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FEAT Special Section: Truth Emerging from Leading-Edge Art/Science/Technology Interaction

TRUTH EMERGING FROM LEADING-EDGE ART/SCIENCE/TECHNOLOGY INTERACTION

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Abstract

The FEAT initiative organized and studied residencies of leading international artists in European Future and Emerging Technology projects. During the residencies, the artists closely collaborated with engineers and scientists on fundamental research in visionary areas of novel technologies not solely as an artistic endeavor, but also to investigate effects of artistic engagement on technoscience. Effects of the collaboration are visible on many levels including fundamental questions about the technoscientific project objectives, ethical aspects, and the aesthetics of scientific experiments. Interactions also resulted in long-term relations and opportunities for scientists to engage with artists in a shared effort to uncover truth.

Future and Emerging Technologies (or FET) is a part of the European Commission's framework programme that focuses on fundamental research in high-risk, visionary technology fields. FET and in particular FET Open projects are expected to initiate radically new lines of technology through unexplored collaborations between advanced multidisciplinary science and cutting-edge engineering. While FET research often is of a fundamental nature, it is still technology development with a long-term application perspective. This makes FET a very interesting case to study. For example, the project *nuclock* studies the transitions from an isotope of the element thorium-229 to its excited isomer state to eventually use its energy difference to define the second with an extremely high resolution. This could result in novel clocks up to 100 times more precise than atomic clocks today. *DIACAT* develops a new technology for the direct photocatalytic conversion of CO2 into fine chemicals and fuels using visible light. *subCULTron* are developing a culture of robots designed to live in challenging, human polluted environments, where they will monitor their surroundings.

We designed the FEAT residencies in close collaboration with the Waag Society in Amsterdam. Our aim was to stimulate take-up of FET research results and create internationally significant new forms of impact and innovation by embedding and supporting high profile international artists with FET projects. Following an open call, independent evaluators chose artists from over 250 applications. We gave the artists the opportunity to choose from about eighteen FET research projects (Fig. 1). As a result, the residencies cover very diverse areas of research and technology such as robotics, synthetic biology, quantum physics, chemistry, and supercomputing. For about nine months, experienced artists developed artworks in close interaction with scientists from the different research labs.

Although the interaction of artists and scientists resulted in the creation of artworks, this was not its sole purpose. The project was an initiative to make technology project results visible with nonscientific audiences including innovators, research managers, and citizens and to stimulate innovation through transdisciplinary approaches and take-up of those results. Another objective was to study the impact of artistic collaboration on researchers, to expand the scientific discourse in an ethical dimension and better understand the impact of art/science collaboration for long-term technology development.

Fig. 1. The FEAT collaboration teams at the Matchmaking Workshop in Amsterdam. (© Erich Prem. Photo: Franz Bergnuber.)

Art, Science, and Technology Collaboration

The methodology for FEAT is based on previously identified recommendations resulting from the ICT & Art Connect initiative [1]. It goes beyond these approaches by emphasizing embedding of artists in a longer-term interaction from the early research phases by awarding residencies and performing case-by-case mentoring, but building on openness and hands-on direct collaboration. Therefore, identification, selection, and coupling of the artist and the FET project was based upon affinity and interests of the artists in the specific FET area and a residency period of nine months was chosen. This aimed at a strong interaction between artists and scientists to facilitate an early development of trusted relationships. Such mutual trust is not always easy to develop, but important for a creative working environment and for very practical reasons including for example scientists granting the artists access to all data.

Hands-on collaboration means that artists were practically involved with their cooperating FET project and worked on the emerging technologies. This implies spatial proximity, but also topical exchange. Artists could acquire specific technical competencies, e.g. laboratory techniques. While some artists chose to work closely with their research partners and even develop their artwork in collaboration with the scientists, others preferred visiting the laboratories for a set period and then returned to their studio to develop the artwork on their own. We expected that such openness about the format of the residences would lead to high-quality results given the experienced background of the artists. We would perhaps choose a different set-up in the case of artists less experienced with scientific collaboration.

FEAT within the Science Discourse

Nowadays there is an increasing number of science and technology programmes that invest in artists, e.g. the European Commission's STARTS initiative in the Framework Programme for Research "Horizon 2020". The explicit rationale as described in call texts is to increase the impact of scientific work, foster new ways of thinking, and stimulate innovation emerging from art/science cooperation, cf. [2]. To the best of our knowledge, FEAT is the first initiative to pair artists with research projects that have long-term engineering as well as basic research objectives. The FET projects are special as they aim at traditional scientific truths, usually in the form of predictive models of reality. At the same time, they seek to realize purposeful technical function and technical principles based on such models. It is not at all clear how the arts fit in with research that is at the same time scientifically oriented and technologically minded. It is particularly unclear how an

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artistic stance—without considering any design aspects or decorative ambitions—contributes to such technoscientific processes. FEAT was conceived with the explicit aim to study the effects of artistic residencies on technoscience and on research management. Practically, we closely monitored the residencies, organised workshops to discuss experiences, and performed interviews with artists and scientists about their experiences.

Outcomes and Findings

The works that emerged from FEAT presented in this issue show outcomes and impacts from the art/science and technology interactions on many levels. As expected, the artists ask fundamental questions about science and technology, e.g. about the project objectives which they often critically examined. As (relative) outsiders to the world of science, artists are in an excellent position to devote time and energy to societal context which may be well known to the scientist, but to which the researchers can devote little time in their daily work. Scientists reported how the interaction with artists liberated them from their daily lab routine, permitted a fresh look at their own work, and allowed to devote explicit time for less goal-focused deliberation.

The artists also provide us with a more direct access to the aesthetic qualities of experiments than scientists who require an elaborate theoretical scaffolding of their work for their work.

FEAT's long-term residencies mostly led to longer-lasting interactions that go much beyond just the single residency and are indicated by mutual follow-up invitations to collaborate and a shift in the personal networks of the researchers (and obviously, the artists). Scientists and engineers do not remain mere suppliers of "inspiring environments" as longer-term residencies make it possible for the artists to acquire competencies in scientific and engineering techniques which they later use in creating works of art. Also, the artists are often fascinated by new materials and become early users of emerging technologies in ways that were not predicted by those first developing the technologies. It must be noted that the impact assessment of science and technology programmes requires years and often decades and the full effects of FEAT are therefore not fully visible yet.

Discussion

The art/science programmes funded by the EC clearly argue that art has a *function* to fulfil in science and technology, in fact they refer to a range of functions from science communication to enhanced creativity, and even innovation. For me, the artworks presented in this issue concern the aesthetics of scientific experiments (Evelina Domnitch and Dmitry Gelfand); they point out the emotional aspects of technology (Anna Dumitriu); and concern ethical aspects (Spela Petric & Miha Tursic). They do not just serve technoscientific work, they affect the very subject matter of the research and engineering endeavour.

The artists in FEAT created artworks that aim to unveil key aspects of technoscientific work. For example, they focus on the immediate aesthetics of an experiment; they provide more linguistically mediated narrative and reference to the history of technology and its ethical consequences; or they simply question the purpose of technoscientific endeavours to compute meaning from data. These efforts are very much aligned with recent proposals from philosophers of technology. Peter-Paul Verbeek discusses the need to find new ways of understanding how technologies affect human subjectivity and how humans can develop responsible relations to their technologies [3]. Similarly, Sabine Roeser has suggested to include emotional aspects in the work of engineers to improve ethical insight [4]. To both proposals, the involvement of artists in technoscience may be a very practical answer.

I believe that one way of interpreting the FEAT residencies is as an effort of (re-)connecting three different strands in one activity: (i) a basic science activity that aims to understand the world by means of a model of reality; (ii) a technological activity related to this model, using it for human purposes; and (iii) an artistic process of creation bringing forth truth in works of art. This latter aspect refers to Martin Heidegger's nature of "things" and artworks [5,6], i.e. objects brought about in human acts of creation. Heidegger uses examples of tools and works of art as results of related, but different creative acts. While tools emerge from practical interest with a clear purpose, works of art may be said to carry the reason for their creation in them. While tools as artefacts point to purposes outside of them, works of art have no such clearly identifiable purpose nor are they clearly pointing to something else except for truth [7]. A logical connection between science, art, and technology then can be made as different ways of purposeful creation of valid expressions.

The FEAT residencies of artists with leading-edge technoscientific research projects created three different, but intimately related creative processes that may at times support or disturb each other. These processes are unpredictable as too many details depend on the precise setting, on the individual people involved, but also on organisational settings, time-plans and even organisation boundaries. They resulted in more than just aesthetic commentaries on the scientists' way of world-making. They went beyond an ethical exercise questioning the engineer's intentions, or a meta-philosophical one that tries to undo the potential harm arising from a reductionist technoscientific endeavour. All this may be at work in FEAT projects, but the residencies are not focused on such now traditional dichotomies. They facilitate co-creative processes which are surprisingly united in the intention to uncover truth; not just any or one, but truths shared between science and art. If we are lucky, this creation may even go beyond the schismatic perspectives of science as the domain of eternal but useless truth on the one hand or purpose-driven but purely instrumental and post-industrial business on the other. Artists then would be tasked with a new function that many may not even realize as necessary today: to re-unite science and technology.

References and Notes

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