, so that the audience can become a part of the creation of the works. In the process of aesthetic experience, a work of art is not only a simple work of art, it also becomes a carrier of ideas and a medium for social interaction. The audience is not only influenced by the artwork itself, but also experiences the theme implied by the biological media, conveying a new cognition to the society, and making a second creation and dissemination of the artwork.

### 2.2. Communication Initiative

Biological art pays more attention to the audience's active communication experience and emphasizes the audience's active participation. The communication relationship formed by biological art is the emotional agitation felt by the audience

in the tense stretching distance created by biological art, so that the aesthetic goal can deeply communicate with the audience's mind, and then affect the audience's individual concept, and the audience will actively pass on their own aesthetic experience to form social opinion. In the whole process of biological art communication, the audience is not only a simple recipient of communication information, but also an active participant in the communication of works, which will further blur the distance between reality and art. For example, the Genetically Modified Bacteria Release Machine, co-created by Beatrice da Costa's team, guides the audience to click a button and release E. coli in the exhibition hall, and the air in the exhibition hall acts as a communication medium connecting the E. coli and the audience, allowing the audience's body and E. coli to actually communicate in real time and space. For another example, Genesis Katz uses the Internet as an interface to display both inside and outside the exhibition hall, no matter where the audience is, they can press the button to become an experimenter to change the creation. Katz's creative intention makes the relationship between art works and audience become closer and actively participate in communication. It can be clearly seen from here that biological art tries to bring art beyond the space and time of the exhibition hall, and narrow the space and time distance between the audience and the art works, art and reality, which is an exploration emphasizing the initiative. Encourage the audience to confuse the difference between life and art, so that the audience has time to reflect, the deeper the degree of reflection, the longer the duration of experience and emotion, and the intensity of communication will be extended. Furthermore, biological art creates a new industrial chain between business, science and art, and promotes the interaction between art and society. With the continuous strengthening of communication, the boundaries of disciplines gradually melted, and biological art appeared in front of the public as a medium for active communication of information.

### **3. An Analysis of the Creative Practice of Biological Art**

The collision of various disciplines is still on the rise in the 21st century, and biological art will become the living body art explored by multiple intelligent disciplines with the deliberate call of the century. With the advent of the cloned sheep "Dolly" and a series of research results such as human gene sequencing, biological art has entered a new era. The biological art produced under the guidance of biological science and technology is closely related to the biological state, biotechnology, art presentation and social morality. In the study of biology, according to the traditional habits, the characteristics of biotechnology and artistic expression are classified, and biological art will be inclined to the situation and characteristics of biological technology or artistic expression according to different emphasis. Contemporary bioart involves almost all scientific and technological fields and art forms, and is constantly expanding and changing, making it difficult for bioart researchers to evaluate it comprehensively. As a result, a large number of artists began to study the concepts and materials related to biology, which injected new vitality into art design.

#### **3.1. Biological Art of Living Life: Music Creation after Nerve Cell Staining Imaging**

As the name implies, living biological art is a living living art, it is a living living art, can also be said to be a living biotechnology. It includes gene inheritance and transformation, life cloning, living cells and bacterial culture and so on. The media of living biological art works include humans, animals, plants, algae and fungi. Its artistic expression is based on the premise of life, which is its basic and main characteristic. It has the process of life growth, the characteristics of organisms and life, the process of change and development of life, and its own growth, development, aging, death and so on. Its artistic expression in the category of art, there are cell biological art, microbial art, environmental biological art and so on, they are also an important part of modern biological art. In a narrow sense, the biological artists represented by Katz express a thinking and exploration of life and the future development trend of human beings in their works. Artists use living data, living tissues and living features in living forms to carry out artistic practice and creation with vital significance, and to manipulate, edit and appreciate new life processes. The slicing of life-form systems into incomplete, relatively independent and isolated states is displayed and collected in a living and living way. It does not seek the carrier of a certain genre and style, nor does it seek the media extension of traditional experience, nor does it try to have any connection with human history, but draws its artistic inspiration from the sudden change of biotechnology, and uses a new form of artistic life to show it.

The brain of a typical healthy person has about 200 billion nerve cells, which form the basic units of nervous system structure and function. A nerve cell is a type of cell with long synapses (axons) that can be connected between cells by protuberances. In these bumps, electrical impulses travel along one neuron to another, thus forming a specific electrical connection between different neurons. This connection enhances the possibility of excitation or inhibition and regulates the body's activity by transmitting electrical signals. Using a state-of-the-art imaging system that samples mouse brain tissue, a team of researchers led by Dr. Stephen Smith of Stanford University School of Medicine has been able to quickly and accurately locate and calculate the relationships and details between nerve cells, as well as capture and classify color images of various nerve cell connections. Magnetic resonance imaging, which provides a picture of the brain's function and anatomy, is used to study the human brain. To be able to hear acoustic music, the scientists assigned each neural activity pattern to a musical instrument, so that when a person listened to acoustic music, the pitch of the instrument could change with the intensity of brain activity, and the original thoughts were translated into music.

#### **3.2. Static Life Bioart - Algae Arranged in Visual Patterns**

In terms of the broad connotation, bioart is represented by Mitchell and Miles, who believe that contemporary bioart involves a wide range, referring to the art of the artist's reconstruction of bioart works after each biological feature is digitized, visualized, principled, conceptualized and imitated, or both compatible art forms. To be specific, it is an art form that rediscovers, excavates and refines one or more biological features with organisms as the carrier, and then presents them

concretely. It is characterized by inanimate and living organisms or both. Biological art without biological characteristics is a static life form, including all biological tissue images, biological structure function and emotion simulation, biological gene sequencing group maps, etc. These artworks are displayed and collected in a static way of life. Static biological art is a static and inanimate biological art work, which corresponds to the biological art of living life. Biological artists digitize, map, static, principalize, conceptualize, and mimic the biological characteristics of each biological life, and then present them through various forms of art. Static body biological art includes all electron microscope imaging, biological gene sequencing, biological tissue images, biological structure projection and animation, biological tissue fiber printing, static body biological music, biological body painting cell video device, etc, see Figure 1. The British microscopist and artist Klaus Kemp is known for his meticulous arrangement of Victorian-style diatom patterns under the microscope. Inspired by the arrangement of Victorian patterns, Kemp finds, captures, cleans, organizes, and arranges micrometer patterns of diatoms under a microscope for a number of bioart exhibitions. Diatoms are tiny, single-celled algae with chromatophores that are surrounded by the smallest organisms on Earth, jewel-like shells and mud, with an estimated 100,000 living species. These beautiful single-celled phytoplankton, the lowest level of the food chain, use light as their main food source to produce large amounts of nutrients. Unlike their mossy green brethren, diatoms can form beautiful, diverse shapes and colors.

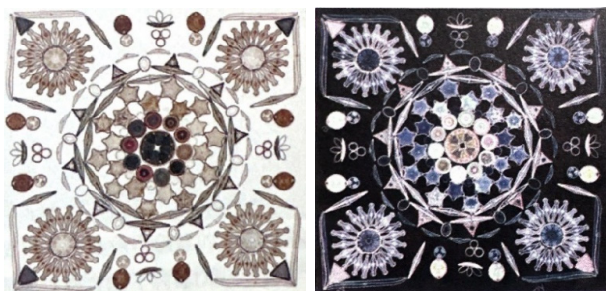


Figure 1. Arrangement 246 (Diatom Frustules) (2002)

### 3.3. Concept and Behavior Biological art -- Ant Colony Intelligent Behavior Art

Concept and behavior biological art is the organic combination of living and static body media, and has a broader definition in connotation, and more "pan-biological" characteristics. Generally speaking, the narrow meaning of "biological art" is a concept of artistic creation through the cognition and understanding of life ontology, and then the cognition and discovery of life phenomena, with "manipulation" and "exploration" as the core concepts. Living organism is the medium of biological art with life as the core, and it is also the basis of experiment and creation. The broad connotation and the concept of wet media are more focused on comprehensive media in the general sense, using static or dry body media to discuss life and biological art, and its connotation is not based on living beings. There are many interpretations of the art of behavioral biology, usually the interaction between the actions of artists or groups and life, in a particular time and space, life itself is also an object of behavioral expression; The other is that the artist has successfully induced the intelligent behavior process of biological groups through careful arrangement and planning,

and produced different natural biological artworks.

Born in the island nation of Ecuador and now living and working in Cologne, Germany, Kuai Shen's observations of the collective intelligent behavior of insects can be traced back to his childhood, when he loved to observe insects and began to think about how they were related to each other. In the process of studying at university, he has been carrying out his own experimental ant installation art, and eventually built his own ant nest. Shen explores the social similarities and differences between humans and ants through four key areas: control, self-creation, self-group, and emergence. Shen believes that humans can learn from the way ants build miniature ecosystems, facilitating and consolidating the interactions of life. In works such as *Oh! mlgas* and *Manifesta 9*, Shen has created an audio-visual installation of ant swarm activity that explores the relationship between human technology and ant sociality. The device consists of two main parts: biology (consisting of ants, fungi, and leaves) and technology (consisting of turntables, microphones, video, and computers). This is a non-human-mediated ecology that monitors the social complexity of leafcutter ants by amplifying their vibrational signals and tracking their division of labor. In this particular installation, the two turntables echo the movement within the ant colony, thus affecting the movement of the record needle on the vinyl. Interacting with a computer vision program through contact microphones, turntables and video cameras, the life of an ant colony: presents itself as a complex scratch and scratch effect.

## 4. Conclusion

Biological art makes it clear that it will change the ethical and cultural values of society. Educationally, by making science accessible to the general public, bioart can raise public awareness of important ethical and political issues in biotechnology. Politically, bioart can also foster a critical attitude toward biotechnology-only. From the institutional point of view, the continuous development of biological art can break through the academic situation of the separation of the two cultures. Biological art, as a new art form, has innovative ways of thinking, pioneering art practices and the threshold of biotechnology, and even includes more far-sighted creatures to create and transform, which is an important factor that leads to the continuous development and self-definition of this biological entity. With the cross-integration of art and biology, artists in the field of art have shown a high interest in joining the ranks of this revolution, and the emerging works have injected new vitality into it, forming an art form based on multi-culture, opposing art only technology and emphasizing morality. It does not pursue the bearing of a certain genre and style, nor does it expand the media in the traditional experience, nor does it try to associate itself with the meaning of human history, but draws artistic inspiration from the rapid progress of biotechnology, and presents it in a new form of artistic life, urging the reconstruction of cultural and aesthetic meanings, as a budding global phenomenon.

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