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## FRUITFUL MISUNDERSTANDINGS: ARTISTIC RESEARCH IN ART/SCIENCE WITHIN THE EPISTEMOLOGICAL TURN

The current trend of an increased mutual interest between the arts and the techno-sciences can be addressed as an “epistemological turn”—it not only results in the production of new forms and narratives, but unfolds in poetic and critical ways of alternative knowledge production, especially including hands-on practices with shared media, materials, and matters. Weary of the gilded cage of metaphor and representation, symbolic intervention, formalistic evocations, or critique at a safe distance, such techno-science related artistic strategies call for an analysis that is not based primarily on imagery but on material media and epistemic connections, meanwhile the techno-sciences themselves have become powerful producers of aestheticized images today. Phenomena that once assumed the form of artistic images are being translated, scattered, and fragmented into a variety of instances of mediality—they are not only means to an end but fully integrated elements of the aesthetic object. However, these encounters and entanglements should not be seen as a new paradise of interdisciplinarity; they rather continuously provoke misunderstandings—however fruitful both for the actors engaged in such relationships,

and for outside observers. And what if the greatest misunderstanding would be the mantra-like claimed art/science binary itself?

World wide, art/science programs, residencies, funding schemes and institutional initiatives spring up like mushrooms, giving raise to research activities branded as *artistic research* or *arts-based research*. However, the focus is often placed on the different finalities and methodologies of understanding, researching and communicating, while the two distinct fields are, indeed, equally affected and inextricably linked precisely through the technological media and apparatuses of our time—a fact that clichés inherent in this binary tend to obscure. Of course, despite the pervasive trend of interdisciplinary encounters enabled by the broad field of art seen as a pluripotent catalyser, stereotypic misunderstandings persist here and there. We may still find, on the one hand, researchers in the natural sciences who apprehend collaborations with an artist in terms of “beauty,” “creativity” or “genius.” Others, driven by a clear utilitarian mindset, would expect an artist to assist them in visualizing their findings to communicate in a more convincing way to their community. On

the other hand, there may also still be artists who, when crossing the threshold of a scientific laboratory, will perceive an army of technicians potentially at their service, inclined to materialize their preconceived ideas. Such misunderstandings will rarely be fruitful.

“Fruitful misunderstandings” within the framework of an “epistemological turn,” on the contrary, should turn participants’ different expectations, asymmetric relationships and institutional constraints into productive tension, by overcoming binary thinking inherited from the two cultures debate initiated by Charles Percy Snow<sup>1</sup> as the most prominent point of reference since the 1960s, and not waiting for sociological miracles for a much desired “third culture”<sup>2</sup> suddenly to happen. Some fundamental questions need to be raised: Why is it that only the natural sciences are still considered the only “true sciences”? Why does the very notion of the “humanities” not include the status of science as claimed in the German term of *Geisteswissenschaften* coined by Wilhelm Dilthey<sup>3</sup> with the intention to consider research in the humanities to have equal value than in the natural sciences. Dilthey’s goal was to establish *Geisteswissenschaften*’s proper methodological foundation, distinct from, but equally ‘scientific’ as the so-called natural sciences which he considered being reduced to positivist cause and effect logics, and neglecting the complex relationships at stake with regards to human “understanding.” To go even further: Why are the arts, then, so often associated primarily with the humanities, and not with engineering, while especially in the media arts many practitioners today have a background or a focused interest in the natural sciences, and highly specialized expertise in the most diverse technologies? How can one see the arts then, still today, as natural science’s “natural other”? At the same time, natural scientists often aim at clearly distinguishing themselves from engineers, in a way comparable to artists distinguishing themselves from designers. Artists and scientists generally converge in their desire to reflect on *how they know what they know*, instead of straightforward utilitarianism with regards to the subsequent tools they use. Since the inquiry into

how knowledge and cultural production itself operates—the aforementioned “epistemological turn”—it is worth to refer to philosopher of sciences Hans-Jörg Rheinberger’s concept of “epistemic things”<sup>4</sup> coined to describe not only the tools and agencies used in scientific research, e.g. model organisms and technical apparatuses, but also the special social dynamics of research processes, in line with the work of anthropologists, sociologists and historians of science, such as Bruno Latour<sup>5</sup> and Donna Haraway.<sup>6</sup> While the techno-sciences have become powerful producers of aestheticized images, art is no longer merely concerned with the aesthetic transposition of knowledge, but with knowing and feeling of *how knowledge is being produced*. In this sense, the very notion and finality of the term “research” needs to be questioned as well, and framed in a two-fold way when conducting *artistic research* or *arts-based research*, taking into account art’s inherent feature of *criticality*: One can either do research to find a solution or an answer to a problem or analytic question, or do research with the aim to generate new questions.

Historians of science interested in the interdisciplinary potential of the arts flag up the urgency of a “practical turn” which, according to Hans-Jörg Rheinberger, should emphasize the very making and the material means of research in the debates concerning an adequate notion of science and “disclose even the natural sciences and scientific knowledge of nature itself as cultural phenomena in their historical specificity and, insofar, to pull them over to the side on which the humanities have always found themselves”<sup>7</sup> – whereby not only the sociology of science and philosophy of technology are meant here. In particular, it is the contemporary network of experimental systems, e.g. with the requisite technical arrangement of model organisms, that must be examined self-reflexively as “the genuine working units of contemporary research” beyond merely results and insights. For in them “the scientific objects and the technical conditions of their production are inextricably interconnected. They are, inseparably and at one and the same time, local, individual, social, institutional, technical, instrumental, and, above all, epistemic

units. Experimental systems are thus impure, hybrid settings. It is in these “dynamic bodies” that experimenters shape and reshape their epistemic things.”<sup>8</sup> In this context, the supposedly untouchable art/science binary turns out to be a misunderstanding as such, since an increasing number of artists ground their practice precisely at this threshold.

However, the assumption that artists or curators approaching researchers in the natural sciences are first and foremost interested in aesthetic images is still widespread even in educational environments with established art/science programs. An anecdote from Michigan State University, where I co-direct the trans-disciplinary artist-in-residence program BRIDGE<sup>9</sup> together with artist and researcher Adam Brown, may be indicative of such unconscious logics at work. While contacting the biochemistry and molecular biology lab on campus in order to promote the idea of artists physically engaging hands-on with the available tools and media, a dear colleague running the plant research laboratory got straight to the point: “Oh, since you’re interested in art: I have some nice spectroscopic images from my photosynthesis research, and beautiful time-lapse movies from our chloroplasts as well...” It took me some time to explain that the purpose of my visit was less to contemplate these colourful and spectacular images than to borrow a number of the portable spectrometers the MSU lab has developed to conduct field studies allowing real-time analysis of photosynthetic and protective metabolisms in plants—for art projects. “Oh, you really plan to work with artists hands-on with our devices?” The inquiry into opportunities for artistic research using the lab’s inexpensive MultispeQ hand-held devices<sup>10</sup> able to measure plant, soil, water, and environmental parameters and to easily view, map, analyze and share collaborative research data was motivated by a research agenda that feminist philosopher of sciences Donna Haraway has described as “situated knowledge”—a stance that inspires many artists. Since in the sciences the focus has for long shifted from *visibility* to *measurability*, and art still counts on its traditional competence

to produce powerful images, the idea was to encourage cultural practitioners to explore the manifold possibilities of measuring “greenness”<sup>11</sup> with regards to ecology and climate related modelling while insisting on the political and epistemological aspects not only of *what* we measure but *how* and *from where* we measure. Technical devices and color-code conventions are neither naturally given nor neutral or objective, while the mediality of green plays a central role in climate-related measurements, modeling and visualizations. On the one hand, the abstract remote measurements of the satellite-based Normalized Difference Vegetation index (NDVI) scrutinize large pixels of more or less uniform greenery to map carbon exchange crucial to assess impacts of CO<sub>2</sub> sequestration strategies. Here, vegetation is considered monotonous greenery and quantifiable CO<sub>2</sub> neutralizers while qualitatively neglecting biodiversity. On the other hand, hand-held devices such as the MultispeQ may encourage the collection of ground-based data and focus on qualitatively relevant parameters of biodiversity, not on abstract greenness indexes, corresponding to Haraway’s critique of tools that claim mechanical objectivity:

Vision requires instruments of vision; an optics is a politics of positioning. Instruments of vision mediate standpoints. (...) Positioning is, therefore, the key practice in grounding knowledge organized around the imagery of vision (...) Situated knowledges are about communities, not about isolated individuals. The only way to find a larger vision is to be somewhere in particular. The science question in feminism is about objectivity as positioned rationality.<sup>12</sup>

More and more initiatives that boost interdisciplinary artistic research embed such attitudes of situated knowledge and “hands-on” practice, such as demonstrated as well by the results of MSU’s BRIDGE artists-in-residency program and its final exhibition *MATTER(S) matter(s): Bridging Research in the Arts and Sciences* at the Eli and Edythe Broad Museum.<sup>13</sup>

With their shared interests in materiality and topical issues—the dual “matters” invoked in the exhibition title—artists and natural scientists addressed the deceptively seamless influence of the techno-sciences which increasingly determine, physically and mentally, the world today — addressed by theoreticians such as Helga Nowotny as the “scientification of society”<sup>14</sup> — while their pervasive entanglement with their technological tools and sociopolitical contexts are often overlooked.

In a similar way, the Max Planck Institute’s recent initiative KLAS<sup>15</sup> — Knowledge Links through Art and Science — has been investigating the mutual benefits of art-science collaborations related to the vast research field of Synthetic Biology and its public perception and understanding. In order to justify its utility or usefulness, KLAS conducted extensive interviews about the participants’ personal experiences in relation to their conceptual and methodological exchange.<sup>16</sup> Some typical patterns indicative of asymmetric expectations appear in these interviews as well. Questions articulated by biologists include “What I can learn from artists? To be designers. They could help design our microfluidics channels,” and express affirmed utilitarian desires with regards to the tools of research themselves. Other natural scientists hope to benefit from artists’ communication skills with regards to “public engagement: if the artists can help with our work, that would be useful;” “I have learned to better explain my work to people outside my field.” Some cultural practitioners, for their part, think that “artists can certainly contribute for the advancement of science, a field that requires both imagination and creativity.” Interestingly, after a while these interviews reveal aspects that show an enhanced willingness to engage in critical self-reflection on both sides. Influenced by the artists’ presence, a biologist addresses the epistemological blind spots as follows:

One of the biggest temptations facing scientists today is the use of high-end technology instead of reason. (...) If we are given a “technological” solve we would

rather just throw everything in a machine and see what comes back. A lot of artists have noticed this back and forth with technology, while a new technology can help us see something differently, it can also obscure or distract from the original intention.

This last aspect points precisely to a potential benefit that the arts can provide for the natural sciences highlighted by Hans-Jörg Rheinberger, namely to work against natural science’s sometimes uncritical use of metaphors and “media blindness:”

There is a general tendency on the part of scientists to blend out the epistemic dimension of their work: the ever-changing means and media. (...) They tend to look through them, (...) to view them as allowing (...) immediate access to the “findings.”<sup>17</sup>

Should all natural science labs then have an artist in residency? It is worth asking whether art/science interactions, which often are framed at an institutional level, can be abstracted from the constraints inherent in the respective individual or collective frameworks. Idealists may hope for new Leonardos<sup>18</sup> and Frank Malinas<sup>19</sup> to emerge, but such hybrid figures acknowledged for both sides of their expertise remain extremely marginal. While some art academies, like the French Le Fresnoy, have started to offer residencies for scientific researchers<sup>20</sup> as well, the contrary case of the artist in residency in a natural science context largely prevails. Here, a sort of homogeneity is often misleadingly assumed with regards to what happens when a cultural practitioner crosses the threshold of a “laboratory” — which regularly creates fruitful misunderstandings and friction. Oron Catts, artist and co-founder of SymbioticA, the internationally known laboratory at the University of Western Australia where artists can acquire scientific methods, has criticized the vagueness of the term and described very different roles an artist might take on when entering a life science lab:

1) the illustrator, 2) the commentator/representer, 3) the visitor/guest/onlooker, 4) the appropriator, 5) the entertainer, 6) the user, 7) the industry worker, 8) the hoaxer, 9) the hobbyist/amateur, 10) the after-hours/under-the-table, 11) the mail-order/ready-made, 12) the researcher/embedded in science/technology setting.<sup>21</sup>

In addition, artists in labs may be tempted to creatively turn their dealing with, or struggling against their hosts into an attitude known in the context of art as the genre of “institutional critique,” and conducting their own laboratory studies in a resolutely post-Latour-ian way. However, a trend can be witnessed that artists in scientific contexts increasingly try to go beyond visualization, sonification, data translation, and text-based narration. In this regard there is a helpful distinction made by German media philosopher Dieter Mersch<sup>22</sup> who argues that we are living in a culture where text-based *discourses* are generally articulating claims of *truthfulness*, while *images* are widely responsible for the production of *evidence*, in a fruitful division of labour. But instead of corresponding to traditional genres of artistic expression, here, *visuality* and *discursiveness* just become part of the hybrid “epistemic objects” generated by experimental systems, including the social structures of the lab, the material arrangements of model organisms, instruments, the contemporary technologies and media shared by the arts and the sciences. After the paradigm shifts brought about by the *linguistic, performative and pictorial turns*, an *epistemological turn* emerges: Art here is no longer merely concerned with the aesthetic transposition of knowledge, but with knowing, analyzing, processing and transmission of how knowledge is produced.

## Notes

<sup>1</sup> ‘The Two Cultures’ was an influential lecture held in 1959 by Charles Percy Snow. Snow’s main thesis was that Western society was irreconcilably split into two cultures — the natural sciences and the humanities.

<sup>2</sup> John Brockman, *The Third Culture: Beyond the Scientific Revolution* (New York: Simon & Schuster, 1995).

<sup>3</sup> Wilhelm Dilthey (1833-1911) was a German philosopher known for his distinction between the natural and human sciences, claiming that the main task of the natural sciences is to provide causal explanations, while the core task of the human sciences is the understanding of the organizational structures of human and historical life.

<sup>4</sup> Hans-Jörg Rheinberger, *Toward a History of Epistemic Things. Synthesizing Proteins in the Test Tube* (Stanford: Stanford University Press, 1997).

<sup>5</sup> Bruno Latour and Steve Woolgar were among the first anthropologists and sociologists to study the daily work processes of empirical researchers at a scientific laboratory. Their book *Laboratory Life. The Social Construction of Scientific Facts* was published by Princeton University Press in 1979.

<sup>6</sup> Donna Haraway’s theoretical work on technoscience addresses traditional scientific practices in a critical way.

<sup>7</sup> Hans-Jörg Rheinberger, *Natur und Kultur im Spiegel des Wissens* (Heidelberg: Universitätsverlag, 2015), 34.

<sup>8</sup> Rheinberger, *Toward a History of Epistemic Things*, 2-3.

<sup>9</sup> <http://bridge.art.msu.edu>.

<sup>10</sup> <https://photosynq.org>.

<sup>11</sup> Jens Hauser, “Greenness: Sketching the Limits of a Normative Fetish,” in Natasha Lushetich, ed., *The Aesthetics of Necropolitics* (London: Rowman and Littlefield, 2018), 97-118.

<sup>12</sup> Donna Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective”, *Feminist Studies* 14 (3)(1988):586, 590.

<sup>13</sup> The *MATTER(S) matter(s) exhibition from October 27<sup>th</sup> 2018 to March 3<sup>rd</sup> 2019* was co-curated by Jens Hauser and Steven L. Bridges. Featured artists included Art Orienté Objet (Marion Laval-Jeantet & Benoît Mangin), Evelina Domnitch & Dmitry Gelfand, Tagny Duff, HeHe (Helen Evans & Heiko Hansen), Zbigniew Oksiuta, Kuai Shen, Stelarc, and Sissel Tolaas.

<sup>14</sup> Helga Nowotny, Peter B. Scott and Michael T. Gibbons, *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty* (Cambridge: Polity Press, 2001).

<sup>15</sup> <https://klas.mpikg.mpg.de/aims/>.

<sup>16</sup> [https://klas.mpikg.mpg.de/wp-content/uploads/2018/10/KLAS-WS-Booklet\\_Otavio.pdf](https://klas.mpikg.mpg.de/wp-content/uploads/2018/10/KLAS-WS-Booklet_Otavio.pdf).

<sup>17</sup> Hans-Jörg Rheinberger, “Risking Reason: The Productive Tension of Art and Science the Work of Paul Vanouse,” in Jens Hauser, ed., *Paul Vanouse - Fingerprints...: Index - Imprint - Trace* (Berlin: Argobooks, 2011), 95.

<sup>18</sup> It is impossible to establish an exact number of publications or programs evoking Leonardo da Vinci (1452-1519), the Italian polymath of the Renaissance, in order to idealize the reconciliation of artistic and scientific creativity.

<sup>19</sup> Frank Malina (1912-1981) was an American aeronautical engineer and painter, especially known for being a pioneer in both the art world and the realm of scientific engineering.

<sup>20</sup> <https://www.lefresnoy.net/en/school/research-and-production-residency>.

<sup>21</sup> Oron Catts, “Contribution to an online-symposium”, in Suzanne Anker and J.D. Talasek eds., *Visual Culture and Bioscience. An Online Symposium* (Baltimore: University of Maryland, 2008), 120-121.

<sup>22</sup> Dieter Mersch, “Visuelle Argumente: Zur Rolle der Bilder in den Naturwissenschaften,” in: Sabine Maasen, Torsten Mayerhauser and Cornelia Renggli, eds., *Bilder als Diskurse – Bilddiskurse* (Weilerswist: Velbrück, 2006), 96-97.

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