

studio lab

studiolab

What has been learned

Andrea Bandelli – Wiggert van der Zeijden

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How can we create better platforms for interactions between science and art?

What happens when scientists, artists, designers and students work together and create opportunities for public engagement?

We address these questions with the evaluation of Studiolab, a European project that supported science and art from 2011 to 2014.

Marking a departure from traditional evaluation reports, this book documents in an innovative and accessible way what has been learned from the creative interactions developed in Studiolab.

Evaluation study by

Andrea Bandelli

Text by

Wiggert van der Zeijden

Edited by

Andrea Bandelli

Sally Duensing



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TRINITY COLLEGE DUBLIN

PEARSE STREET

DUBLIN 2, IRELAND

T: +353 (0)1 896 4091

E: INFO@SCIENCEGALLERY.COM

DUBLIN.SCIENCEGALLERY.COM

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**studiolab:
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has
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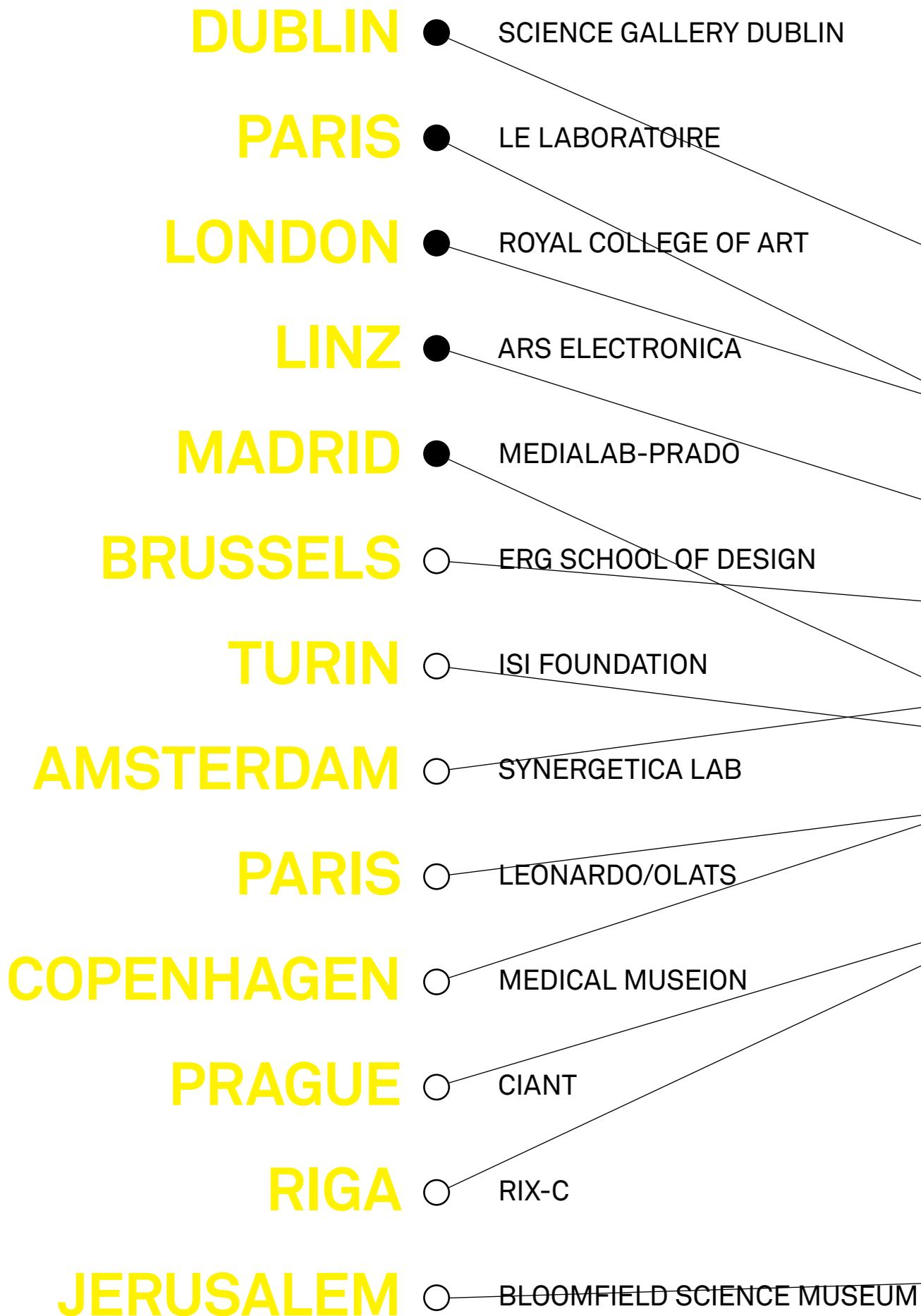




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Colophon

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Andrea Bandelli

Text

Wiggert van der Zeijden

Editors

Andrea Bandelli & Sally Duensing

Design

gebr.silvestri

We are deeply thankful to all the participants of Studiolab, who have wholeheartedly collaborated for the realization of this report. Special thanks to Jane Chadwick, Joseph Roche and Lynn Scarff from Science Gallery Dublin for their assistance and support throughout the process.

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What happens when you bring art and science together?

Blurred boundaries

If we look at the history of science in Europe, we could argue that much of modern knowledge was created by the exchanges between art and science, by a discovery process that benefitted from a parallel approach rooted in artistic and scientific exploration. For example, Pythagoras's application of mathematical relationships to musical tones, Leonardo da Vinci's studies of turbulence and Galileo's ink sketches of the lunar surface observed through the telescope. Starting from the 19th century, however, there has been a growing divide between art and science. This separation between the scientific and artistic world is the result of a widely implemented specialization of knowledge. As a result, academic programs offer little room for creative cooperative programs or interdisciplinary learning, and cultural institutions and art museums have little programmatic focus on science. But society today is facing new challenges. The rigid divide between art and science is not an asset anymore. Innovation requires an interdisciplinary approach where art, design and science reinforce each other. Art and science are thus learning again to live and develop together. They nurture each

other, they inspire each other and we see increasingly more examples of how significant breakthroughs are achieved when scientists, artists and designers collaborate, exchange knowledge, create new knowledge by sharing their complementary approaches. But still, "art" and "science" are two different worlds. We are slowly bridging the gaps of the "two cultures" as identified by C. P. Snow, but we still think in terms of two entities that need to be brought together. The language we use is a clear sign of this opposition: there is no one term that can be used to identify "science & art" together. We always have to mention both in order to make clear what we are talking about. And yet, the results of these collaborations often defy the limits of our definitions. When looking at the process and the results of the Studiolab project it would be very difficult to put a conventional label to most of them. Is it science? Is it art? Is it design? Is it education? and so on, for all the disciplines that Studiolab touched. Instead, the 112 activities that resulted from the Studiolab project call for breaking down the boundaries between art, science, design, communication, education. They demonstrate that the boundaries between disciplines and approaches become increasingly blurred, and these blurred zones are extremely fertile grounds for innovation. At the same time, blurred boundaries can be problematic because they challenge established and trusted ways to work, to manage, to invest, to educate, and more broadly, to think.

This book represents the evaluation of Studiolab, and it looks at how these blurred boundaries were discovered, what kind of innovation emerged, and how they changed the people and the organizations involved.

Rather than a typical evaluation report, this book is designed with the intention of being a document that is accessible, interesting and useful to an audience beyond the funders and participants in the project.

What is Studiolar

Studiolar was a European project that ran from 1 July 2011 until 31 December 2014. It was financed with a grant by the European Commission under the programme “Science in Society” of the 7th Framework Program for Research. The goal of the project was to create a platform for creative interactions between art and science in which major players in scientific research work together with experts in art and experimental design. Like a giant “accelerator of ideas”, Studiolar facilitated these interactions and the results led to a wealth of pilot activities – 112 in total – which were produced and developed on the platform made available by the European grant.

In the grant application, the partners of Studiolar identified three content areas on which they would focus, one for each year of the project. The three topics reflect major scientific, technological and societal challenges where the borders of knowledge are rapidly shifting:

The Future of Water

The Future of Social Interactions

Synthetic Biology

According to the grant application, these topics were chosen because they:

- Cover broad areas of expertise of existing mentors and participants in each partner organization;
- Provide a fertile ground for interrogation from both art and science perspectives;
- Connect with key areas of research currently of focus in European research centres;
- Are both appealing and uncomfortable and carry the inherent ambiguity that invites artists to inquire and interpret.

Studiolab was further structured into three strands of work, which loosely mapped on to three target audiences, and most of all provided three different (but as we will see, tightly intertwined) processes to nurture and sustain innovation. The three strands are:

- **Incubation: the development of ideas and concepts into tangible products or services.**

The grant proposal describes incubation as a process whereby artists, scientists, researchers and designers who are professionals, academics, students or amateurs can work together with mentors overcoming the conventional and institutional obstacles, and develop actual products – educational, social, cultural, or commercial. This process is always visible and transparent to the public who interact with it at different points in the process.

- **Education: promoting interdisciplinary learning and art-science approach in education.**

According to the Studiolab proposal, the activities developed under this strand of work apply concepts of creativity and art & science collaboration to secondary school and university curricula, and prepare a baseline of students at both 2nd (high school or secondary school) and 3rd level who can be directly involved in mentorship programs with the partners in Studiolab.

- **Public engagement: initiating and sustaining dialogue and interactions between the public, science and art.**

In the words of the proposers: *The underlying philosophy of Studiolab is to enable a cultural dialog between the public and the partners involved in the incubation and education modules. An active participation of the public in all the phases of development is not only a mechanism to include the competencies and ideas that the public brings, but most importantly it is a powerful way to hold the developers (artists, scientists, and in general the “creators”) accountable to the public, to make sure that the outcomes of the experiments and installation bear relevance to a wider audience and ultimately that the processes which are at the basis of the interactions between science and art in Studiolab are in fact social processes.*

All the activities developed within Studiolab were of an experimental nature, designed to be pilot projects from which the partners could observe and learn what worked and what did not work, what were the conditions under which innovation develops, and what were the obstacles to fruitful collaboration.

The players

Studiolab had five core partners and eight expert partners. The core partners provided the main infrastructure to the project, that is, locations, frameworks, services, and capacity. The five core partners and the eight expert partners formed the consortium of the project. Together, they provided expertise, developed activities and programs, and fuelled the network with their own connections and resources. Most of the core partners and some of the expert partners had already worked together, although on a much smaller scale and for shorter periods of time. With Studiolab they had the opportunity to deepen their mutual knowledge and achieve more structural forms of collaboration.

The five core partners are:

SCIENCE GALLERY DUBLIN TRINITY COLLEGE

DUBLIN

(Coordinator)

Science Gallery is a new type of venue where science and art collide. An initiative of Trinity College, Dublin, the Science Gallery organizes temporary exhibitions and a rich program of events where the public, mainly in the age range 15 to 25, can meet and openly discuss all issues of contemporary science.

www.dublin.sciencegallery.com

LE LABORATOIRE

PARIS

Le Laboratoire is a contemporary art and design center in central Paris, where artists and designers experiment at frontiers of science. Exhibitions of works-in-progress from these experiments are frequently the first steps toward larger scale cultural, humanitarian and commercial works of art and design.

www.laboratoire.org

ROYAL COLLEGE OF ART SCHOOL OF DESIGN DESIGN INTERACTIONS

LONDON

The Design Interactions programme at the Royal College of Art explores new roles, contexts and approaches for interaction design in relation to the social, cultural and ethical impact of existing and emerging technologies. It currently offers a two-year MA programme.

www.rca.ac.uk

ARS ELECTRONICA

LINZ

Ars Electronica assembles and configures the commentary, concepts and visions of our modern, information-based society throughout the realms of science and research, art and technology. Ars Electronica has four divisions: The Festival as proving ground, the Prix as competition honoring excellence, the Center as a year-round setting for presentation & interaction, and the Futurelab as in-house R&D facility.

www.aec.at

MEDIALAB-PRADO

MADRID

Medialab-Prado is a program of the Department of Arts, Sports and Tourism of the Madrid City Council. It is conceived as a citizen laboratory for the production, research and dissemination of cultural projects that explore collaborative forms of experimentation and learning that have emerged from digital networks where art, science, technology, and society intersect.

www.medialab-prado.es

The eight expert partners are:

ERG SCHOOL OF DESIGN

BRUSSELS

ERG – École de Recherche Graphique – is an École Supérieure des Arts (ESA), a free, autonomous higher education institution in Brussels. It provides bachelor and master courses, among which the master “Graphic Practices and Scientific complexity”, where students acquaint themselves with scientific research work, databases, points of view and experiments linked with the scientific, technological, economical and biological fields.

www.erg.be

ISI FOUNDATION

TURIN

The ISI Foundation – Institute for Scientific Interchange – promotes scientific research fostering the creation of research groups and innovative and interdisciplinary labs, with a special focus on the science of complex systems. It provides high level interdisciplinary research and training in the fields of Mathematics, Physics, Computer Science and Life Sciences.

www.isi.it

SYNERGETICA LAB

AMSTERDAM

Synergetica is an art-science laboratory, investigating photonics, fluid dynamics, acoustics, quantum chemistry and psychophysics. In addition to providing a platform for artists working in these domains, Synergetica serves as a curatorial and educational entity, disseminating interdisciplinary art works and art-science research.

www.synergeticalab.com

LEONARDO/OLATS

PARIS

Leonardo/Olats (Leonardo Observatory for Arts, Sciences and Technologies) is the French section of the Leonardo organization, the global network of scholars, artists, scientists, researchers and thinkers for purposes of networking, resource-sharing, best practices, research and events in Art/Science/Technology.

www.olats.org

MEDICAL MUSEION

COPENHAGEN

Medical Museion is a combined museum and research unit at the University of Copenhagen. The main exhibition space is in central Copenhagen, in the former Royal Academy of Surgeons. The focus of Medical Museion's research programme is medical history, medical humanities, medical science communication and medical museology.

www.museion.ku.dk

CIANT INTERNATIONAL CENTRE FOR ART AND NEW TECHNOLOGIES

PRAGUE

CIANT is an international platform for research, production and presentation of creative use of information and communication technologies within the arts, often intersecting with various scientific domains. It is based in Prague, Czech Republic.

www.ciant.cz

RIXC – CENTRE FOR NEW MEDIA CULTURE

RIGA

RIXC Centre for New Media Culture is a new media artists collective and the producer of new media artworks, events and publications, based in Riga, Latvia. RIXC works on the most novel and current topics in digital art by performing innovative experimental projects in art, science and technology, creating an infrastructure to support other forms of art and culture.

www.rixc.lv

BLOOMFIELD SCIENCE MUSEUM

JERUSALEM

The Bloomfield Science Museum Jerusalem is a cultural and educational institution that presents exhibitions consisting of interactive exhibits on subjects of science and technology, and integrates these exhibits into a context through a wide range of educational activities. It is an agent of change that offers its visitors access to science and technology, challenging them to think differently about the world.

www.mada.org.il

Why this book

This publication is the evaluation report of the results of Studiolar. In this study, we look at the partnerships that have been established and at the incubation, education and public engagement modules that have been developed. We discuss how the partners have benefitted from Studiolar and how the results can be used for future activities. We identify the barriers, obstacles and challenges experienced during the project. We investigate how a hybrid approach to a problem leads to innovative and creative solutions and look for lessons to be learned in order to provide fertile soil in which the art-science process can flourish.

The evaluation focuses on Studiolar as a whole, on the collaborations, and not on the individual projects of the partners. However, specific projects are highlighted as examples of the activities developed within the project and to illustrate the findings of the evaluation.

The evaluation study was structured on two levels, “What has Studiolar achieved?” and “What can we learn from Studiolar?”. Under “What has Studiolar achieved?” we assessed the visible side of Studiolar: what the partners developed, how the results met their expectations, the collaborative level of the platform, the problems encountered and the unexpected results. Under “What can we learn from Studiolar?” we looked at the gains of the institutions involved in Studiolar and their partners. The aim was to find out if and how the interactions developed during Studiolar can be used as instruments for further activities. This level of evaluation looked at the broader impacts of the project, at the changes that took place in the institutional culture of the organizations involved in Studiolar and at the obstacles and barriers to innovation identified during the project.

For this evaluation study we employed the following methods:

- Site visits to all the five core partners and three expert partners (ERG – Ecole de Recherche Graphique, ISI – Institute for Scientific Interchange, and Synergetica Lab);
- Analysis of quantitative and qualitative data collected from each partner using an online questionnaire;
- 10 in-depth interviews with the project leaders of all the five core partners and two expert partners (ERG and ISI);
- Additional research using the project website, the community website, and the documentation provided by each partner. The content of the website was further analysed to identify collaborative and transdisciplinary work by the partners.

Andrea Bandelli led the evaluation process, conducted site visits and interviews, analysed the data and produced the report. Wiggert van der Zeijden wrote the main body of this book, which was further revised by Andrea Bandelli and edited by Sally Duensing. gebr.silvestri designed the final publication.

2 What has studiolab achieved?

112 activities

Studiolab produced 112 activities: exhibitions, workshops, courses, conferences, lectures and meetings. Of these activities 49 were related to the future of social interactions, 14 to the future of water and 37 to synthetic biology. 12 more activities crossed the boundaries of two or all three themes. Major exhibitions such as GROW YOUR OWN and Project Genesis, visited by hundreds of thousands of people, explored the possibilities of synthetic biology; the controversial Hacklab, part of the exhibition HACK THE CITY, allowed the public to manipulate social interaction. Intimate installations such as Hydrogeny showed the elements of water come to life. The many conferences and workshops created multiple opportunities for thousands of scholars, artists, scientists, researchers and designers to meet, exchange information and develop further projects and activities. Almost 3000 students used the curricula developed by the partners and received the support of 365 mentors.

The outcomes

From the interviews and the analysis of the activities, we identified 6 main outcomes of the project. We use these outcomes as “lenses” through which we look back at what has been achieved by the partners in order to identify the factors that shaped the project and its results. Through these lenses we go beyond the individual activities, and we describe what is the value of the platform that Studiolab developed.

The 6 lenses are:

- 1 The theme as a catalyst
- 2 An integrated framework
- 3 Creativity in education
- 4 Dynamic collaborations
- 5 Hybrid work style
- 6 Missed potential

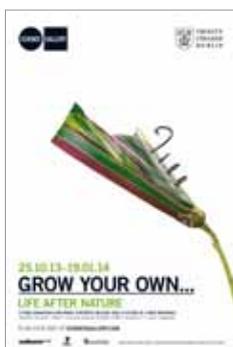
1 The theme as a catalyst

Although there were many activities organized under each of the three themes, synthetic biology was the most popular theme, according to the partners. Major exhibitions were devoted to it, with partners such as Ars Electronica, Science Gallery and the Royal College of Art working together at an intense level. This popularity had certainly something to do with the rapid developments in this field. 'It was newsworthy,' says Lynn Scarff of Science Gallery. But what played a significant role was the fact that synthetic biology was the last of the three themes developed by the partners. The first theme to be developed in Studiolab was the future of water; one year later it was the future of social interactions, and the last year it was synthetic biology. This was not a sharp division of work; some partners started to do work related to synthetic biology very early on, and late in the project there were still some activities planned around the future of water. The main work on synthetic biology however took shape after Studiolab was running for almost 2 years and it could benefit from a deep collaborative ethos among the partners.

Science Gallery was involved in all three themes, producing exhibitions and experiences on each of them. Founding director Michael John Gorman explains how synthetic biology was able to capture and benefit from mutual trust, learning and adaptation that developed in the previous two years:



'It has taught us a lot about our core processes, what works and what does not. We wanted to learn from other organizations who are experimenting at the intersection of science, art and design. Studiolab gave us the possibility to work closely with the Royal College of Art, share experiences and practices with Ars Electronica and Medialab-Prado, and give substance to the Idea Translation Lab together with Le Laboratoire. Through that intensive cooperation we were able to try out new ideas and models. Like the joint curating of exhibitions by scientists, artists and designers.



With
synthetic
biology,
all the pieces
fell into place:
the intensive
collaboration
and learning
from each
other, the
integration
of the
processes
to make
a great
exhibition.

Our exhibition GROW YOUR OWN strongly reflects that innovation process that we have gone through.'

For the Royal College of Art synthetic biology was the main topic, says Anthony Dunne, Head of Design Interactions. He explains how their work around this theme was able to take the results of an incubation process and make it into a public engagement opportunity to support public dialogue on the issues of synthetic biology:

'Our focus was on synthetic biology, the subject we have the strongest connection with. For example, we worked closely with Science Gallery for the exhibition GROW YOUR OWN, which was co-curated by Professor Paul Freemont from Imperial College London, Cathal Garvey, Daisy Ginsberg, Michael John Gorman and me. The Royal College of Art wants to bring speculative design to a higher level. In the process of incubation the students started realizing that they weren't just making a small object about an ethical dilemma, but that they were involved at a deeper level with questions about society and the developments in this particular field of science. The challenge was to create imaginary products which can become reality given the developments in synthetic biology. And to make them in such a way that visitors of GROW YOUR OWN and other exhibitions would not put them aside as being implausible, but to make them so well thought out and well executed that they are perceived as real, so that people are triggered to reflect on it. Studiolab offered us the opportunity to do that, together with our partners, on a much higher and more intensive level.'

2 An integrated framework

It is striking how the three strands education, incubation and public engagement were intertwined in projects. The overview on p. 124 provides a powerful picture of how education, incubation and public engagement were interconnected and were often realized simultaneously. All the partners interviewed unanimously affirmed how the integration between the three strands of work was much more intense than originally expected. Some partners, such as Le Laboratoire or Ars Electronica, have traditionally worked with a tight integration of education, incubation and public engagement. In fact, this integration is quite well-known to several institutions. What Studiolab allowed to create was an integration that crossed the institutional boundaries. For example, it allowed students from Trinity College to follow education modules at Science Gallery, incubate their ideas at Le Laboratoire and show their products in an exhibition at Ars Electronica (see “Opimilk”, p. 69). Or the students at ERG who used a curriculum developed by ISI and received mentorship by RCA. These exchanges were not only beneficial for those individuals who were part of the activity, but for all the institutions involved as well.

The strands are complementary, intertwined and mutually reinforcing. Project Genesis organized by Ars Electronica is an example of how this integrated approach works at the institutional level with a focus on all three strands. Educational workshops, like a DNA workshop, were developed for the students and the public; artists and scientists worked together in a process of incubation which led to the development of the installations. These formed an exhibition in which public engagement took shape, and through the questions and dialogue with the visitors, the staff of Ars Electronica was exposed to a process of education about the ethical and social implications of synthetic biology. Opimilk, the painkiller of the future, exemplifies the process from idea to product through the three strands.

‘This integration is part of the philosophy and methods of Ars Electronica,’ says Matthew Gardiner, artist and researcher at Ars Electronica:

‘The incubation processes of Project Genesis, as well as other projects, is something we do in-house, or through mentoring on location. For example, we receive a concept through an open call, and we offer the opportunity to realize that work with our mentorship. My own contribution to Project Genesis, Synthetic Memetic, is realized that way (see p. 65). The education is intertwined in various ways in Project Genesis, in the exhibition itself, in the workshops, in the texts and documents of the installations, and in the guiding of the public by info trainers. Those info trainers have a pure educational function. A tour through the exhibition is actually an education process. The Biolab we had at Project Genesis is part of that process too and gives context to the experiments and the exhibition. Such a lab in the exhibition offers a great opportunity to get the public involved with the theme. In the Biolab the public can actually work with the tools and techniques available to the scientists and artists who developed the exhibits – such as extracting DNA and genetic sequencing.’

For Medialab-Prado this integrated approach was the starting point of the whole project, said Laura Fernández, cultural program director:

‘Ever since the initial proposals for Studiolab we wanted to be involved in all three strands simultaneously – if you could divide them anyway. Our projects with workshops are particularly suited for this approach. Like our project *Interactivos?* (see p. 75), in which education, incubation and public engagement go hand in hand. In the workshops we work at the prototyping of products which involved a lot of incubation processes. Learning happens through workshops, through

tutors, in the group, through collaboration with various expertise, thus from each other. That sounds rather open-ended, but it is in practice particularly effective. Also university students and teachers are participating and they make *Interactivos?* a part of their own school program. The interdisciplinary work itself is a learning experience for them. The public engagement is woven into the project, because of the open and transparent nature of the workshops, and also occurs when we exhibit the prototypes and discuss them with the audience.'

For Science Gallery learning how to integrate the three strands was part of a renewal process the institution was ready for.

Michael John Gorman:

'As a science-art exhibition space we always had a strong focus on public engagement.'

With
Studiolab
we could
try out new
models with
innovative
approaches
in which

public
engagement,
education
and
incubation
are
integrated.
It has given
us a whole
new way of
working.'

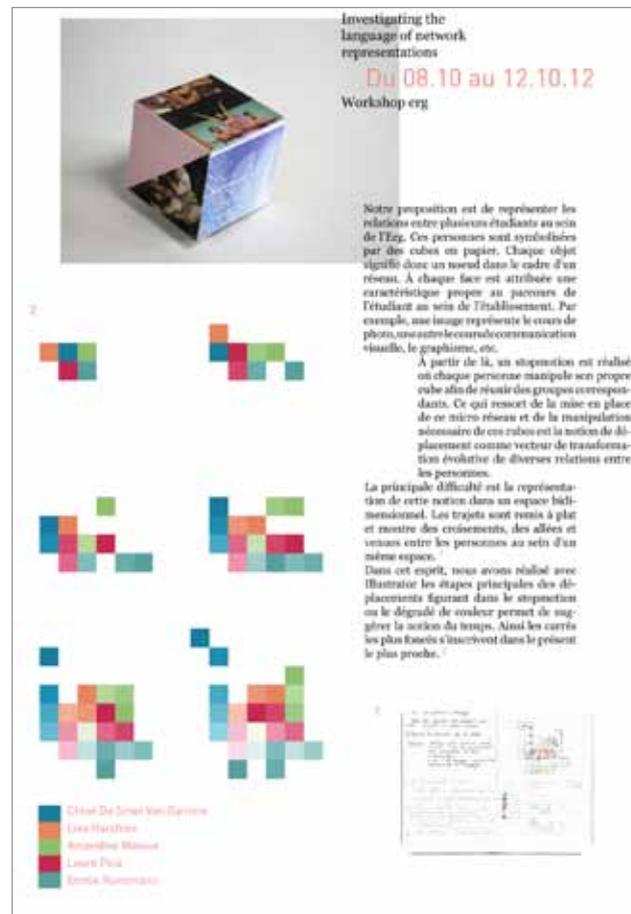
This integration between strands effectively means that it becomes possible to substitute the name of one strand with another and the same activity still makes sense. For instance, when an activity labelled as "education" can be in fact called "incubation", or when "public engagement" can be described as "education".

3 Creativity in education

Studiolab had some unexpected outcomes in its educational activities. The project intended to create new interdisciplinary curricula for high school and university students. That proved to be less easy than thought, because the school systems in the countries of the partners are all different from each other. At the same time, this constrain fuelled the creativity to collaborate and to develop education modules for different groups of students and settings.

Science Gallery and Trinity College organized the Idea Translation Lab, a twelve week course for students to develop their creative idea into a product. It has become a regular part of the curriculum now at Trinity College. ISI Foundation organized a postdoc in design and computer science to train a new generation of students skilled and comfortable in both domains. ERG School of Design introduced a master in Art & Science focused on the visualization of dynamic social networks. Synergetica developed two curricula, one about three dimensional spheroidal projection techniques and one about the mechanics of subatomic vacuum. These curricula were used in schools in the Netherlands and Spain. The Bloomfield Science Museum created a 4 month course for design students in collaboration with the Bezalel academy of arts and design. The Royal College of Art introduced a dynamic form of education in which research, education and creation were united in an integrated process; teachers became tutors, and

exhibitions
were a step
of the
learning
process
rather than
a final goal.



The Royal College of Arts also innovated by involving students who have recently graduated in the creation of projects. It offered the former students the opportunity to literally “come back to school” and experiment with their newly acquired professionalism in an educational environment. The result was the exhibition Blueprints for the Unknown which includes the intriguing project The New Weathermen (see p. 77).

Anthony Dunne explains the importance of giving students the space to keep experimenting – something that most young professionals cannot afford to do anymore once they start a professional career:

‘With Studiolab we have created almost a kind of PhD program for promising students who have graduated so we can keep working with them and bring speculative design to a new level. They all have their own independent practices. We wanted to make use of their expertise and give them at the same time a working and learning experience in a high profile setting. So we offered them a dynamic form of education with lots of room for experimentation and experience, which was driven by the process itself.’

Studiolab showed how an art-science hybrid approach and a collaborative way of working innovates education and professional training. We might call it “teaching by problem”: the teacher presents the students with a problem that is still open, where the teacher needs the creative input from the students, and the students benefit from the knowledge and the contextualization of the teacher. In the end, both the teachers and the students will be surprised by the results. A beautiful collaboration that exemplifies this approach arose between ERG – École de Recherche Graphique – and computer scientist Wouter van den Broek from ISI Foundation. It resulted in classes and workshops on the visualization of networks. Wouter van den Broek:

‘The students of graphic design ERG don’t have specific knowledge in computer science and social networks, but are particularly good in conceptualizing and visualizing. I was positively surprised at how they worked with the subject. In the morning I talked about the visualization of social networks, the problem with that, the dynamic nature of networks, and the lack of a proper ‘language’ to make such dynamic networks visual. In the afternoon, they presented their vision and solutions. There was a team with a stop motion video as a representation of a dynamic social network. Others came up with drawings or experimental multimedia representations. And there was even a danced representation of a dynamic network. Very fascinating how they think. It was much better than I expected.’

The design results were then used in college classes on visualization of networks for university students. Anne Degavre from ERG elaborates on how this process was beneficial for the scientists too:

‘There was a lot of learning from each other. Wouter’s workshops were challenging for the students. In return, scientists can learn a lot from us about communication: how our art students conceptualize issues and pack them. Thanks to our work, university students can learn how to communicate their research not only on a functional level but in a different way. They learn about the communication process itself, on a deeper level, and to think out of the box and to be creative.’

4 Dynamic collaborations

Networks of universities, research institutes and museums have been around for a long time, but the unique aspect of Studiolab is that it brought these normally separate institutions together. This collaboration has led to very special and lasting relationships. The dynamics of the cooperation surprised the partners; what started in a somewhat hesitant way, changed over time in enthusiasm. During the course of the project, many personal contacts were established. The individuals working on Studiolab were soon exposed to different methods and approaches to work. From these personal bonds stronger institutional collaborations ensued. The core partners worked together with each other in larger projects. The expert partners had in general more collaborations and exchanges at regional level and produced activities in collaboration with local institutions.

Studiolab engendered three levels of collaborations. The first one was at the institutional and personal level among the institutions in the consortium. This included strengthening and widening existing collaborations and forming new bonds. The second level was between the consortium and new partners, such as between Medialab-Prado and digital media lab Ljudmila in Ljubljana, Slovenia. In this case the collaborative model based on the *Interactivos?* workshops, trialled between Medialab-Prado and Science Gallery during HACK THE CITY was exported to new institutions outside of the Studiolab initial consortium. Expanding activities beyond the consortium was one of the original aims of Studiolab, which was sometimes curbed by the administrative overheads experienced by the partners (see p. 39). The third level of collaboration was the most unexpected and unplanned, and it was often enabled by the public of the organizations involved. For example, Irish students who followed the education modules developed by Science Gallery at Trinity College participated a few months later in the ArtScience Prize at

Le Laboratoire, working with the mentors there, and then showed their work at the “Project Genesis” exhibition at Ars Electronica (see “Opimilk”, p. 69). Like in a complex system, this kind of collaborations emerge from the intense activity of each partner combined with an infrastructure for mutual updates and communication.

In terms of collaborative work, Medialab-Prado felt at the beginning like the “new kid on the block”, because Studiolab was the first European project they joined. But their project *Interactivos?* brought them from one co-operation into another. Laura Fernández explains:

‘We wanted to expand our network, find new formats, learn from other institutions and their approaches, build partnerships with organizations that organize exhibitions and offer other forms of public engagement, and learn from organizations that have something in common with us. It was the first time we participated in a European project, and we felt quite a bit lost. But organizing our program *Interactivos?* in Dublin and Ljubljana was particularly inspiring and worked as a catalyst for new experiences, like for example with the Hacklab of Science Gallery. The contact with Ljudmila, the digital media lab in Ljubljana, was for us even a whole unexpected outcome of Studiolab. One of the artists, who had worked with us, did later a collaboration with them too. We met him again at Ars Electronica, with a new work in partnership.’

Collaboration meant stretching the comfort zone of the partners.

It meant giving up control on “how things are done” at one institution and let the other partner(s) take over. Initially it may provoke resistance, trying to understand the need to change accepted practices. The result, however, is a deeper understanding of the institutional culture of an organization, and a driver to innovate in ways that were unthinkable before. An example of this was prototyping and commercialization – that is, the process to bring an idea to a real product. It was for several organizations an uncharted topic: it is not what science institutions or artists usually do. And yet, it is a fundamental part of the innovation process that stems from the collaboration between artists and scientists. Le Laboratoire in Paris developed a specific knowledge in this regard, which is at the basis of the ArtScience Prize. A process where students are challenged (and mentored) to take an idea and build a real product from it – be it a commercial product, a cultural or philanthropic one. An example of what results from this process is the Cell bag (see p. 73).

Xavière Masson, director of Le Laboratoire Paris, explains how the ArtScience Prize was a catalyst of collaboration for the partners of Studiolab:



‘The partners and Le Laboratoire worked together over the course of a summer workshop, a one-week long program which we organized four times as part of Studiolab. In the morning, the students took lessons from experts, such as entrepreneurs with a start-up or other professionals from the academic, industrial, cultural and design world. In the afternoon, the students worked with their mentors on their own project development (i.e. business plans, prototyping, etc...). At the end of the week they presented their ideas and products during a public event. Thanks to the cooperation within Studiolab, additional students were able to participate. For this project we collaborated with Trinity College, Science Gallery, graphic design school ERG, the Royal College of Art and Ars Electronica. As result of the cooperation, the students with the best ideas were invited to exhibit at Ars Electronica, which was a unique and wonderful opportunity for those students.’

Nothing can better demonstrate this approach than having the students presenting their project Organight at Ars Electronica (see p. 71), and shortly afterwards witnessing them launch their very own start-up company to commercialize their product, called Glowee.

5 Hybrid work style

Studiolab was all about a hybrid approach. Although the initiatives were often driven (or initiated) either from the art or from the science side, the joint contribution of both disciplines was very strong. At Ars Electronica – by definition an arts organization – the projects were led by artists, but there was a lot of input from scientists too. Matthew Gardiner explains:



‘The
scientists
had an
important
voice in
the learning
process
about the
scientific
develop-
ments.

The artists
were decisive
in the
question
how to
conceptualize
and
communicate
the matter.
And both
were needed
to investigate
questions,
perspectives
and social
relevance.'

Science Gallery had for each exhibition both a researcher and a designer as curators and organized special labs like the Hacklab and the BioLab which brought together all kinds of disciplines in a unique process of creation and innovation.

Michael John Gorman:

'The Labs we organized were perhaps the most innovative part of our exhibitions. Lots of things happened there. One day they tried this, the other day something else. And the results were sometimes very innovative, just because of the colourful mix of various disciplines that participated. The Hacklab was controversial and not only because of a dispute with customs about a drone incident (see next page). It resulted in processes and approaches that may only arise in a hybrid context and which are now an important part of our exhibitions.'

The hybrid approach also increased the credibility of the design and art institutes in the field of research.

Anthony Dunne:

'Our graduate students worked on Blueprints for the Unknown and other exhibitions. Although funding forced us to keep research and design separated, the conceptualization of questions resulted in a contribution to research on these questions – call it 'research by experimental design'. Studiolab fed the recognition that an artist-led process can contribute importantly to the scientific process and public engagement.'

All the interviewees mentioned that their organizations quickly learned that they needed to face unconventional ways of working, and to resist the temptation to follow established and more traditional procedures.

6 Missed potential

Some aspects of the projects did not live up to the original expectations or to the potential that (in hindsight) they had. For example, ISI had much to offer in their role as a ‘scientific advisor’ for all the partners. Their expertise could have been used more. It did not happen, mostly because of practical reasons, says Wouter van den Broek:

‘At ISI, in terms of networking the collaboration was successful. We had a couple of great partners, ERG, Science Gallery and Le Laboratoire for example. And we have done great things too. But our expertise has not been used to the full extent. Our core business as ISI is science. The use of this expertise was not fully exploited due to lack of knowledge about each other, lack of communication or by specific budgetary rules, including those of our own organization.’ This is an area of friction between the organizational and the individual levels. Staff are booked to work under certain projects, their time is allocated (that is, covered) by certain budgets, and it is not always possible to shift time and resources between projects, because they come from different funders and sources. This prevents the implementation of the “hybrid approach”, because it constrains the areas where the staff can work. The diminished role of ISI as a “scientific advisor” exemplifies also how difficult it is to plan and define certain roles in advance. While the initial plan was to have ISI as a content provider, in the course of the project it turned out that ISI was a fundamental element for the mentoring and education modules thanks to the collaborations it was able to establish.

The Studiolarb proposal had also a plan to develop an ‘Idea Bank’, a database of art and science ideas to consider as candidates for the incubation, education and public engagement modules of Studiolarb. This database was intended to be a repository of contacts, ideas and procedures, and act as a “bridge”

between partners. Its development suffered some delays, and it was later developed as the “Studiolarb Community” website. But it did not fulfil the initial expectations. As explained later (see p. 38) the communication between the partners relied on several tools, practices and habits, and therefore a new (and untested) electronic platform was not a reliable way to support the communication flow required by the project.

Lynn Scarff explains that the problems of the Idea Bank were due mostly to the lack of incentives for artists and scientists to be listed in the database:

‘The Idea Bank was intended as an on-going resource for people and ideas, meant for the artists and scientists themselves. It failed for two reasons. First, there were logistical problems with the website of the Idea Bank, which came online after 12 months of delay. Secondly, the way it was set up did not have the impact that was intended. We thought that the partners would give input to it, but there was not much enthusiasm to do so. It worked well from the perspective of Studiolarb, but in practice as a network it was not appreciated nor did it work. In hindsight, it might have been better if we had added something like a crowd funding facility for the participants to it. It was too much like a bulletin board. And as a bulletin board alone it had not enough attraction.’



... And a few incidents

Studiolab also had some minor 'incidents' which made the news. HACK THE CITY was particularly prone to accidents, because of its experimental content. At the start of the exhibition

three artists
were
arrested at
Heathrow
airport and
detained
for seven
hours on
suspicion
of terrorism.



fell on the ground and had to be taken to the hospital. Not the best way to start a new exhibition!

These incidents were not the main reason for the media to talk about Studiolab. On the contrary, many initiatives received considerable media attention, due to their "edginess". One for all, the project "Selfmade", the "human cheese" by Christina Agapakis and Sissel Tolaas which was featured on hundreds of media outlets worldwide (see p. 61).

1
<http://www.siliconrepublic.com/innovation/item/27915-quadcopter-drone-group-held>

2
<http://www.wired.com/2012/06/loitering-theatre/>

According to the customs officers there was 'suspicious technology' in their luggage¹. What also turned out not to be allowed was flying with a drone into the Facebook headquarters in Dublin, despite the invitingly open windows². It resulted in unintended but very welcome publicity at international level. Another of the projects used duct tape to mark specific spots on the pavements around Dublin. The rain made them very slippery, and as a result one of the vip guests at the opening event

3 What can we learn from studiolab?

Lessons learned

One of the strengths of collaborative projects such as Studiolab is that they create a “safe zone” to push the limits of individuals and organizations, taking away the fear of making mistakes. As a result, by reflecting on the processes set in motion by the project, we identified seven “lessons learned” – seven items that illustrate what makes a project stronger, what are the potential obstacles to success and what are likely to be fragile components that need special attention. The seven “lessons learned” described in this chapter are:

- 1 **Organizations learned to change**
- 2 **Innovation requires a ‘sandbox’ environment**
- 3 **‘Silo’ mentality is an obstacle**
- 4 **‘Small Talk’ is more important than Skype**
- 5 **Make budgets flexible**
- 6 **Allow mistakes**
- 7 **Giving a structure to creative risks**

① Organizations learned to change

Studiolab has shown that the art-science approach and the integration of processes can be a strong impulse for innovation. Not only for specific projects, but also for the institutions themselves. The hybrid approach with its crossovers and collaborations became a way of working for many of the institutions involved in Studiolab. It stimulated all those involved to do things that were not done before, and eventually it provoked a process of change for the organizations.

There was an experimental mind-set at the core of the interdisciplinary focus of Studiolab that enabled organizations to evolve into what we can call 'engines for innovation'.



MUTANT PRODUCTS WORKSHOP

SCIENCE GALLERY, DUBLIN 18TH TO 20TH APRIL 2012

This process is visible in two areas: the new roles for the staff and the change process for the institution.

It was not uncommon for The Royal College of Art and its people to play several new roles simultaneously: they developed exhibitions, created installations and artworks, curated them, mentored students in Paris and Dublin, participated in various workshops and conferences and wrote contributions for publications. Several other partners experienced such diversity of roles, at all levels of staff in the organization. It gave a boost to Studiolab, but also to the organizations themselves. For the Royal College of Art, this meant enhancing its profile.

Anthony Dunne:

“The experiences in Studiolab have intensified our commitment to the art-science and bio-art communities.

Studiolab
has helped
us to
redefine
our position
and role as
designers.’



The partners learned from each other and they found confidence to change some of their work processes. Medialab-Prado for instance redesigned the social model of the organization.

Laura Fernández:

‘One of the outcomes of Studiolab is that we now have integrated Studiolab’s model of collaboration into the model of Medialab-Prado, with more emphasis on being a community, including a new site which presents all our projects.’

Le Laboratoire created a richer network around the ArtScience Prize.

Xavière Masson:

‘We brought the ArtScience Prize to the next level and extended our ‘family’ with new partners. Together we have become stronger and smarter and through this collaboration our students now have a bigger stage to show their work.’

For Science Gallery, the result was even a completely new, challenging institutional strategy.

Michael John Gorman:

‘As the initiator of the program, we probably have got the most value from it.

I have the
feeling
that we have
learned more
in the past
three years
than you
normally
do in thirty
years.

It has given us the confidence to be a place of incubation (with the development of the Idea Translation course), transformation and processes (with the community labs initiatives), more than a place of exhibition of art and science.'

② Innovation requires a 'sandbox' environment.

According to Harvard Professor David Edwards, founder of Le Laboratoire, innovation demands a 'sandbox' environment. In many ways Studiolab offered such an environment, as a whole and in each individual project. For example, the Hacklab was a sandbox to try out activities that were never done before at Science Gallery. It takes courage to try something as uncertain as a Hacklab, or to engage with the public in a new way like in the Biolab. The platform *Interactivos?* of Medialab-Prado can be seen as a sandbox too. Their format was adopted by other partners who dared to step into a process where the results were unknown.

The
outcomes
of an
experimental
environment
cannot be
defined,
programmed
or managed
in advance.

Many initiatives were undertaken without a firm guarantee of success. It is inherent in an experimental environment that results may not be as expected. Sometimes this means the end of an idea, sometimes this feeds creativity and leads to innovation. Studiolab has shown that innovation occurs when one has the courage to experiment.

Matthew Gardiner summarizes very well what made Studiolab special, despite the administrative and budgetary constraints that are intrinsic to a project of this sort (see p. 39):

‘When we had a new idea, Studiolab allowed us to say ‘ok, let’s do it!’, rather than lingering over the question ‘with what resources?’.



3 'Silo' mentality
is an obstacle

The hybrid
approach
of Studiolab
stands
in stark
contrast
with the
rigidity
of the
academic
world.

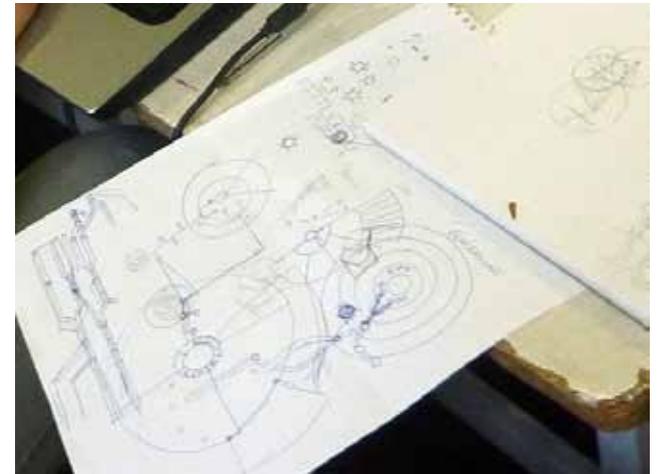
The partners were very positive about the value of an interdisciplinary approach, but they experienced at the same time that existing structures, such as the academic field, do not facilitate this approach.

In practice,
the hybrid
nature of
work is not
sufficiently
valued and
recognized.



Academic disciplines are still organized into 'silos' and offer little opportunity to publish interdisciplinary work. That is what computer scientist Wouter van den Broek experienced, talking about his work with Science Gallery on real-time visualizations of patterns of the spread of infectious diseases.

'Interdisciplinary work always covers several scientific fields, in this case biology, epidemiology, networks and computer science. But when it comes to publishing, I have to divide my interdisciplinary work in publications for individual domains. I can publish in a journal of biology, or epidemiology, or computer science. But not in one that covers all three domains. The result is a publication that does not portray the interdisciplinary work to the full extent. And also, those publications in other fields have little or no value for my career as a computer scientist. If I want to pursue an academic career in computer science, publications in biology or epidemiology journals don't really count much.



Contributions
to inter-
disciplinary
work are
therefore
in a way
unattractive,
at least for
the academic
career.'

4 'Small Talk' is more important than Skype

An important lesson from the evaluation is that you cannot bridge a physical distance using 'Skype' alone. Collaborations need regular face-to-face contact and small talk over a cup of coffee.

Xavière Masson:

'A stumbling block in initiating and continuing relationships was often the distance, even though we all have Skype. If we did not see some partners for a while and then run into each other in real life, we often said: we should work more together. It was often the beginning of something new.

Direct
contact is
absolutely
necessary
for collabo-
rations.'

There was a lot of cooperation between people who regularly saw each other for reasons outside the scope of Studiolab. Distance determined participation and success of cooperation. Dublin and London were close together, Jerusalem seemed to be far away. As a result, the Science Gallery and the Royal College cooperated very intensively and the Bloomfield Science Museum saw fewer opportunities for collaborations. This is one of the reasons for the low performance of the "Idea Bank" – an electronic communication tool can support and enhance existing relationships, but it is very hard to create new ones if there are not enough personal contacts already in place.

As a lesson learned for future projects, it might be useful to identify the "connectors" – partners with a lot of established contacts – well in advance at the beginning of the project and focus on them with the management; realizing that not every partner has to communicate at the same level. In the overall project management it is important not only to structure the formal contacts, but also to consider how 'small talk' can be facilitated without making it to a formal structure.



5 Make budgets flexible

Studiolab has shown that not only the size of the budget is important, but also its “spendability”, the possibility to use it in an agile and dynamic way. All the interviewees mentioned the need for more flexible budgets. As with so many projects, Studiolab’s use of funds was decided and fixed at the award stage: who gets what and why. But it turned out that there was a strong need to make the applicability of the funds part of the process. Gradually the partners discovered that there were better ways to do things than anticipated. Or that the cooperation with another partner who was not part of the consortium had more potential. More innovation could have been possible. As someone said during the interviews:

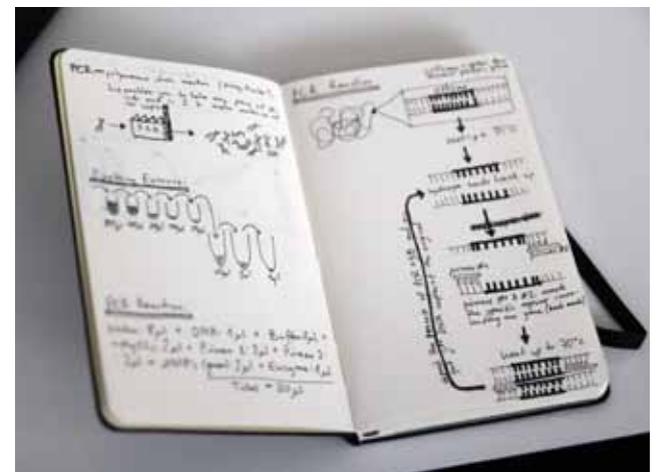
‘Deliverables were set in advance, but innovation does not work that way.’

Some partners experienced the strict administrative obligations of the funding as a stress factor and were afraid of making mistakes. And then there was the paradox that funds were only allowed to be used for ‘execution’ and not for ‘research’, while, for instance, for the Royal College of Art research and design are part of an integrated process. Of course changes were possible, but only through time-consuming and lengthy administrative procedures. That made it difficult to change partnerships during the project and to start new initiatives. This was at odds with the dynamics of Studiolab and maybe the reason why not all possibilities have been fully exploited to the max.

A suggestion for similar projects is to make the allocation of a portion of the budget dependant on the process itself.

Matthew Gardiner explains:

‘We ran against contractual restrictions, budgetary rules and administrative obstacles. For some collaborations and experiments there was a lack of flexibility in our resources. For example, we could facilitate projects, but contract partners could not easily be changed. It didn’t stop us from doing what we had to do of course. With a more flexible budget, related to the open call and our use of direct costs, we could have tackled more opportunities that arose in practice.’



Sometimes
a project
pays back
after five
years,
but you
are held
accountable
for what is
happening
now.

You want
to invest,
but the
project
rules want
you to
harvest.

This
discrepancy
was
sometimes
frustrating.'



6 Allow mistakes

“Risk is a social catalyst”

told us David Edwards. Undertaking a risky activity brings people and organizations closer together, and strengthens their collaborative spirit.

Given the experimental nature of Studiolab some partners would have appreciated to have more space to take risks and make mistakes. In practice, the partners played it (mostly) safe. Allowing uncertainties felt risky. Ars Electronica wanted to take more calculated technical or creative risks, but had to forgo of this because of budgetary rules or legal restrictions on the changes allowed in the contract. Others wanted to take part in experiments that were uncertain in terms of the ‘return of investment’ and could raise questions on whether the budget was “well spent”. But the sandbox concept is conducive to experimentation: where risks were taken, for instance with the Hacklab, it led to special crossovers with outstanding outcomes. With the possibility to take more risks, Studiolab had probably achieved even more innovation.

Michael John Gorman:

‘Studiolab was a very ambitious project. Exciting to do, but in a sense also risky. We did things we had not done before. You never know what happens unless you dive in and do it. The Hacklab was a completely new tool for us. Normally we work with more structured forms of incubation, but with the Hacklab the processes were to say the least more chaotic. And because of that it



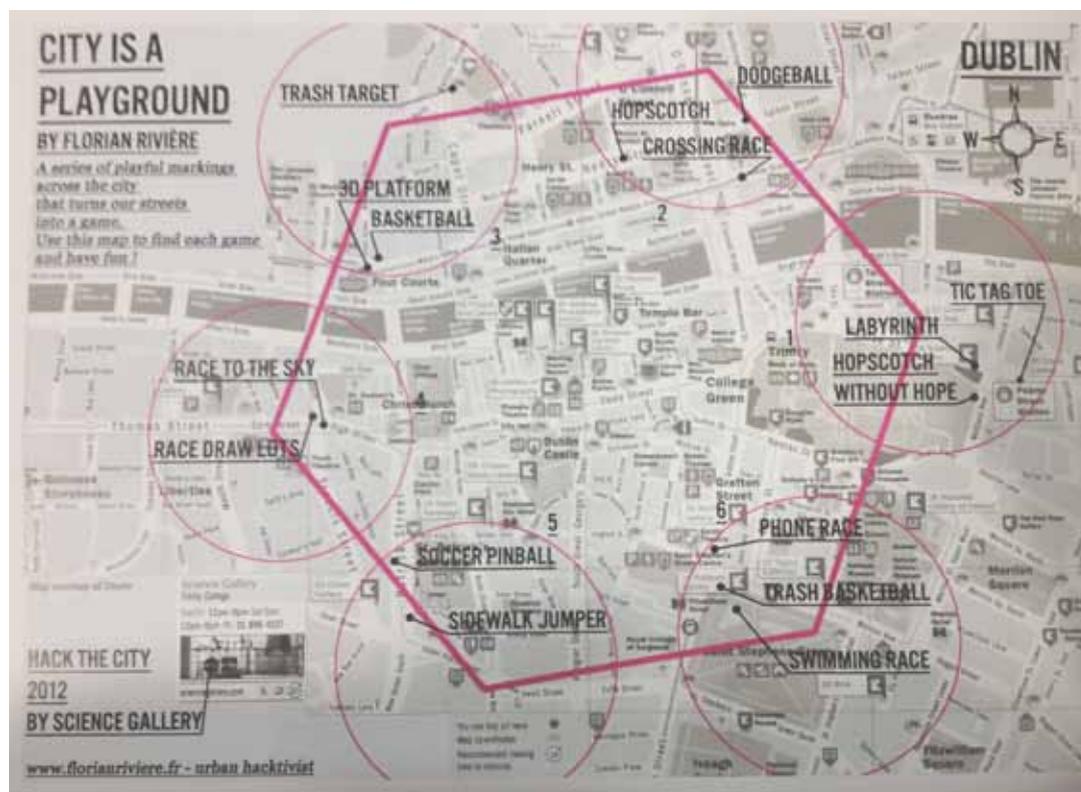
was potentially innovative. It was a learning process we dared to experience, even though we realized that we could not control everything and errors were possible.

Hacklab turned out to be one of our best experiences. And yes, there were indeed things that went wrong.’

7 Give a structure to creative risks

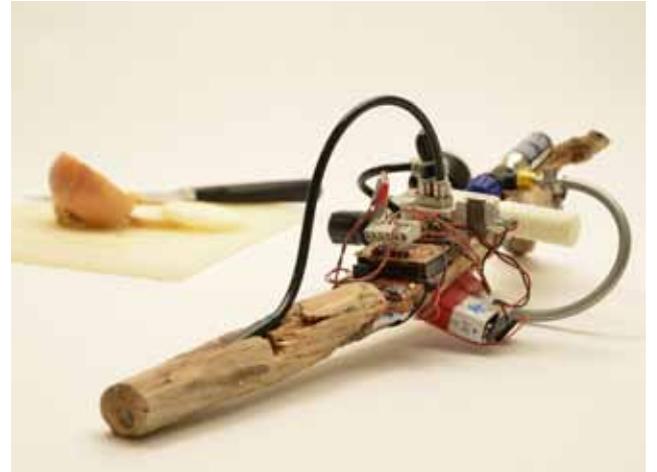
For many
of the
participants
in Studiolab
the ‘open call’
method
was an
eye-opener.

Normally, curators bring known people together for an exhibition or a project. Studiolab relied instead on an open procedure. For each major activity within Studiolab, the partners published a call inviting interested parties (artists, designers, researchers etc.) to submit ideas and projects. In addition, some individuals were personally invited to submit their proposals. Rather than the “top-down” traditional curatorial approach, this was a “bottom-up” process that proved to be a success factor for all partners. The open calls were also the best opportunities for the partners to make new and valuable contacts.



Matthew Gardiner:

'With Project Genesis we wanted to bring mentors, scientists and artists together with challenging ideas and encourage new talent. It is mostly young artists who want to try new things, think out of the box and give energy. Through the open call we came in contact with people with whom we had never worked before, including students and other emerging talents. Taking creative risks then is part of the deal. We also invited some experienced artists to join the project because of their proven quality and the statements which they can make. We reached the balance we were looking for. It took a lot of our resources and attention, but it was a great result for the project.'



4 Towards a model of collaboration

Studiolab at its core was a four year experiment in art-science collaboration. With this evaluation, we sketch the model that is emerging from this experiment. Overall, the partners were very satisfied with their participation in the project. In practice, the collaborations were broader, more intense, and more appealing than originally thought. In a way the partners were surprised by the effects that Studiolab had. They changed probably more than they had expected. The possibilities brought by the collaboration between art and science are fascinating and the multidisciplinary approach and integrated processes are rewarding. The result is an impressive list of 112 art-science pilot projects that transmits a lot of enthusiasm.

It would be too simplistic to draw a model of collaboration based on this one experience. However, Studiolab showed how the following elements are the pillars for an effective cooperation:

- 1 An experimental environment where people can try out new ways of working
- 2 'Let's do it' approach with an open mind (and supportive management) for the unexpected
- 3 Flexibility in budgets, planning and implementation
- 4 Use of the open call process
- 5 Acceptance of mistakes and uncertainties as part of the broader process of innovation
- 6 Thoughtful communication and facilitation of informal face-to-face contacts
- 7 Tight integration of education, incubation and public engagement activities.

- 1 An experimental environment where people can try out new ways of working





- 2 **‘Let’s do it’ approach with an open mind (and supportive management) for the unexpected**



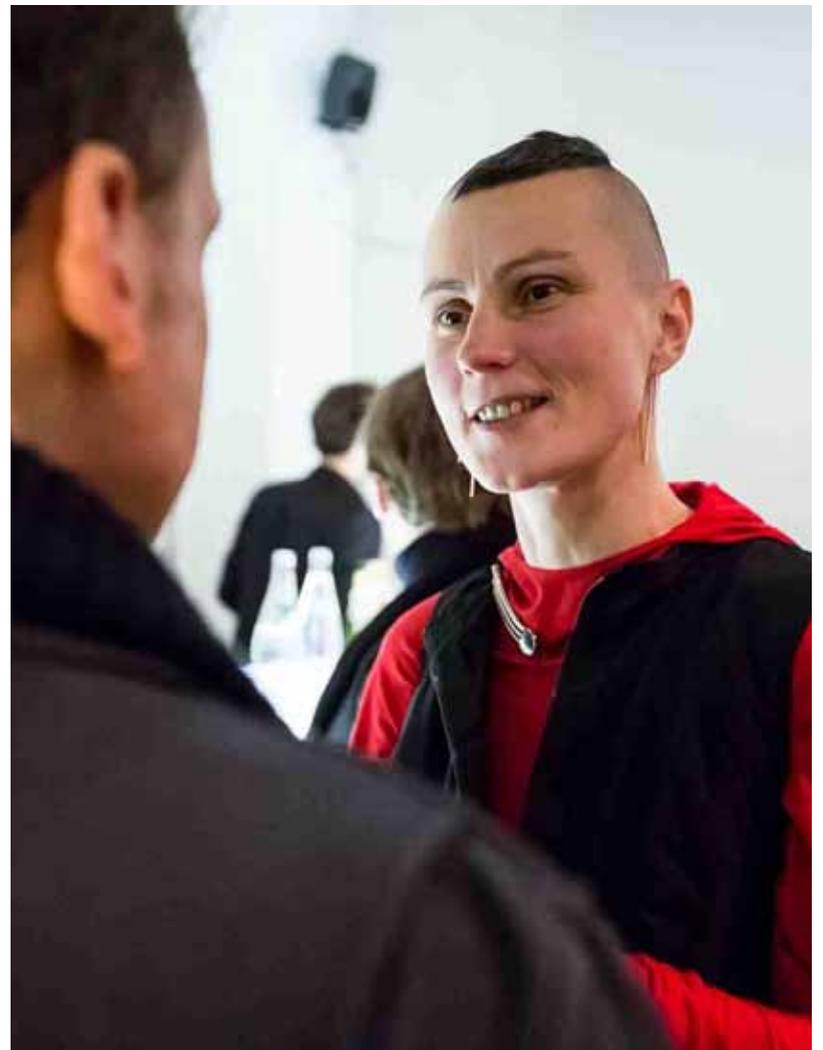
**3 Flexibility in budgets,
planning and
implementation**

4 Use of the open call process

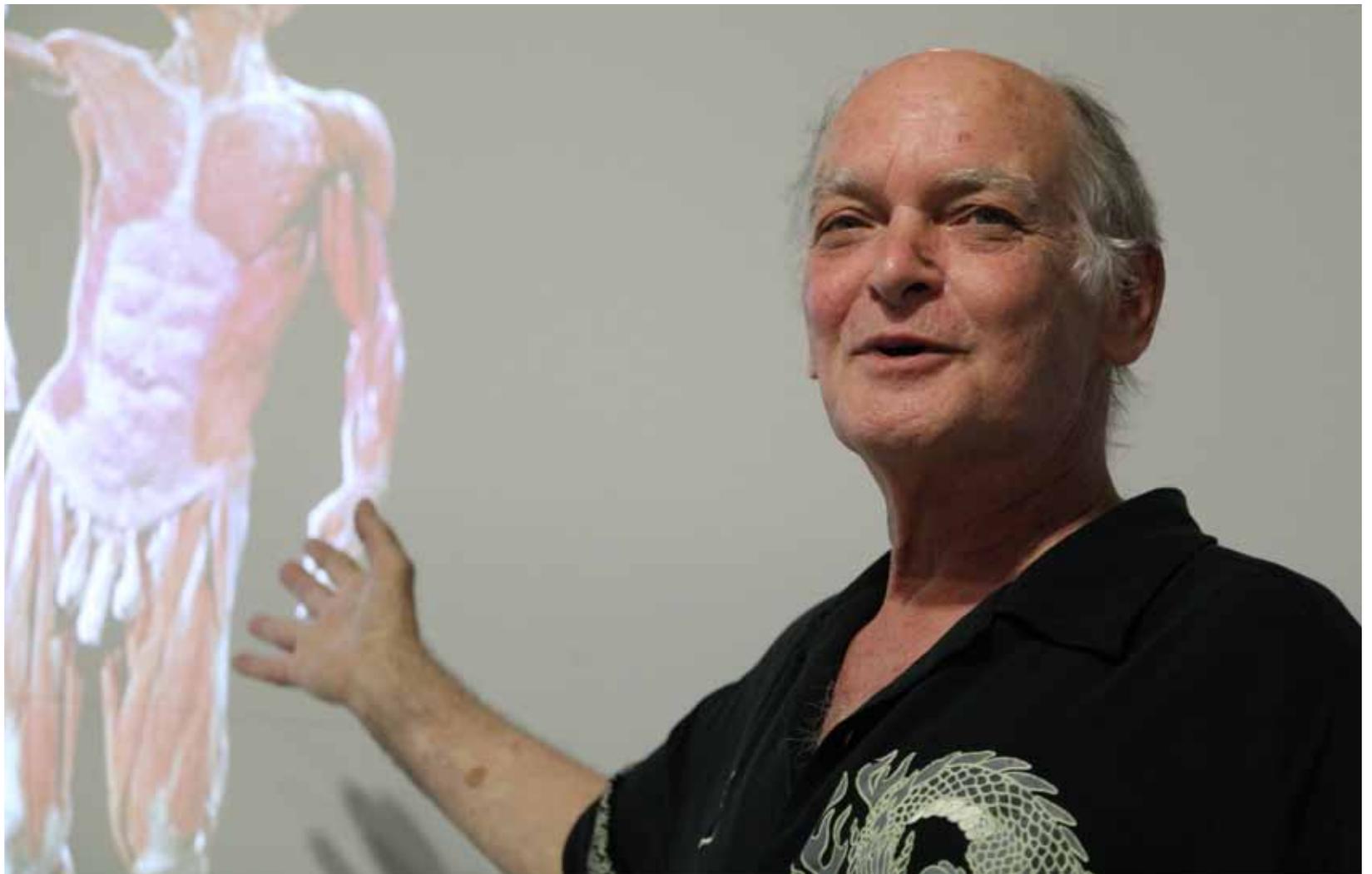


5 Acceptance of mistakes and uncertainties as part of the broader process of innovation





6 Thoughtful communication and facilitation of informal face-to-face contacts



- ⑦ **Tight integration of education, incubation and public engagement activities.**



5 Highlighted projects

The following pages give a flavour of the pilot activities developed for Studiolar. Our aim with this selection is to give a sense of how diverse the formats were and how interconnected the activities of Studiolar turned out to be. The selection includes:

- the two exhibitions **GROW YOUR OWN** and **Project Genesis**, with a number of artworks which resulted from the open calls and the incubation processes;
- the artwork **Hydrogeny**, developed by Evelina Domnitch and Dmitry Gelfand for Synergetica, which was then exhibited in multiple locations in Europe, USA and Canada;
- **Opimilk** and **Organight**, two student projects which exemplify the innovative incubation and education approach of Studiolar and cross fertilization among participating institutions;
- **Cellbag**, an example of how the hybrid approach of science and art becomes a commercial and humanitarian product;
- **Interactivos?**, workshops which combine incubation, education and public engagement with social relevance and citizen participation;
- **The New Weathermen** and **Into Your Hands Are They Delivered**, two artworks developed for the project Blueprints for the Unknown to provoke dialogue and debate, which were exhibited in multiple locations within and outside of Studiolar.



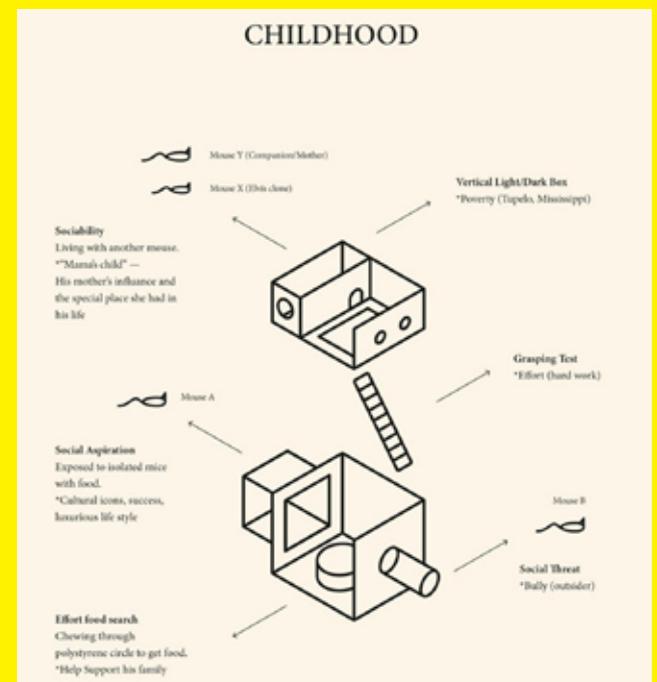


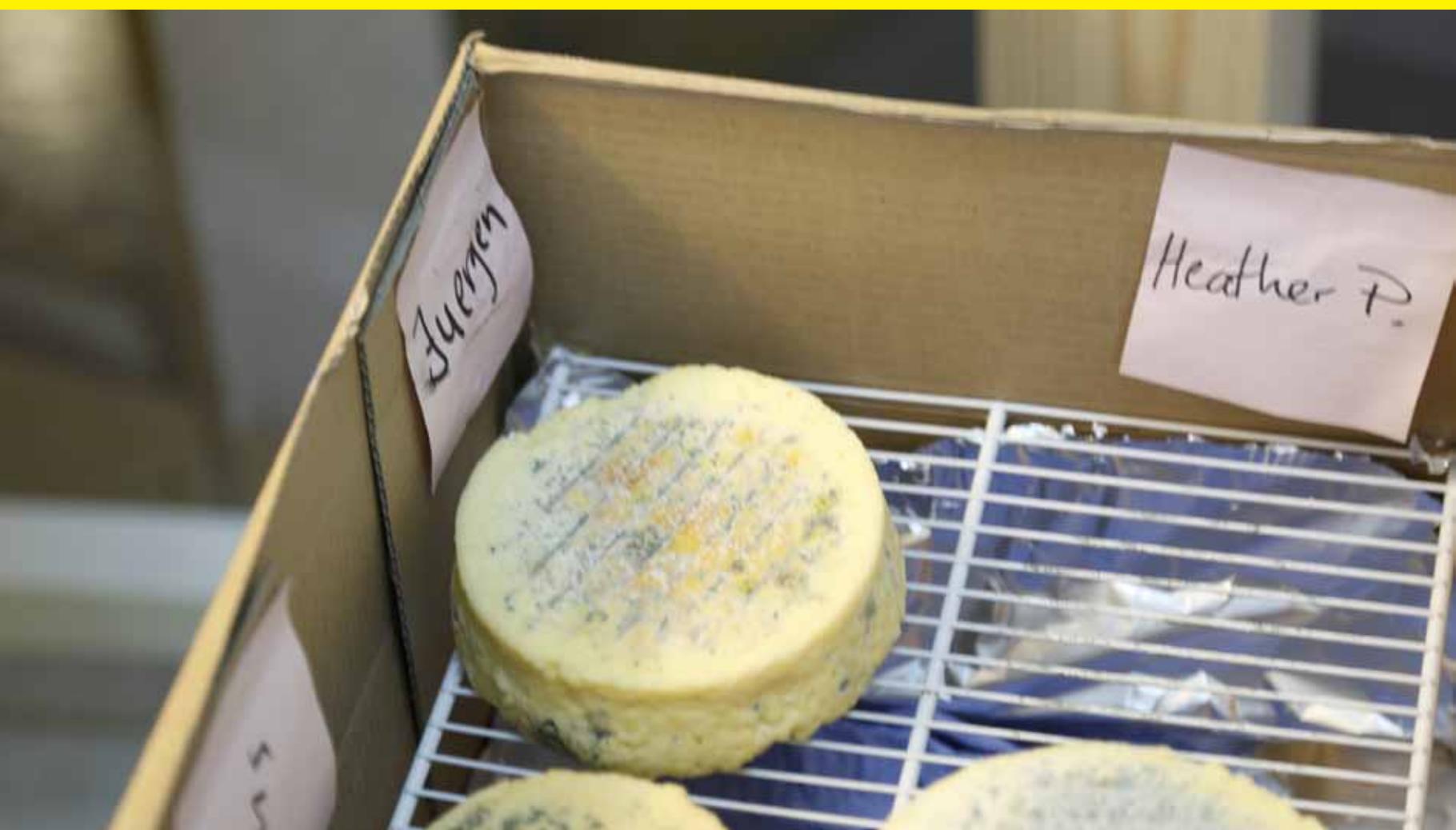
Elvis mouse

He immediately attracted the attention of press and public, the running Elvis mouse. A media-friendly and – potentially – heavily addicted mouse with genetically modified genes that were sneakily taken from a hair of rock legend Elvis bought on Ebay. The little King of Rock ‘n’ Roll was part of the exhibition GROW YOUR OWN. The question of artist Koby Barhad was: are you still the owner of your DNA? The artist asked a lab to break the genetic code of ‘his’ Elvis hair and ordered the genetic model for a mouse with a predisposition to obesity and addiction. The Elvis mouse showed realistic possibilities in a boundary breaking field of science. This powerful and creative image evoked informed and open discussions with visitors about identity, ownership and DNA.

ALL THAT I AM, Installation, 2011, Koby Barhad (IL), part of GROW YOUR OWN.

<https://dublin.sciencegallery.com/growyourown/alliam>



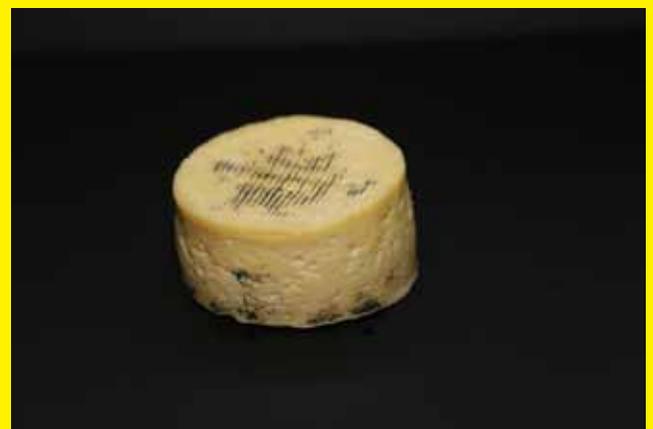


Self Made 'human' cheese

Christina Agapakis (microbiologist) and Sissel Tolaas (smell researcher) make cheese. Not with the customary *Lactobacillus*, but using bacterial strains that live naturally on the human skin. The bacteria of any moist spot on the body are suitable to make cheese. For the smell it doesn't make a difference, the bacteria in the worst smelly milk cheeses are closely related with those on our skin responsible for smell. It is not without reason that we talk about 'cheesy feet' every time our sweaty feet need a little freshening up. Christina's and Sissel's cheese production was part of the exhibition GROW YOUR OWN and opened with a human cheese & wine reception. In the "community lab" at the exhibition visitors could make cheese themselves using their own skin bacteria. Our body is a super organism with a unique microbial profile. We are protected by a landscape of bacteria, and we wash away a portion of this protective layer every day. We have also a complex relationship with fragrance: we are either attracted by the smell of French cheeses, or repelled by it. The two researchers have named the cheese after their respective donors. A short film accompanies every cheese made, portraying the donor with data from microbiological and odour analysis. We are treated to a Self Made Ben and a Self Made Seane, respectively a natural cheese and a crust cheese, both from somewhere below the belt. In a radio interview the researchers say: 'We want people to reflect on the way we live with bacteria and why they are important. It's cheese for thinking, not for eating.'

SELF MADE, installation, 2013, Christina Agapakis (US) & Sissel Tolaas (NO), part of GROW YOUR OWN.

<https://dublin.sciencegallery.com/growyourown/selfmade>
<http://agapakis.com/cheese.html>





It's all about you!

Project Genesis

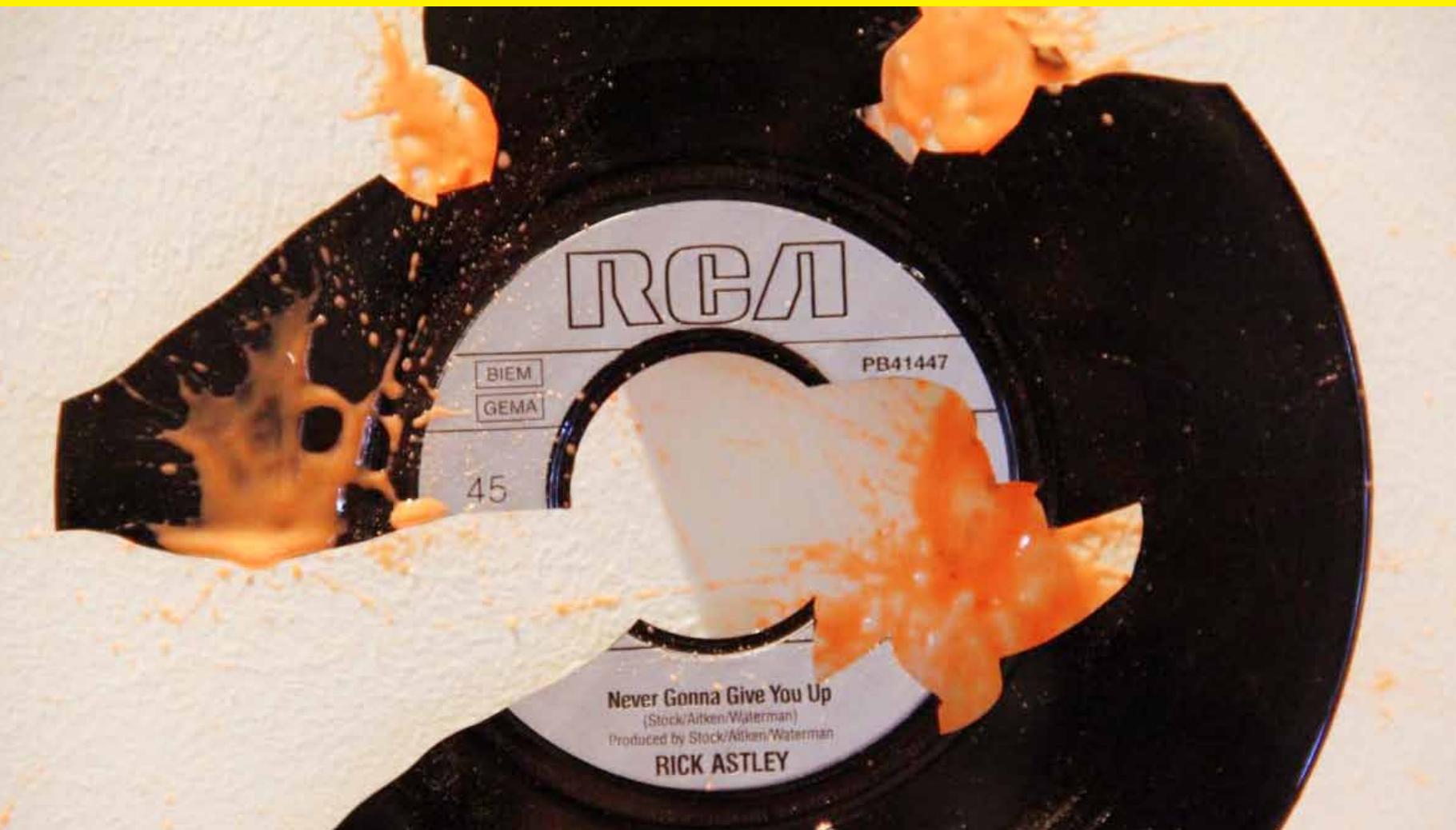
How could life made in a lab look like?
The art-science organization Ars Electronica Center organized the program Project Genesis to answer that question.

Synthetic biology allows us not only to read the genetic code of life but also to rewrite it, change existing life and create new life. But should we want to do that? Project Genesis is the commentary by 18 artists from Australia, Austria, France, Germany, Great Britain, India, Ireland, Japan, Latvia, Spain and Switzerland on the new possibilities that synthetic biology offers us. Project Genesis includes an exhibition, workshops and educational programs. During the development phase, everyone interested could debate with the creators on the website of the project. As the slogan of Project Genesis already said: 'it's all about you'.

Project Genesis was organized by Ars Electronica in cooperation with Science Gallery and Le Laboratoire. Contributions by Medialab Prado, RIX-C, ERG, Royal College of Arts, Medical Museion.

<http://www.aec.at/center/en/ausstellungen/projekt-genesis/>





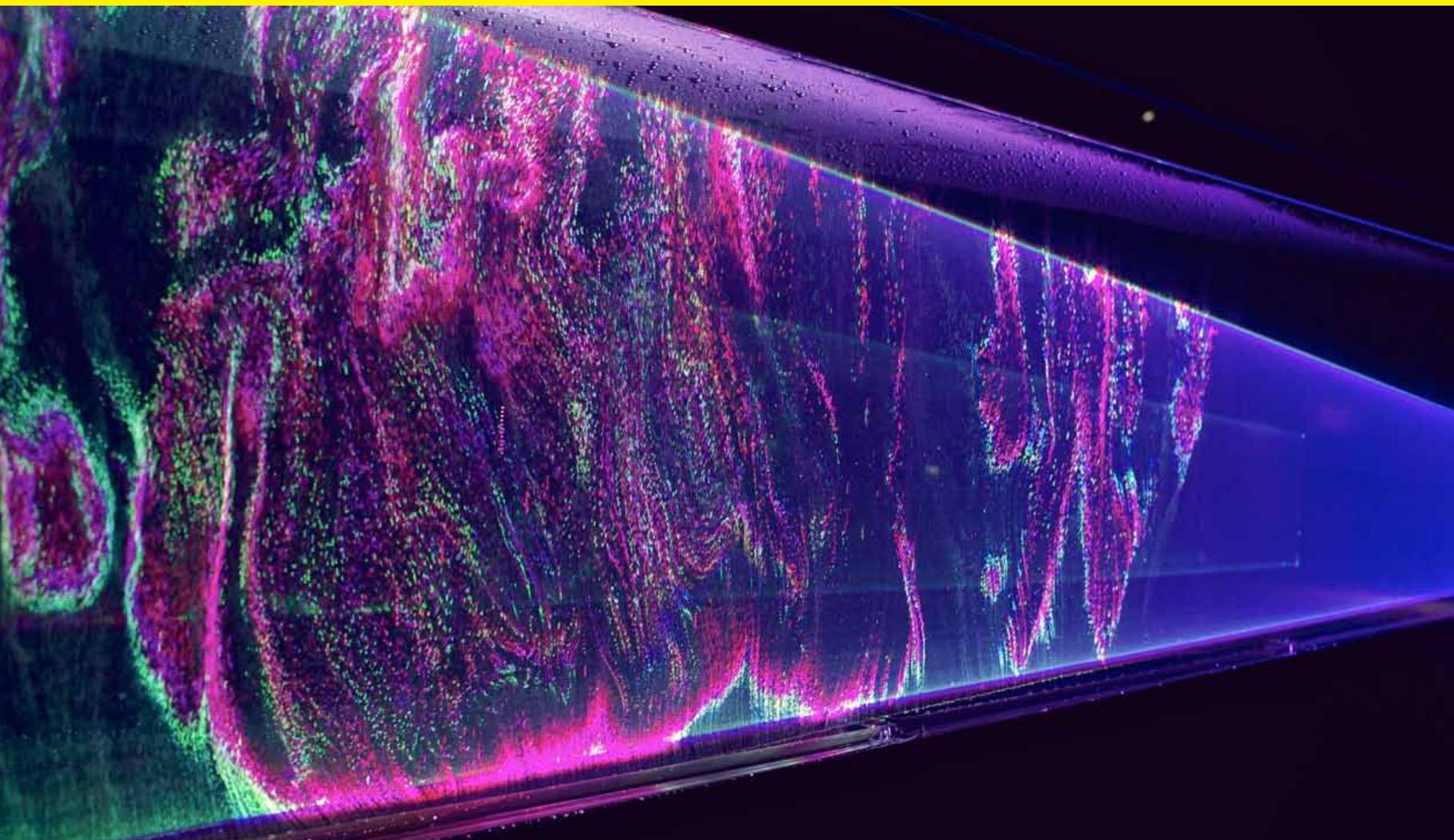
Synthetic Memetic

Artist Matthew Gardiner created a playful, intriguing variation on the well-known application of anti-theft DNA spray strategy used by the police. DNA spray contains a unique code that can link a person with a crime scene. But Gardiner did something special with the DNA. He composed the DNA sequence in a way that the nucleotide bases correspond to the letters of the hit 'Never Gonna Give You Up'. The DNA sequence was packed by the artist in a blob of paint for a paintball gun. This way, each paintball bullet can contain a unique message. DNA is not only an information carrier of life that can be manipulated, it can also be a data storage medium for all kind of messages.

Synthetic Memetic, installation, 2013, Matthew Gardiner (AU), part of Project Genesis.

http://matthewgardiner.net/art/Synthetic_Memetic
<http://www.aec.at/center/en/2013/07/26/synthetic-memetic/>







How do you show the properties of water in a playful, impressive way? Evelina Domnitch and Dmitry Gelfand did it for the exhibition SURFACE TENSION with a simple aquarium, some electrodes and a laser.

The water work of the two artists provides insight in the behaviour of hydrogen. Hydrogen is the simplest atom in nature, or as the artists say, 'hydrogen is the mother of all matter, it feeds the stars as well as interlaces the molecules of their biological descendants – to whom it ultimately whispers the secrets of quantum reality.'

With some electrodes on the bottom of the aquarium, they create electrolysis which separates water into hydrogen and oxygen. The process is made visible by a white light laser. The artists further describe their work: 'Strings and strata of hydrogen bubbles slowly rise to the surface. The white laser sheet illuminates the bubble trajectories as it breaks up into its constituent spectrum of colours. Some researchers presume that these nanobubbles of dissolved gas are the carriers of water's magnetic 'memory', enabling electromagnetic fields to saturate its innards for hours and even days after their initial appearance. In the seas and oceans, the lingering presence of electromagnetic fields photonically imparted by sunlight triggers the electrolysis responsible for most of Earth's hydrogen. An essential form of photosynthesis, solar water splitting is the cleanest and most efficient means imaginable for generating and storing energy.'

Hydrogeny continues Evelina and Dmitry's work in constructing art installations that offer ever-transforming phenomena for the viewer's observation. 'The immediacy of this experience,' the artists says, 'allows the observer to transcend the illusory distinction between scientific discovery and perceptual expansion.'

In the case of Hydrogeny it provides an intriguing picture that is reminiscent of the best animations about the genesis of the universe.

The duo has collaborated with numerous scientific research facilities including the Dutch Synergetica Lab, an art-science laboratory, investigating photonics, fluid dynamics, acoustics, quantum chemistry and psychophysics. Part of the project was a lecture and live performance at the Synergetica Event organized by the Science Gallery, that examined the future of water as a powerful source of clean energy, and in particular how we can learn from the processes by which it is naturally harnessed.

HYDROGENY, Evelina Domnitch and Dmitry Gelfand.

Hydrogeny was part of SURFACE TENSION and was exhibited at Science Gallery in Dublin, Eye Beam in New York, and THEMUSEUM in Kitchener, Canada.

<https://dublin.sciencegallery.com/surfacetension/hydrogeny/>



Opimilk

Do we need a pharmaceutical factory to produce the painkillers of the future, or is it enough to have a dairy farm? Human Health & Disease students of Trinity College worked out an idea to get painkillers directly from the milk of a cow. To make that possible the gene of the painkiller opiorphin would have to be isolated from human saliva. After some manipulation, this gene might be injected in a fertilized ovum of a cow. The cow that grows from it will produce the desired pain-killer in her milk. With this technique also dairy products such as cheese and yogurt can serve as a painkiller.

The idea of Opimilk was developed in the Idea Translation Lab, the curriculum course and facility at Science Gallery and Trinity College developed within Studiolab for students to work together on a creative project. The idea was further incubated at the ArtScience Prize workshop at Le Laboratoire where Marie Nepper, a student from ERG, helped the team to create the visual image of the product and prepare the installation for Project Genesis at Ars Electronica. The installation includes a schematic representation of the process and a fridge full of attractively styled bottles of Opimilk.

Credits: Teresa Dillion, Naomi Griffin Murtagh, Claire Dempsey, Aisling McCrudden.

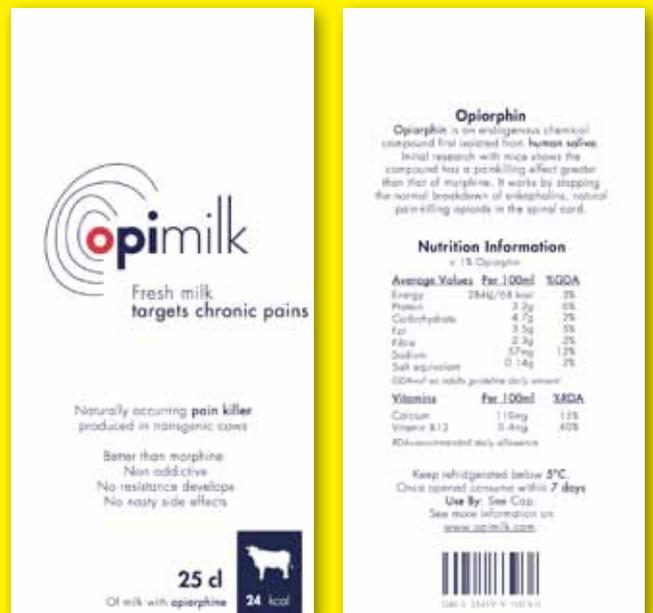
Opimilk was part of the education modules at Science Gallery Dublin, of the incubation activities at Le Laboratoire in collaboration with ERG, and of the exhibition Project Genesis at Ars Electronica.

<https://www.behance.net/gallery/13704749/opimilk>

<http://www.aec.at/center/en/2013/07/26/opimilk/>

<http://manepper.tumblr.com/post/56959916028/opimilk-le-nouveau-lait-antidouleur-plus>

opimilk-le-nouveau-lait-antidouleur-plus





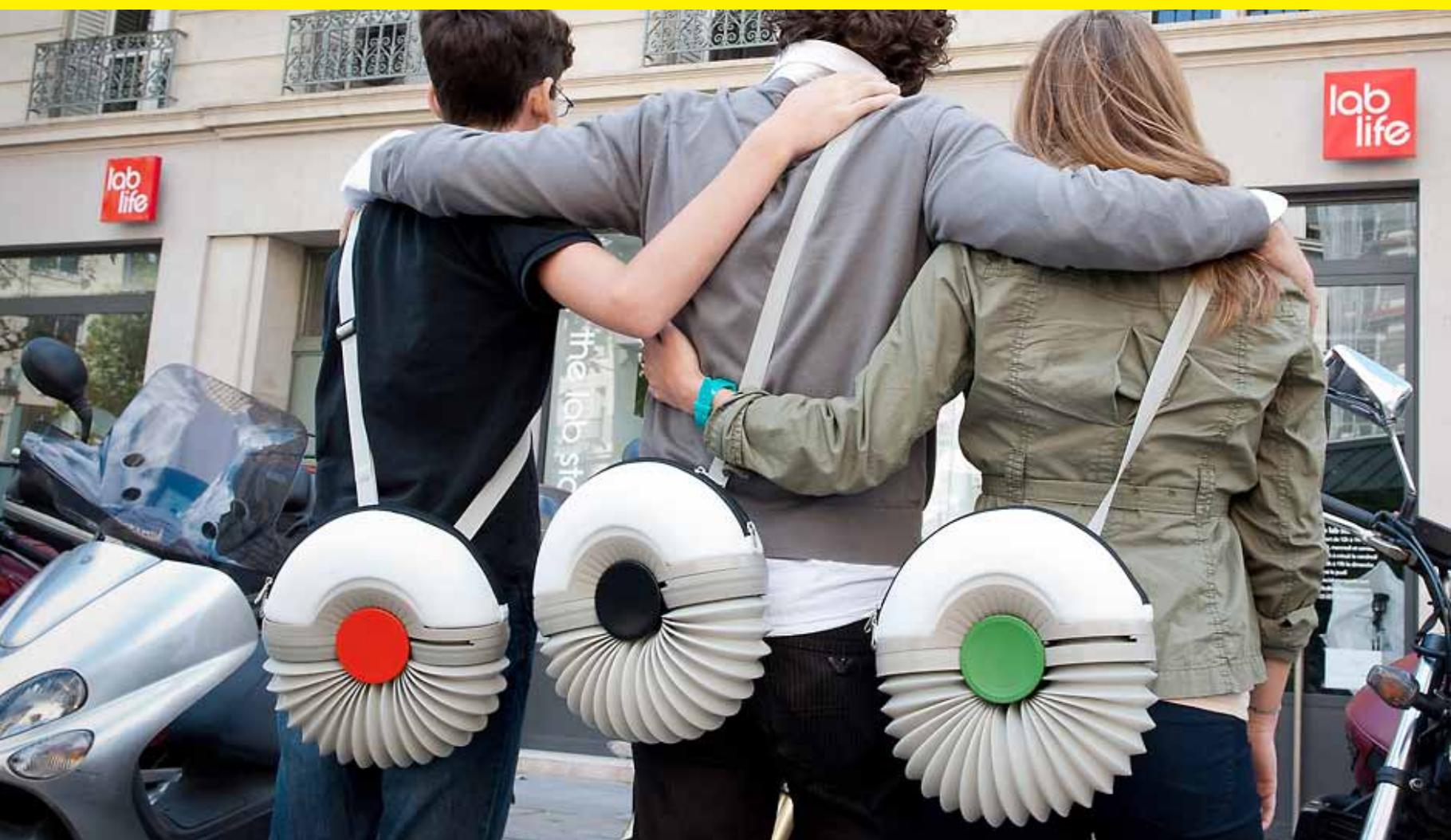
Organight

In the city of the future, bacteria can be used as suppliers of light. At the Project Genesis exhibition the product Organight – winner of the ArtScience Prize 2013 – was shown. Organight uses bioluminescence, the luminous property of living organisms. In this case, of the modified bacteria *Bacillus Subtilis* and Lux Operon. The bacteria are embedded between two layers of foil which form a sticker. These stickers can be used on shop windows as luminous brand logos for instance. The same principle can also be used for illumination of highways and locations. The bacteria take solar energy during the day and glow in the dark at night. It is a biodegradable source of illumination that lasts several months. The idea is being developed to be a commercial product by a start up company founded by the students who won the ArtScience Prize.

Credits: Pierre Cordelle, Maëlle Chassard, Guilhem Aulotte, Sandra Rey; Le Laboratoire.

Organight was incubated at Le Laboratoire and was part of the exhibition Project Genesis at Ars Electronica.

<http://www.glowee.fr>



From Pumpkin to Cellbag

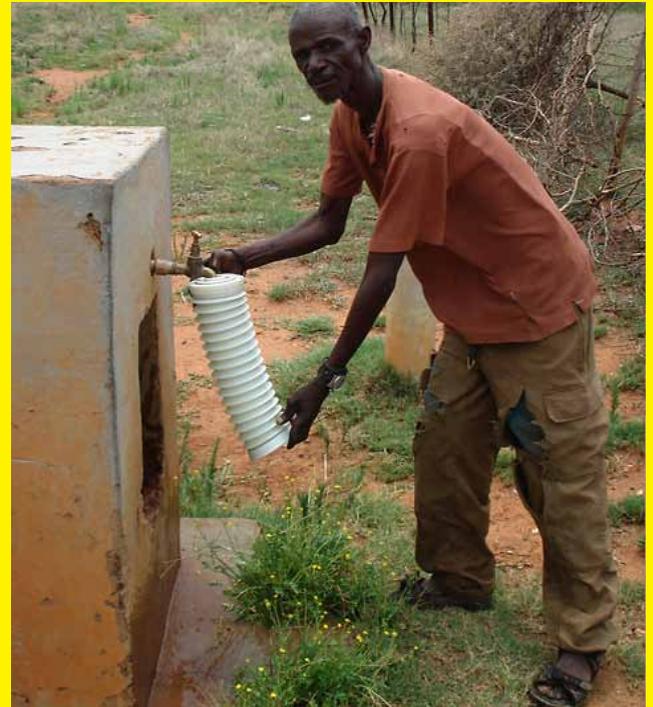
As part of an international project, students from Harvard and the University of Pretoria explored practical ways to improve transport of water in local African communities under good sanitary conditions.

Studiolab partner Le Laboratoire has recently presented the Cellbag, an innovative water carrier and citybag in one. The design is inspired by the biological cell: it expands or contracts, depending on the amount of water it absorbs. The Cellbag consists of a telescopic tube for water and a compartment for a snack or lunch; together they form a donut-like figure. The futuristic design is a creation of designer Mathieu Lehanneur and Harvard professor David Edwards.

The Cellbag is based on the Pumpkin, a prototype of a water carrier and water filter, devised by a group of students from Harvard University under the direction of Edwards. The Pumpkin is part of an international project to improve access to clean water. The Pumpkin makes it possible to carry large and small volumes of water due to the disc shape that can be changed. The water-carrier can be used as bag on the head or hanging over the shoulder, or as tube draped around the waist.

Proceeds from the Cellbag are used to support the project.

<http://www.coolhunting.com/design/cellbag>





Interactivos?

One of the formulas in the programming of Studiolab was *Interactivos?*. A program in which artists, researchers, students and in general anyone interested in creativity and technology work intensively together in a collective process of creation. The aim is to bring an idea to a real product in a short time. The program works with open source hardware and software. The whole process of creation is open to visitors, often citizen scientists who also contribute to the process of creation.

Interactivos? – consistently written with a question mark – is a research and production platform for the use of technology for creation, education and collective learning. It is a workshop, a seminar and a showcase in one. It is not based on the relationship teacher-student, but on an experimental model in which everyone learns from everyone. Promising projects are selected through an open call and elaborated through debate, collective learning and producing. The transdisciplinary working groups can make use of the expertise of tutors who function as conceptual and technical advisers.

Interactivos? is a core product of Medialab-Prado that first organized the event in 2006. Studiolab made it possible to organise *Interactivos?* in Ljubljana and Dublin in collaboration with the partners. During the exhibition HACK THE CITY at Science Gallery Dublin, a “hacklab” was organized following the proven Spanish model. A ‘fast cooking process’ of 17 days in which a variety of artists, designers, makers, doers, data nerds, geeks, activists, engineers and city planners sought inspiring solutions for urban issues. It yielded six prototypes that were shown in the main exhibition. Projects such as hacking our home electrical system, visualizing energy usage and improving efficiency. And a mobile app to crowdsource information on

dangerous areas for cycling (the full list is at http://medialab-prado.es/article/interactivos12_dublin_hackear_la_ciudad_necesidades_actuales_y_futuras).

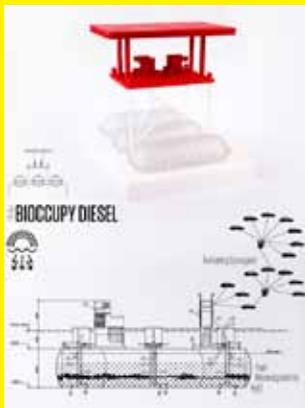
Part of the open-door policy of *Interactivos?* is capturing all the work process on video, which is then published on the website of Medialab-Prado.

Interactivos?, Medialab-Prado, Madrid, Spain.

<http://medialab-prado.es/interactivos>



The New Weathermen



The climate crisis shows how polarized environment discussions are. Bio-conservatives advocate restraining consumption, return to nature and distrust of new technologies. Techno-progressives on the contrary have an optimistic faith in progress with an important role for new and better technologies. But this dichotomy seems overtaken by time. With the art-science project The New Weathermen artist David Benqué explores the changing relationship between science and ideology. The New Weathermen represents a fictional group of environmental activists that are embracing synthetic biology as their weapon, where what is permissible is shifting depending on what is possible. The three components developed were:

#PIRATE POLLEN @lub

Many golf courses and homes use genetically modified grass, resulting in stronger and more beautiful lawns. Biotech Companies have a patent on that grass. But the Weathermen oppose to patenting nature. Traditional activists would maybe try to destroy the experimental crops but the Weathermen stand for a different strategy. For the Weathermen, the answer to Big Biotech is not No Biotech, but Open Source Biotech.

The Weathermen come up with plans to remove the patented gene off the grass with the use of modification techniques and sneaky dissemination. They call it Homology Directed Repair. It will make the grass sensitive to herbicides as ever before. The next time herbicides are used they will not only destroy the weeds but also the expensive, patented grass carpet. But there is also a less destructive approach possible. The Weathermen themselves bring an open source type of grass on the market that in terms of growth and appearance can compete with the patented grass species. Everyone can contribute

to the improvement of the open source grass species and therefore everybody is owner of it too.

#PalmOPS #BIOLULZ

Due to the increasing oil palm plantations a lot of rainforest and biodiversity get lost. This provokes resistance from environmentalists. However, for the food industry palm oil is highly attractive as an alternative to trans fats, and the amount of plantations keeps growing. Therefore The Weathermen want to influence the public opinion. By means of a spray action with an Agrobacterium they modified the new palm oil plantations. The modified version now produces a fat inhibitor which makes palm oil indigestible giving the users all kinds of side effects. Exit palm oil! This strategy builds on existing treatments for alcoholism, whereby the medicine Coprine causes a massive hangover to drinkers.

#BIOCCUPY DIESEL

To disrupt the fossil-fuel industry, the Weathermen work on optimizing microbial infections in fuel: the so called Diesel Bug. In various tanks they try to create maximum growth of microbes which create all kinds of problems to the car engine. If it succeeds, the bug will be passed on to any car that refuels at an infected pump and to each pump that is used by an infected car. The infection should result in a non-optimal combustion and other problems with conventional cars.

The New Weathermen is a project by David Benqué. His installation includes sketches, miniature models and technical drawings. The installation is part of several exhibitions, including: Blueprints for the Unknown, GROW YOUR OWN and Project Genesis. It was shown in Dublin, Linz, Rotterdam, Hasselt.

<http://www.davidbenque.com/projects/the-new-weathermen>

<http://studiolab.di.rca.ac.uk/projects/the-new-weathermen>



RJI ENT.3 T-SEE 489

On a sweltering afternoon in the northern marshes of Texas an entomologist finds an odd, oversized wasp with a strange oily layer on its body and wings. There are thousands of known species of the parasitic wasp, but nobody recognizes this one. The creature is put away into the archives of the Richards-Jones research institute. A few years later the insect is spotted again, outside the walls of the institute, but now in large swarms and in an almost unrecognizable form. The renewed observations are accompanied by a mysterious nervousness around the oil wells and installations of Texan Global Petroleum. Employees complain about the swarms of large insects while pipe systems and oil wells of the dominant oil giant have to deal with severe blockages. Pipes are opened and an unprecedented amount of lumpy fibrous balls removed. It seems the wasp uses the pipes as breeding places and the trading goods of the oil giant as food for its children. The spread of the *Megarhyssa Petrolis* – that is the name that the insect gets – is unstoppable. Global Petroleum Innovation Labs begins a race against the clock. The extremely large golden brown parasite seems to be the same as the bug in the Richards-Jones Institution, but the differences are noteworthy too. What happened? Where does this parasite come from? How did the biochemistry of the golden beast connect to petroleum and synthetic products? The rational scientific attitude gives way to a paranoid fear when faced with the consequences of a giant parasite that seems to be built for laying eggs in petrochemicals.

This is the start of the allegorical story *Into Your Hands Are They Delivered*, a title that refers to the Bible text in which God transferred the management of animal and plant life to man. The installation tells the story of the *Megarhyssa Petrolis* with a variety of 'evidence', such as photographs and original



documents of the laboratory. The complete story can be found on <http://into-your-hands.com>.

Is this a naturally mutated wasp or is it an artificially designed wasp? Developments in synthetic biology make designing new forms of life a real possibility. But regardless of this, outside the walls of a lab every designed life is part of an unstable and changeable ecosystem that leads to unknown outcomes.

Into Your Hands Are They Delivered wants to question our cultural ideas about nature. The idea that man stands 'outside' nature and the actions of humans actually are unnatural, and that 'natural' is synonymous with 'good' and 'unnatural' with 'evil' is deeply rooted in our thinking and an important part of the debate on synthetic biology. How tenable are our ideas in this matter?

INTO YOUR HANDS ARE THEY DELIVERED is a project by Tobias Revell in collaboration with Research Design Interactions at the Royal College of Art, London.

The installation is part of several exhibitions, including: Blueprints for the Unknown, GROW YOUR OWN and Project Genesis. It was shown in Dublin, Linz, Rotterdam, Hasselt.

<http://studiolab.di.rca.ac.uk/projects/into-your-hands-are-they-delivered>

<http://into-your-hands.com>

6 Insights on the results

The Studiolar website (<http://studiolarproject.eu>) documents the pilot activities developed by the partners during the project. There are however results and impacts which were not fully documented on the website. This chapter presents therefore additional insights on the results of Studiolar as recounted by the partners, in order to capture those impacts that would otherwise go unrecorded.

We focused on three kinds of results:

- Quantitative assessment of the number of people involved with Studiolar at large: the individuals who collaborated with the partners to develop the activities, the students involved in the education modules, and the visitors to the public engagement activities.
- Outcomes that are particularly noteworthy for the partners: we asked each partner to list up to three “most significant” results from the project. These are activities that were exemplary for the collaboration or the integration and development processes they set in motion; or that surprised the partners for the unexpected and unplanned impact they had on their organization.

- Remarkable individuals that collaborated with the Studiolar partners in various capacities - as mentors, content experts, designers, scientists, curators, etc. While it is beyond the scope of this report to list all the individuals who contributed to Studiolar, we wanted to document the wide range of skills and competences that the project attracted. We asked therefore each partner to indicate, where possible, up to three “most significant” collaborations.

This chapter is divided in three sections, corresponding to the three strands of Studiolar: Incubation, Education and Public Engagement. The three strands are highly interconnected and many activities fit into more than one strand; we avoided repetitions, while highlighting some overlaps.

The first section includes the number of collaborators who engaged with the partners on the Incubation activities. Collaborators acted in general as content experts and process leaders of the various activities under the Incubation strand: workshops, seminars, conferences, etc. The second section reports the number of students and mentors engaged in the Education modules. These modules had many different formats, depending on the education systems in each country, the capacity of the partners and the activities offered. Therefore both mentors and students are quite broadly defined: students are the beneficiaries of the learning experiences facilitated by the mentors. The third section reports the estimates of the number of visitors to the exhibitions developed under Studiolar, and the collaborators involved in developing the Public Engagement activities.

Incubation

Eight partners developed incubation modules where artists, scientists, researchers, designers and students worked together with their mentors and produced projects, artworks, products and processes. The results of the incubation modules often formed the basis for further activities under the education and/or public engagement strands.

Number of mentors involved at each partner institution:

Bloomfield Science Museum	53
CIANT	300
Le Laboratoire	400
MediaLab Prado	794
Medical Museion	11
Ars Electronica	117
Science Gallery Dublin	279
Royal College of Arts	15
Total	1969

Bloomfield Science Museum

Total number of mentors involved in incubation activities: 53

Most significant results

1. **Transparent Studio** - a 4 month course for students of industrial design, held at the Bloomfield Science Museum, investigating and developing innovative light sources. Students explored the scientific and technological aspects of design with light, and the added value of integrating the scientific and technological knowledge to the art work and the artistic creation. The course was also a proof of concept for the idea of collaborating with art students in residence in the venue of a science museum.
2. **Transparent light** - an exhibition presenting the results of the Transparent Studio course, exemplifying the transition from incubation/education to public engagement.

<http://www.mada.org.il/exhibitions/shakoof>

Furthermore, two one-day conferences open to the public provided fertile ground for further incubation processes at the Bloomfield Science Museum:

3. **Man-Machine, between art & science, 14 June 2012**
(100 participants)
4. **Animal-vegetable-mineral-synthetic, between art & science, 12 June 2013**
(120 participants)

<http://www.mada.org.il/culture/conferences/bezalel/2013>

These two conferences brought together scientists, artists and museum experts for discussions on synthetic biology. The panels related to cutting edge technology, cultural and ethical issues, main art works and artists, and future trends.

Main collaborators

Prof Ezry Tarazi, a leading designer, theoretician, and educator, teaches at the design department in Bezalel academy. Prof. Tarazi was the mentor for Transparent Studio and curator of the Transparent light exhibition.

<http://www.tarazistudio.com/>

Dr. Omer Tsimhoni, Group Manager, Human Machine Interface Research at GM Advanced Technical Center - Israel. Dr. Tsimhoni spoke at the Man-Machine' conference.

https://media.gm.com/content/Pages/news/us/en/2012/Jan/0118_research/_jcr_content/rightpar/sectioncontainer_2/par/download_0/file.res/OmerTsimhoniProfile.pdf

Dr. Eran Gilat, Scientist (Neurobiology and Imaging) and an avid fine art Photographer, spoke at the Animal-vegetable-mineral-synthetic conference.

<http://www.erangilat.com/>

CIANT

Total number of mentors involved in incubation activities: about 300

Most significant results

CATCH - Verticalizer

Traumatic, degenerative and post-operative states require efficient, economical, individual and home-use equipment. One of the most efficient physiotherapy and rehabilitation devices that enables upright standing of people with paresis of lower limbs and trunk are **standing verticalizers**.

Verticalizers are based on a simple idea that the sitting/lying position is not the position of the body for which man evolved; the physiologically desirable posture is the standing position. However, basic verticalizers do not guarantee medium- and long-term maintenance of attention and motivation of the user. CIANT attempted to solve this issue by creating an innovative prototype of a **tilting verticalizer** that serves as an experimental **art/technology platform** tailored for disabled individuals. An original tilting frame was equipped with various hardware and software components. The hardware part consists of a **tilt sensor** attached to the retaining portion of the device, **LCD monitor** mounted on the verticalizer and a **computer**.

The software part presents a wide combination of **cognitive, gaming and therapeutic activities** that create a link with the outside world, which is normally unreachable for the user. At present, several software **modules combining art with ICT in the rehabilitation process have been developed**. Some of them employ **gamification**, i.e. use of game principles in a non-game context in order to engage users. One of the modules, based on a computer game ArmA 2, enables the user to navigate through a beautiful and hyper realistic virtual landscape, one of the most elaborate in the world of gaming.

The final aim is to connect multiple devices via network, which will enable regular online consultations between a therapist and his/her group of users and also interaction among the users in the group. The possibility to compete with other members of the group in fulfilling tasks given by the therapist introduces yet another level of motivation for the users.

Developed in cooperation with:
Ambulatorium (NGO)
Masarykova 1019
664 42 Modřice
Czech Republic
top@ambulatorium.cz
www.ambulatorium.cz

The main objective of this project is to create spaces for active and voluntary collaboration, linking creative people, artists and cultural agents as well as scientific researchers and computer scientists in Europe. The project aims to expand and multiply exchanges in the dimension of scientific knowledge, technological advances and artistic production by elaborating common experimental projects with an ambition to link and integrate the world of artistic expression and the world of impairment and disabilities.

We achieve this by drawing upon specific expressive potentialities and by favouring activities involving communication and exchanges in order to permit disadvantaged people to be better 'human beings in the world'. We believe that human impairment, once peripheral, constitutes an emancipatory force that cannot be ignored by any form of socio-cultural development.

Therefore, our overall objective is to develop and reinforce the conceptual and methodological ties that form tight bonds between scientific research projects and advanced artistic practises by means of transdisciplinarity and transensoriality. In particular, we focus on the integration of tactility, vision, hearing, spatial cognition, speech, communication and interactive gestural forms of expression within interdisciplinary intercultural practices resulting in innovative artworks with high social relevance.

In order to stimulate and catalyse creativity we establish specific experimentation protocols that accommodate workshops, meetings, seminars, performances, and exhibitions.

We produce events oriented toward a broad public with a vision to initiate long-term collaborative creation projects in the field of human handicaps. These projects link advanced research laboratories with creative young people in order to showcase the interrelationships which exist between the universe of the disabled, contemporary experimental art and foundational research.

Main developer

Ing. Miloslav Klouda (Ambulatorium, Brno)

Co-developers:

Andrej Boleslavský, Pavel Smetana,
Martin Zrcek (CIANT, Prague)

Main collaborators

Louis Bec, artist, scientist, philosopher,
visionary

<http://v2.nl/archive/people/louis-bec/view>

Claudia Westermann, architect, philosopher

<http://mutamorphosis.net/2012/attractors-streams-of-interest/>

Pavel Sedlák, curator, project manager

http://www.ciant.cz/index.php/cz/?option=com_blankcomponent&view=members&Itemid=&member=Main.PavelSedlak

Total number of mentors involved
in incubation activities: about 400

Most significant results

1. The production of three ArtScience Prize summer workshops
<http://www.artscienceprize.org/paris/fr/themes>

2010-11 The Future of Water

http://youtu.be/_A67pXdsMBE

2011-12 Virtual Worlds

<http://youtu.be/o23eXZCeNVk>

2012-13 Synthetic Biology

<http://youtu.be/NA8MgwgVhmQ>

2. Culture Labs: encounters to present and reflect on the “cultural labs” in Europe

Over the last decade, artists, designers, and scientists have collaborated in widely varying circumstances. Through their original and sometimes provocative projects they have explored questions at once critical to an understanding of contemporary society and hard to explore along disciplinary lines. Often developed in public exhibitions, these cultural experiments have produced a rare public dialog around the future of change with ramifications to cultural, educational and commercial practice. By this exceptional experiment, a series of unique encounters, David Edwards, founder of Le Laboratoire in Paris, Harvard Professor, invites key actors of the artscience movement to present their personal visions of the “culture lab.” Studiolab partners Synergetica, Science Gallery and RCA took part among others.

<http://studiolabproject.eu/event/experiment-17-culture-labs>

3. FUSO project

A crowd funded project to realize a household water filter for developing countries. The project was incubated during the ArtScience Prize workshop 2011 and progressed to become a full blown start up company owned by the students themselves.

<http://es.ulule.com/fuso/>

<https://www.facebook.com/fusoproject>

MediaLab Prado

Total number of mentors involved in incubation activities: 794

http://medialab-prado.es/article/funcionamientos_presentacion_final_proyectos
<http://studiolabproject.eu/project/future-social-interaction/funcionamientos-open-designs-and-social-remix>

Most significant results

1. Fluoride Station, a work station in Medialab-Prado that intends to be different, an interactive laboratory open to experimentation that might motivate creativity, where learning with games is practical and the activities are focused on creativity, through visits, workshops and workgroups. Within this framework a number of activities have taken place: Urban Camps, CoderDojo, coding workshops, etc.

<http://studiolabproject.eu/project/future-social-interaction/fluoridestation>

2. GuerrillaHuerta/BombaSeed within the framework of “Interactivos?12 Dublin: Hack the City. Current and Future Needs” workshop that took place in Dublin in July 2012, organized by Science Gallery in collaboration with Medialab-Prado. This project led to a series of residencies, replications and workshops throughout the world.

<http://articultores.net/free/?s=huerta>

3. “En torno a la silla” (“Around the chair”) is a project developed within the framework of the workshop “Funcionamientos. Open Design and Social Remix” that took place in Medialab-Prado in December 2012 and January 2013. This project aims to design and build a kit for a wheel chair that allows the user to experiment new possibilities depending on his or her needs: a portable ramp, a foldable table and an armrest-luggage.

Main collaborators

1. Sergio Galán (Spain) as promoter of CoderDojo in Madrid. CoderDojo is an international initiative started in Ireland in 2011 aiming to teach young people how to program. It is a collective learning club for kids to know other people with similar interests and to learn from each other. This initiative has been highly successful bringing the attention of more than 300 kids and parents in Madrid.

http://medialab-prado.es/person/sergio_galan/
<http://coderdojo.com/>

2. Judith Villamayor (Argentina) as promoter of the project GuerrillaHuerta/BombaSeed within the framework of “Interactivos?12 Dublin: Hack the City. Current and Future Needs” workshop that took place in Dublin in July 2012.

<http://villamayor.com.ar>

3. Mario Toboso Martín for his participation as a tutor in the workshop “Funcionamientos. Open Design and Social Remix” that took place in Medialab-Prado in December 2012 and January 2013. This workshop aimed to develop proposals involving the design of objects, environments and other tools from the perspectives of cultural diversity, open design and open standards.

http://medialab-prado.es/person/mario_toboso_martin

Medical Museion

Total number of mentors involved in incubation activities: 11

Most significant results

1. DIY biology lab/installation at Medical Museion: The process of producing the lab/installation was novel for all partners, following a principle of co-curation between museum staff, biohackers, and designers. The product itself was also novel, being neither a fully functioning hackerspace nor an exhibition; instead it combined elements of both.

<http://studiolabproject.eu/project/synthetic-biology/biohacking-do-it-yourself-doing-and-debating-synthetic-biology>

2. Research outcomes: The Medical Museion team worked together with a sociologist to record the process of the collaboration through interviews. The result is the article “Co-Curation as Hacking: Biohackers in Copenhagen’s Medical Museion”, published in *Curator: The Museum Journal*, in January 2015:

Davies, S. R., Tybjerg, K., Whiteley, L. and Söderqvist, T. (2015), Co-Curation as Hacking: Biohackers in Copenhagen’s Medical Museion. *Curator: The Museum Journal*, 58: 117–131. doi: 10.1111/cura.12102

A short research report by Karin Tybjerg and Louise Whiteley was also published in the journal *Science Fiction Studies*:

Biohacking and Synthetic Biology. Tybjerg, Karin; Whiteley, Louise Emma. In: *Science Fiction Studies*, Vol. 40, No. 2, 2013, p. 406-40

3. Gene Gun Hack Prototype: Rüdiger Trojok developed a new hack for a key piece of laboratory equipment required to do synthetic biology research: the gene gun. The development of the object, simultaneously a technical proof-of-concept and an object for display and communication, led to novel design choices and to its display in the Project Genesis exhibition at the Ars Electronica Center in Linz. Instructions for building the prototype are open source:

https://labitat.dk/w/images/0/0e/Rudiger_Trojok_gene_gun_hack-v01.pdf

Main collaborators

Medical Museion: Associate Professor Karin Tybjerg and Associate Professor Louise Whiteley were Producers of the collaborative project and the lab/installation that resulted, and part of the curatorial team. They are also university researchers in medical humanities/science communication.

<http://www.museion.ku.dk/author/Karin/>

<http://www.museion.ku.dk/author/louise/>

BiologiGaragen: DIY bio space in Copenhagen. Martin Malthe Borch has an MSc in Biological engineering and is a designer and co-founder of BiologiGaragen. Malthe was part of the collaborative team building up the lab/installation and associated events.

Rüdiger Trojok is an open-science scholar and molecular biologist. Rüdiger was part of the collaborative team building up the lab/installation and associated events, and developed the gene gun hack presented in the lab/installation and in Project Genesis (see also “Public Engagement Activities”, p. 116).

<http://biologigaragen.org>

<http://ciid.dk/education/portfolio/idp12/students/malthe-martin-borch/>

<http://www.openbioprojects.net/>

Center For Synthetic Biology, University of Copenhagen. The project manager Emil D. Lambreth Polny and the communication officer at the University’s Center for Synthetic Biology contributed to discussions about the development of the lab/installation and its dissemination through press and online materials and events.

<http://synbio.ku.dk/>

Total number of mentors involved
in incubation activities: 117

Most significant results

Project Genesis includes the incubation of Sonja Baumel's "Metabodies", Georg Tremmel and Shiho Fukuhara's "Common Flowers / White Out", Ars DNA and Synthetic Memetic.

1. Metabodies

We human beings are walking biotopes. Billions of bacteria live on and in our bodies. Every day, wherever we go, we carry around 2-3 kilograms of them with us, and thus 100 times more genetic information than our own human genome contains. To make the hidden diversity of this personal ecosystem visible, "Metabodies" focuses our attention on the bacteria's communications. As soon as the bacteria are present in sufficient numbers, exchange of chemical substances takes place among them. When this so-called quorum sensing occurs, organisms created especially for this project begin to glow. A sampling of our skin's bacterial population, which was transplanted into a fluid culture medium where it can flourish under ideal conditions, provides a completely new way of looking at our body's bacteria. In all of our activities, we differ from one another not only genetically but also bacterially.

Credits:

Sonja Baumel (AT),

Manuel Selg (AT),

Ars Electronica Futurelab, 2013

<http://www.aec.at/center/en/2013/07/26/metabodies/>

2. Common Flowers / White Out

The blue carnation developed by a company named Florigene Ltd. was the first commercially available genetically engineered plant. It's still being marketed worldwide. Carnations come in lots of different colors, but blue wasn't one of them until the implanted gene of a petunia made a previously white carnation turn blue. The "Common Flowers / White Out" project addresses this transformation process and develops strategies to enable laypeople to remove genes that had been implanted into genetically engineered plants. But efforts to completely reverse such interventions raise many questions. Does a plant whose original genetic makeup was restored and no longer differs from other plants of its kind still have to be considered genetically engineered? To what extent is it possible to supervise a market in which foodstuffs and other living products are genetically modified and traded on a purely aesthetic basis? And to whom do these life forms belong?

Credits:

Georg Tremmel (JP/AT),

Shiho Fukuhara (JP), 2013

<http://www.common-flowers.org>

<http://www.aec.at/center/en/2013/07/26/common-flowers-white-out/>

3. ARS-DNA

Today's information-based society is still confronted by an essential problem: How can digital data be stored to memory for 10, 100 or even 1,000 years without having to transfer it periodically to new data storage media? But this fear of memory loss could soon be a thing of the past, since nature itself holds the key to sustainably storing information: DNA. It takes up hardly any space, doesn't have to be constantly supplied with energy, and can conserve information error-free over hundreds of generations. For example, a single gram of DNA has enough memory capacity for 700 terrabytes of data! Researchers are now working to reduce both the cost of this wonderful data storage medium and the time it takes to access the information it contains. With ARS-DNA, you can convert your name or some other series of characters into a DNA sequence and simultaneously see how much you would have to pay today to have this done in a lab. Each character, each letter, is first converted into the corresponding ASCII code or, rather, into an eight-figure binary number (that equals 1 byte). Then, Bits2DNA, an algorithm developed by molecular biologist George Church, converts this sequence of zeroes and ones into a sequence of nucleic bases, whereby a 0 becomes A or C, and a 1 becomes T or G. In order to assure the stability of the DNA, the algorithm is set up to avoid generating over three identical nucleic bases in a row (e.g. AAA). Example: The letter "a" is assigned ASCII code 65, expressed in base 2 notation as 01000001, which translates into the DNA sequence AGACCCAG.

Credits:

Artistic Direction:

Hideaki Ogawa (JP)

Original Concept:

Matthew Gardiner (AU)

Programming:

Deniz Saglam,

Veronika Pauser (AT),

Matthew Gardiner (AU)

Original Bits2DNA Algorithm:

George Church (US)

<http://www.aec.at/center/en/2013/09/13/ars-dna/>
<http://www.matthewgardiner.net/you-synthetically/>

4. Synthetic-Memetic

See p. 65

Main collaborators

1. Dr Manuel Selg,
Microbiology,
Gene Technologies Scientist

<http://research.fh-ooe.at/en/staff/5633>

2. Georg Tremmel,
Microbiology, Concept Artist
(with Shino Fukuhara)

<http://www.trembl.org/>

3. Sonja Baeumel, Artist

<http://www.sonjabaemel.at/>

Science

Total number of mentors involved in incubation activities: 279

Main collaborators

1. Alexandra Daisy Ginsberg - Curator and Researcher of GROW YOUR OWN

Most significant results

1. Laurence Gill and Joanne Mac Mahon's

Solar Water Disinfection

The project was developed during the SURFACE TENSION incubation process and then secured funding through fundit.ie to trial the project in the field.

<http://fundit.ie/project/solar-water-disinfection>
<https://dublin.sciencegallery.com/surfacetension/sunlight/>

2. Community Biolab as part of GROW YOUR OWN

The Biolab space developed during the incubation and education processes of the theme "the future of synthetic biology" and featured in the exhibition GROW YOUR OWN. The lab featured a series of workshops by designers and scientists working in the field.

<https://dublin.sciencegallery.com/growyourown>

3. Idea Lab - HACK THE CITY
An open call identified five projects which spent a week being incubated, and produced at the end of the process five final projects that went onto be developed in partnership with Dublin City Council.

http://www.pivotdublin.com/index.php/blog/entry/hack_the_city_idea_lab1

<https://dublin.sciencegallery.com/growyourown>
<http://daisyginsberg.com>

2. Teresa Dillon - artist, curator and researcher and key mentor for the Idea translation Lab - future of social interaction - HACK THE CITY

<http://www.polarproduce.org>
<https://dublin.sciencegallery.com/hackthecity/>

1. Ralph Borland - artist, curator and researcher and key mentor for the Idea translation Lab - future of water - SURFACE TENSION

<https://dublin.sciencegallery.com/surfacetension/>
<http://ralphborland.net>

Royal College of Arts

Total number of mentors involved
in incubation activities: 15

Most significant results

The exhibitions organized outside
of the Studiolab network:
at V_2 Institute for the Unstable media,
Rotterdam, Netherlands
(21 May 2014 until 9 June 2014)
and at Z33 House for Contemporary Art,
Hasselt, Belgium
(5 October 2014 until 4 January 2015)

<http://v2.nl/events/blueprints-for-the-unknown>

<http://www.z33.be/en/projects/opening-future-fictions>

Main collaborators

RCA has documented its incubation activities
in an excellent way; for all information regard-
ing mentors, projects and activities see the
website

<http://studiolab.di.rca.ac.uk/>

Education

The education modules developed by Studiolarb involved students from the formal secondary and tertiary education systems as well as a range of informal education opportunities for the participants to workshops and laboratories. Many education activities were tightly integrated with the incubation activities, sharing mentors and processes. The following table gives an overview of the number of students and mentors involved in the education strand of Studiolarb. When available, the breakdown of student gender is given in the next pages.

	Students	Mentors
Bloomfield Science Museum	112	8
CIANT	300	100
ERG	80	10
ISI Foundation	12	4
Le Laboratoire	500	80
Royal College of Arts	60	8
MediaLab Prado	665	65
Synergetica	45	8
Ars Electronica	805	17
Science Gallery Dublin	218	65
Total	2797	365

Bloomfield Science Museum

Total number of students involved:
112 (60% female, 40% male)

Total number of mentors involved
in education activities: 8

Most significant results

1. The artistic Brain, a new afternoon course for 9th grade teenagers. Consisting of 15 meetings, the course brought together Jewish and Arab teenagers for a series of enriching experiences on brain research and the art interpretations evolving from it. The course was held for two years.

Main collaborators

Dr. Alit Stark-Inbar,
a brain researcher located nowadays in
Berkeley, who helped develop the course.

http://www.bio.huji.ac.il/udiZohary/people/Alit_Stark.html

CIANT

Total number of students involved: 300

Total number of mentors involved
in education activities: about 100

Main collaborators involved

Most significant results

The education activities of CIANT were part of the Mutamorphosis II conference and platform. Before the open call was launched, CIANT organized a call for “attractors” – people who shaped the call for abstracts for the conference, with a tight collaboration and exchange of knowledge. The attractors did not taught in schools, but shared knowledge with secondary and tertiary students through the platform of the conference.

1. Louis Bec - His search for new zoomorphic types and forms of communication between artificial and natural species led him to found a fictitious institute named “Scientifique de Recherche Paranaturaliste” with Louis Bec as its presiding director.
2. David Benqué - BA in graphic design from the Royal Academy in the Hague, the Netherlands, and an MA in Design Interactions from the Royal College of Art in London, United Kingdom.
3. Denisa Kera - Assistant Professor at the National University of Singapore and Asia Research Institute fellow. In her present research she is bringing together Science Technology Society (STS) studies and interactive media design.



Total number of students involved: 12

Total number of mentors involved
in education activities: 4

Most significant results

“Investigating the Language of Network Representations” formed the basis of a new course on data visualization taught by Wouter Van den Broeck starting from the academic year 2014-2015 in the third year of the program on multimedia and communication technology at the Erasmus University College Brussels (Erasmus-hogeschool Brussel) in Brussels, Belgium.

<http://narranova.org/lonr/>

Main collaborators

Wouter Van den Broeck

<http://www.addith.be/wvdb-cv-en-web.pdf>

ERG

Total number of students involved: 80
(50% male, 50% female)

Total number of mentors involved
in education activities: about 10

Most significant results

ERG set up a master in Graphic Practices and Scientific Complexity (<http://www.erg.be/erg/spip.php?article1082&lang=fr>). Within this course, the following are some of the most remarkable results generated by Studiolab, demonstrating how education progressed into public engagement and incubation:

1. Hybrids Workshop

These events were developed by Laure Pica and Lisa Harchies, two designers graduated from ERG. After studying for two years the possible relationships between science and art, the gap between the artist's vocabulary, procedures, techniques and scientific models became their experimental field for new educational values. Picking up this concept, they imagined a workshop in which young audiences would transpose genetic engineering concepts into art through graphic creations using mainly the collage technique. Participants were invited to create animals, beings, species, "little monsters" straight from their imagination and creativity. This workshop took place from August 1st to 7th 2013 in Linz and became a permanent feature at Project Genesis.

<http://www.aec.at/center/en/2013/07/26/hybrid-werkstatt/>

2. Opimilk design

At the ArtScience Innovation Workshop 2012 in Paris at Le Laboratoire, Marie Nepper, an ERG student, met Teresa Dillion, Naomi Griffin-Murtagh, Claire Dempsey, Aisling McCrudden, who were part of the team from Dublin. Opimilk was their project (see p. 69). Marie helped the team to create a strong visual identity and a creative presentation for their project which was then displayed in the exhibition Project Genesis.

<http://www.aec.at/center/en/2013/07/26/opimilk/>

3. Mushroom Prints

A collaboration between ERG and the mycology laboratory at UCL (Université Catholique de Louvain). Produced by Jean- François Rees (Animal Biology Professor) and Aurélie Commerce and Charlotte Naber (two ERG students) this project is an experiment to print with living materials. After several manipulations made in the protected atmosphere of a laboratory, a special ink created from peptone water and fungal spores is injected into an HP printer cartridge. Prints on test paper are placed on a layer of agar, a vegetal nutrient, and protected in a Petri dish. The printed material is not visible immediately, it grows from day to day and appears gradually. Each print is unique, it grows according to the species of fungus, ambient temperature, presence of infections, interaction of different species (*Aspergillus Niger*, *Cystofilobasidium capitatum*, *Duclauxii* of *Penicillium* and *Fusarium*). The prints evolve, changing over time. In addition to publishing and printing, Aurélie and Chalotte participated in several

scientific information events (mainly during the Night of science during the UCL Mushroom Festival), where each visitor had the chance to bring home one of their designs printed with this very special technique. They are also planning to publish a book showing the visual impressive results of those experiments, tracing the entire process, and their personal discovery of the lab technician atmosphere, actors, tools and spaces.

<http://www.uclouvain.be/en-33273.html>
http://www.aure.be/les_champignonnistes_associees.html

Main collaborators

1. Hugues Bersini

Professor at Université Libre de Bruxelles and Co-Director of the IRIDIA laboratory. His main research interests are modelling and control of complex systems, neural networks and fuzzy control, data/graph/text mining, autonomous agents and dynamics of biological networks, computational chemistry, immune engineering, cognitive sciences, bio-informatics and object-oriented technology. He teaches Artificial Intelligence, Object-Oriented technologies (UML, Design Patterns, Java, .Net) and Web Programming (Django/Python) both for academics and for enterprises. He has written ten books on information technology. He is a member of the Belgium Royal Academy of Science. Hugues Bersini was the main scientific mentor in the 2012 school year.

<https://www.ulb.ac.be/rech/inventaire/chercheurs/4/CH1814.html>

2. René Rezsöházy

A molecular geneticist, René Rezsöházy is fascinated by everything related to information and its transmission in the living world. Today, he leads a team of several young researchers and students, with whom he designs experiments, analyses the results and shares the excitement of discovery, including getting mad trying to understand why «it doesn't work».

<http://www.uclouvain.be/rene.rezsosahazy>

3. Giampiero Caiti

Art director, book publisher & designer, exhibition designer, curator. Giampiero Caiti has designed, published, written, edited, adapted, illustrated, coordinated or packaged art, cooking, fiction and non-fiction books, how-to and travel books, youth illustrated books, atlases, reference, scientific and architectural publications, smartphone apps. He is also master head professor at ERG where he co-directs the working experimental art-science group.

Le Laboratoire

Total number of students involved: 500

Total number of mentors involved
in education activities: 80

Most significant results

The education activities of Le Laboratoire were tightly intertwined with the incubation modules, and provided a framework to connect education with innovation, entrepreneurship and creativity. The following are two examples of this process:

1. Le Whif, a student idea developed during the educational workshops at the ArtScience Prize, developed into the start up company quantumdesigns.com
2. Ophone, a device to transmit olfactory experiences, developed into the start up onotes.com

Both examples show how the fertile ground of Le Laboratoire, combined with excellent mentoring opportunities, give students the opportunity to pursue their ambitions and realize them as entrepreneurial activities.

Royal College of Arts

Total number of students involved: 60
(40% male, 60% female)

Total number of mentors involved
in education activities: 8

Most significant results

1. The Opimilk project (see p. 69) started as part of the Idea Translation Lab in Dublin, under mentoring from the Royal College of Arts; it was further developed at the ArtScience Innovation Workshop 2012 in Paris at Le Laboratoire and was exhibited in Ars Electronica as part of Project Genesis exhibition.

Main collaborators

1. Louis Buckley, Agatha Haines and Soomi Park - mentoring the Art Science Labs workshop in Paris.
2. David Benqué - co-tutoring (with Theresa Dillon) in Idea Translation Lab, at Science Gallery Dublin, 2013.

<http://www.aec.at/center/en/2013/07/26/opimilk/>

MediaLab Prado

Total number of students involved: 665
(60% male, 40% female)

Total number of mentors involved
in education activities: 65

Most significant results

The education activities of MediaLab Prado were developed in the form of several workshops organized with learners and educators. MediaLab Prado offered informal education opportunities which progressed to the incubation stage or developed into cultural products.

1. Progress into incubation: CoderDojo project has become the umbrella for a number of prototypes developed by young students during the coding learning sessions. For instance, a group of children have developed a videogame for the digital facade of Medialab-Prado.

<http://medialab-prado.es/article/spaceinvaders>

2. Madrid Urban Laboratory produced 16 projects developed in a collaborative manner in work groups formed by artists, urban planners, activists, scientists and an array of different profiles and backgrounds.

<http://medialab-prado.es/article/mluproyectos>

3. Interactivos?'12 Dublin: Hack the City. Current and Future Needs produced 5 projects in a similar way.

Main collaborators

1. Juan Freire was one of the tutors of Madrid Urban Laboratory workshop and symposium. He has fostered and guided the development of all projects.

http://medialab-prado.es/person/juan_freire

<http://studiolabproject.eu/event/madrid-urban-laboratory-infrastructures-practices-and-tools-rethink-shared-life>

2. Carolina García Cataño was one of the tutors of Interactivos?'12 Dublin: Hack the City. Current and Future Needs.

http://medialab-prado.es/person/carolina_garcia_

<http://studiolabproject.eu/event/interactivos12-dublin-hack-city-current-and-future-needs>

3. Mónica Montoya curated Fluoride Station, which offers space and support for younger workgroups to develop projects and activities centered on digital culture and it encourages participation and collaborative work, in order to motivate new social relations and mutual learning.

<http://studiolabproject.eu/project/future-social-interaction/fluoridestation/>

<http://medialab-prado.es/person/monicamontoya>

Ars Electronica Center

Total number of students involved:
805 workshop participants during 69 work-
shops (gender breakdown approximately
50/50);

30657 guided tour participants
(mostly high school students).

Total number of mentors involved
in education activities: 17

Most significant results

1. Project Genesis - ARS DNA
Education project
Instant Workshop style developed
from the incubation project ARS DNA
(see p. 93); it is an example of how
an incubation project develops into
an education activity and a public
engagement product.

<http://www.aec.at/center/en/2013/09/13/ars-dna/>

2. Zoom in on Project Genesis
Education project, specific for high
school students to address the
topics raised by the Project Genesis
exhibition.

<http://www.aec.at/center/2013/09/04/zoom-in-projekt-genesis/>

3. MyBrid
Education project designed to
address synthetic biology concepts
for students above 5th grade.

<http://www.aec.at/center/2013/09/04/mybrid/>

4. Ene, mene, muh – wie natürlich bist
denn du?! (eeny meeny miney mo,
touch a hybrid by the toe?!) Education
project designed to address synthetic
biology concepts for students in
grade 1-4.

<http://www.aec.at/center/2013/09/03/ene-mene-muh/>

5. Science Days
Science days organised around
the theme of Synthetic Biology.

<http://www.aec.at/press/en/2013/10/18/science-days-projekt-genesis/>

Main collaborators

1. Dr. Manuel Selg
Microbiology, Gene Technologies

<http://research.fh-ooe.at/de/staff/5633>

2. Sonja Baeumel

<http://www.sonjabaeumel.at/>

3. Prof. George Church
Genetics, Molecular engineering,
Chemistry

http://en.wikipedia.org/wiki/George_M._Church

4. Joe Davis
Artist, Researcher, bioinformatics,
sculpture

[http://en.wikipedia.org/wiki/Joe_Davis_\(artist\)](http://en.wikipedia.org/wiki/Joe_Davis_(artist))

Synergetica

Total number of students involved: 45

Total number of mentors involved
in education activities: 5

Most significant results

1. Synergetica taught two courses at the ArtScience Interfaculty of the Royal Academy of Art, The Hague, Netherlands:

“Cloud Chamber: Subatomic Aesthetics”, 2011

In a series of hands-on particle physics experiments, students learned how to perceive and interact with the perpetual dance of the subatomic vacuum. Customarily beyond the reach of the senses, ionized nuclei, protons, electrons, as well as more exotic muons and antiprotons arrive from outer space at the rate of approximately a thousand particles per square meter per second. Most of them do not even originate in the solar system, but from within the galaxy, and the highest energy particles are likely of extragalactic origin. Traveling close to the speed of light, these cosmic rays are rendered visible as they traverse a supersaturated gas, leaving behind a thread of condensation droplets. Infused with a heightened awareness of emergent airborne particles and associated quantum phenomena such as Compton scattering, beta deflection, and the photoelectric effect, students learned diverse techniques to electrically, magnetically and acoustically influence particle behavior.

“Spherometria”, 2012

From the lenses of our eyeballs,
rushing beyond the Earth’s escape

velocity, our gaze slides across the curvature of our atmospheric lens, which both magnifies and brings into focus the glowing spheres comprising the cosmos. Spheres within spheres, perhaps, ad infinitum, evoke not only the structure of space, but also the perceptual process that allows us to tune into this structure. Students learned how to hone this feedback mechanism through various 3D spheroidal projection techniques within specifically configured inflatable architecture created by Cocky Eek. This hands-on exploration of optical physics was elaborated by means of curvilinear video mapping, laser scanning and projection, as well as a survey of imaginative geometric interpretations of spherical spatiality by the likes of Frei Otto, Buckminster Fuller, Bernhard Riemann and Hermann Minkowski.

<http://sphaerae.net/spherometria.html>

2. Synergetica Lab invited the biophysicist Raoul Frese to present his research on artificial photosynthesis at the closing of the SURFACE TENSION exhibition at Science Gallery Dublin, and at ‘The Source’ exhibition at The Dutch Institute for Media Art. This led to a collaboration between Raoul Frese and artist Ivan Henriques, entitled “Symbiotic Machine” (currently the largest scale example of artificial photosynthesis). The artwork was presented in the spring of 2014 at Het Glazen Huis, Amsterdam, and it was awarded an honorary mention at Prix Ars Electronica 2014.

<http://ivanhenriques.com/2014/03/02/symbiotic-machine/>

3. During the course “Cloud Chamber: Subatomic Aesthetics”, the artwork ‘Memory Vapor’ was developed, which was later presented at ‘The Source’ exhibition at The Dutch Institute for Media Art. It then won an honorary mention at Prix Ars Electronica 2013. It was also presented at the workshop “Water is in the air” organized by Leonardo in June 2012.

<https://www.youtube.com/watch?v=-en14t7zesU>

4. The course ‘Spherometria’ led to the collaborative open call with Ars Electronica called ‘Yours Synthetically’, and to the presentation of selected works at ‘Sphaerae’, Ars Electronica Festival 2013.
5. The “Space Science in the Arts” course will be repeated in spring 2015. Besides future curricular incarnations, the course has fostered a vibrant incubational platform combining the efforts of Synergetica Lab, the ArtScience Interfaculty of the Royal Academy of Art in The Hague, and E.S.T.E.C. (European Space Research and Technology Centre).

Main collaborators

1. Raoul Frese, biophysicist, guest lecturer at “Synergetica Event” at the closing of the SURFACE TENSION exhibition, Science Gallery, guest lecturer at the Source exhibition, Dutch Institute for Media Art, and project leader of “Symbiotic Machine”,

<http://www.raoulfrese.nl/>

2. Paul Prudence, software artist, expert in data visualisation and spherical projection, co-taught the Spherometria course.

http://www.dataisnature.com/?page_id=14

<http://www.transphormetic.com/>

3. Evelina Domnitch and Dmitry Gelfand work with physics, chemistry and computer science to create immersive artworks and performances. They are the founders and directors of Synergetica Lab.

www.synergeticalab.com

www.portablepalace.com

Science

Total number of students involved: 218

Main collaborators

Total number of mentors involved
in education activities: 65

1. David Benqué - Involved in Mutant Workshop and Idea Translation Lab programme.

Most significant results

1. The curriculum for the Idea Translation Lab, originally developed together with Le Laboratoire, was adopted by the undergraduate course in Trinity College. Science Gallery is currently in conversations with the Irish Department of Education and Science about the ITL course linking into the new Junior Cert curriculum (ages 15 - 17 yrs).

2. Teresa Dillon - Involved in Idea Translation Lab and Idea Lab (see incubation projects, p. 94).

3. Linda Doyle - Director of CTVR / the telecommunications research centre, Trinity College Dublin and curator of HACK THE CITY, mentor on the Idea Translation Lab.

<http://ctvr.ie/linda-doyle/>

<https://dublin.sciencegallery.com/education/itl>

2. Urban Knights, a module developed out of the open Idea lab sessions for HACK THE CITY. It is now run by Teresa Dillon in Berlin.

<http://www.urbanknights.org/about/>

Dublin

Public Engagement

The public engagement activities of Studiolab were the most visible products of the collaborative project. They attracted impressive numbers of visitors; but most importantly, they catalysed the collaboration between the partners. A large number of individuals were also involved as advisors, developers, designers, curators, artists, researchers etc. at each institution; they are listed as “collaborators” in the following pages. In several instances the public engagement activities were also the platforms where the public could examine and discuss the results of the education and incubation activities.

	Collaborators	Visitors	
Bloomfield Science Museum	-	15000	
CIANT	50	500	
ERG	16	1200	
Le Laboratoire	45	3000	
Leonardo	42	500	
Medical Museion	13	285	
MediaLab Prado	700	1000	
Synergetica	15	300.000	this figure includes visitors to SURFACE TENSION in Dublin, New York and Kitchener
Ars Electronica	80	130.000	museum visitors per year, plus an average of 90000 festival visitors each year for 2011, 2012, 2013
Science Gallery	115	332.000	
Royal College of Arts	5	1200	

Bloomfield Science Museum

Total number of visitors to
public engagement activities: 15000

**Activities exemplary for the
dialogue with the public**

Transparent light exhibition (see p. 85)

CIANT

Total number of visitors to public engagement activities: 500

Total number of collaborators involved in public engagement activities: 50

Activities exemplary for the dialogue with the public

MutaMorphosis II:
Tribute to Uncertainty International Conference (6-8 December 2012)
- was an open platform for meeting and discussion of potential ways for further projects, where the presenters were specialists and experts and the public was represented by students, creative developers, artists, technology specialists etc. The conference brought up a lot of new connections and project proposals.

Total number of visitors to public engagement activities: 1200

Total number of collaborators involved in public engagement activities: 16

Activities exemplary for the dialogue with the public

1. The seminar “Infinite Conversation. Art and Sciences (which dialogues?)”, held on March 5, 6 and 7, 2012, proposed to confront specific, heterogeneous approaches and reflections. Trying not to file science under the rubric of reality, and arts under the rubric of fiction, the meeting between the different forms of arts and of sciences was considered as belonging not only to any common ground, but as a genuine space for dialogue. 23 artists, scientists and historians and around 300 students took part.

<http://seminaire.erg.be/index.php?/2012/entretien-infini/>

2. Each year in March the school opens its doors to the public for 2 days, and in that occasion the work of the students of the master Graphics practices and Scientific Complexity are presented among others. About 700 people visit the school for this yearly event.

<http://portesouvertes.erg.be/index.php?/portesouvertes/imprimer-le-vivant/>

3. The lecture “Chaos Cosmos” by Pierre Sterckx, historian of science and art, curator of the exhibition “Turbulences” (Paris, Bruxelles). October 2011

Le

Laboratoire

Total number of visitors to public engagement activities: 3000

Total number of collaborators involved in public engagement activities: 45

Activities exemplary for the dialogue with the public

1. Organight (see p. 71) gave students the opportunity to go from Education to Public Engagement in full scope, and generated a lot of public dialogue during the exhibition Project Genesis
2. The presentations of the ArtScience workshops and Experiment 17 Cultural Labs generated remarkable dialogue, collaborations among the participants and also with artists, scientists and the general public, often beyond the scope of the event itself.

<http://studiolabproject.eu/event/experiment-17-culture-labs>

Leonardo

Total number of visitors to
public engagement activities: 500

Total number of collaborators involved
in public engagement activities: 42

Activities exemplary for the dialogue with the public

Water is in the Air Workshop

<http://olats.org/studiolab/eau.php>

DataBody on the Dissection Table
round-table

<http://olats.org/studiolab/databody.php>

Hacker les Bactéries, workshop

<http://olats.org/studiolab/hackerbacteries.php>

*“During all three workshops
participants proposed and
developed projects and
collaborations which extend
beyond the mandate of Studiolab
and that will continue its legacy.”*

Annick Bureau

Medical Museum

Total number of visitors to public engagement activities: 285

Total number of collaborators involved in public engagement activities: 13

Activities exemplary for the dialogue with the public

1. Hackers In The House Open Days

For three Sundays the biohackers were 'in residence' in the lab/installation, such that the museum's usual audience – including many who would never seek out an art-science or biohacking event – could encounter them. Visitors were able to try out a demonstration or ask the biohackers questions, allowing public dialogue to proceed according to the visitors' own agenda and often in unexpected directions. These interactions informed the planning of the hands-on workshop and debate event.

2. Hands-On Biohacking Workshop

In this workshop, a small group of participants worked together with the biohackers in the lab/installation space on both domestic biohacking and laboratory techniques. This allowed participants to get hands-on with the scientific techniques, and to engage in bottom-up discussions, further stimulated by the objects and exhibition texts that surrounded them. Anecdotally, some participants then attended later events or visited the local hackerspace.

3. Doing And Debating Synthetic Biology

This event brought together representatives of the project team together with a sociologist, a philosopher, and a professor in synthetic biology in order to address the broader questions around synthetic biology, biohacking, and art-science. There was a noticeably diverse audience setting the discussion agenda to cover topics as diverse as safety and regulation, the purpose of art-science, and 'branding' of synthetic biology. The meeting between university science, biohackers, and social science and humanities perspectives on both was unusual, and contributed to ongoing interactions between these groups.

MediaLab Prado

Total number of visitors to public engagement activities: 1000

Total number of collaborators involved in public engagement activities: 700

Activities exemplary for the dialogue with the public

1. HUERTA IIIG (Funcionamientos: Open Designs and Social Remix Project) was created to develop a collective space for the elderly to host an adapted ecologic garden prepared for a variety of uses.
2. Mycophone (Interactivos? '12 Ljubljana. Obsolete Technologies of the Future Project), a responsive installation using electronics, sound, and biological material was exhibited in thingworld – International Triennial of New Media Art in 2013 and became a workshop for age group +14 in collaboration with Hackteria to explain the world of mushrooms, sound circuits, electronics, and biohacking in April 2013 in Biotehna, Ljubljana, Slovenia.

http://medialab-prado.es/article/iljubljana_showcase

3. “Seniors in Game” (“Mayores en juego”, during Madrid Urban Laboratory Project) created a network of elderly interested in the artistic experience and digital culture through playful and educational environments.

<http://medialab-prado.es/article/mluproyectos#mayores>

Synergetica

Total number of visitors to public engagement activities: 300000 (this figure includes visitors to SURFACE TENSION in Dublin, New York and Kitchener)

Total number of collaborators involved in public engagement activities: 15

Activities exemplary for the dialogue with the public

“In terms of the vast number of visitors and media impressions, the SURFACE TENSION exhibitions (Science Gallery - Dublin, World Science Festival - New York, THEMUSEUM - Kitchener) reached an unprecedented resonance for Synergetica Lab. Besides the sheer quality and poignancy of the exhibition, the timeliness of the theme (“the future of water”) seems to have been a pivotal attractor. It was also particularly significant for Synergetica Lab because it was among the first large scale exhibitions exposing the art/media world and general public to the aesthetics of fluid motion – one of Synergetical Lab’s primary domains of research. Though on a far more intimate scale, the exhibition “The Source” (Dutch Institute for Media Art) drew the attention and catalyzed heated discussions of rather diverse factions of Amsterdam society, from the art community to scientists, environmentalists and politicians. The most astonishing dialogue that resulted from the exhibition took the shape of an award-winning collaboration (“Symbiotic Machine”) between biophysicist Raoul Frese and artist Ivan Henriques who met for the first time at the opening lecture.”

Evelina Domnitch and Dmitry Gelfand

Ars Electronica Center

Total number of visitors to public engagement activities: 130000

Total number of collaborators involved in public engagement activities: 80

Activities exemplary for the dialogue with the public

“Project Genesis was the most significant exhibition for public dialogue. Interactions arising through guided tours always brought up deep discussions that engaged the fundamental philosophical issues surrounding the topic of synthetic biology. The infotrainer staff commented often that this was the most interesting exhibition to work within because of the ongoing and diverse discussions. For instance, a visit from a group of Catholic Theological Philosophers brought out comments congratulating our expertise in phrasing deeply relevant and engaging questions for the visitors such as “Does your DNA belong to me?” to raise the topic of corporate and governmental access or ownership of our genetic fingerprints. Our method of allowing the artworks to speak within a background of scientific information, due to the exhibition design, gives the visitor an objective viewpoint from which to mount their own arguments. This ongoing dialogue that impacts the worldview of our visitors daily, allows for a new perspective, through artworks to view a complex and compelling topic that raises more questions than it answers. The questions are so complex for our present day society. Within Project Genesis, singular projects like Ars DNA pointed clearly to an alternative use of DNA as data storage. This has prompted a number of other artists to request

access to the source coding tool (available at <http://www.matthewgardiner.net/you-synthetically>).

Projects like Common Flowers / White Out have inspired and engaged local biology students to collaborate and to develop their own GMO plant projects. Opimilk has had quite a number of bottles stolen from the exhibition. The most significant interaction in this case involved the discovery and return of the bottles (which are filled with rice powder) along with a letter of apology.”

Matthew Gardiner

Science Gallery Dublin

Total number of visitors to
public engagement activities: 332000

Total number of collaborators involved
in public engagement activities: 115

**Activities exemplary for the
dialogue with the public**

Interactivos - HACK THE CITY

<https://dublin.sciencegallery.com/interactivos>

Hydrophonica - SURFACE TENSION

<http://youtu.be/NZDXBhjtFFM>

<http://youtu.be/sE5suc-rqFw>

<http://youtu.be/AdOVPLICVzl>

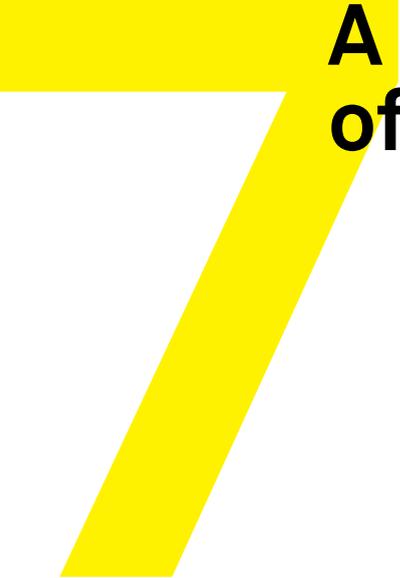
<http://youtu.be/hG2uD1h5qbc>

Community Biolab - GROW YOUR OWN

<https://dublin.sciencegallery.com/growyourown>

*“All of these projects had the
strongest genuine collaboration
between artists, scientists and
designers in their development,
and as such had the strongest story to
tell and hook to engage the audience.
The Community Biolab in GROW YOUR
OWN was the most successful as it
was designed to evolve throughout
the exhibition.”*

Lynn Scarff



A catalogue of experiences

The following pages give a visual summary of the pilot activities and the collaboration among the partners, based on the data available on the Studiolab website.

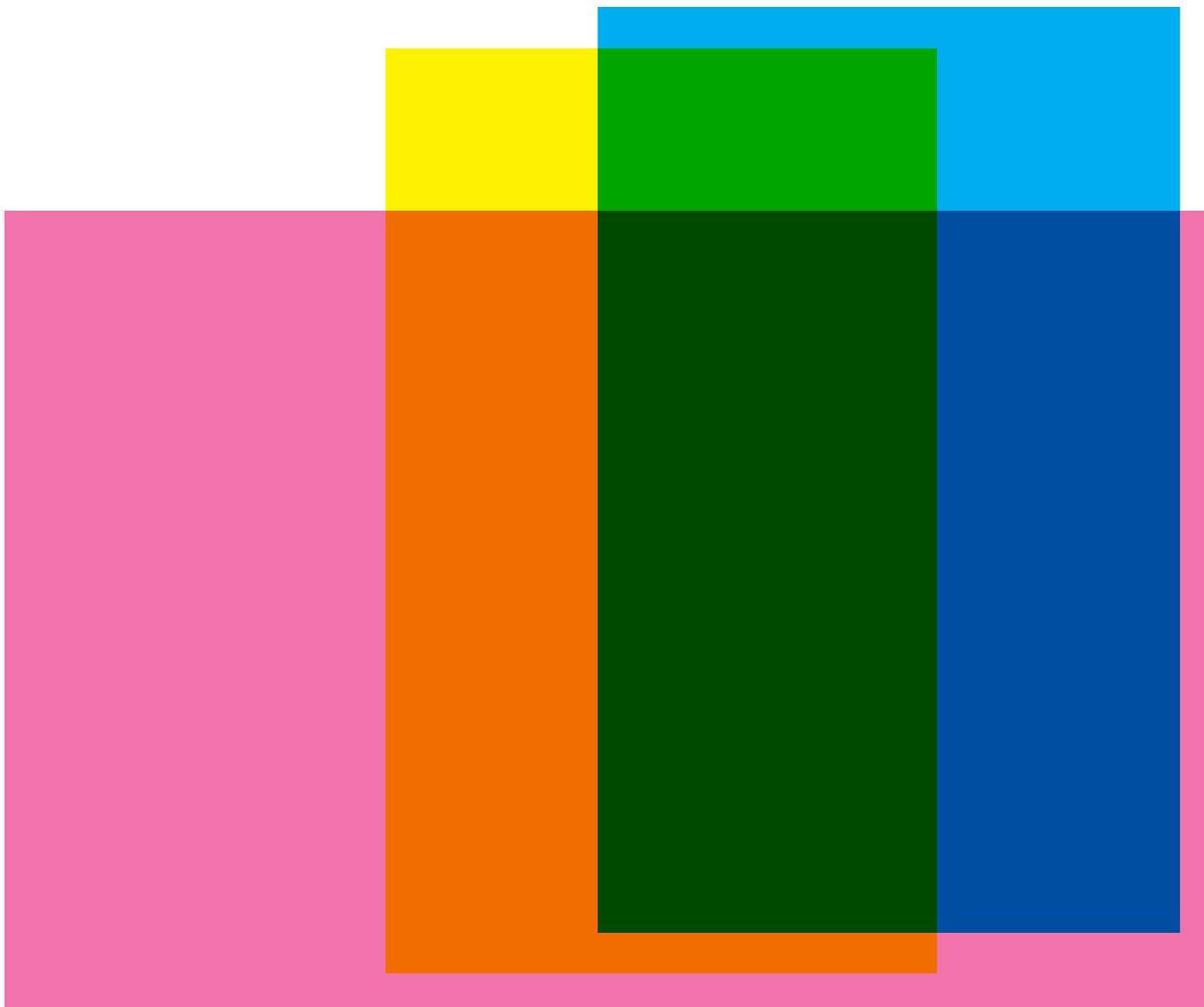
The distribution of the pilot activities by strand and by theme is shown on pp. 124-127; it is noteworthy that while there are relatively few overlaps across themes, there are many more contaminations and overlaps across the three strands. A clear demonstration of how interconnected the incubation, education and public engagement approaches are. For example, of the 93 projects which fall under Public Engagement, 22 belong also to education, 21 to incubation and 23 to all three strands together.

The collaboration among the partners is visualized on pp. 128-131. The thickness of the lines connecting the partners on the ring on p. 129 increases with the number of projects developed together. In the chart on pp. 130-131 the partners are connected with all the projects they were involved in, and each project is connected with all the partners that worked on it. The number next to each project shows the number of partners involved.

The core partners are displayed in magenta and the expert partners in blue. The colour of the dot next to each project shows which partners worked on it: magenta for core partners only, blue for expert partners only and purple for both together.

All the projects with their web addresses are listed in alphabetical order at the end of the chapter.

Studiolab projects by strand

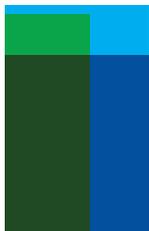


In total _____ 112



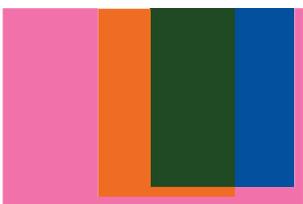
Incubation including mixed strands _____ 56

- Only Incubation _____ 5
- Incubation & Public Engagement _____ 21
- Incubation & Education _____ 7
- All three strands together _____ 23



Education including mixed strands _____ 59

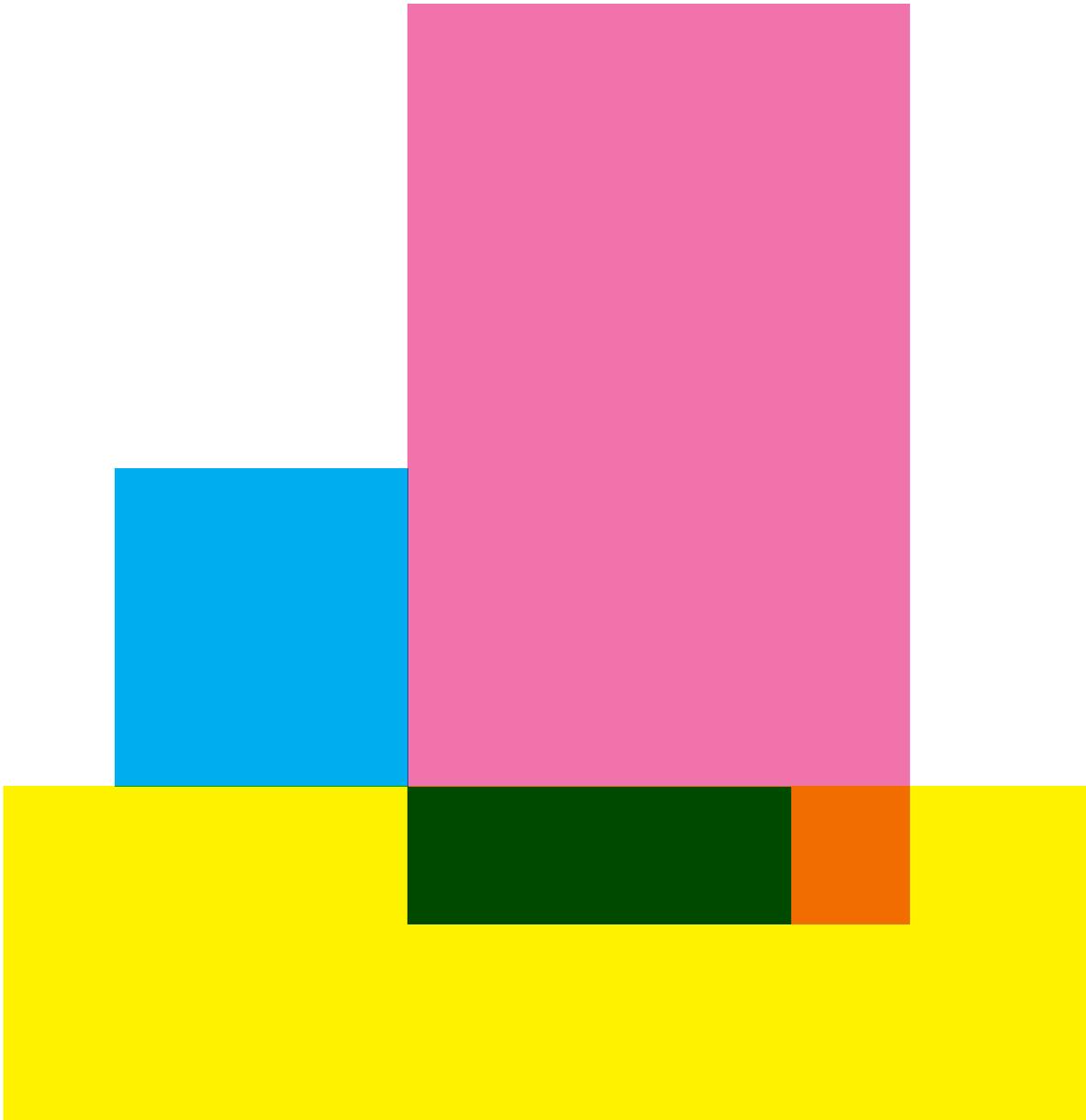
- Only Education _____ 7
- Education & Public Engagement _____ 22
- Education & Incubation _____ 7
- All three strands together _____ 23



Public Engagement including mixed strands _____ 93

- Only Public Engagement _____ 27
- Public Engagement & Education _____ 22
- Public Engagement & Incubation _____ 21
- All three strands together _____ 23

Studiolab projects by topic



In total _____ 112



Future of Water including mixed themes _____ 23

- Only Future of Water _____ 14
- All three themes together _____ 9



Synthetic Biology including mixed themes _____ 49

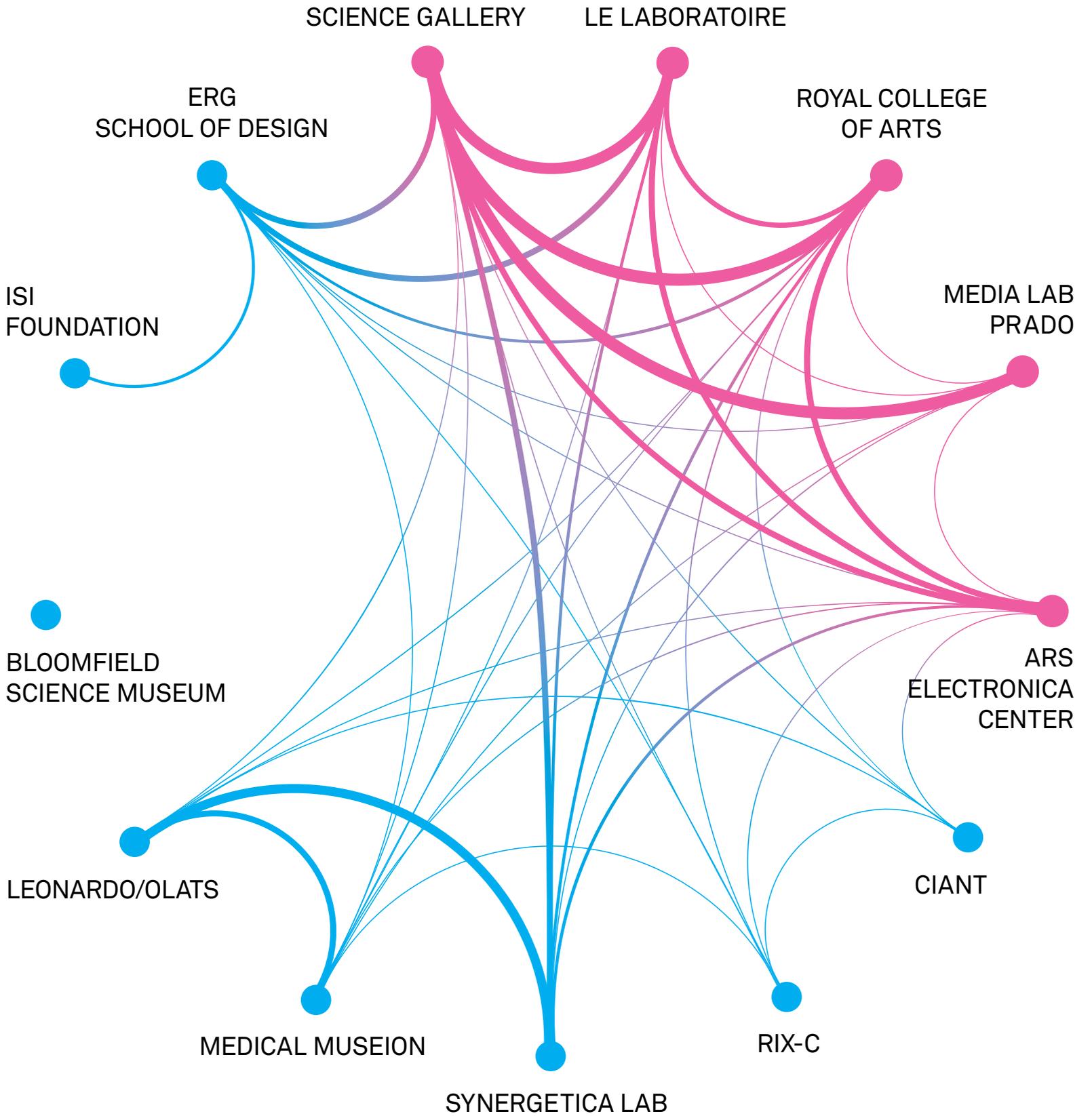
- Only Synthetic Biology _____ 37
- Synthetic Biology & Future of Social Interactions _____ 3
- All three themes together _____ 9



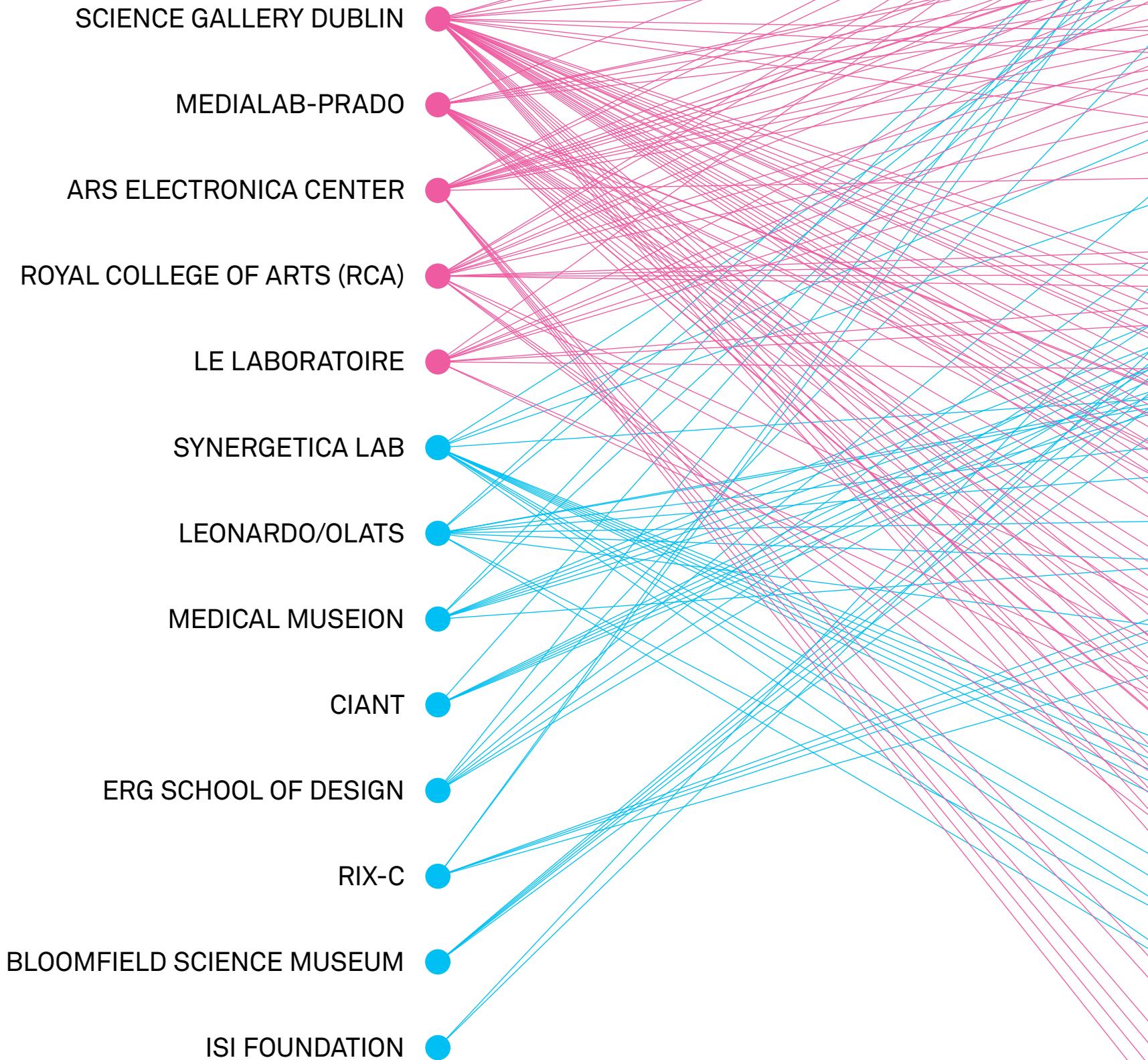
Future of Social interactions including mixed themes _____ 61

- Only Future of Social interactions _____ 49
- Future of Social interactions & Synthetic Biology _____ 3
- All three themes together _____ 9

Collaboration among the partners



Studiolab projects by partner





- Animal-vegetable-mineral-synthetic, between art & Science
<http://www.mada.org.il/culture/conferences/bezalel/2013>
- Ars DNA
<http://studiolabproject.eu/project/synthetic-biology/ars-dna>
<http://www.aec.at/center/en/2013/09/13/ars-dna/>
- Ars Electronica 2012: THE BIG PICTURE - New Concepts for a New World
<http://studiolabproject.eu/event/ars-electronica-2012-big-picture-new-concepts-new-world>
- Arts, Humanities and Complex Network Symposium
<http://studiolabproject.eu/event/arts-humanities-and-complex-network-symposium>
- Arts, Humanities and Complex Networks: A Leonardo Multimedia E-book and Web Companion
<http://studiolabproject.eu/project/social-interaction/arts-humanities-and-complex-networks-Leonardo-multimedia-e-book-and-web>
- Arts, Humanities, and Complex Networks - 4th Leonardo Satellite Symposium at NetSci2013
<http://studiolabproject.eu/opencall/arts-humanities-and-complex-networks-4th-Leonardo-satellite-symposium-netsci2013>
- ArtScience Innovation Workshop 2011: The Future of Water
<http://studiolabproject.eu/project/future-water/artscience-innovation-workshop-2011-future-water>
- ArtScience Innovation Workshop 2012: Virtual Worlds / The future of Social Interaction
<http://studiolabproject.eu/project/future-social-interaction/artscience-innovation-workshop-2012-virtual-worlds-future-social>
- ArtScience Innovation Workshop 2013: Synthetic Biology
<http://studiolabproject.eu/project/synthetic-biology/artscience-innovation-workshop-2013>
- Atelier "Hacker les bactéries" avec Anna Dumitriu
<http://studiolabproject.eu/event/atelier-hacker-les-bact-ries-avec-anna-dumitriu>
- Bio Art - Bio Design, enjeux culturels et sociétaux de la biologie de synthèse
<http://studiolabproject.eu/event/bio-art-bio-design-enjeux-culturels-et-soci-taux-de-la-biologie-de-synth-se>
- Bio-Fiction workshop
<http://id2studio.at/content/1892-2/>
- Biohacking Workshop at Labitat in Copenhagen
<http://studiolabproject.eu/event/biohacking-workshop-labitat-copenhagen>
- Biohacking: Do It Yourself! Doing and Debating Synthetic Biology
<http://studiolabproject.eu/project/synthetic-biology/biohacking-do-it-yourself-doing-and-debating-synthetic-biology>
- Blueprints for the Unknown
<http://studiolabproject.eu/project/synthetic-biology/blueprints-unknown>
- Call for Abstracts: MutaMorphosis
<http://studiolabproject.eu/opencall/call-abstracts-mutamorphosis>
- Call for Attractors: Tribute to Uncertainty
<http://studiolabproject.eu/opencall/call-attractors-tribute-uncertainty>
- Call for Collaborators. Interactivos?'12 Dublin: Hack the City. Current and Future Needs
<http://studiolabproject.eu/opencall/call-collaborators-interactivos12-dublin-hack-city-current-and-future-needs>
- Call for Collaborators. Interactivos?'12 Ljubljana: Obsolete Technologies of the Future
<http://studiolabproject.eu/opencall/call-collaborators-interactivos12-ljubljana-obsolete-technologies-future>
- Call for Collaborators. Interactivos?'14: Rethinking collective behavior and action
<http://studiolabproject.eu/opencall/call-collaborators-interactivos14-rethinking-collective-behavior-and-action>
- Call for Media Art Histories 2013: RENEW conference abstracts - Extended deadline
<http://studiolabproject.eu/opencall/extended-deadline-call-media-art-histories-2013-renew-conference-abstracts>
- Call for Participants: Renewable Lab
<http://studiolabproject.eu/opencall/call-participants-renewable-lab>

- **Call for Partnerships: MutaMorphosis**
<http://studiolabproject.eu/opencall/call-partnerships-mutamorphosis>
- **Call for Projects. Interactivos? '12 Ljubljana. Obsolete Technologies of the Future**
<http://studiolabproject.eu/opencall/call-projects-interactivos-12-ljubljana-obsolete-technologies-future>
- **Cloud Chamber: Subatomic Aesthetics 2011**
<http://www.koncon.nl/blobs/Curricula/Vakkenbeschrijvingen/electives.pdf#page=11>
<http://www.olats.org/studiolab/eau.php?in=acte>
- **Codeform**
<http://studiolabproject.eu/project/synthetic-biology/codeform>
- **Codeform and Fifty Sisters Presentations by Jon McCormack**
<http://studiolabproject.eu/event/codeform-and-fifty-sisters-presentations-jon-mccormack>
- **CoderDojo. Programming Workshop for Young People**
<http://studiolabproject.eu/event/coderdojo-programming-workshop-young-people>
- **Doing and Debating DIY Biology at Medical Museion: Open Days**
<http://studiolabproject.eu/event/doing-and-debating-diy-biology-medical-museion-open-days>
- **Doing and Debating DIY Biology at Medical Museion: Symposium**
<http://studiolabproject.eu/event/doing-and-debating-diy-biology-medical-museion-symposium>
- **Doing and Debating DIY Biology at Medical Museion: Workshop**
<http://studiolabproject.eu/event/doing-and-debating-diy-biology-medical-museion-workshop>
- **Experiment 17 - Culture labs**
<http://studiolabproject.eu/event/experiment-17-culture-labs>
- **Fabulous Fabbers - Ghost Estate Edition**
<http://studiolabproject.eu/project/future-social-interaction/fabulous-fabbers-ghost-estate-edition>
- **Fifty Sisters**
<http://studiolabproject.eu/project/synthetic-biology/fifty-sisters>
- **Fluoride Saturdays**
<http://studiolabproject.eu/event/fluoride-saturdays>
- **Fluoride_Station**
<http://studiolabproject.eu/project/future-social-interaction/fluoridestation>
- **Funcionamientos: Open Designs and Social Remix**
<http://studiolabproject.eu/project/future-social-interaction/funcionamientos-open-designs-and-social-remix>
- **Funcionamientos. Open Design and Social Remix. Call for Projects**
<http://studiolabproject.eu/opencall/funcionamientos-open-design-and-social-remix-call-projects>
- **Funcionamientos. Open Designs and Social Remix. Call for Collaborators**
<http://studiolabproject.eu/opencall/funcionamientos-open-designs-and-social-remix-call-collaborators>
- **Funcionamientos. Open Designs and Social Remix. Phase 1**
<http://studiolabproject.eu/event/funcionamientos-open-designs-and-social-remix-phase-1>
- **Funcionamientos. Open Designs and Social Remix. Phase 2**
<http://studiolabproject.eu/event/funcionamientos-open-designs-and-social-remix-phase-2>
- **GAME: Brainstorm**
<http://studiolabproject.eu/event/game-brainstorm>
- **GAME: THE FUTURE OF PLAY**
<http://studiolabproject.eu/event/game-future-play>
- **GROW YOUR OWN**
<http://studiolabproject.eu/event/grow-your-own>

- GROW YOUR OWN - open call
<http://studiolabproject.eu/opencall/open-call-grow-your-own>
- HACK THE CITY: Brainstorm
<http://studiolabproject.eu/event/hack-city-brainstorm>
- HACK THE CITY: Take Control
<http://studiolabproject.eu/project/social-interaction/hack-city-take-control>
- Hydrogeny
<http://studiolabproject.eu/project/future-water/surface-tension-hydrogeny-synergetica-lab>
- Idea Translation Lab 2011
<http://studiolabproject.eu/project/future-water/idea-translation-lab-2011>
- Idea Translation Lab 2012
<http://studiolabproject.eu/project/future-social-interaction/idea-translation-lab-2012>
- Idea Translation Lab 2013
<http://studiolabproject.eu/project/food/idea-translation-lab-2013>
- Idea Translation Lab 2014
<http://studiolabproject.eu/project/future-social-interaction/idea-translation-lab-2014>
<http://youtu.be/SLytmsADhHs>
- Idea Translation Lab Class of 2013: Presentations and Showcase
<http://studiolabproject.eu/event/idea-translation-lab-class-2013-presentations-and-showcase>
- Idea Translation Lab for Transition Year Students (April 2013-June 2013)
<http://studiolabproject.eu/project/food/idea-translation-lab-transition-year-students-april-2013-june-2013>
- Idea Translation Lab for Transition Year Students 2012
<http://studiolabproject.eu/project/future-social-interaction/idea-translation-lab-transition-year-students-2012>
- Interactivos Exhibition
<http://studiolabproject.eu/event/interactivos-exhibition>
- Interactivos? '12 Dublin: Hack the City. Current and Future Needs
<http://studiolabproject.eu/event/interactivos12-dublin-hack-city-current-and-future-needs>
- Interactivos?'12 Ljubljana. Obsolete Technologies of the Future
<http://studiolabproject.eu/event/interactivos-12-ljubljana-obsolete-technologies-future>
- Interactivos?'12 Ljubljana. Project Showcase
<http://studiolabproject.eu/event/interactivos12-ljubljana-project-showcase>
- Investigating the Language of Network Representations
<http://studiolabproject.eu/project/future-social-interaction/investigating-language-network-representations>
- Investigating the Language of Network Representations Workshop at ERG, October 2012
<http://studiolabproject.eu/event/investigating-language-network-representations-workshop-erg-october-2012>
- Lab City. Urban Camp
<http://studiolabproject.eu/event/lab-city-urban-camp>
- LIQUIFIED SKY
<http://us5.campaign-archive1.com/?u=45963fe3d5ee3ed2a808a24b2&id=cd733c57d8&e=a2080008a5>
- Living Logic - Day 1 - Manuel Selg
<http://studiolabproject.eu/event/living-logic-day-1-manuel-selg>
- Living Logic - Day 2 - Joe Davis
<http://studiolabproject.eu/event/living-logic-day-2-joe-davis>
- Living Logic - Day 3 - Church, Schmidt and Hauser
<http://studiolabproject.eu/event/living-logic-day-3-church-schmidt-and-hauser>
- Living Logic: Masterclass
<http://studiolabproject.eu/event/living-logic-masterclass>

- Madrid Urban Laboratory. Call for Projects
<http://studiolabproject.eu/opencall/madrid-urban-laboratory-call-projects>
- Madrid Urban Laboratory. Infrastructures, practices and tools to rethink the shared life
<http://studiolabproject.eu/event/madrid-urban-laboratory-infrastructures-practices-and-tools-rethink-shared-life>
- Man-Machine, between art & Science
<https://www.mada.org.il/culture/conferences/bezalel/machines>
- Media Art Histories 2013: RENEW - The 5th International Conference on the Histories of Media Art, Science and Technology
<http://studiolabproject.eu/event/media-art-histories-2013-renew-5th-international-conference-histories-media-art-science-and>
- Meta-Life: Biotechnologies, Synthetic Biology, A-Life and the Arts
<http://studiolabproject.eu/project/synthetic-biology/meta-life-biotechnologies-synthetic-biology-alife-and-arts>
- Michael John Gorman at ESOF: What does art bring to science?
<http://studiolabproject.eu/event/michael-john-gorman-esof-what-does-art-bring-science>
- MutaMorphosis II: Tribute to Uncertainty International Conference
<http://studiolabproject.eu/event/mutamorphosis-ii-tribute-uncertainty-international-conference>
- MutaMorphosis: Tribute to Uncertainty
<http://studiolabproject.eu/project/biology-social-interaction-water/mutamorphosis-tribute-uncertainty>
- Mutant Products workshop
<http://studiolabproject.eu/event/mutant-products-workshop>
<http://studiolab.di.rca.ac.uk/blog/mutant-products-workshop>
- Mutant Workshop
<http://studiolabproject.eu/event/mutant-workshop>
<http://studiolab.di.rca.ac.uk/blog/mutant-products-workshop>
- Open Call. Living Logic: Masterclass
<http://studiolabproject.eu/opencall/open-call-living-logic-masterclass>
- Opening Seminar - INTERACTIVOS? '12 DUBLIN: HACK THE CITY - CURRENT AND FUTURE NEEDS
<http://studiolabproject.eu/event/opening-seminar-interactivos12-dublin-hack-city-current-and-future-needs>
- OSCILLATOR exhibition
<http://studiolabproject.eu/event/oscillator>
- OSCILLATOR open call
<http://studiolabproject.eu/opencall/oscillator>
- OSCILLATOR project
<http://studiolabproject.eu/project/future-social-interaction/oscillator>
- OSCILLATOR: Brainstorm
<http://studiolabproject.eu/event/oscillator-brainstorm>
- Project genesis
<http://studiolabproject.eu/project/synthetic-biology/project-genesis>
<http://www.aec.at/press/en/2013/07/31/projekt-genesis-synthetische-biologie-das-leben-aus-dem-labor/>
- Real Fiction
<http://studiolabproject.eu/event/real-fiction>
- Renewable Lab
<http://studiolabproject.eu/event/renewable-lab>

- **Space Science in the Arts**
<http://studiolabproject.eu/project/future-social-interaction-future-water-synthetic-biology/space-science-arts>
- **Sphæræ at Ars Electronica**
<http://studiolabproject.eu/project/synthetic-biology/sph-r-ars-electronica>
- **Spherometria, 2012**
<http://sphaerae.net/spherometria.html>
- **Studiolab Public Forum: Hacks, Mutants, Synthesis, Uncertainty, Water and Networks**
<http://studiolabproject.eu/event/studiolab-public-forum-hacks-mutants-synthesis-uncertainty-water-and-networks>
- **SURFACE TENSION: Brainstorm**
<http://studiolabproject.eu/event/surface-tension-brainstorm>
- **SURFACE TENSION: The Future Of Water**
<http://studiolabproject.eu/event/surface-tension-future-water>
- **Synapse - Conference with Jenny E. Sabin on Research & Experimental Design**
<http://studiolabproject.eu/event/synapse-conference-jenny-e-sabin-research-experimental-design>
- **Synbio tarot card reading**
<http://studiolab.di.rca.ac.uk/blog/synbio-tarot-reading>
- **Synergetica Event**
<http://studiolabproject.eu/event/synergetica-event>
- **The artistic Brain**
no website available
- **The Data Body on the Dissection Table. Arts, Humanities, Medicine and Complex Networks**
<http://studiolabproject.eu/event/data-body-dissection-table-arts-humanities-medicine-and-complex-networks>
- **The reality of science fiction: A panel discussion on science and sci-fi**
<http://studiolabproject.eu/event/reality-science-fiction-panel-discussion-science-and-sci-fi>
- **The source**
<http://studiolabproject.eu/project/future-water/source>
- **The Source Finissage**
<http://studiolabproject.eu/event/source-finissage>
- **Transparent light**
<https://www.mada.org.il/exhibitions/shakoof>
- **Transparent Studio**
<https://www.mada.org.il/exhibitions/shakoof>
- **Turn the City Green - Workshop on Aungier St.**
<http://studiolabproject.eu/event/turn-city-green-workshop-aungier-st>
- **Urban Camp. Think, Create, Build**
<http://studiolabproject.eu/event/urban-camp-think-create-build>
- **Water is in the Air**
<http://studiolabproject.eu/event/water-air>
- **Water is in the Air: Physics, Politics and Poetics of Water in the Arts**
<http://studiolabproject.eu/project/future-water/water-air-physics-politics-and-poetics-water-arts>
- **Water is in the Air: Proceedings and Video Recordings**
<http://studiolabproject.eu/project/future-water/water-air-proceedings-and-video-recordings>
- **WE, THE RESISTANCE**
<http://studiolabproject.eu/project/future-social-interaction/we-resistance>
- **Workshop on performing arts, humor and science fiction.**
<http://studiolabproject.eu/event/workshop-performing-arts-humor-and-science-fiction>
<http://medialab-prado.es/article/tallerescenahumorycienciaficcion>

- Yours Synthetically, (project)
<http://studiolabproject.eu/project/synthetic-biology/yours-synthetically>
- Yours Synthetically, (exhibition)
<http://studiolabproject.eu/event/yours-synthetically>
- Yours Synthetically, (open call)
<http://studiolabproject.eu/opencall/yours-synthetically>

Photo credits

Clockwise from top left:

p. 18: Agatha Haines
Science Gallery

p. 22 Chloé De Smet Van Damme,
Lisa Harchies, Amandine Maloux,
Laure Pica and Emilie Ronsmans

p. 25 Helena Božič

p. 26 Martin Hieslmair
Tom Mesic
Martin Hieslmair

p. 28 Science Gallery

p. 29 Claus Langer
Science Gallery

p. 32 Science Gallery/RCA

p. 33 Le Laboratoire

p. 35 Phase One Photography
Tom Mesic

p. 36 Lucie Schwob, Nicolas Peillon
and Marie Nepper

p. 37 Wouter van den Broek

p. 38 Le Laboratoire

p. 39 Ars Electronica

p. 40 Ars Electronica

p. 41 articultores.net

p. 42 Science Gallery

p. 43 Martin Malthe Borch
Ars Electronica
Tom Mesic

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