Ars Electronica Futurelab

Pixelspaces

Pixelspaces is an annual series of conferences that the Ars Electronica Futurelab has been hosting since 2001. Attendees take up current issues at the nexus of art, science and society, and discuss them from the perspective of an atelier-laboratory.
The series' thematic spectrum has undergone steady expansion from its initial focus on computer gaming, architecture and virtual/augmented reality to its present orientation on the R&D work currently in progress at the Ars Electronica Futurelab. *Pixelspaces* has thus established itself as the dynamic hub of a community of artists and scientists that enables conference participants to present their work and to discuss socially relevant issues associated with it.

Pixelspaces 2011: Re-Scripting

Re-Scripting is a term used by scholars in the humanities to describe the active modification of the meaning of concepts, objects, locations, relationships, etc. as a result of personal and social actions.
Theories, ideas, hypotheses, methods and prototypes / The Ars Electronica Futurelab, which has defined itself since its very inception as a lab-atelier or atelier-lab (depending on the weighting desired), is intimately familiar with the interdisciplinary crossover paradigm as the elemental driving force behind innovation. For years now, designers, artists, software & hardware developers, social scientists and media & cultural theorists have been working side by side in teams custom-staffed for the particular project. This results in ideal conditions for research on and development of innovations (that can perhaps even be characterized as radical). They are then released into the society that gave rise to them. Incessantly reconfiguring the terms of collaboration is also conducive to coming up with new working methods and approaches to the implementation of scientific and artistic R&D projects.
A wide array of variations on the innovative methods used in the Futurelab in the spirit of "shared creativity" is now increasingly being applied in the general context of art and science. This is expressed by the re-scripting of the term "research." *Pixelspaces 2011* is focusing on this latest paradigm shift at the interface of art and research, and discussing its implications for art, science and society.
The symposium spans a broad thematic arc: on one end of the spectrum, the do-it-yourself philosophy that is being adopted increasingly widely in digital communities and that is making an essential contribution to linking up traditional scientific systems to novel approaches to science; on the other, the current international discourse on collaboration between art and science. We will also be considering some concrete issues in the field of artistic research.

Changing the Research Paradigm

Having gotten its start with simple everyday objects and progressed all the way to highly complex scientific test assemblies, there doesn't seem to be anything the "do-it-yourself" culture can't do. People are replicating scientific experiments in their own living room, opening up new market niches with the simplest of technologies, and delivering electricity to disadvantaged regions in developing countries.

In concrete terms, this development is emblematic of a cultural orientation that does not proceed under the assumption that technologies and professional expertise can only be produced in scientific laboratories or by large companies. Instead, people are going out on their own and, via projects and initiatives, engendering knowledge that, just like science, stakes a claim to general applicability. The same holds true in the area of technology–due to changed conditions of production, more and more is being produced in local contexts. Thus, a new type of specialized knowledge and novel techniques are available.

If this observation is tied in to Helga Nowotny's concept of "mode 2 science," which posits that the boundaries between the scientific system and other areas of society are becoming increasingly permeable, then, in the context of the previously described phenomena, this raises the prospect of a new linkup connecting areas of society that previously were strictly separated from one another.

This symposium is designed to scrutinize these facts and circumstances. The aim is, on the one hand, to shed light on the new interrelationship among science, technology and society from the perspective of practitioners, and, on the other hand, to generally reflect on the current and future opportunities and risks that this shift entails.

Doing justice to this complex topic necessitates looking at it from different points of view and bringing in background factors. We will showcase several projects singled out for recognition in [the next idea] voestalpine Art and Technology Grant category of this year's Prix Ars Electronica. The *ChokePoint Project* examines the question of who actually exercises control over the internet and how this medium can be technically decentralized. The *Kibilight Project* deals with the subject of energy production; it's an attempt to hook up solar technology with a business model that makes electricity and an income available to young people in Kenya. The *Haberlandt Machine* can prepare edible dumplings from algae. We'll also be hearing from key researchers on the Ars Electronica Futurelab's staff, including Matthew Gardiner, who will report on his work in connection with the FabLab (from fabrication laboratory; see Neil Gershenfeld, MIT). Wrapping things up will be Ulrike Felt, who does research on science and the sociology of technology. She'll go into sociologically interesting questions having to do with the opportunities and risks this process of change presents.

Selected Speeches & Projects

James Burke, P2P Foundation

ChokePoint Project

James Burke is on the staff of Amsterdam-based P2P Foundation whose *ChokePoint Project* is this year's recipient of Prix Ars Electronica's [the next idea] voestalpine Art and Technology Grant. As an information architect and experience designer, he's produced an impressive array of projects including communications campaigns and product & service designs. The *ChokePoint Project* that Burke will present raises the question of who actually holds sway over the internet. Its aim is to identify the internet's nodes and come up with strategies that make it possible to free the internet from the clutches of power structures and turn over control to the individual.
http://p2pfoundation.ning.com/

Elizabeth Otieno, Solafrica.ch

Kibilight Project

Elizabeth Otieno works for the Kibera Community Youth Programme. At *Pixelspaces 2011* she'll talk about the *Kibilight Project* now running in Kenya that garnered an Honorary Mention in the Prix Ars Electronica's [the next idea] voestalpine Art and Technology Grant competition. Its aim is to make solar energy—and thus the first form of electrical energy of any kind—available to large segments of the population. Kenyan young people are learning how to build small portable solar lamps that they can then sell on national and international markets. Thus, a technical development is being successfully embedded in a youth education model as well as a business model.
http://www.solafrica.ch

Gerard Rubio, Raúl Nieves, blablabLAB

Haberlandt

Gerard Rubio and Raúl Nieves are members of the blablabLAB artists' collective in Barcelona. They are presenting the *Haberlandt* project that's developing a "vending machine" that can turn algae into edible dumplings. The *Haberlandt* machine functions both as a biotope in which algae can be cultivated as well as a processor that can prepare the end product. It has been awarded an Honorary Mention in the Prix Ars Electronica's [the next idea] voestalpine Art and Technology Grant competition.
http://www.haberlandt.blablablab.org

Matthew Gardiner, Ars Electronica Futurelab

Open Hardware

Matthew Gardiner is an artist and researcher at the Ars Electronica Futurelab. His address deals with open hardware's multifarious influence on art, science and society.
Free and Open Source Software (FOSS) culture has paved the way for Open Hardware, through licensing frameworks such as the GPL, LGPL and MIT license. The proliferation of well known projects with artistic applications such as arduino, pinguino, reprap and makerbot has significantly upgraded knowledge in global communities, creating new social structures and intellectual frameworks around them. What are the strategies that have led to their success, and how does knowledge in this culture get generated, shared and importantly how does the culture protect itself from intellectual property trolls?
http://metthewgardiner.net

Art meets Science / Art makes Science

Creative Collisions: Artists to the labs! Scientists to the ateliers!

Science and art, creativity and research, research about / in / by means of art. Art that lets you know. There's suddenly a confluence of terminology that seems to emanate from two different worlds. Science from Mars, art from Venus. Or maybe not? Now, they've been gradually approaching one another as if this were something to be taken completely for granted and, finally, colliding head on in the term "artistic" or "art-based research."

Since Day 1, the Ars Electronica Futurelab has regarded artists also as individuals who perform research. Where we work, it goes without saying that building interdisciplinary bridges is a substantial part of the innovation process. But now, a discourse about this very subject has begun to gather momentum among serious, top-name researchers in international scientific circles as well—about the methods used in the artistic development process and their potential to generate useful insights; about international programs to cultivate this potential and nurture appreciation of it; and finally about the actual qualities that characterize the interdisciplinary collaboration of science and art. Repeatedly a source of provocation, this discussion is also a most welcome event; it is future-oriented and necessary. A catalytic effect can be ascribed to the 2002 University Law based on the Bologna curriculum architecture, in that this has led to a change in status of what used to be art schools and academies. At the new "universities of art," research is now established as a constitutive element of a course of study; scholarly doctoral theses can and should be produced. In Austria—a country that has already garnered international recognition for its exemplary approach to artistic research—the progressive paradigm shift even led in 2009 to the introduction by the FWF–Austrian Science Fund of a special subsidy program for artistic research. According to the program guidelines, its objective is to provide financial support for "gaining insights and developing methods by means of aesthetic and artistic—in contradistinction to purely scientific—processes of arriving at knowledge." At *Pixelspaces 2011* the Ars Electronica Futurelab will present *(St)Age of Participation,* the first art-based research project subsidized by the FWF.

To address the issue of the equality/inequality of the traditionally separate categories of scientific and artistic research, one can begin by asking: What does "doing research" actually mean? From the Latin term *poscere,* a researcher is someone who poses questions, who inquires and seeks, someone who bids or asks for something. Obviously, this basic motif of investigation puts science and art on the same wavelength. Science theorist Jürgen Mittelstraß has distinguished further characteristics the two disciplines share: immanent creative output and dealing on an ongoing basis with "how innovation comes to be." Thus, it is the desire to comprehend how things are in order to release new things into the world. At this point it would be fruitful to cite the hermeneutics of Hans-Georg Gadamer, who wrote back in 1960 that "finding new [methods]—and the researcher's creative fantasies that underlie them—constitutes the essence of all research." Or do we go along with Paul Feyerabend in *Against Method: Outline of an Anarchistic Theory of Knowledge:* "Anything goes"?!

In addition to identifying (terminological) parallels between scientific and artistic ways of working that may intuitively support a trans-systemic team-formation process, we should also take a closer look at the quintessential mode of research used in art. Inherent in the traditional concept of science is an established set of rules that are indispensible to the trans-subjective reproducibility and comparability of studies and their results. In artistic research, though, methodological freedom and singularity are precisely what can lead to an explorative as well as radical attainment of insight. An essential capacity of art is engendering emotional, aesthetic or intellectual shifts of

perspective in connection with processes of social change. This quality can, in turn, assume great significance for scientific progress. In any case, it is important at the outset of artistic research projects to clearly delineate the initial conditions and the questions to be answered. This is so because especially when the degree of methodological freedom is high, reflection of the research process (particularly with respect to enabling third parties afterwards to comprehend what was attained) is highly relevant.
At *Pixelspaces 2011* the Ars Electronica Futurelab will present several projects that open up new autonomies and spheres of latitude for the conduct of artistic-scientific research or interdisciplinary collaboration. *Collide@CERN* is an artist-in-residence program currently being developed jointly by CERN, the Geneva-based organization that is the world's largest center of nuclear research, and the Ars Electronica Futurelab. An EU project entitled *StudioLab* creates "hybrid spaces" for creative interactions between art and science. *(St)Age of Participation* and *OHMI–The One-Handed Musical Instrument Project* are two tightly focused research initiatives: the first is investigating futuristic participative dramaturgies for stage-based productions; the second aims to foster the development of musical instruments for the classical orchestra that can be played with one hand.

Selected Projects

(St)Age of Participation

Today, the mass audience (the successor to the "public") can be used as a creative, participating force. It is, instead, merely given packages of passive entertainment. (Marshall McLuhan, 1967)
Since the summer of 2011, the Ars Electronica Futurelab and media artist, choreographer and composer Klaus Obermaier have been jointly investigating innovative forms of audience involvement in stage-based media art. *(St)Age of Participation* is the three-year project's title, a reference to the contemporary paradigm of social media, user-generated content and the culture of collaboration in the digital domain. In late 2010, the FWF–Austrian Science Fund's PEEK arts development program granted funding for this project to the Futurelab, the only non-university research facility to receive such a subsidy.
Throughout the history of the theater, dramatists have taken advantage of the innovations of their times to transform artistic performances into highly emotional events in order to impart an unforgettable feeling of sensation and magic to their audiences. Now, the time has arrived in which the latest technology makes it possible for a modern, stage-based dramaturgy to reflect and conceptually integrate the audience's potential to act in the capacity of a "creative, participating force" as McLuhan put it in 1967. This obviously raises the prospect of productive collaboration with experts in media art who have extensive, across-the-board experience with interactivity and participation.
The dance & media performance *Apparition* (2004) and a production of Stravinsky's *The Rite of Spring* (2006) are two highlights among the many multimedia productions the Ars Electronica Futurelab and Klaus Obermaier have successfully staged together. Now, *(St)Age of Participation* is blazing a new trail. Whereas plenty of experience with audience involvement has already been gained in conjunction with individual interactive exhibitions, working in the genre of stage-based

dramaturgical media performance confronts Futurelab staffers with wide-ranging new challenges. The aesthetic, emotional and intellectual quality of the production may not be diminished despite—or, actually, precisely due to—possibly unanticipated interventions on the part of the audience. When sounds, visuals and other content are being generated in real time by viewers or listeners, the flow of the work must nevertheless remain intact. Or else it has to be reconceived. This calls for a dynamic dramaturgical concept for the tripartite collaboration involving professional performers, audience members and technology, as well as coming up with new technological tools and embedding them in intuitively understandable interaction metaphors so that audience members can grasp the cause and effect of what they do. What is ultimately called for is a redefinition of what a stage is.

The artistic research process going on in conjunction with *(St)Age of Participation* focuses on achieving exemplary conceptualization of dynamic interaction dramaturgies. This effort is based on the analysis and enhancement of useful technologies such as tracking systems, laser scans, ambient devices, 3D avatars and augmented reality apps. Moreover, the project staff is designing three settings for dramaturgical experiments and testing them in cooperation with professional performance artists in multiple trials with live audiences. Each trial is being assessed according to artistic, technological and social-scientific criteria as well as from the audience's perspective. The aim is to impart a new quality to the audience's emotional and social involvement in artistic experiences.

http://www.stageofparticipation.org

Project directors: Christopher Lindinger, Klaus Obermaier
Project team: Ars Electronica Futurelab: Roland Haring, Martina Mara, Veronika Pauser
Supported by FWF, Programmlinie PEEK, program management: Alexander Damianisch

Stravinsky's *The Rite of Spring* (2006), Ars Electronica Futurelab and Klaus Obermaier

Digital Arts Prize

One of the great paradoxes of digital arts is at its roots, because it is all about the body. The word "digital" comes from the Latin *digitalis,* which means "related to the finger", and shows that at the heart of digital creation, lies the physical–the person who at a stoke may generate the sounds and sights of worlds which are oceans and light years away. Artists like Mariko Mori and Tony Oursler use the digital to push us to our limits, propelling us to experience our world and relate to it in dimensions we haven't yet dreamt of, let alone encountered.
So it is with great excitement that in a new cultural partnership, CERN, the birthplace of the worldwide web, which is one of the great means of digital arts transmission, is creating a new prize with Ars Electronica and Ars Electronica Futurelab.

Collide@CERN

The Prix Ars Electronica Collide@CERN Prize invites artists to dare to be different. Every year for the next three years, in an open competition, one artist will be given the chance to have a two-month residency at CERN with a leading scientist as mentor and creative ideas agent. The residency will be completed, with a crucial production month at Ars Electronica, working with the multi-talented transdisciplinary Ars Electronica Futurelab team to make the work inspired by CERN.
The Prix Ars Electronica Collide@CERN prize marks the beginning of a new three-year program of artists' residencies at CERN in 2012 in many different art forms. Called Collide@CERN, it's CERN's latest experiment, colliding the imaginations of artists with scientists to take culture into unexpected new creative dimensions in the 21st century.
Particle physics is in many ways the most imaginative, creative, and experimental of the sciences–daring us to think in up to 11 different dimensions, construct new theories of how the world is made and test them out. In this way, physics is very akin to the arts–both look beyond the paradigms and push boundaries of perception and conception to their limits.
Take Max Planck and the birth of quantum mechanics and Einstein's general relativity at the start of the 20th century. These ideas sparked some of the greatest arts movements of our time: the birth of Surrealism led by Marcel Duchamp; Cubism and the paintings by George Braque and Picasso; Modernism as expressed in the poetry by T.S. Eliot and Paul Celan, and music by Iannis Xenakis.
Collide@CERN aspires to inspire a creative revolution–using the ideas of particle physics as springboards of the imagination across art forms–dance and performance, visual arts, music, the written word and beyond.
As the great Albert Einstein believed, knowledge is limited, imagination embraces the world, going on to state that: "The most beautiful experience we can have is the mysterious. It is the fundamental emotion which stands at the cradle of true art and true science."

Text: Ariane Koeck, CERN

StudioLab

StudioLab is a European platform for creative interactions of art and science. It brings together major players in scientific research with centers of excellence in the arts and experimental design, and makes use of the new Hybrid Spaces network to carry out a series of projects at the nexus of art and science.

These projects consist of processes of incubation, education and public involvement. In the case of StudioLab, these go into an effort to develop products and activities that are of pedagogical, social, cultural and commercial value.

Allocated to one of three overarching themes—Future of Water, Future of Social Interaction and Synthetic Biology—these projects are designed to create best-practice examples for innovative collaboration by artists and scientists, and a unique program of activities that foster Europeans' creativity and their ability to learn.

The project aims to expand and intensify synergies between art and science by setting up a European *artscience lab network* entitled StudioLab. This network supports a new generation of trailblazers in Europe as they go about implementing innovative ideas; it is making its presence felt in European culture in the form of exhibitions, commercial implementations and humanitarian interventions. StudioLab opens up traditional institutions of creativity and "contaminates" their culture with the processes and creativity to be found in smaller, more dynamic organizations.

The cooperation of art and science creates promising circumstances that go far beyond the direct interaction among the participating artists and scientists. This results in enhanced appreciation for science on the part of new target groups, advantages for the educational system due to the development of interdisciplinary programs that encompass a wide array of learning styles and capacities to learn, the development of innovative new products and processes, and the possibility of turning them into a commercially viable business venture. StudioLab is developing a series of initiatives and actions in which artists, designers, scientists and researchers with a diverse array of skills and expertise that are impossible to pigeonhole in conventional categories can be encountered in the so-called public sphere.

Science Gallery / Trinity College Dublin, Ireland
Ars Electronica Futurelab, Austria
Le Laboratoire, France
Royal College of Art, United Kingdom
MediaLab Prado, Spain
ERG School of Design, Belgium
Foundation ISI, Turin
Bloomfield Science Museum, Jerusalem
Studio Optofonica, Netherlands
CIANT, International Centre for Art and New Technologies, Czech Republic
Leonardo / Olats / Yasmin, France / Turkey
Medical Museion Copenhagen, Denmark
Rixc, The Centre for New Media Culture, Riga, Latvia
Supported by funding from the EU, FP7, Topic "Science and the Arts: An Experimental Approach".

OHMI–The One-Handed Musical Instrument Project

There is presently no orchestral musical instrument that can be played with one hand. As a result millions of people across the world with impairment in one hand or arm are excluded from music making. We want to invent new instruments to open full and undifferentiated participation in musical life; whether at school, in the home, or in a professional ensemble. The technical difficulties of this challenge are considerable. It is now fairly straightforward to synthesize the sounds of orchestral instruments electronically, but this is a far cry from the subtlety and complexity of performance on a real orchestral wind or string instrument. The OHMI Project is trying to create musical equivalence, compatibility and the possibility of participation. Our success will have a profound impact not just on individuals, but also on society's relationship with disability, opening new realms of achievement and possibility.

The OHMI Trust

The OHMI Trust was formed by Stephen Hetherington and Martin Dyke in 2011 in response to Stephen's attempts to find a musical instrument his hemiplegic daughter could play at school. Its purpose is: *To promote the invention of new instruments that can properly emulate classical instruments and give open, full and undifferentiated participation in musical life to everyone.*

The Ars Electronica OHMI Competition

The project kicks-off with a half-day workshop at the 2011 *Pixelspaces* Conference organized by Ars Electronica's Futurelab during the Ars Electronica Festival. Participants of this workshop will be international experts and interface designers who will evaluate and discuss the current state of relevant technology and ideas for future developments. As a result of this workshop the OHMI Competition will then be launched and the rules for the competition will be formally published. It is expected that each round of the competition will last two years. At the end of the first year the best concepts and prototypes will be awarded funds to assist further development. Actual performances will then be given on the new instruments at the end of the second year. It is planned that the winning instrument will get a special Prix Ars Electronica award and will perform as part of the Ars Electronica Festival before playing again with the City Of Birmingham Orchestra in the UK.

Text: Stephen Hetherington

The OHMI Trust *(http://www.ohmi.org.uk)* in collaboration with Ars Electronica, The City of Birmingham Symphony Orchestra, HemiHelp, and the Digital Exploration Centre.