

DESIGN & TECHNOLOGY <sup>3</sup>  
SERIES  
ELI KUSLANSKY

8 LOOKOUTS  
ARE SHOPS, CLASSROOMS &  
LIBRARIES TURNING INTO  
SCIENCE CENTRES?  
19  
THE NETWORK

12 ENGAGEMENT FOR A SUSTAINABLE  
FUTURE. MICHAEL PETER &  
CHRISTOPHER GARTHE  
18 SPREADING THE WORDS  
GEMA REVUELTA

THE ECSITE MAGAZINE | WINTER 2014 | ECSITE.EU

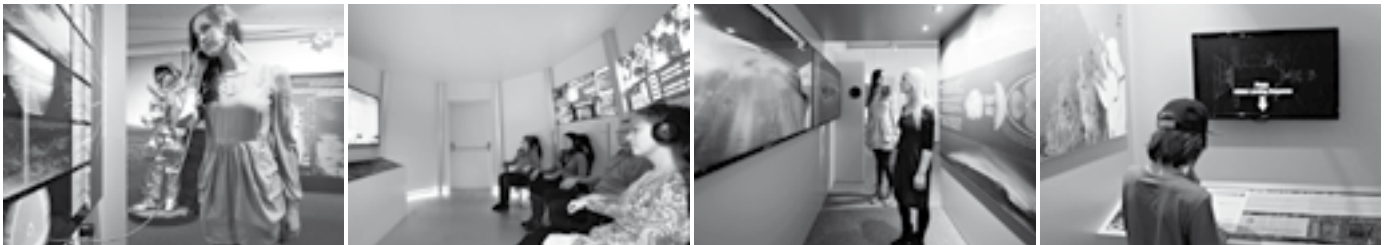


# SPOOKIES, Cities, Liquid Networks & Living labs

# Libraries

# READY FOR TAKE-OFF?

From March 2015 we are selling the exclusive special exhibition **SOUNDS OF SPACE**. It is currently successfully running in the interactive **MED-EL Science Center AUDIOVERSUM** in Innsbruck – in cooperation with the Austrian Space Forum.



At various high-tech stations the visitors dive into different spheres and experience the fascination of the universe with their own eyes and ears.

- › Modular design
- › Trilingual throughout in German, English and Italian
- › Requires about 100 square metres of floor space
- › Wheelchair-accessible
- › Detailed description and digital material available



Further information can be found at:  
[www.audioversum.at/space-exhibition\\_en/](http://www.audioversum.at/space-exhibition_en/)

## Interested?

Simply get in touch with us:

**MED-EL Deutschland GmbH**

**Dr Eckhard Schulz**

(Manager Special Projects)

Moosstrasse 7  
82319 Starnberg  
Germany

Tel.: +49 (0)8151 7703 50  
[eckhard.schulz@medel.de](mailto:eckhard.schulz@medel.de)

**AUDIO**  **VERSUM**  
ScienceCenter

**MED**  **EL**

# Legible Cities, Liquid Networks & Living labs

## Eli, could you introduce yourself? Some call you a digital media guru...

I'm Managing Partner and Chief Strategist at Unified Field, an agency creating interactive media for science centres, museums, corporations and government agencies. I've been working in the cultural sector for over thirty years – twenty two of them at Unified Field thinking up solutions to deliver messages and experiences through digital media (although I did start as a maritime curator - go figure).

Recently, we created a new consultancy practice inside Unified Fields called "Future Culture", in which we work with our clients to create cultural centres of the future, and producing real-world applications using big data. We have been working on a number of Future Culture projects, including multi-channel media programs, next generation maker spaces, smart cities and participatory exhibits.

Some of this like big data might sound alien to some – but actually data doesn't come from outer space. A lot is created by human beings fulfilling an ancient urge to communicate with one another. I recently gave a keynote speech on this at the Leadership Reception at the Association of Science Technology Centres (ASTC) conference in Raleigh, where I spoke about "Ubuntu", an ancient African belief in a universal bond of sharing that connects all humanity. Maybe Ubuntu is the spiritual ancestor of the Internet with drumbeats being the first true HTML.



INTERVIEW WITH  
**ELI KUSLANSKY**  
MANAGING PARTNER AT UNIFIED FIELD

In conversation with  
**Maarten Okkersen**  
Chair of the *Spokes* Editorial Committee,  
**Julie Becker**  
Ecsite Communications Manager and  
**Nicolas De Smet Van Damme**  
Ecsite Communications Intern.



## "Big data" has become a buzz word – but what does it mean exactly? How is it different from "normal" data?

Nowadays, we produce incredible amounts of data – most of it without even being aware of it. Each of your emails, tweets, Facebook pictures or clicks is data. But also each of your credit card purchases, each of your entry and exit points to a public transport system using an RFID card, each of your phone's connections to a network... In fact, most of this data is generated by sensors registering activity (for instance cars stopping at a traffic light).

The nature of each of these individual data points is not different from what we already know (call it "normal" or "small" data if you will) – what is new

is the amount of it (we've produced 90 percent of the data in all human history in the last two years alone), and the tools we use to collect and analyse that data, plus the predictive power of these tools. So basically we call data "big" when a collection of data sets is so large and complex that it becomes difficult to process and its analysis requires programmes that extend beyond traditional data processing and statistical tools.

## Big data can predict things?

Big data can be used to reveal correlations and hidden patterns a lot faster than "normal" or "small" data that relies on causalities.

For instance where and when viral outbreaks are more likely to happen in a given neighbourhood – or who is likely to win upcoming elections.

## ...And might this be used to improve visitors' experience in your science centre?

Exactly. The tens of millions of visitors to science centres every year generate big data sets. This data can be used in many ways – for instance feeding into a mobile app that provides each visitor with tailored co-curated journeys through your current offering, based on their preferences but also on how crowded or popular different exhibits are or even simple things like how the natural light will be in your galleries at any given time.

Having better insights into your visitors also could help ticket sales. At the Point Defiance Zoo and Aquarium in the Pacific Northwest they use big data analysis to tell them what their visitors

---

Award-winning narrowcast channel developed by Unified Field for the lobby of Yale School of Management (USA).

---



Big data can be used to reveal correlations and hidden patterns a lot faster than “normal” or “small” data that relies on causalities.

do while they visit, what they’re saying on social media, which exhibits they prefer, and what conservation programs they’re participating in. In one year the result is a 700% increase in ticket sales. That’s a lot.

But in my view big data offers much bigger opportunities for science centres: I am convinced that they can have an important role to play in equipping data-literate citizens and in leveraging the data they and their visitors already create. US-based museums, science centres, zoos etc. collectively receive about 850 millions visits per year, almost 2.7 times more people than the total US population – this represents incredible amounts of data. In Europe, visits to science centres per year are equally in the tens of millions.

### Leveraging data?

If knowledge is power, then big data is rocket fuel. The question of who owns the data and who has the capacity to analyse it is absolutely central. Science centres and museums have already started to move away from the attractions model that saw them as providers of fun phenomenological educators of young audiences. Many of them want to become places where all citizens can learn and enjoy themselves, as well as equip themselves with the skills they need to participate in the future of science with all its social implications.

**Science centres want to host and facilitate that conversation and play a more active role in their communities. No way you can do this in the very near future effectively (I’m talking 5 years, not 20) if you don’t tackle big data now.**

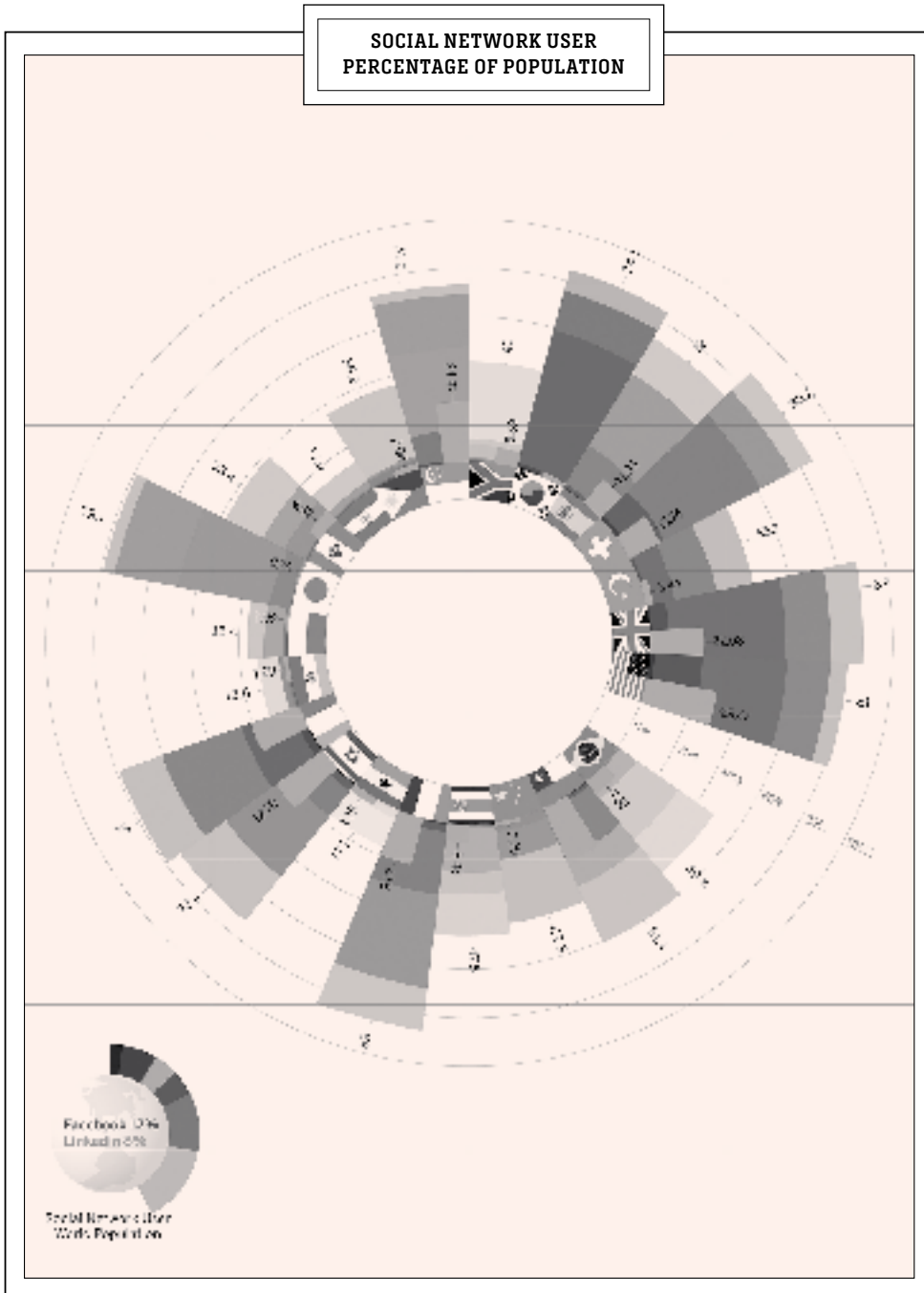
It is one of the essential languages of the 21st century. We – including science centres – should all be brokers of big data. But big data in itself doesn’t make much sense: at the Future Culture practice we think that science centres need to look at it in the context of what we call “the three L’s”: Legible Cities, Liquid Networks and Living Labs.

### Spokes readers will be familiar with living labs – but Legible Cities? Liquid networks?

By 2050, 70% of the world population will live in cities – these will be where the future of innovation happens. A lot of people talk of “smart cities” (that of course make use of big data). But right now the people busy planning and building smart cities all come from the same world: big information technology corporations. And they are building these cities in their own image: top-down, with seamless control, uniformity and systems in which in some cases citizens need to pay to use the data they generated themselves! This is not how cities work.

I am urging science centre and Ecsite to join in and act now to help create a humanistic version of the smart city – cities that are innovative learning cities. Cities just like the process of innovation itself are messy and organic.

Example of data displayed on the Yale School of Management narrowcast channel. Three floors of interactive media show real time information such as class and conferences schedules, photography from students, special announcements, customized presentations, data visualizations...



I am urging science centre and Ecsite to join in and act now to help create a humanistic version of the smart city – cities that are innovative learning cities. Cities just like the process of innovation itself are messy and organic.

Science centres aren't simply just *in* the city – they need to be more of a dynamic part of it. We call these future cities “legible” because we want to reveal the hidden patterns and flow of knowledge and information. To make the dynamics of a city visible to help citizens make better sense of it, make better choices, create informed journeys and ultimately have better lives.

Science centres and museums are already very good at providing entry points into complex information – they also have a crucial role to play in facilitating conversations in and about the city, in connecting with people and organizations in what we call “liquid networks”, i.e. places (not necessarily physical places) in which ideas move fluidly, bang against each other to create other new ideas, hybridize and coalesce into something concrete. ‘Liquid networks’ is an idea posited by Steven Berlin Johnson in his book *Where Good Ideas Come From* (see “Going further” section p.7). This is where the Living Labs come in. We think of living labs as extensions of the current makers or tinkers space. If we consider these experiments to be entry level wouldn't it be valuable to provide advanced levels to dynamically tie these activities to real life, the entrepreneurial chain and research? Many science centres are already doing just that.

### **Surely big data analysis requires expensive tools...**

Indeed. That's why I'm hoping to inspire the science centre and museum community to join forces and share the cost of setting up the infrastructure, the custodial organization and the channels to get the most out of the big data being generated by the centres and their visitors. Individual organizations do not have the means or bandwidth to do this alone or even in small partnerships.

One idea for instance is a dedicated digital media channel, a narrowcast channel owned by and for science centres. On it original and sourced content could be distributed, run by centres on relevant topics, and involve science engagement professionals, scientists, policy makers and visitors...

It is narrowcast in the sense that unlike a broadcast channel it can be experienced primarily on site at dedicated locations. The American Zoo Association already has a channel similar to this going out to 50 zoos and aquariums. A narrowcast channel is simply a flexible interactive bi-directional vehicle for dedicated content accessible primarily to the science centre audience (as opposed to broadcast). It doesn't mean that it excludes people – it's simply for a specific audience, for instance a community of interests. This channel could also be a great potential source of revenue for the field.

I'm proposing taking a network like the gathering of cities of scientific culture Ecsite created with the PLACES project and of injecting big data into it... to speak the language of numbers that power brokers use.

I also urge the Ecsite community (in fact the worldwide science centre community) to set up a centre for data literacy. I'm sure we could find a business model to make it self-sufficient. Remember: big data is power – it's big funding too! We could also create data literacy in the form of interactive games aimed at visitors. These could have usage tracking tied to real world problems so as visitors use them they are also building a big data set useful in real world applications.

I'll be at the 2015 Ecsite Annual Conference in Trento (Italy) next June – hoping to continue conversations there...

I'm hoping to inspire the science centre and museum community to join forces and share the cost of setting up the infrastructure, the custodial organization and the channels to get the most out of the big data being generated by the centres and their visitors.

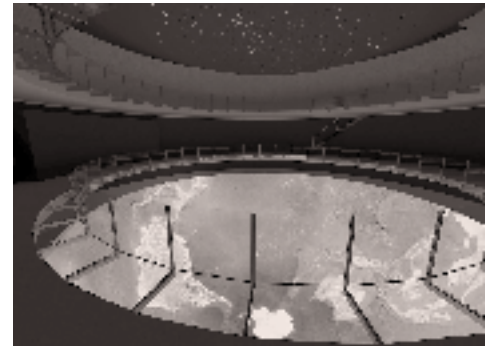


**“AND THEN, EVERYTHING FALLS INTO PERSPECTIVE”  
WHAT DOES A BIG DATA EXHIBIT LOOK LIKE?  
WE ASKED HANS GUBBELS, DIRECTOR OF CONTINIUM  
DISCOVERY CENTRE IN KERKRADE (NETHERLANDS),  
CURRENTLY WORKING WITH UNIFIED FIELD ON  
LARGE-SCALE DEVELOPMENTS TO CREATE AN  
EARTH THEATRE AS A LEGIBLE CITIES PROJECT.**

“We wanted to engage audiences with sustainable development – many readers will know how difficult it is to turn this concept into a visitor experience. I was struggling with this thought when I had the chance to meet three astronauts. Asked about the most striking experience they had had in space, they all agreed: it was seeing the earth from above. “And then,” they said, “everything falls into perspective.”

The idea of the “Earth Theatre” was born: it will be the world’s first inverted planetarium. It will consist of a 16-meter wide hollow projection sphere visible from two rings of glass balconies, rendering the illusion of looking down on our planet from space. It will provide a powerful big data visualisation tool, illustrating both planetary phenomena and zooms on more local trends. We are working on programmes for 2016 that will make the theatre fully interactive, allowing visitors to control parameters. We are currently putting together a EU research proposal on big data visualisation to explore further possibilities. What sounded like an amusement technology is proving to have serious learning and research potential...”

The future “Earth Theatre” planned by Continium in Kerkrade (Netherlands).



## GOING FURTHER

### Background

- Bauman Zygmunt (2000), *Liquid Modernity*, Polity Press.
- Pentland Alex (2014), *Social Physics: How Good Ideas Spread - The Lessons from a New Science*, Penguin Press.
- Townsend Anthony M (2013), *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*, W. W. Norton & Company.

### Big data applied to museums and science centres

- American Alliance of Museums: <http://futureofmuseums.blogspot.com/2014/06/a-recap-of-big-data.html>
- Cultural Data Project: [www.culturaldata.org/](http://www.culturaldata.org/)
- Cairns, Suze (2012), “One Provocation for Big Data”, post on the Museum Geek blog: [museumgeek.wordpress.com/2012/02/01/one-provocation-for-big-data/](http://museumgeek.wordpress.com/2012/02/01/one-provocation-for-big-data/)
- Price Kati (2014), “How can technology improve the museum experience?”, V&A website: [www.vam.ac.uk/blog/digital-media/how-can-technology-improve-the-museum-experience](http://www.vam.ac.uk/blog/digital-media/how-can-technology-improve-the-museum-experience)

- Alton Elizabeth (2014), “What Big Data Means for Animal Attractions”, Entertainment Designer website: <http://entertainmentdesigner.com/featured/what-big-data-means-for-animal-attractions/>

### Smart cities

- “Dumbing down the smart city”, video of speech by designer Adam Greenfield: [www.lse.ac.uk/researchAndExpertise/researchHighlights/societyMediaAndScience/SmartCities.aspx](http://www.lse.ac.uk/researchAndExpertise/researchHighlights/societyMediaAndScience/SmartCities.aspx)

### Liquid networks

- TED talk by Steven Berlin Johnson: [www.ted.com/talks/steven\\_johnson\\_where\\_good\\_ideas\\_come\\_from](http://www.ted.com/talks/steven_johnson_where_good_ideas_come_from)
- Johnson Steven Berlin (2011), *Where Good Ideas Come From - The Seven Patterns of Innovation*, Penguin Press.

• •  
 INTERVIEWS BY  
**JULIE BECKER**  
 ECSITE COMMUNICATIONS MANAGER  
 AND  
**NICOLAS DE SMET VAN DAMME**  
 ECSITE COMMUNICATIONS INTERN  
 • •



• •  
**ARE SHOPS,  
 CLASSROOMS AND  
 LIBRARIES TURNING INTO  
 SCIENCE CENTRES?**  
 • •

---

Immersive retail environment created and tested by E. Pantano at the University of Calabria (Italy).

---

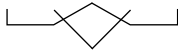
The idea for this issue's "Lookouts" section emerged when the *Spokes* Editorial Committee was approached by Michael Vogt from the Central and Regional Library of Berlin, who was offering to tell readers about the "humanities science centre" he is currently developing inside a library, directly inspired by our sector's engagement ethos and interactive tools.

"How interesting," we thought, "people from other fields are looking at us and borrowing techniques. Our model is spreading. Hang on... or are we all coming up with similar solutions because of overarching changes in people's expectations? Let's ask colleagues at the forefront of neighbouring fields and find out what they're busy cooking – and whether they are peering over our shoulder."

Hear about future trends in classrooms, libraries, retail environments - and about the designers who work for them all. You will see that "interactivity", "immersion", "personalisation", "experience" etc. have become standard concepts for anyone thinking about engaging audiences, be they library users, shoppers, business partners or students.

After a non-exhaustive peak at neighbouring fields, we would conclude that other sectors are sometimes borrowing techniques from science centres in particular or informal learning in general but that our field is far from owning the exclusivity for interactivity. It looks like convergent trends are leading to cross-fertilization – see for yourself what we can learn from our colleagues.





**MICHAEL VOGT**  
PROJECT LEADER  
"WELT DER SPRACHEN"

Central and Regional Library of  
Berlin (Germany)

**With "Welt der Sprachen", you are planning a science centre-type experience inside a library – tell us about it.**

The project is part of the "Humboldt-Forum", a cultural venue to be housed in the heart of Berlin in the repurposed Berlin Palace. The Prussian Cultural Heritage Foundation, the Humboldt University of Berlin and the Central and Regional Library of Berlin will share the space, offering audiences (mainly tourists) exhibitions and experiences with the overarching "dialogue of cultures" concept. A preview exhibition is currently on show and the venue should be opening in 2019.

What kind of experience could a library offer to tourists who for very practical reasons can't be lent books to – and mostly don't speak German anyway? We had to completely re-think our relationship to users in this new context. Thematically, we picked a universal topic: language. But how could we tackle this intangible subject? This is when we chose to follow a science centre-type model, creating a "humanities science centre". I used to run a math science centre in Dresden – using interactivity to engage visitors with abstract concepts is a rather familiar challenge to me.

There will be two adjacent spaces: the "humanities science centre" and a modern

library. We want them to have strong links. There will be books in the humanities centre as well as electronic media in the humanities centre – and an invitation to step into the library space to dig deeper. To develop this venue we are kindly supported by the European Fund for Regional Development (EFRD) from 2012 to 2015.

**Would you say your hybrid project is part of a trend seeing libraries becoming more like science centres?**

I believe that libraries in general are changing and looking for new formats, borrowing from neighbouring fields. Archives and books used to be hidden or buried deep and there has been a long evolution towards more accessible resources.

**Many libraries go further and have extended beyond the basic function of storing books. They offer access to other information media and often act as co-working places, answering shifting demands and practices amongst users.**

Like a lot of museums, they have learnt from other entertainment and cultural venues and have become more pro-active in reaching users. Like science centres, we shouldn't be only about providing pure information, but should also try to "make people cleverer than the exhibit" – in other words help people think by themselves. Google is a very helpful tool, but learning whether what you are looking for is relevant or whether you are looking for it in the right place is crucial. In the future, I can imagine interactive exhibits in local libraries teaching users how to make the most of available resources.

**What can science centres learn from libraries?**

Libraries have an incredible asset: they are able to build relationships over time with their users, with a return visit rate science centres can only envy. I think that they are currently realising that this relationship can be more interactive and more two-way. Tools borrowed from the science centre world can help achieve this – combined with more traditional "information sources" available to help visitors explore further once their curiosity is picked.

**In my view, science centres could learn from this combination: they are usually very good at raising visitors' interest – but often they fail to provide ways of exploring further and gaining deeper understanding.**



**ÀGUEDA GRAS-VELÁZQUEZ**  
SCIENCE PROGRAMME  
MANAGER

EUN, Brussels (Belgium)

**ELINA JOKISALO**  
COMMUNICATIONS  
OFFICER

EUN, Brussels (Belgium)

**What is EUN?**

In brief: the European Schoolnet brings together 30 Ministries of Education across Europe. We aim to bring innovation in teaching and learning to our key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. We act as a platform of exchange. We organise events and teacher trainings, run school pilot projects, disseminate best practice...

**We're doing this interview at your office in Brussels, seating on beautifully designed wheel-around chairs in what you call the "Future Classroom Lab". What is it?**

The initiative behind the Future Classroom Lab started in January 2011 when we decided that we wanted to have a physical space to test and demonstrate the innovative teaching practices resulting from many of our pedagogical projects and technologies that can support these practices.

This is a space where teachers, policy makers and industry partners can come together and experiment with pedagogical ideas and technologies "for real". We organise teacher training workshops, seminars with industry partners eager to pick teachers' brains, advocacy sessions...

When running workshops, we insist on take-away messages and practices that can be implemented also in low-tech classrooms. Perhaps you don't have the budget to buy the latest modular furniture, but you could involve your students in re-arranging desks in the classroom...

**Personalisation, soft skills, creativity... this will sound very familiar to the science engagement community. We are asking similar questions and experimenting with similar tools – what do you think we can learn from each other?**

We can certainly exchange on questions like engagement, inspiration, motivation... more than ever, learners are asking: "What do I get out of it? Why should I listen to you (or press your button) when I can just google it?"

**Schools have traditionally rather neglected space and furniture design – something science centres and museums have a lot of experience with.**

Science centres are also rather good at sparking interest – but often could learn from teachers about learning sequences and how to avoid push-button pitfalls.

Another common question is the role of humans in our increasingly high-tech learning environments. Teachers are changing from "preachers" to "facilitators" or "mediators": they are not expected to know everything anymore (any student armed with a smartphone will "beat" them on pure facts), but rather to help students grasp tools, go through sequences, analyse experiences, work together, express ideas...

**What about explainers and guides? How do they view their role in the age of the ubiquitous encyclopaedia?**

**Around us, we see different classroom areas called "Exchange", "Develop" or "Create". A lot of screens: laptops, interactive whiteboards, a Chroma Key set, tablets, what looks like voting pads... and modular furniture on wheels, not to forget a small amphitheatre laid with artificial grass and some bright red giant bean bags. What do they say about the classroom of the future?**

As your readers will know, there is a lot of pressure on the school education to meet the challenges of an ICT-immersed society and to support developing skillsets the young should have. The teaching practice needs to be ready for these challenges and evolve. One tendency is to move towards personalised learning, acknowledging students' different learning styles and levels. Competence-based approaches are becoming significant instead of just handing down knowledge. Teaching collaborative processes, information search and analysis, creativity, self-expression is already needed... in short, skills for the 21st century.

**There are indeed a lot of devices around us, but technology should not dictate teaching practice – it's the other way around.**

We always start by defining learning objectives before picking the right tool. Many of them can be used to serve different goals. Interactive LED screens disseminated throughout the room act as wonderful presentation tools for the teacher, but also turn out to be a valuable collaborative means for students. Tablets take on a double role, too: they are both great personal learning devices and collaborative device allowing pupils to share information.



**ELEONORA PANTANO**  
POST-DOCTORAL RESEARCH  
FELLOW AND RESEARCHER

University of Calabria (Italy) and  
Technical University of Eindhoven  
(Netherlands)

**Could you briefly introduce your research?**

I am a post-doctoral research fellow at the University of Calabria (Italy) and a researcher at the Technical University of Eindhoven (the Netherlands). I hold a Master's Degree in Business Engineering and a Ph.D. in "Psychology of Programming and Artificial Intelligence". My research activities explore marketing management and mainly relate to consumers' attitude and acceptance towards new technology-based retail settings. I also look at how business and retail models are implemented in terms of innovation and technology management.

**At the University of Calabria, you set up and evaluated an "immersive retail environment". What is it?**

**Immersive retail enriches physical stores with interactive technologies in order to extend services offered at the venue.**

We set up an experimental clothes shop combining a "traditional" layout and a multiple screen experience in which customers armed with a data glove could navigate a virtual shop, going up and down floors, browsing through lines, manipulating clothes etc.

Immersive stores offer a double advantage: to the consumer on the one hand, by providing a fun, unexpected and entertaining shopping experience. The tangible store still exists, but is enhanced to offer different surfaces, a better layout, and a larger choice of products. On the other hand, it is also very helpful to retailers, who benefit from precise data on their customers' shopping behaviour. They can better pick their visitors' interests and target their

buying patterns. It saves them physical space – and thus money – too.

We intentionally picked a test audience that tends to avoid “physical shopping” these days: young males aged 20-26. Our evaluation showed that immersive retail did heighten their intention to purchase goods.

**How do you convince consumers to bother with a visit to a physical shop when one can shop online while waiting for the bus – or chilling out at home?**

We found two main motivations when studying our young males sample. First, the excitement of discovering new experiences (here, the glove interface and the virtual shop). Second, the fun and social aspect: young generations do still value physical interactions.

**Interestingly, research shows that virtual shopping environments do not make shopping assistants redundant.**

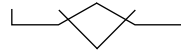
Their role has changed, though: they sometimes help customers use technology, but most of the time they ensure a “reassuring physical presence”. Shoppers want to see that they are available – even if they don’t ask them for help.

**So these could be motivations for a science centre or museum visit too?**

Absolutely. Interestingly, my work on immersive retail is directly inspired by a pilot I ran for Calabria’s cultural heritage promotion. We had set up a virtual museum to attract young audiences to archaeology. So in this case retail very clearly learnt from heritage and museums techniques!

**Generally speaking, I think that the retail industry, tourism or education all face similar challenges: users demanding personalised, fun experiences – and needing convincing when it comes to attending a physical venue.**

We all know that knowledge transfer – I see the desire to purchase as the result of a knowledge transfer – is more efficient when it is fun or exciting.



**KARI GJESTRANG**  
CEO

Expology, Oslo (Norway)

**As an exhibition design agency, you work for a diversity of clients. Is conceiving an exhibition for a science centre or museum different from remodelling a company’s public lobby?**

Yes and no. We always start with the same question: what are clients trying to do? What kind of experience will allow us to engage the target audience with the subject at hand? We have a backbone: Confucius’ famous saying “I hear and I forget. I see and I remember. I do and I understand”. The more senses involved, the better.

**I’m convinced that people these days expect richer and more participative interactions, not just in science centres but also in their work environments or at the supermarket.**

So we start with the same questions, regardless of whom we work for. The answer to these fundamental questions, however, is unique to each project. Even when clients approach us asking us to reproduce one of our exhibits they have seen somewhere else and liked, we go one step back and take the time to define the projects’ objectives and target audiences.

**Do you sometimes use interactive science centre-type tools in completely different contexts?**

I would be cautious in labelling interactive experiences as “science centre type”. I would say that there is a trend towards more interactive and more personalised experiences in a lot of sectors. Because of their history, science centres are perhaps more receptive than other fields and better equipped to provide such experiences.

## GOING FURTHER

- Berlin Central and regional library: [www.zlb.de/en.html](http://www.zlb.de/en.html) and “Welt der Sprachen” project page: <http://www.zlb.de/ueberuns/presse/die-zlb/die-welt-der-sprachen-in-der-humboldt-box.html>
- Expology: [www.expology.no](http://www.expology.no)
- European Schoolnet: [www.eun.org](http://www.eun.org) and Future Classroom Lab website: [fcl.eun.org](http://fcl.eun.org)
- Pantano E., Servidio R. (2012), “Modeling innovative points of sales through virtual and immersive technologies” in *Journal of Retailing and Consumer Services* Vol.19.
- Pantano E., Timmermans H.J.P. (2011). *Advanced Technologies Management for Retailing: Frameworks and Cases*. Pennsylvania, USA: IGI Global. Edited volume. Can be bought online at <http://www.igi-global.com/book/advanced-technologies-management-retailing/49571>

**You can work on engagement in a lot of different settings. For instance, we “designed” several editions of a conference gathering stakeholders involved in the Norwegian health system reform.**

We created a series of tools to make participants active: simple low-tech solutions such as tailored placemats or discussion spaces, combined with more high-tech solutions like digital voting pads.

We sometimes take the principles of very common science centre exhibits and use them in different settings like corporate venues – but the contrary is true, too. For instance, we developed a social learning game about journalistic techniques for a newspaper and later used the same “backbone” in a science centre to bring scientific methods closer to audiences. I call this cross-fertilization.

**As a design agency, you often “navigate” between very different clients – are these different worlds porous?**

We try to contribute to it! Like many design agencies, cross-disciplinary is in our nature. Internally, we make very different professionals meet: content developers, architects, 2D designers, 3D scenographers, multimedia developers, graphic designers, designers, front-end programmers – and of course clients, often first-time buyers, who have to actively contribute to the process to reach a successful concept.

**We decided to go further: each year, we hold a clients’ forum. People coming from different horizons put their heads together to discuss questions they are all facing – or save precious time in not duplicating already existing research.**

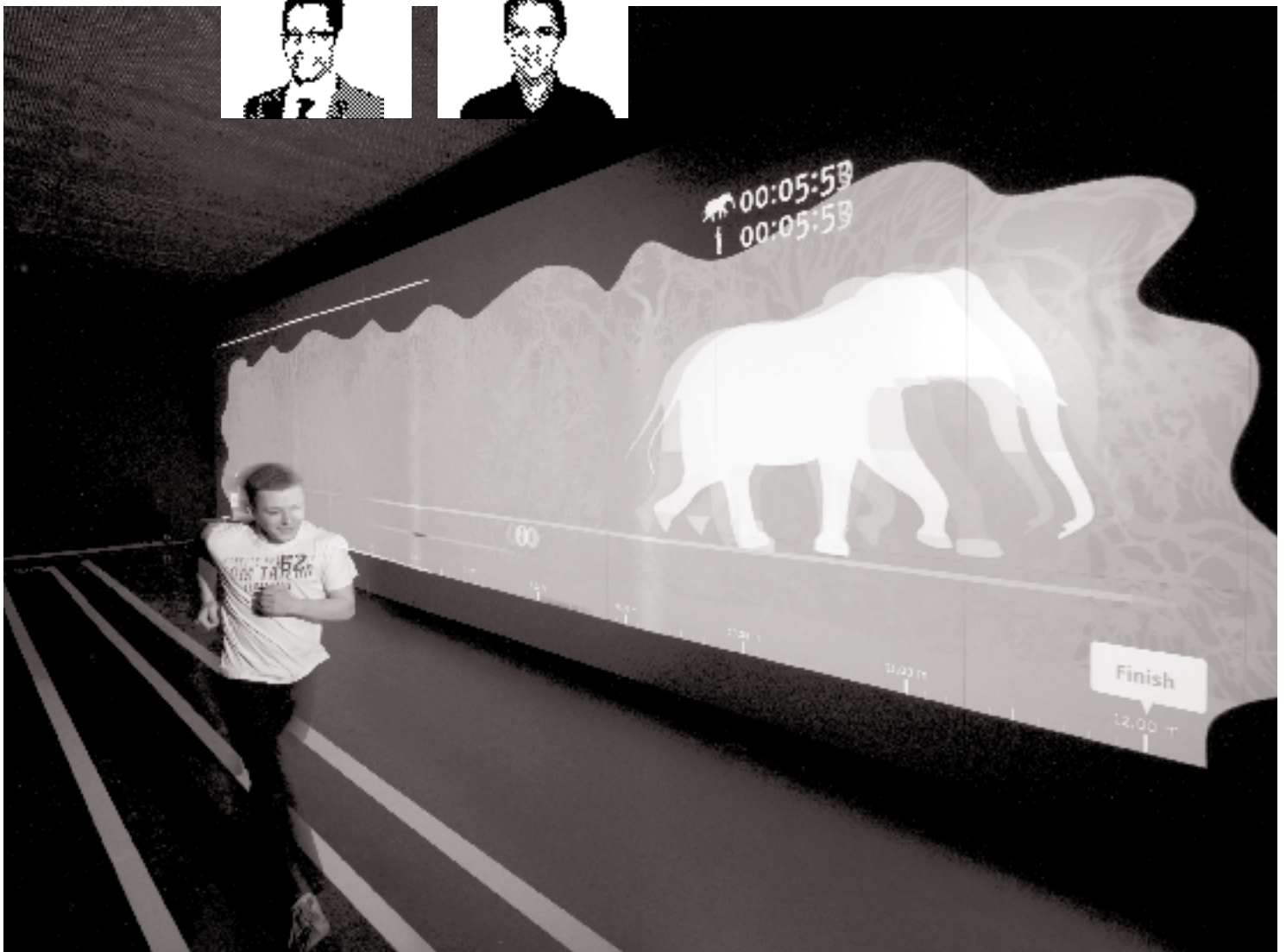
CHIEF OPERATING  
OFFICER,  
SCI-BONO DISCOVERY  
CENTRE,  
JOHANNESBURG  
(SOUTH AFRICA)

HEAD OF CONCEPT  
AND CONTENT,  
STUDIO KLV,  
BERLIN (GERMANY)

MICHAEL PETER

CHRISTOPHER GARTHE

Actively learning about species leads to a better understanding of interconnections in natural systems. Here at Dynamikum Science Centre, Pirmasens (Germany).



# Engagement for a sustainable future

## EDUCATION FOR SUSTAINABLE DEVELOPMENT AS A CONCEPT FOR SCIENCE CENTRES AND MUSEUMS

**Currently, the world is experiencing multiple crises. Every day we hear news about financial instability, peak oil, effects of climate change and biodiversity loss. In addition, more than 2.6 billion people live in abject poverty, and the gap between rich and poor continues to increase. The concept of sustainable development offers viable approaches to tackle these global challenges.**

However, sustainable development is dependent on the collective actions of citizens and these actions can only be influenced by education<sup>1</sup>. Through education citizens will be enabled to address the complex challenges of the 21st century. As proponents of innovative education programmes, science centres and science museums can play a central part in this educational process. Thus, the Mechelen Declaration<sup>2</sup>, signed by Ecsite and other international networks at the Science Center World Summit 2014, articulates the goal that science centres and museums are committed to taking “actions that have a positive global impact and that will make people everywhere more aware of the opportunities that science and technology hold for the sustainable advancement of humankind”.

There are numerous ways in which science centres and museums can contribute towards this sustainable advancement, e.g. by improving the energy efficiency of their buildings or by using recycled materials when constructing new exhibitions. But apart from these technical issues, sustainable development can be at the core of the visitor experience and the educational programmes of science centres. To further look into the connection between sustainable development and science centres, the concept of education for sustainable development has to be discussed in more detail.

[1] cf. United Nations Conference on Environment and Development (1992): *Agenda 21: programme of action for sustainable development. Rio declaration on environment and development*, Rio de Janeiro, Chapter 36.

[2] Read the whole Mechelen Declaration at: [www.scws2014.org/home/mechelen-declaration](http://www.scws2014.org/home/mechelen-declaration)

### Education for sustainable development in science centres and museums

According to the UNESCO, Education for Sustainable Development (ESD) is far more than including sustainability issues in different learning contexts, or teaching the science behind the global challenges. ESD aims at fostering the competencies and values that will lead to the transition to sustainable development<sup>3</sup>. These competencies should enable people to (i) solve complex problems which come with the global challenges, (ii) make collaborative decisions in order to shape their future and (iii) develop life styles which contribute to a sustainable development.<sup>4</sup> ESD is also about values and the main value of ESD is respect: respect for other people, for the environment, for the planet.

Science plays a crucial role in reaching that sustainable future, because science

can not only provide an understanding of sustainability but also an understanding of the basic principles, values and lifestyles that are necessary to shape a sustainable future. Over the last ten years the goal of the UN Decade of Education for Sustainable Development was “to integrate the principles, values and practices of sustainable development into all aspects of education and learning”<sup>5</sup>. This obviously includes science centres and museums. So, what role does ESD play in science centres and museums today?

Science centres and museums occupy a unique space in informal learning and advocacy. Many science centres around the world are addressing global challenges and exploring sustainability as a relevant topic for exhibitions - but as it was argued ESD is more than that. Most science centres are still struggling with the challenge of delivering



**EDUCATION FOR SUSTAINABLE DEVELOPMENT IS MORE THAN LEARNING ABOUT GLOBAL CHALLENGES AND THEIR SOLUTIONS.**

Community gardening as science project with a problem solving capacity. Community Garden Project in Soweto (South Africa).

ESD, i.e. equipping visitors the necessary skills, changing their values, influencing their behaviours and life styles. So the question is: how can we achieve this? What are the specific strengths of science centres and museums and how can we use them to have a meaningful impact?

### Implementing Education for sustainable development

To successfully promote competencies necessary to solve the complex future challenges, science centres and museums will not only focus on what their visitors are taught at a specific exhibit but rather on how they are learning and interacting. Out of numerous competencies which are proposed within ESD<sup>6</sup>, science centres are specifically suited to (i) encourage interdisciplinary thinking and imagining future scenarios, (ii) learning participatory skills to deal with and decide in complex situations as well as (iii) change behavioural patterns of visitors. These competencies can be learned by using different approaches – and every approach is not specifically linked to only one competency. Interdisciplinary and systems thinking can be

seen as a central knowledge to understand global problems and future scenarios. It can be learned by using investigative methods that encourage visitors to seek relevant research and information, discover relationships within systems, and contribute by doing their

**HOW CAN SCIENCE CENTRES FOSTER COMPETENCY-BASED LEARNING?**

own investigations and drawing their own conclusions. Interdisciplinary thinking could be ideally learned by conducting problem solving projects set up to address sustainability risks within the community. One example is the Scienza Science Centre in Pretoria, South Africa

[3] cf. [www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development](http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development)

[4] cf. de Haan, G. (2006): “The BLK ‘21’ programme in Germany: a ‘Gestaltungskompetenz’ based model for Education for Sustainable Development”. *Environmental Education Research*, 12/1, pp. 19-32.

[5] [www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/mission](http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/mission)

[6] cf. e.g. de Haan, G. (2006): L.c.; UNESCO (2006): L.c.

that has been involved in a number citizen science<sup>7</sup> projects like “MammalMap”, which promoted a greater knowledge of environmental systems and a sense that the individual can contribute to a sustainable development.

To deal with complex problems, collaborative decisions are often necessary. Thus, participatory skills are an essential competency. By using deliberative methods, participants are encouraged to express their own views and values and enabled to shift to a new view. These methods of social learning comprise discussions, learning groups and debates. The goal of the FUND project and the game PlayDecide

was specifically to facilitate the take-up of participatory methods. The resources are still available online in many languages and on many subjects including Climate change at [www.playdecide.eu](http://www.playdecide.eu). Such approaches also aim at achieving active communities with common concerns. Thus,

science centres have embarked on outreach programmes and are contributing to concrete community work. One of the many examples is the Miami Science Museum in Florida, USA, which uses not only science center exhibits but also social media and land art to engage volunteers to restore coastal habitats. Another example is the Johannesburg City Parks Science Centre that has embarked on a tree planting programme, which is also aimed to address poverty alleviation by planting fruit trees.

When talking about the path to a sustainable future, it is obvious that the personal behaviour is a key factor in the equation. Science centres can support behavioural change by using experiential learning such as role plays and games. These are useful as they enable participants to see things differently and visitors have the opportunity to ‘rehearse’ new behavioural patterns. As a special type of games, serious games are



an educational tool which is regularly used in science centers. There are an increasing number of serious games about sustainable development issues<sup>8</sup>, including “EnerCities” dealing with Sustainable urban development, “Clim’way” on Climate change management or “Catchment Detox” about water management.

### Barriers and challenges

The science centres and museums that started initiatives to implement this new approach know this: ESD comes with many challenges. One challenge is to make topics relevant to visitors. Sustainability is broad and all encompassing. Thus, it is essential to make topics and problems relevant not only at a local level but at a level that relates to visitors’ everyday lives. Another challenge is the demand that visitors should learn competencies, though this is difficult as the visit to a centre or a museum is somewhat time-limited.

And can science centres and museums really claim to change the behaviour of visitors? One participant of the national conference marking the end of the Decade on ESD held in September 2014 in Bonn, Germany, summed it up frankly: “Institutions like science centres and museums

often struggle with incorporating the latest didactic concepts. Thus, the complex concept of ESD seems to be too difficult to implement”.

## HOW CAN SCIENCE CENTRES SUPPORT VISITORS TO CHANGE THEIR BEHAVIOUR?

Community Garden Project in Soweto (South Africa).

## ESD IS A COMPLEX CONCEPT WITH MANY CHALLENGES FOR THE IMPLEMENTATION.

[7] cf. for an introduction into citizen science see Hand, E. (2010): “Citizen Science: People Power”. *Nature* 466, pp. 685-687

[8] cf. for an overview of serious games about sustainability see Katsaliaki, K. (2012): “A survey of serious games on sustainable development”. *Proceedings of the 2012 Winter Simulation Conference*. Berlin, pp. 1-13.

### Ways to move forward

As UNESCO advocates, in the context of ESD, science “should be regarded broadly to include social sciences as well as natural sciences”<sup>9</sup>. Science centres are challenged to embrace this broad understanding and incorporate more social science research into their exhibitions and programmes. This integration of social sciences also shows the need for a truly interdisciplinary team and approach in centres and museums. At the interface of research and public, science centres can also act as stakeholders in transdisciplinary research<sup>10</sup> and facilitate citizen science projects. By making these activities an important aspect of the programme, science centres could contribute hugely to the cause of ESD. Thus, a growing number of science centres make sustainability their key topic, e.g. the Crystal in London, UK or the Klimahaus in Bremerhaven, Germany<sup>11</sup>.

Regarding the whole science centre field, Charles Hopkins, UNESCO Chair for ESD, underlines: “Strategizing with science centres and museums for ESD for a more sustainable future could be very powerful”. So how could this be done? A first step might be to bring together all science centres and museums who are interested in this approach. Although the Nature Group has lead discussions on the topic, the establishment of a fully-dedicated Ecsite working group on ESD could be one way to achieve this.

We are convinced that, although the UN Decade on ESD ended in 2014 without significant involvement of the science centre field, it might just be the right time to strengthen the cooperation. UNESCO is following up the Decade by drafting a Global Action Programme on ESD<sup>12</sup>. It is the responsibility of the science centre community to get involved in the Global Action Programme not only to benefit from the UNESCO activities but to show their importance in the field of ESD, to put the Mechelen Declaration into action and to contribute to the sustainable future that we wish to create for future generations.

**THE SCIENCE CENTER  
COMMUNITY  
NEEDS TO GET  
INVOLVED IN  
THE GLOBAL ACTION  
PROGRAMME ON ESD.**



[9] UNESCO (2006): *Framework for the UN DESD International Implementation Scheme*, Paris, p. 17.

[10] cf. for an introduction into the concept of transdisciplinarity see Hirsch Hadorn, G. et al. (2008): *Handbook of Transdisciplinary Research*.

[11] For more information about these institutions visit [www.thecrystal.org/exhibition.html](http://www.thecrystal.org/exhibition.html) and [www.klimahaus-bremerhaven.de/en](http://www.klimahaus-bremerhaven.de/en)

[12] Find the proposal of the Global Action Programme at: <http://unesdoc.unesco.org/images/0022/002243/224368e.pdf>






---

Discovering characteristics of animals is a first step in designing protection activities within the community. Here at Dynamikum Science Centre, Pirmasens (Germany).

---

#### Connect with the authors

**Michael Peter** is Chief Operating Officer at Sci-Bono Discovery Centre in Johannesburg, South Africa ([www.sci-bono.co.za](http://www.sci-bono.co.za)). He is also the recent Chair of the Southern African Association of Science and Technology Centres (SAASTEC). Michael has a keen interest in ESD and has been encouraging the science centres in the SAASTEC network to engage more in activities around ESD.

Michael has delivered conference papers on ESD at the SAASTEC Conference in 2013 and at the Science Centre World Summit in 2014.  
*[Michael.Peter@sci-bono.co.za](mailto:Michael.Peter@sci-bono.co.za)*

**Christopher Garthe** is Head of Concept and Content at the creative agency studio klv in Berlin, Germany ([www.studioklv.de/en](http://www.studioklv.de/en)). He is specializing in Education for sustainable development and has worked on various projects dealing with sustainability issues including an interpretive canopy walkway in Ghana, a visitor centre on agriculture, food and health in Luxemburg and a science center which covers biodiversity issues in Germany.

Christopher has organized and spoken at a session on ESD at Ecsite conference in 2013 and organized and convened a session on ESD at the Science Centre World Summit in 2014.  
*[christopher.garthe@gmx.de](mailto:christopher.garthe@gmx.de)*

## Putting concepts into practice: Nausicaá, Boulogne (France)

Nausicaá is more than an aquarium – much more. Since its opening, its aim has been to foster a more sustainable use of the ocean; after its active participation in the 1998 international Year of the Ocean, Nausicaá was named “Centre of Excellence for Marine Education” by the International Oceanographic Commission / UNESCO.

When the idea of the Decade of Education for Sustainable Development was first discussed in 2002, Nausicaá not only supported this idea, and participated in the initial planning, but also fully endorsed its principles: to learn about and deepen awareness of environmental issues, to reflect on our modes of living, shifting these toward sustainability, to empower people to take concrete actions to resolve the environmental challenges they face.

With the first exhibit on Ocean and Climate in 2003 and the new one to be open in 2015, Nausicaá shows the links between our daily lives and global issues; the “Environment Friendly House” is an interactive exhibition engaging the public to change their consumer habits in order to reduce pressure on the Earth's natural environment and climate. Since 2010, the Mr. Goodfish programme aims to sensitize the general public and the seafood industry professionals about the sustainable consumption of seafood. On an international scale Nausicaá is a founding member of the World Ocean Network whose objective is to inform, mobilize and encourage everyone to act for the sustainable use of the ocean.

[www.nausicaa.co.uk](http://www.nausicaa.co.uk)

# Spreading the words



GEMA REVUELTA  
Gemma.revuelta@upf.edu



This journal defines itself as “a new voice in discussions worldwide about science, its history, material culture, communication and presentation in museums”, inviting readers to join the conversation.

Although the wheel was one of the greatest achievements of humanity, it is of course a bad idea to invent such wheel over and over again. The publication of results, either through a book or a journal, has helped the scientific community learn from other people’s experiences and has enabled the advance of knowledge. In the field of science communication, or in the broader “science and society”, there is a growing demand to publish and share results, learn from others’ experiences in order to not repeat the same mistakes again. That is exactly what we want to promote in this new section of *Spokes*, in which we will regularly review books and journals addressing our readership’s interests: science communication, public engagement, museology, science and society in a broader sense, etc.

## The Science Museum Group Journal

We will start this new section with a review of the *Science Museum Group Journal* (SMGJ) because of its singularity and specificity for our readership and because of its young age (its first issue was launched in Spring 2014). The name of the publication should not lead into thinking that it limits its content to the work done by the Science Museum Group from the UK. On the contrary, it specifically encourages contributions from international scholars with different perspectives and experiences to share.

SMGJ is a double blind peer reviewed journal whose target audience are academics, students and museum professionals across the range of disciplines relevant to science museology (for example, science commu-

nication, history of science, history of film, photography and television, conservation, informal learning etc.). Another feature of this journal is that it can host different kinds of media (including video, audio, and high resolution colour images) in a fully open-access format. Authors publishing on it can freely use images from the “Science and Society Picture Library” ([www.scienceandsociety.co.uk](http://www.scienceandsociety.co.uk)).

This journal defines itself as “a new voice in discussions worldwide about science, its history, material culture, communication and presentation in museums”, inviting readers to join the conversation. Considering the authors that write for it and the topics addressed, it is clear that the journal makes an important effort to become -an exchange platform between academics and practitioners. SMGJ is published twice yearly. To date, two numbers have been published. Among its articles can be found, for instance, a piece on the Collider exhibition (focused on a visit to the CERN), “at a time when historical studies of scientific laboratories and museum reconstructions of spaces are subject to renewed interest”. Or a review on science communication in Latin America, right after the PCST international conference was held in Brazil.

**There is currently an open call for papers for the third issue of the Journal, which will be published in Spring 2014. The call is for papers on the topic of Communication (in all its multiple meanings, including science communication). The deadline for submission is the end of December 2014 (<http://journal.sciencemuseum.ac.uk/news/>).**



Light Walk



Compute-r-evolution



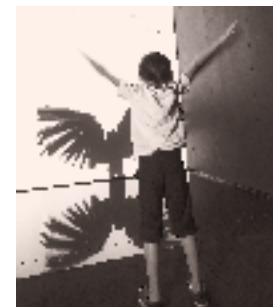
Sex: a tell-all exhibition



Numb3d by numb3rs!



Your body works hard!



Digital revolution



### Light Walk: Bob Miller and the Exploratorium

San Francisco Public Library (United States)

→ Until 5 February 2015

In celebration of the 40th anniversary of the Exploratorium's Artist-in-Residence programme, the museum presents a dynamic investigation of the work of artist Bob Miller, a self-titled "natural philosopher" and author of many of the Exploratorium's most iconic exhibits about light, color, and shadow. "Light Walk" includes papers, letters, photographs, and objects that illuminate Miller's methods of inquiry and spirit of curiosity. Through the lens of Miller's work the spirit and history of the Exploratorium's pioneering Artist-in-Residence programme — which for 40 years has actively integrated the perspectives and values of both art and science — is revealed. [www.exploratorium.edu](http://www.exploratorium.edu)

Picture: © Exploratorium

### Compute-r-evolution

NOESIS – Thessaloniki Science Center and Technology Museum (Greece)

→ Until March 2015

The exhibition is about the historic evolution of computers, from the first forms of ancient computing devices such as the abacus and the Antikythera mechanism, till the modern computing systems, as well as the history of game consoles from Brown Box and Odyssey, till PS4 and Xbox One. That way adult audiences, besides being emotionally involved with the exhibits, will realize the speed of technological

progress, while children expand the boundaries of their interest in science, technology and their applications. This exhibition is organised in collaboration with the "Thessaloniki Retroclub" team. [www.noesis.edu.gr](http://www.noesis.edu.gr)

### Sex: l'expo qui dit tout / Sex: a tell-all exhibition

Montreal Science Centre (Canada)

→ Until 8 March 2015

The questions teenagers have about sexuality are as legitimate as they are diverse. "Sex: a tell-all exhibition" responds to the main concerns that young people - and not-so-young people - may have about sexuality in a positive, frank and respectful manner. Aimed at visitors over 12 years old, it is structured into five themed zones – "My origins", "Me", "Me and you", "Me and others", and "My point of view" – and answers over 100 basic questions through 50 interactive games, videos, and original multimedia productions. This innovative exhibition was developed with the help of respected specialists (sexologists, doctors and scientists), teaching experts, parents, and teenagers, and received prizes from the Canadian Association for Science Centres and the Quebec museum society. [www.montrealsciencecentre.com](http://www.montrealsciencecentre.com)

### Diamo i numeri! / Numb3d by numb3rs!

Casa Serodine, Ascona (Switzerland)

→ 2 March - 26 April 2015

From fingers, through dices, to data: numbers underlie our everyday life in a profound, seemingly magic, way. This highly interactive exhibition talks about why we use numbers, how much they count when we gamble, where they are concealed in our everyday life. Through exhibits, simulations and augmented reality, the visitors are invited to play with numbers mainly without using formal mathematics, but through intuition and reasoning. It is an exhibition about the mathematical universe in which we live, a world made by natural shapes as well as hazardous bets and numbers generated by credit cards, internet, surveys, clinical

investigations... It is definitely an exhibition about us. [www.diamoinumeri.ch](http://www.diamoinumeri.ch)

### Trop fort ton corps / Your body works hard!

Le Vaisseau, Strasbourg (France)

→ Until 30 August 2015

The human body has so many skills that we don't have a clue about, but all of them are measurable. In this exhibition, which features 23 interactives produced by the Swiss science centre Technorama, visitors get to find out, among other things, how loud they can shout, how much air fits into their lungs and see if they're able to guess the length of 1 meter or 1 minute! While offering a fun discovery of this exceptional machine which is the human body, "Your body works hard!" also triggers some collective questioning and tackles the issue of normality and the positioning of oneself compared to others... An opportunity to discover, without taboo, our differences and our resemblances. [www.levaisseau.com](http://www.levaisseau.com)

Picture: © Jonathan Sarago – C667

### Digital revolution

Tekniska Museet, Stockholm (Sweden)

→ Until 30 August 2015

This interactive experience offers visitors exhilarating illusions and the opportunity to create works of art for all the senses. With the help of technology, everyone becomes a part of the exhibition. Visitors explore how art, music, film and video games have been inspired by, and continue to be developed by the use of, digital technology. Tekniska Museet invites them on "a revolutionary journey" which will take them from personal computers and simple video games of the 1970s, into the future. "Digital Revolution" is produced by Barbican Centre, London, with commissioning partner Google and is sponsored in Sweden by Samsung Electronics Nordic. <http://www.tekniskamuseet.se>

Picture: Chris Milk, *The Treachery of Sanctuary*, 2012, The Creators Project, a partnership with Intel and VICE. © Anna Gerdén, Tekniska Museet.



Mummies. Witnesses of the past



Beddy-byes



The Brain

### Momias. Testigos del pasado / Mummies. Witnesses of the past

Parque de las Ciencias, Granada (Spain)  
→ Until September 2015

Mummies are a direct window into the past and an important source of information for science. Who were the people behind the mummies we now have in front of us? A lot of information has been acquired by studying mummies often using the latest technology - information on the culture of extinct societies, past diseases, food, rituals, technology, etc., on which very few traces are left in archaeological records. The exhibition "Mummies, Witnesses of the past" features 50 mummies or original remains from 27 institutions, and 240 items: objects used for mummification, mummy scans, interactive displays, videos... displayed on over 1,600sqm. [www.parqueciencias.com](http://www.parqueciencias.com)

### Mon dodo / Beddy-byes

Le Forum départemental des sciences, Villeneuve d'Ascq (France)  
→ Until 15 November 2015

Through a number of manipulations, observations and games, this new exhibition allows children between the ages of 3 and 6 and their accompanying adults to discuss the (qualitative and quantitative) need for sleep, as well as the notion of cycle and the role of sleep in development. The children will observe that everyone, around them and around the world, sleeps, wonder how to know they are sleepy, try out different sleeping positions, identify situations with positive or negative influence on sleep, discuss sleeping rituals... The exhibition was prepared with the help of eight specialists of sleep and early childhood.

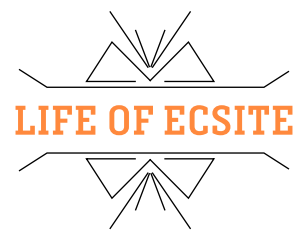
[www.forumdepartementaldessciences.fr](http://www.forumdepartementaldessciences.fr)

### Hjernen / The Brain

Experimentarium, Copenhagen (Denmark)  
→ Until March 2016

The travelling exhibition developed by Experimentarium in cooperation with Continium in Kerkrade (Netherlands) and Universeum in Gothenburg (Sweden) will be presented in Copenhagen until March 2016. "Use it or lose it!" is the motto of "The Brain" exhibition, which insists on the fact that the brain needs to be exercised, used and challenged – just like the body. Through "hands-on, minds-on" exhibits, it invites visitors to learn how to treat their brains right – for optimal functioning throughout life. It offers visitors a wide range of activities that will pull their brain out of familiar routines, shake it up, surprise it and challenge it to a vigorous mental workout. [www.experimentarium.dk](http://www.experimentarium.dk)

Please note that Experimentarium is presently located at a temporary address in the centre of Copenhagen, until renovation of its Hellerup venue is completed in 2016 (see website).



### NEW ECSITE MEMBERS

#### Upgraded to Full Member

Science Centre Netzwerk, Vienna (Austria)

#### Sustaining Members

MUSEKO, Tallinn (Estonia)

Breeze Creative Ltd, Bnei Atarot (Israel)

#### Associate Members

OSU Pythéas, Marseille (France)

RZSA – Royal Zoological Society of Antwerp, Antwerpen (Belgium)

ESO – European Southern Observatory, Garching bei München (Germany)

"Forum Science" Association, Sofia (Bulgaria)

North Carolina Museum of Natural Sciences, Raleigh (United States)

A. M. Qattan Foundation, Ramallah (Palestinian Territories)

AmbienteParco Impresa sociale srl, Brescia (Italy)

ICN2 – Institut Català de Nanociència i Nanotecnologia, Bellaterra (Spain)

Centro Ciência Viva do Algarve, Faro (Portugal)

### ECHOES FROM THE DIRECTORS FORUM

Hosted by the AHAA Science Centre in Tartu (Estonia) on 12-14 November, the 2014 Ecsite Directors Forum gathered senior managers of Ecsite Full member organizations. Four outstanding keynote speakers took the floor to explore this year's theme: "Downloading the future".



Toomas Hendrick Ilves



Cooking the conference



EU Commissioner C. Moedas with C. Franche (Ecsite) and J. Broerse (Vrije Universiteit Amsterdam)

Estonian President Toomas Hendrick Ilves painted his country's impressive vision for the future and outlined his enduring commitment to e-governance, putting digital technologies such as e-health at the service of citizens. Representing telecommunications giant TeliaSonera, Peret Mürk-Dubout then painted the portrait of an ultra-connected tomorrow, while Skype founder Jaan Tallinn outlined his current work on cyber-security and co-author of "The Idea Book" Teo Haren challenged participants to rethink their perception of their own creativity. Directors also took part in two "Ecsite strategic dialogues" – not to forget entertaining social events. Warmest thanks to AHHA for hosting this inspiring top-quality event.

### PREPARING FOR THE 2015 ANNUAL CONFERENCE

The 2015 Ecsite Annual Conference will be hosted by MUSE in Trento (Italy) on 11-13 June.

The programme is taking shape: at the beginning of November the Annual Conference Programme Committee selected 86 session proposals out of 168 submissions.

The Ecsite Business Bistro registration opened with great success, since about a third of the booths are already taken up. The social and commercial hub for the Annual Conference, located right next to the session rooms, provides a relaxed environment for meeting and doing business with science communication decision-makers. The remaining booths can be booked through Lucy Schweingruber at the Ecsite team ([lschweingruber@ecsite.eu](mailto:lschweingruber@ecsite.eu)).

Watch the news section of the Ecsite Annual Conference website: each month, Ecsite unveils the interview of a person involved in cooking up the largest science engagement professional event in Europe. Interviewees tell us more about their role, their take on the "Food for curious minds" conference theme and even their favourite traditional recipe.

[www.ecsite.eu/annual\\_conference](http://www.ecsite.eu/annual_conference)

### TWO HORIZON 2020 SUCCESSFUL PROJECT PROPOSALS

Two project proposals submitted with other partners under the Horizon 2020 framework have been given the green light by the European Commission.

The **SeeingNano** project will create novel visualisation tools for enhanced nanotechnology awareness. Social scientists, nano scientists and visualisation experts will collaborate to develop tools allowing different target audiences to "see at the nano scale" thus engaging with the breadth of nanotechnologies and the uncertainties and potential risks connected to them. A public repository of tools and best practices will be created. The project is coordinated by the Nanotechnology Industries Association. Ecsite's main task will be to manage the piloting, validating and launching of visualisation tools, carried out by five Ecsite members: Techmania (Czech Republic), Domus - Museos Científicos Coruñeses (Spain), Ustanova Hiša eksperimentov (Slovenia), Museo Nazionale della Scienza e della Tecnologia Leonardo da Vinci (Italy) and Pavilion of Knowledge - Ciência Viva (Portugal).

**EUSPACE-AWE** uses the excitement of space to attract young people to science and technology and stimulate European and global citizenship. The three-year-long project is coordinated by Leiden University (Netherlands) and aims to increase the number of young people that choose space-related careers. Different actions will be aimed at children, teenagers, teachers and policy makers and a repository of innovative peer-reviewed educational resources will be created. Ecsite will be in charge of dissemination to science centres and museums. Ecsite members Ellinogermaniki Agogi (Greece) and Ciência Viva (Portugal) are also partners, while Googol (Italy) and NEMO (Netherlands) will be involved as third parties.

### ENGINEER PROJECT WINS A SCIENTIX AWARD

The Engineer project supports the widespread adoption of innovative methods of science teaching and the introduction of engineering in European schools. Presented at the Scientix conference in Brussels on 25-26 October, Engineer won a Scientix award for the category "STEM teaching materials addressed to teachers". Ecsite was in charge of the project's advocacy and nine Ecsite members participated in testing pilot sessions. Resources for museums and schools are available online.

[www.engineer-project.eu](http://www.engineer-project.eu)

### ECSITE CONTRIBUTION TO "SCIENCE FOR AND WITH SOCIETY" CONSULTATION

Last summer the European Commission launched a consultation to inform the 2016-2017 "Science with and for Society" Programme (part of the Horizon 2020 funding framework). You will remember that Ecsite called for contributions from science engagement organizations – the resulting statements were submitted in October and can be read on the Ecsite website. We are now waiting to hear from the Commission when results will be made public.

### SCIENCE WITH AND FOR SOCIETY IN ROME - AND ON THE COMMISSION'S AGENDA

New European Commissioner for Research, Science and Innovation Carlos Moedas mentioned at length the Ecsite-led VOICES citizen consultation during a speech given at the Sis-RRI conference organized by the Italian presidency in Rome on 19-21 November (Sis-RRI means "Science, Innovation and Society: achieving Responsible Research and Innovation"). Through this pioneering project, citizens were able to contribute to defining the European research agenda. Moedas' interest for VOICES seems to indicate continuity in the



Philae landing countdown in Toulouse



An award for Tinker Imagineers

Commission’s support for the “Science for and with society” objective within the Horizon 2020 research framework – a programme dear to the science engagement community.

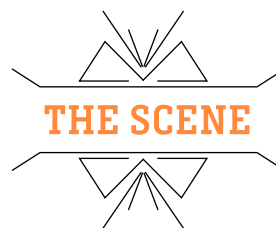
Speaking at the same conference, Ecsite Executive Director Catherine Franche suggested ways to make RRI projects funded by the European Commission more effective.

Alongside the conference, some of the artworks and objects produced during the Ecsite-coordinated KiiCS project were showcased at the MAXXI museum in Rome in the “Science Art Society” exhibition. A fitting showcase for a project that brought together artists, scientists and business representatives to generate innovation.

### PHILAE AND ROSETTA: LIVE AND KICKING WITH THE SPACE GROUP

On 12 November, Philae became the first robot to ever land on a comet. To celebrate this achievement with the public, 12 Ecsite Space Group members organised live events through which experts engaged audiences with comets and the European Space Agency’s Rosetta mission. Resources from the “Rosetta Kit” developed by the Ecsite Space Group such as the “Cook your own comet” activity and the “Comets and ESA’s Rosetta” exhibition met a great success – they are still available online. With the Philae lander’s mission complete, Rosetta will now continue its exploration, entering comet Tchouri’s orbit in 2015 and hereby reaching its closest approach to the sun.

[blogs.esa.int/rosetta](http://blogs.esa.int/rosetta) and [www.ecsite.eu/activities\\_and\\_resources/thematic\\_groups/space-group](http://www.ecsite.eu/activities_and_resources/thematic_groups/space-group)



### MOVEMENTS



**Brigitte Coutant**, Director of National and International Relations at Universcience (Paris, France) announced her retirement from Universcience for February

2015. Brigitte’s contribution was instrumental for the recognition of scientific culture in France and Europe and she has been a long-standing advocate of the science centre’s international role. She played a key role in the Ecsite network over the years: active from the organization’s very early days, she served successively on the board as Treasurer, Chair of the Annual Conference Programme Committee and Vice-President. She will remain involved in the field. “After more than 30 years dedicated to the creation of la Cité des sciences in Paris, to its national and international development, then, five years ago, to Universcience, I have decided to retire,” Coutant stated. “I feel privileged to have dedicated my professional life to this exciting, challenging mission: bringing science and technology into culture. The friendship of our field, the shared passion and conviction of the importance of scientific and technical culture for and with the public have created a unique and highly valuable spirit. We often compare our field to a family and I think it is true. We have to keep it. The creation of Ecsite has been an exciting adventure which I shared

with several pioneers. I feel proud of it. Since the beginning, I have accompanied the association in its growth. Today, thanks to the vision of its Presidents and Directors, to the commitment of the Board and of its members, Ecsite has become a key platform for science engagement in Europe but also worldwide. I wish the organization a great future, under the leadership of Catherine Franche and her team. I will stay available to share my experience and contribute to the development of the network.”

Ecsite Honorary Member Pr. Per-Edvin Persson commented on the news: “Brigitte Coutant is the Grand Lady of Ecsite - she was part of the La Villette team that originally proposed Ecsite in 1988, and has been with us ever since. It is inconceivable that she is about to retire - how young do they let them go in France? Brigitte has served Ecsite truly well, both officially and unofficially, on the Board and outside. I remember many meetings, from driving antique cars in Bavaria to feeding reindeer in Finnish Lapland. You cannot leave us! But if you do in spite of that, welcome to the silverback gang!”

**Michaela Livingstone** is leaving her position at the UK Association for Science and Discovery Centres (ASDC) mid-December. She acted as the Ecsite Space Group’s Communications Coordinator, responsible for the publication of the Space Group newsletter sent to members every second month. A warm thank you for this precious contribution. Michaela accepted a position at Oxford University, managing their Public Engagement portal.





IPC meeting



Spanish Science Centres and Planetariums meeting



Field Museum President at Parque de la Ciencias

### ECSITE MEMBERS RECEIVE LEADING EDGE AWARDS AT THE ASTC CONFERENCE

The 2014 Roy L. Shafer Leading Edge Awards were announced on 18 October in Raleigh (North Carolina, USA). They are presented each year at the annual conference of ASTC (the Association of Science-Technology Centres) "in recognition of extraordinary accomplishments in Visitor Experience, Business Practice, and Leadership in the Field that not only enhance the performance of their own institutions but also significantly advance the mission of science-technology centers and museums". Mikko Myllykoski collected the visitor experience award for the thought-provoking "Heureka Goes Crazy" mental health exhibition conceived by Heureka (Vantaa, Finland) in cooperation with Univescience (Paris, France) and Ciência Viva (Lisbon, Portugal). Erik Jacquemyn from Technopolis (Mechelen, Belgium) received the leadership award for his role as Chair of the Science Centre World Summit 2014.

### TINKER IMAGINEERS WINS FX DESIGN AWARD

The 2014 FX Design award for Museums and Exhibitions was announced on 26 November in London. Ecsite member Tinker Imagineers was chosen from a shortlist of 10 international candidates, for their design for the Dutch Silver Museum in Schoonhoven (Netherlands). The jury stated: "Lots of beautiful displays, all different yet hanging together and holding interest. Very clever, fun, nicely done, intriguing." "Winning prizes may not be the ultimate goal in life, but it certainly feels good!", reacted Joost van der Spek at Tinker Imagineers. "On our part we thank Leo van den Bogaert of the Unschooler Mind Company for making it all happen. And we thank the Dutch Silver Museum for the inspiring collaboration and their courage to truly do something new."

### PLANNING THE 2017 SCIENCE CENTRE WORLD SUMMIT IN TOKYO

Representatives of science centre networks from around the globe met in October at a meeting of the IPC (International Planning Committee) held during the ASTC conference in Raleigh, North Carolina (USA). Plans for the next Science Centre World Summit taking place in Tokyo in 2017 were discussed. The summit will be hosted by National Museum of Emerging Science and Innovation Miraikan. Current and past Presidents Rosalia Vargas and Robert Firmhofer represented Ecsite alongside Executive Director Catherine Franche.

### MORE SCIENCE, MORE CULTURE AND MORE EUROPE

Parque de las Ciencias (Granada, Spain) hosted the annual meeting of Spanish Science Centres and Planetariums' Directors on 26-28 November. It gathered Directors from Spain's and Europe's most important science centres and planetariums as well as Ecsite representatives with the aim of exploring new ways to boost the public's interest in science, under the motto "Más ciencia, más cultura y más Europa" ("More science, more culture and more Europe"). As announced in the previous issue of *Spokes*, the meeting also saw a step forward in the creation of a new Spanish science centre association: statutes were approved.

### LAUNCH OF NEW PORTUGUESE SCIENCE COMMUNICATION NETWORK

The Portuguese "Rede SciComPt" network is open to all engaged in activities related to science communication. Its creation was announced in November, building on the success of two conferences in 2013 and 2014. It aims to: promote science communication in Portugal; foster the sharing of professional experiences between science communicators; promote informed citizen participation in matters of science and technology; and organise an annual

organisation conference, SciComPt. Registration for associates is now open and a first General Assembly will be held in January in Lagos, Algarve during SciComPt 2015. [www.scicom.pt](http://www.scicom.pt)

### CIÊNCIA VIVA LAGOS WINS A CALOUSTE GULBEKIAN FOUNDATION AWARD

The Ciência Viva Centre in Lagos (Portugal) was recently awarded a €20,000 grant for the implementation of its "Saúde a 4 Tempos" project, as part of the Health Literacy Contest organized by the Calouste Gulbenkian Foundation. The contest funds projects promoting ways of acquiring, processing and understanding information in the field of health promotion. "Saúde a 4 Tempos" will be rolled out in the Algarve schools and in other regional institutions. Seasonal themes will be developed: the immune system and allergies in spring, skin and cancer in summer, mental health in fall or the flu in winter.

### PARQUE DE LAS CIENCIAS AND CHICAGO FIELD MUSEUM WORKING ON COLLABORATION AGREEMENT

Parque de las Ciencias (Granada, Spain) and the Field Museum in Chicago (USA) are working on a collaboration agreement for future international projects. The news was confirmed by Richard W. Lariviere, President of the Field Museum, during a visit to Parque de las Ciencias at the end of September.

### CITTÀ DELLA SCIENZA LAUNCHES ARCHITECTURE COMPETITION FOR RECONSTRUCTION

Two years after the criminal fire that destroyed a large part of its premises, Naples-based science centre Città della Scienza (Italy) launched an international competition for the architectural planning of its new buildings. The competition was announced during a press conference held at the Strasburg European Parliament on 25 November.



New Tinkering Zone in Milan



Exploratório Ciência Viva in Coimbra



ESA's My Planet from Space

## NEW IN MILAN: TINKERING AND SPACE EXPLORATION

The Leonardo Da Vinci National Museum of Science and Technology in Milan (Italy) recently unveiled two new public spaces.

“Space exploration” meets the need of humanity to understand the unknown. This new permanent exhibition devoted to space and astronomy opened in the presence of two important astronauts: Claudie Haigneré (now President of Univescience) and Eugene Cernan, (the last man on the Moon). It focuses on the technology behind space missions, the research and life of astronauts and presents important original objects, such as part of the Vega launcher, the satellite San Marco, the Krechet suit designed for Russian cosmonauts, the reproduction of the International Space Station lab, and, last but not least, the Moon fragment brought back from the last Apollo mission. Tinkering is a way to explore, understand and change the world. Inspired by the Exploratorium’s Tinkering Studio in San Francisco, activities in the new “Tinkering Zone” engage visitors of all ages in highly personalized experiences, where individual creativity can challenge its limits. The space integrates tinkering, making, engineering and design experiences, to create an inter-disciplinary learning context. The physical setting becomes a fundamental stimulus for creative processes. Following the opening of the “Tinkering Zone”, begins a programme of activities for families and schools, teacher training programs and special events with artists and makers.

## A NEW GROWN-UP EXPLORATÓRIO CIÊNCIA VIVA IN COIMBRA

With the completion of its second stage, the Exploratório - Ciência Viva Centre in Coimbra (Portugal) now occupies a total surface of 4,000 sqm on the left bank of the Mondego River and offers – besides small specific exhibitions and other facilities – a new (house-made) exhibition

centred on the relations between basic science and health: “Keeping fit... with science”. The health sector offers a special context for science communication and science education which perfectly meets the strong attachment that the very ancient University of Coimbra (founded in 1290) bears to health and medicine.

## AT-BRISTOL'S NEW PERMANENT FOOD EXHIBITION

Looking for a preparation exercise for the 2015 Ecsite Annual Conference and its “Food for curious minds” theme? A visit to At-Bristol’s (UK) “Food” space opened last July could be what you need. The interactive exhibition offers visitors the opportunity to dress up like a bee and collect pollen, take a peek at diets from around the globe, converse with a robot chef or get their hands dirty in a fully functional experimental kitchen. To celebrate the opening, At-Bristol organised a Guinness World Records breaking activity: visitors helped create the world’s longest popcorn string (32,000 pieces and 320m long).

## ESA CREATES “MY PLANET FROM SPACE” EXHIBITION

The European Space Agency (ESA) produced the “My Planet from Space: Fragility and Beauty” exhibition to celebrate fifty years of European collaboration in space. It was realised in close partnership with the Italian Space Agency, the Italian Presidency of the Council of the European Union, the European Commission and Roma Capitale. Through satellite images and videos, the exhibition takes visitors on a journey to some of the most beautiful and remote places on Earth. This collection of images demonstrates the fragility of our planet and the challenges posed by climate change. Satellite eyes provide images of an ever-changing Earth: glaciers melting, sea levels rising, rainforests threatened by deforestation, growing desertification affecting croplands and uncontrolled urban sprawl.



## A CHALLENGE TO ALL: EMBEDDING RRI IN EXHIBITION MAKING

As you will have read in this issue, science engagement professionals, scientists and policy makers gathered in Rome on 19-21 November at the Sis-RRI conference organized by the Italian EU presidency. Sis-RRI means “Science, Innovation and Society: achieving Responsible Research and Innovation”. The definition of RRI is a topic in itself - participants in the RRI Tools project are currently busy with this very question (more on this in the next *Spokes* issue). For the purposes of this column let’s quote René von Schomberg for whom “Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the ethical acceptability, sustainability, and societal desirability of the innovation process and its marketable products in order to allow a proper embedding of scientific and technological advances in our society”. The European Commission identifies six pillars: “engagement, gender equality, science education, open access, ethics, and governance”.

I’m convinced that many science centres and museums have had an RRI-drive for a long time, involving multiple stakeholders in programmes, embedding multiple voices in narratives, experimenting with co-creation, creating spaces for dialogue between citizens and scientists...





Rosalia Vargas

A process reflected in the Mechelen Declaration signed last year during the Science Centre World Summit in Belgium: “Increasingly, science centres are moving beyond the traditional hands-on exploration of scientific phenomena. Many science centres are engaging with their audiences in the dialogues that address global challenges, and equipping them to become active players within their communities.”

I would argue however that RRI principles have been too often restricted to programmes targeted at adult audiences – I’d like to see more of us experimenting with RRI processes in exhibition making. We are seeing interesting examples like Città della Scienza’s new “Sea Horizon” exhibition (Naples, Italy) - which Maria Cristina Russo, Director of International Cooperation for Research at the European Commission, visited on behalf of the new European Commissioner for Research, Science and Innovation Carlos Moedas at the beginning of November. I am curious to hear from other pioneering projects...

**Rosalia Vargas**  
President of Ecsite,  
and Ciência Viva -  
Pavilion of Knowledge,  
Lisbon, Portugal  
Picture: © Ciência Viva

RRI Tools is a three year long project funded under the European Commission FP7 to foster Responsible Research and Innovation (RRI) in Europe with a view to a harmonious and efficient relationship between science and European society. The project is coordinated by “La Caixa” Foundation in Barcelona (Spain) and Ecsite is in charge of assessing the needs and constraints of RRI stakeholders. Several Ecsite members are also involved in the project. The Pavilion of Knowledge - Ciência Viva, in Lisbon (Portugal), is the European coordinator of the 19 hubs that are implementing this project in 30 countries in the European Research Area.

You will find EC member René von Schomberg’s 2013 RRI definition and many other resources on

[www.rri-tools.eu](http://www.rri-tools.eu).

Ecsite contact: Luisa Marino, Project Manager ([lmario@ecsite.eu](mailto:lmario@ecsite.eu));  
Ciência Viva contact: Carlos Catalao ([calves@cienciaviva.pt](mailto:calves@cienciaviva.pt)).

#### SPOKES EDITORIAL

**COMMITTEE CHAIR:**  
MAARTEN OKKERSEN,  
MUSEON, THE HAGUE,  
THE NETHERLANDS

**EDITOR:**  
JULIE BECKER,  
ECSITE, BRUSSELS, BELGIUM  
[COMMUNICATIONS@ECSITE.EU](mailto:COMMUNICATIONS@ECSITE.EU)

**MEMBERS:**  
NATHALIE CAPLET,  
CAP SCIENCES, BORDEAUX,  
FRANCE  
GEMA REVUELTA,  
UNIVERSITAT POMPEU  
FABRA, BARCELONA, SPAIN

SPOKES IS A PUBLICATION FOR ECSITE MEMBERS. SPOKES IS PUBLISHED BY ECSITE - ASSOCIATION EUROPÉENNE DES EXPOSITIONS SCIENTIFIQUES, TECHNIQUES ET INDUSTRIELLES, AISBL

**RESPONSIBLE EDITOR:**  
CATHERINE FRANCHE,  
EXECUTIVE DIRECTOR  
**FREQUENCY :** QUARTERLY  
ISSUE 6, WINTER 2014

**COPYRIGHT:**  
REPRODUCTION IN WHOLE OR IN PART OF ANY ARTICLE IN THIS MAGAZINE IS PROHIBITED WITHOUT PERMISSION FROM ECSITE.

**GRAPHIC DESIGN:**  
[WWW.KATEHOUBEN.COM](http://WWW.KATEHOUBEN.COM)

89/7 AVENUE LOUISE  
LOUIZALAAN  
B-1050 BRUSSELS, BELGIUM  
T +32 (0)2 649 73 83  
[WWW.ECSITE.EU](http://WWW.ECSITE.EU)



ECSITE THANKS THE WRITERS WHO HAVE GENEROUSLY CONTRIBUTED TO THIS ISSUE OF SPOKES.

#### ECSITE CORPORATE PARTNERS

ECSITE THANKS ITS CORPORATE PARTNERS WHO SUPPORT THE NETWORK'S ACTIVITIES. CORPORATE PARTNERS ARE DISPLAYED ON [WWW.ECSITE.EU](http://WWW.ECSITE.EU), IN SPOKES MAGAZINE AND AT THE ECSITE ANNUAL CONFERENCE.

**CONTACT:**  
[CORPORATE@ECSITE.EU](mailto:CORPORATE@ECSITE.EU) TO LEARN ABOUT PARTNERING WITH ECSITE OR TO BUY ADVERTISING SPACE IN SPOKES.

**ARCHIMEDES MOVING SCIENCE**  
[archimedes-exhibitions.de](http://archimedes-exhibitions.de)

**ASPIRED**  
[vatp.lv](http://vatp.lv)

**BRUNS INTERNATIONAL**  
[bruns.nl](http://bruns.nl)  
**EXHIBITS.NL**  
[exhibits.nl](http://exhibits.nl)

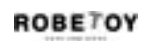
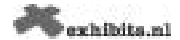
**EXPOLGY AS**  
[expology.no](http://expology.no)

**ROBETOY**  
[robetoy.se](http://robetoy.se)

**SKY-SKAN EUROPE GMBH**  
[skyscan.com](http://skyscan.com)

**SKYPOINT SRL**  
[Skypoint.it](http://Skypoint.it)

**TECHNIQUEST**  
[techniquet.org](http://techniquet.org)





The future “Earth Theatre” in Kerkrade (Netherlands) will project big data visualizations into the world’s first inverted planetarium. More on p.6.

---