

Early Connections between Science and (Visual) Art

Text: [Till Bödeker](#) & [Peter Tepe](#) | Section: [Section: On 'Art and Science'](#)

Abstract: w/k invites art historians to explore the historical connections between science and visual art, in order to expand the prevailing focus on contemporary examples with earlier ones. Initially, a number of already published contributions that illuminate early connections between science and art are listed, followed by introducing a structured approach to categorizing such connections.

w/k is concerned with the connections or interfaces between science and art, with visual art being at the center of interest. As the development of contributions since 2016 shows, examples of contemporary art receive the most attention. By creating the section *Early Connections Between Science and (Visual) Art*, the editorial team wants to strengthen historical processing and counteract the narrow focus on current examples. In particular, art historians are invited to publish relevant articles in w/k. Some guiding questions for historical processing:

- Were there connections between science and (visual) art at a certain time – say in the 1960s? If yes, which sciences, art movements, individuals were involved?
- Which leading figures, in addition to Leonardo da Vinci, can be seen as historical anchor points in the discussion of current developments and crises relevant to w/k?

Assigning w/k articles to the new section

There are already some w/k contributions to early connections between science and (visual) art, which we list below. We arrange them in chronological order based on which decade the science-art-connections first occur in an individual. Since the existing science-art-connections are more precisely determined in the easily accessible articles, we confine ourselves in the overview to a few generally held statements.

Around 1900

- [Icy Hieroglyphics: Wilson Bentley's Snow Crystals](#) – Bentley's photomicrographs are early testimonials of a connection between art and science.

1950s

- [Herbert W. Franke: Border-crosser between Science and Art](#) – Herbert W. Franke is a physicist and cave explorer, but also a pioneer of computer art. He began artistic experiments in the photo lab as early as the 1950s. There are two more w/k articles about Franke: [Herbert W. Franke: Science-Fiction Author and Art Theorist](#), [Herbert W. Franke VISIONÄR](#) (only available in German)

1960s

- [Helmut Schweizer: Wissenschaftskritische Kunst](#) (German) – His art practice was determined by

his rejection of nuclear physics, which led to the development of the atomic bomb. Helmut Schweizer came to this conclusion already in the 1960s. Further article about Schweizer: [Helmut Schweizer – The Chain Reaction of Thought and Action](#)

1970s

- [Karl Otto Götz as a Scientist](#) – The painter Karl Otto Götz also worked as an empirical scientist in the field of perception and personality psychology in the 1970s and developed a test for aesthetic preference – the *Visual Aesthetic Sensitivity Test* (VAST). More contributions about Götz as a psychologist and border-crosser [here](#).
- [Science in Bookplate Design: An Interview with Graphic Artist Harry Jürgens](#) – The science references emerged with Harry Jürgens in the 1970s.
- [Detlev van Ravenswaay: Space Art](#) – His concept of Space Art/Astronomical Art was developed by Detlev van Ravenswaay in the late 1970s.

1980s

- [Renato Santarossa: Glass Cooperations](#) – Since 1984, all of his glass works have been created in close collaboration with technicians, laboratory chemists, and physicists.
- [Border Crosser Between Science and Visual Arts](#) – Multiple connections between science and art have emerged with Peter Tepe since 1989: [Vorlesungstheater](#), [Science-Related: Four New Series](#), [Video Interview 1: Peter Tepe](#), [Strukturverwandt & philosophiebezogen](#) (German). From June 2023 on, the series related to Tepe's 75th birthday *Connections Between Science and Art for 35 Years* will take place in w/k – in cooperation with Mythos-Magazine (www.mythos-magazin.de).

Prospects for historical research

Our article is primarily addressed to art historians, as well as to historians of science who are intrigued by the investigation of past intersections between science and art. Noteworthy examples include the English botanist and photographer Anna Atkins (1799–1871), who is considered the first person to employ photography for the scientific documentation of plants, or Agnes Denes (*1931), who approached ecological issues and collaborated with scientists to shed light on the environmental impacts of land use and urbanization.

In order to classify various artistic practices in a comparable manner, we currently differentiate seven types of science-art connections, to be presented in the next section. Theoretically, we are open to expanding this list by introducing additional types of connections if required. Moreover, we are always keen to refine the existing definitions for greater precision. A new emphasis of this work is to encourage a focused search for earlier manifestations of each type of connection.

The Science-Art Connections with the Current Definitions

For the definitions of science-art connections 1-3, we lean on our five-year summary: [5 years w/k: what happened so far. Part I and II](#) (in German).

1. Science-related Art

Science-related art refers to instances where an artist draws upon theories, methods, or results from a particular scientific discipline during their creative process. This engagement with science invariably takes place within the framework of a distinct artistic program, which may or may not be a part of a broader art movement.

The concept of science-related art provides a straightforward and easily graspable structuring of the expansive field of art and science.

- In principle, there can be specific forms of science-related art for *any* scientific discipline, with each form responding to the current state of development in that discipline.
- From the concept of science-related art, *more specific terms* can be derived when considering individual sciences. Examples include math-related, physics-related, chemistry-related, biology-related, ecology-related, sociology-related, philology-related, and philosophy-related art.
- Moreover, on a more general level, one can distinguish between *natural-science-related* and *humanities- or cultural-science-related* art.

- When it comes to further specifying these individual forms of art, the approach used in defining science-related art can be employed: For example, *math-related* art is defined as when an artist draws upon theories, methods, or results from *mathematics* during their creative process.

Option: Early forms of science-related art in general, and ecology-related art in particular, can be investigated by art historians. It might be particularly fruitful to start with those individuals who are both scientifically and artistically active – in w/k they are referred to as *border-crossers*; more on this later – and to classify their *scientific* activities in terms of the history of science.

2. Tech-related Art

In a *broader* sense, tech-related art is present when an artist uses *older* technology in their creative process. In a *narrower* and more relevant sense for w/k, tech-related art is defined when an artist employs *novel* technology in their work. Art that uses an older technology such as weaving is considered tech-related art in the broader sense, while art that uses new forms of media technology belongs to tech-related art in the narrower sense.

The engagement with technology invariably takes place within the framework of a distinct artistic program, which may or may not be a part of a broader art movement. We suggest using the terms *technology-related* art and *tech-related* art synonymously at a general level.

Two forms of tech-related art in the narrower sense can be distinguished:

Form 1: A new technology – such as a video camera, a drone – is artistically used in visual arts, resulting in artistic video films, drone images, etc. Similar occurrences take place in other art forms, such as music.

Form 2: A new technology is *thematized* in visual arts but not *utilized* directly. For example:

[“Drone Art” between Visualization and Mediation](#)

Technology-related art can also be science-related. For instance, in Space Art/Astronomical Art, the technology of space travel as well as findings from physics are employed. Hence, it's necessary to distinguish between art that is primarily or even exclusively technology-related, and art that combines a technological basis with a scientific reference.

Option: Art historians can focus specifically on early forms of technology-related art. Complementary questions related to the history of technology and science can be added as possible extensions.

3. Collaborations between Science, Technology, and Art

We currently distinguish between five forms of cooperation:

Form 1: An artist collaborates with scientists/technicians/companies to achieve certain artistic goals.

Form 2: Visual artists undertake specific tasks within a larger scientific research project.

Form 3: Artists participate in the transformation of institutions and organizations.

Form 4: Artists contribute to *transdisciplinary* projects. Wolfgang Krohn cites the example of “the creation of new lakes in a landscape deeply altered by brown coal surface mining, which is now being ecologically and economically rehabilitated by bodies of water that have never existed there before.” We refer to these as *unique design projects*.

Form 5: Scientists and technicians undertake specific tasks within a larger artistic design project. Artists who realize large installations (like Christo and Jean Claude) may employ scientists to solve certain knowledge problems that arise in the design process.

Differentiation is needed between artists who produce *artistic phenomena* and those who engage in *other areas of life* and primarily contribute to solving problems specific to those areas.

Option: Early collaborations between science, technology, and art can become subjects of historical research – possibly supplemented by questions specific to the history of science and technology.

Connections 4-6 between Science, Technology, and Art are discussed in [5 years w/k: what happened so far. Part I and II](#) (in German).

4. Border-Crossers between Science and Art

In w/k, individuals who are both scientifically *and* artistically active are referred to as border-crossers. There are also border-crossers between science, *technology*, and art.

- The art produced by a border-crosser is often science-related art, but not always. Karl Otto Götz is

an example of this.

- With regard to an individual's development, they can only be referred to as a border-crosser once they have reached the stage of *independent scientific work*.
- A person can be considered a border-crosser at the *study level* if they study both an artistic and a scientific discipline. Mixed forms are also possible: an independently working artist additionally writes a scientific dissertation; an independently working scientist additionally undergoes artistic training, etc.

Option: In the fields of art history and scientific research, early border-crossers can be specifically sought after.

5. Art-related Science

Art-related science exists when a scientist in teaching, research, or professional publications relies on artistic concepts and/or methods and/or results. The art-related scientist can be seen as a mirror image of the science-related artist. This area is currently only represented by the publisher in w/k.

In the case of both science-related artists and art-related scientists, there are, firstly, border-crossers and, secondly, collaborations between at least one artist and at least one scientist.

Option: Early forms of art-related science can be specifically sought after.

6. Artistic Research

Peter Tepe and Till Bödeker are working together as a team on the topic of Artistic Research (AR) since 2022.[\[1\]](#) They distinguish three discourses: artistic research first as an educational policy concept, second as an art theory, and third as a programmatic approach that individual artists follow in their practice. A brief look at the educational policy discourse: The term "artistic research" has gained a central significance in the context of the Bologna Process, whose main aim was to introduce the three-tiered degree structure – Bachelor's, Master's, Doctorate – across Europe, and not only at universities but also at art academies. During the restructuring of art academies, the conviction was and still is predominant among many that not only scientists research and gain insights but also artists – albeit in a different way than scientists.

Among the theories of artistic research (AR), which can be classified as *art theories*, two groups can be distinguished: One group perceives AR as something distinct from other types of art, while the other

sees research as an integral part of *all* art production. These fundamental positions, which logically exclude each other, are represented in several variants.

Artists who associate themselves with artistic research interpret it *differently*, for instance, they might undertake certain types of research, reflect on the premises of their own artistic activity, or follow a specific method (which could require constantly combining artistic work with the production of reflective texts). Hence, in artistic practice, multiple understandings of AR are in effect, which can be *more accurately defined* and *distinguished* from one another at the scientific level.

In attempts to clarify, it turns out that the artistic research carried out by individual artists can be more precisely determined in some cases, for example as:

- science-related art,
- art-related science,
- collaboration between science and art according to this or that form of cooperation.

As more precise determination is always preferable at the scientific level, the above statements about science-related art also apply to those forms of AR that can be assigned to science-related art. It's important to consider whether there are forms of artistic practice understood as artistic research that do *not* fit into the groups discussed in sections 1–5.

Option: Art historians can specifically search for early forms of artistic research, benefiting from the proposed distinctions ([see w/k contributions to artistic research](#)).

7. Structural Similarity between Scientific and Artistic Activity

The seventh science-art connection was introduced by Peter Tepe in the contribution [Structural Affinity & philosophy-related](#). Such a structural similarity exists when the artistic way of working is oriented towards a specific technique of producing scientific texts.

Option: The question of whether there are other early forms of such structural similarity opens up another possibility for art historical research.

The individual science-art connections can occur in isolation, but can also be combined: for example, an artist who makes physics-related art can cooperate with scientists/technicians/companies and understand what they do as artistic research (combination of 1, 3, and 6). This gives rise to the art historical *option* of specifically searching for early forms of a particular combination.

[1] The series *On Concepts of Artistic Research*, published in the journal Mythos-Magazin, will be continued jointly from delivery 6. Their publication is expected in the summer of 2023.

Picture above the text: Anna Atkins: *Dictyota dichotoma* (1849/50). Photo/Cyanotypie: [Spencer Collection, The New York Public Library](#).

Tags

1. early art-science-connections
2. Peter Tepe
3. Till Bödeker