Science art as an impetus for the development of high-tech cities

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Abstract: Science Art over the past 20 years has become one of the most relevant and rapidly developing forms of contemporary art, it reveals the possibilities of innovative interdisciplinary projects in which an artist and designers work in collaboration with scientists, engineers and technologists, expanding the boundaries of the concept of "art", on the one hand, and revealing the humanistic potential of the latest achievements of science, on the other. These processes also affect the urban environment. High-tech urban clusters, accumulating significant scientific potential, through the opening of science art laboratories, in which collaborative projects of researchers and artists are carried out, stimulate the clusters development, using the intuitive principles of art. This article analyzes the examples of a successfully functioning Ljudmila laboratory in Ljubljana, the International Synthetic Aesthetics project, the My Neighborhood social networking project, and describes the case of the restoration of a historic elm tree in Biscarrosse, France. According to the results of the study, the authors conclude that cooperation between scientists and people of creative professions can turn out to be a significant vector for the development of not only science and art, but also social life in the cities where the practice of Science Art is used.

Key words: Science Art, urban studies, contemporary art, participatory art, innovations

1. Science art in the context of contemporary culture
Science Art is art created as a result of collaboration between an artist and a scientist (of course, projects in the field of Science Art can be done by one person, combining scientific methodology and knowledge of contemporary art (as the well-known pioneer of bioart J. Davis does), but much more often in the Science Art practice, we are dealing with joint project activities of scientists and artists). An important feature of Science Art is its resort to new technologies (such as robotics, the latest achievements in the field of genetic engineering, etc.) or its rethinking of the existing technologies in the context of the urgent problems of society (we can refer to the work of Revital Cohen and Tour van Balen “B/NdAlTaAu” 2015, dedicated to the problem of using rare earth metals, as an example). Science Art exists at the “junction” of science and art, updating contemporary scientific research in the semantic field of contemporary art.

As an already established format of interaction between a scientist and an artist, there are various formats of artists' residence in scientific laboratories, the “Artists-in-labs” format, which implies being in a common space of fruitful scientific and artistic communication, and the exchange of knowledge and ideas between the participants in the process. A "textbook" example of such an exchange is the project of the famous
performer M. Abramovich "Measuring the Magic of Mutual Gaze" in 2011, which gained access to the scientific equipment for visualizing the activity of the human brain in real time. An important aspect of this project was the involvement of the audience as they had the opportunity to look both at the artist's performative activities and at the everyday process of human communication from an unexpected side, as they say, from the "inside out", exploring the phenomenon of non-verbal communication and checking the readings of devices. This project did not entail scientific discoveries, however, in our opinion, it became a curious example of aestheticization of modern scientific developments and a “growth point” for further projects in which artists can set tasks of a different nature.

Projects in the field of Science Art are possible not only within the laboratory, they can also be brought into public space, the city space. Contemporary art focuses on the participatory component, and it is of key importance in the Science Art. At the moment when an artist and a scientist take their project out into the urban space, all its inhabitants become accomplices of this artistic “doing”. For example, owing to the use of scientific methods, a Science Art artist Olga Kiseleva managed to "resurrect" an old elm from Biskaros, an important tree for local residents, which was sung in the songs of troubadours, and is a part of the "collective memory" of the place. The tree itself died from Dutch elm disease (which the artist managed to find out during the study carried out in collaboration with a group of scientists), but its sprouts survived. Together with the staff of the National Institute of Agronomy of France (INRA), the artist found out that the Siberian elm breed is resistant to the fungus and it was with it that the branch of a dead tree was hybridized. This sprout soon grew in place of a medieval tree, which could not fail to please the local community.

In an interview, the artist says: “The project began with the fact that I was invited as an artist to create a work in place of a tree. Using the Duchamp method, we proved that the rescued tree is a work of art, and we also made a sculpture-case that protected the seedling in the first years of its life. And now we are not just planting trees: everything happens in the form of a performance” [1]. It is curious that the idea of “resurrecting” a tree by hybridizing it with another tree belonged to the artist. Indeed art today is not the creation of objects, for example, paintings or sculptures, but “a professional field in which an experiment and a critical view of things are considered to be the main values” [2].

Thus, the relevance of this study is in the analysis of how innovative Science Art practices are transforming urban life by entering the zone of public dialogue between science, art and society.

There are a large number of scientific papers describing the collaboration of scientists, designers, artists, society and the city. D. Dixon and colleagues, for example, analyzed how this happens in the “SimbioticA” laboratory of the University of Western Australia, which invites scientists and artists from all over the world as residents [3]. The problem of public participation in discussions about science is described in the works by Kac [4] and Jasonoff [5]. The specifics of urbanism and public spaces in Russia are well represented in the collected works “Microurbanism” [6] edited by Oksana Zaporozhets and Olga Berdnikova. As for research in the field of Science Art, this issue is well developed both in foreign [7, 8, 9] and domestic discourse [10], however, issues related to the impact of this type of artistic practice on the urban space are still poorly clarified.

2. Science Art laboratories as a growth point of a modern city

Universities, multidisciplinary medical and scientific centers, platforms for research start-ups, centers of contemporary art, all these institutions are associated with a high standard of the city life, they attract creative, educated, energetic people who, in turn, can make the region high in demand. The openness of a society in which the exchange of ideas, the formation of creative unions and project groups, as well as lively public discussions stimulate not only cultural, but also technological and economic growth of the cities. Science Art laboratories, in which masters of science and artists create common projects aimed at applying
the latest technologies to the discursive field of contemporary culture, are becoming today another
invariable attribute of the metropolis of the future.

In Russia, despite its great scientific potential and the high level of education of the population, Science
Art is perceived as a relatively new and under-represented phenomenon. Nevertheless, now there is a
science art laboratory in Moscow, the projects are being implemented in St. Petersburg and Kaliningrad,
and a creative association in Yekaterinburg works regularly. This article will present successful examples
of the relationship between science, engineering, design and art in Russia and in the world.

The first example is the international research project 'Synthetic Aesthetics', which brings together
synthetic biology, art, design and sociology [11]. The idea of the project was to collaborate with the leading
experts in these areas for research, design and construction of biological objects. Biologists focused on
the process of organic transformation, designers and artists selected the optimal and aesthetically valuable form
for these objects, and the task of sociologists was to trace and describe the communication between
scientists and artists. The conceptual part of the laboratory's work was devoted, on the one hand, to a new
round of discussions about how much the hybrid organisms, created by the scientists, need design and
whether it is possible to call the forms, that arose in the process of evolution and natural selection of species
in living nature, the design, while on the other hand, this project was a part of a joint effort of the Science
Art artists, which are aimed at "engineering adjustment of society's attitude to the new technologies,"
[12] as laboratory participants O. Cutts and H. Iwasaki wrote about it. The collaboration began with the
arrangement of the project sites in the USA, Europe, Australia and Japan in 2010, when scientists and artists
first spent two weeks in the laboratory and then two weeks in the studio of their international exchange
partner. This form of interaction led to unusual results: designers learned new ideas for their work through
a deeper immersion in biology, and scientists, in turn, learned from designers originality and derogation
from the dogmatic limitations of science. As the project participants note, in the spaces of "Synthetic
Aesthetics" the impeccable purity of the scientific laboratory and the chaos of the art workshop collided,
generating unexpected discoveries for everyone. As a result of the project, a number of articles and books
were published. New forms of scientific criticism of such interdisciplinary research were also proposed,
one of the project participants, Daisy Ginsberg, whose work is related to design and who documented the
course of work, writes that "the new role of the designer is a form of social criticism" and the designer's
goal is "to develop a type of applied speculative bioethics. Studying science and participating in discussions
with scientists" [13], which is especially important for broadcasting the knowledge revealed by scientists-
artists and the questions they have raised in the field of public discussion.

It should be noted that the experience of developing such a laboratory work is available not only to the
world's leading universities and countries at the peak of economic development. For example, in one of the
small Eastern European capitals with a population of just over 250,000 people, Ljubljana, 'Ljudmila' Art
and Science Laboratory has been successfully operating since the mid-1990s. The manifesto of this project
reads: "Ljudmila engages in the development and popularization of open culture, free licenses
and software, and in new ways of data distribution. It detects the ways through which the transformations in the field of
information and communications technologies affect the society and encourages the corresponding cultural
and artistic practices." On the basis of "Ljudmila" various projects in the field of art, multimedia, new
technologies are regularly implemented, educational programs, performances, performances of the modern
theater are held. Ljudmila works closely with the like-minded people around the world and is an example
of an open dialogue between creative people who are filled with ideas and aspirations. For example, in
2013, the laboratory organized the first 'Strictly Analog' festival in Ljubljana, the festival also has venues
in Graz, Trieste and Tokyo. While it is in no way contrary to digital technology, the festival introduces and
makes the practices of artists working with organic analogue sound and visual effects, “visible”. Their work
consists of audiovisual events, discussions, seminars, temporary facilities and public gatherings, presented
in different locations in Ljubljana. In addition to events in Ljubljana itself, Ljudmila Laboratory has been
organizing the annual PIFcamp since 2015, a week-long international hack camp held in the Triglav National Park, near Ljubljana. PIFcamp is an open source project that helps explore the intersection of art and technology. During the gathering, the camp holds practical seminars, lectures and excursions. But the most important thing here is the process of spontaneous cooperation and exchange of experience.

3. Science Art in Russian cities
At the moment in Russia, Science Art is developing mainly by means of the enthusiasts energy in local communities. In this regard, the work of the art theorist, artist, and curator of the branch of the National Center for Contemporary Art (NCCA) in Kaliningrad, Dmitry Bulatov should be mentioned. He is the author of several books on the theory of Science Art, his works of art are in museums around the world from Miami to Budapest. Dmitry organizes projects in Russia and abroad, regularly receives invitations to become a jury member at prestigious international exhibitions and the biennale of contemporary art. Another Russian science art project of an international level is the Yekaterinburg association of artists "Where Dogs Run". Founded in 2000, the group successfully operates at the intersection of media, science and bio-art. The group's works participate in major projects, including international biennales of contemporary art, they have been nominated for prestigious prizes more than once, the works are found in the collections of the State Tretyakov Gallery, the NCCA, as well as in private collections in France and Austria.

Speaking about science art in Russia, one cannot fail to mention the work of the Moscow institution LABORATORIA art & science space under the leadership of Daria Parkhomenko. It was LABORATORIA who organized the aforementioned project "Measuring the Magic of Mutual Gaze" in 2011 in Moscow, inviting the living legend of contemporary art Marina Abramovich and proposing a new interpretation of the performance “In the presence of the artist” through the projection of Science Art. These projects solve a number of problems, firstly, by popularizing contemporary art and science, secondly, by strengthening international cultural ties, and thirdly, by maintaining the status of the cities as the cultural centers worthy of the attention of travelers.

4. Projects in the field of Science Art as a tool for the formation of new social "assemblies"
The resort to new technologies allows contemporary artists to "reformat" the established idea of a public urban space as a "predetermined", unchangeable one. The art critic B. Groys, examining this issue, notes: “Each individual city dweller, moving through modern public spaces, is more absorbed in his own personal, private interests and tasks. Crowds on the streets and city traffic are experienced by this person exclusively, or at least predominantly negatively, as something that interferes with their fast and unhindered movement around the city”[14]. The restructuring of such public spaces, which are often a space not of a dialogue, but of alienation, is a task that many artists set themselves today. In this context, it is appropriate to recall the words of C. Bishop: "Art is understood simultaneously as the space that is too alien to the real world, and at the same time the only space where experiments are still possible"[15]. C. Bishop is a researcher of the so-called “Art of interaction” practice (art of relationships, relational art), in which artists set the task of organizing cooperation forms between people and of constituting various relationships models and joint creative activity. The concept of "relational aesthetics" [16] is introduced into circulation by the curator and art theorist N. Bourriaud, who considers some artists of the 1990s (including Ph. Parreno, F. Gonzalez-Torres, C. Höller, R. Tiravanija) to be examples of such artists.

A new "round" of experiments, about which C. Bishop wrote, falls on the 2000-2010s, when artists began to turn to modern technologies to build new social "assemblies". Let's consider one of these cases. In 2017, in Bonn, as a result of the collaboration of the artist I. Zakharov-Ross and researchers from the Institute of Information Systems and New Media, University of Siegen, the “My Neighborhood” project was launched at the Frauenmuseum in Bonn, dedicated to “building connections” between people from
different cultures and faiths. Women migrants from different countries, India, Pakistan, Syria, Egypt, Afghanistan, Nigeria, etc., who came to Bonn, became the participants of the project. At that time, there was the problem of integrating new residents into the city space, the problem of communication and the search for a “common foundation”. With the help of scientists (using Arduino technology), the project participants showed their routes around Bonn on special graphite maps, recorded audio comments, and also brought memorabilia from their “previous life” to the museum. A visitor who came to the museum could walk up to the map, put on headphones, slide a finger over the graphite, and this gesture started the audio recording. A visitor could hear the voice of an unknown person, telling, for example, about their impressions of the local market and compare them with their own, finding common ground. Visitors had the opportunity to meet the heroines of the project, and soon the museum space was turned into a living platform, where new communicative situations and connections emerged, and the Bonn space turned into that common foundation (literally: “common ground”), which united life and semantic “fields” of its inhabitants, old and new.

5. Conclusion
Summing up the above, it should be noted that thus far Science Art has revealed only a part of its potential. This interdisciplinary practice turns out to be a creative impulse for scientists, an expansion of the toolkit and technological base for artists, a “growth point” for urban infrastructure and a factor in strengthening the positive image of a modern city. Science Art raises topical questions about the nature of modern age, offers to look at technological progress as a living process and translates important humanizing values into the urban space. This is how the strategies of modern urbanism are gradually being formed, in which projects such as bridges and public spaces made of living trees, grown by F. Ludwig’s team of designers scientists, are possible [17].

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