

Bringing hard science to the public: A personal experience

Almost six years ago I came fresh from Munich University to the Deutsches Museum to install and run a research laboratory for nano-microscopy. I had never set up a lab before and my experience in science communication was virtually zero. Also, it had been years since I last visited the Deutsches Museum and knew nothing about current science in society debates. In short, it was sink or swim. Little did I know, this task would challenge and alter my perception of not only museums and science centres, but of science and research in general.

I started off by duplicating the instrumentation of our university labs. This was set up in an area separated from the public by a chest-high glass wall. We later developed a more comprehensive approach with information boards and interactive elements. The core idea, however, remained the same: scientists conduct their daily research work in full view of the museum visitors. One of my most memorable recollections during this time was a three-hour dialogue with an elderly couple covering nanotechnology, research, ethics and my personal opinions. The best part was that they returned the next day just to continue our conversation!

A lot has happened since these first tentative steps of taking hard science into the public arena. We were granted the EU project NanoToTouch (www.nanotouch.eu) in 2009 based on our experiences with this concept. Within this project similar laboratories have been established in Milan and in Gothenburg, in close cooperation with local universities. In this newsletter you will read about Hans-Christian Becker's experiences at the Universeum science centre. In addition, Morgan



Simple beginnings at the Open Research Laboratory - glass wall, instruments and a scientist

Meyer reflects, from a social scientist's perspective, on the processes of establishing such a lab.

Of course there are many other ways to present hard science in a museum or science centre, as many of you know better than I do. In contrast to our small-scale approach, the Natural History Museum in London has devoted a whole new wing to hard research. The main focus of the recently opened Darwin Centre is to openly present scientific work taking place in the museum. You can read more about their concept and first year experiences in Louise Fitton's article. From Milan, on the other hand, Maria Xanthoudaki relates the challenges of presenting chemistry to a diverse audience at the National Museum of Science and Technology Leonardo da Vinci.

Our own lab, much improved since its inception and home to a research group of about ten scientists, is well accepted by museum visitors. Yet the concept also offered unexpected benefits for researchers. Not only are they able to gain communications skills through daily dialogues with visitors, but this interaction also requires them to deal with the social and ethical aspects of their field and of science as a whole. This, in my opinion, is where hard science confronts the hard facts of reality on a personal level. And so, as guest editor of this newsletter, I invite you to read on...

**Paul Hix, Researcher and Project officer,
NANOTOUCH, Deutsches Museum and Guest
Editor of this issue of the Ecsite Newsletter**

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Nature and the urban environment

Chemistry: Is it really all Greek to me?

One of the many reasons why science centres and museums are valuable in society is to address misconceptions regarding 'hard science'. Is it labelled 'hard' because it is complex or because we believe that only a few of us can (or have the right to) understand it? The relationship between individuals, science and technology has been determined by misconceptions like these for a long time.

These misconceptions seem to have had, and continue to have, an impact on young people's performance at school, on their career choices, on the growth - or lack - of a sense of participation, a critical stance, or scientific citizenship in all of us when dealing with science and technology in everyday life.

Communicating 'hard science' is an important challenge for science centres and museums



A chemical solution on display in the i.lab

because the subject builds on a complex relationship between science and lay persons and on the ambitious goal to improve this relationship.

During the International Year of Chemistry, 2011, the National Museum of Science and Technology Leonardo da Vinci in Milan, Italy, opens a new permanent exhibition on the 'hard science' of chemistry. Interpretation and communication of the topic focuses on the specific case of the Basic Chemicals Industry. The project was funded by the Association of the Basic Chemicals Industry and was developed with the help of experts from the sector and from the field of chemistry.

The exhibition explores the role of the basic chemicals industry in contemporary society in terms of production, science, technology and development. The chemical industry - as well as chemistry itself - is an invisible actor yet integral to most of our needs, material objects and actions. The basic chemicals industry produces primary materials - most of which never reach the consumer - making its role even more imperceptible.

Our perceptions of the chemical industry, and sometimes chemistry itself, are based on the complexity of underlying scientific and technology-oriented notions.

The exhibition takes the visitor on a journey through the industry starting from the beginning of the chemical process (the sources), through their transformations into building blocks, then into intermediate products, to finally become the

everyday products we all use. Scenographical interpretation, real objects and active engagement are main features used to help visitors explore behind-the-scenes aspects of the basic chemicals industry: The '(hard) science of chemistry', the creation of molecules, reactions and transformations, and the work of professionals in the industry.

The exhibition aspires to be an active experience for visitors. The underlying notion is the relationship between chemistry, the basic chemicals industry and the general public - a relationship that encapsulates science, technology and society.

An explorative approach is integral to other exhibitions and education programmes at the National Museum of Science and Technology - this comes from the aim of enriching our knowledge-based society by encouraging scientific citizenship. Public knowledge of science and technology empowers citizens to navigate a knowledge-based society by building skills and competencies to develop an active stance.

Civil society, experts and citizens enjoy a dynamic community when they have access to reliable information and opportunities to explore, discuss and exchange. This kind of environment supports the fundamental aim of addressing the difficulties of young peoples' education in science, namely chemistry, which remains a challenge despite long debates, research studies and proposals for new teaching methodologies.

The International Year of Chemistry offers an additional boost to such objectives, policies and actions. The National Museum of Science and Technology has designed a year-long programme of activities to enrich its provision for schools, families and other audiences, and reinforce its role in science learning as well as encouraging public participation in scientific debate.

The Chemistry Interactive Lab (i.lab), created more than twenty years ago, is one of the museum's first 'active areas'. The exhibit was completely renovated five years ago - both in terms of space and learning methodologies. i.lab

engages visitors in an active exploration of chemical notions by allowing them to run experiments, observe phenomena and discuss processes, errors, results - all with the help of an explainer.

i.labs invite visitors to work on a question or problem individually or in groups and explore in an experimental way with the help of inquiry-based learning methodologies. Since being established, i.labs have been a powerful tool in visitors' learning. They complement the visitor experience in exhibitions and add a 'science centre flavour' to a collections-based science museum.

This year, the Centre for Research in Informal Education of the Museum (CREI©), is offering specific in-service training courses for teachers as part of its permanent provision for schools. Such provisions emerge from the needs of the field and respond to regular requests from teachers for support in training and classroom work.

CREI© was created to offer structured teacher support, through courses on science topics related to its exhibitions and i.labs, and in the use of inquiry-based methodologies in science teaching. The philosophy underlying these courses is that teachers are learners, educators (with competencies relating to teaching methodologies), and active researchers in an ever-developing profession. Teacher training therefore needs to address these three dimensions by identifying content, methodologies and guidelines that enable teachers to be active learners, understand their students' experience by experimenting themselves, and building the necessary confidence to implement new science teaching approaches in their own classroom.

By developing engaging personal learning experiences for teachers, we increase the possibility for change in the science classroom. This is especially true in the case of chemistry, but our experience shows that it is also true for other science or technology subjects.

Science is increasingly intertwined with our sense of belonging in society; social participation is dependent upon learning and making informed decisions, while also taking into account the economic, ethical, social and political aspects of an issue. This means that each and every one of us should be capable



Students working in the i.lab

and confident when addressing science-related issues and when asked to take a position on them.

Museums are, more than ever, settings where scientific knowledge is socially negotiated by different actors, but they are also institutions that can make a difference to empowering individuals in their role as informed and active citizens. The skills developed through museum learning, and the confidence gained by experts and civil society participating in this learning, create a two-way relationship between the scientific community and social elements

historically barred from access: citizens, economy and politics.

The International Year of Chemistry is an important opportunity to address once more the problem of 'hard science' from the point of view of a complex topic which is often invisible, yet highly integrated in our daily lives.

Dr. Maria Xanthoudaki
Director of Education
National Museum of Science and Technology
Leonardo da Vinci, Milan, Italy



Working in the i.lab

BACK!

At Ecsite 2010, 92% agreed they were interested in technology and solutions that strengthened contact with visitors

BUSINESS BISTRO STAND.17 LET'S TALK



Expology is an exhibition and experience consultancy that specializes in the development and design of experience-based learning exhibits and activities. In response to market demand and developments in the means of using a science center or museum, we have developed Expology Solutions. The main advantages of Expology Solutions are:

1. **For the visitor:** it enables visitors to create a personal profile to store, retrieve and share content experienced and created during a visit on social media or back at school.
2. **For the centre:** it allows management to supervise the exhibition - specific exhibits, multimedia applications and hardware. The system also allows for continuous content changes and is easily updated from an offsite computer.

Research between sharks and the rain forest

"Here, between the shark tunnel and the rainforest. That is where we will build the lab." Upon hearing this, my first thought was that this was the most ludicrous idea ever. No way could we set up a working research laboratory with delicate research instruments in what was effectively a humid passageway where the parents collected their kids before descending into the rain forest. I was wrong. Very wrong.

Work could begin after the lab was inaugurated at Universeum Science Centre in Gothenburg Sweden on 18 March 2010. As can be seen in the photo, the lab is divided into three parts. The flanks contain the research labs, which are encased in sliding glass windows. The middle portion is an open showcase where the researchers can interact directly with the visitors, and also perform small-scale demonstrations. For safety reasons, no part of the lab area is accessible to the public.

It turned out that the idea of having sliding windows was excellent. When we occasionally need privacy (at least as much as you can expect when working in a glass cage!) we simply close the windows, but most of the time we keep at least one pane open to allow for easy interaction with the visitors. My experience is that the difference between an open window and a closed one is significant; few people dare approach researchers behind a closed window.

By and large, the visitors fall into three categories. The first, which constitutes the overwhelming majority, look briefly at the information and perhaps sneak a peek into the lab before continuing to the next exhibition area.



Children work with a scientist in the Open Nano Lab at Universeum

The second group is significantly smaller-on a good day perhaps a dozen people-but what they lack in number they make up in interest. One of the most interesting aspects of these visitors is their surprisingly diverse background. I have talked to ten-year-old school kids, fellow researchers, teachers, retirees, and professionals of almost every kind. Many approach us scientists in the lab and ask spontaneous questions, and those approached by us eagerly enter discussions when asked if they are interested in learning more about our work. The third and final group is usually in a hurry. They all ask the same question: "Quick, which way to the restrooms?"

Most visitors have never heard about the kind of biological nanotechnology we are working with in the lab. Rather, they have come into contact with the "nanoparticulate" side of nanotechnology which has entered the

consumer market. Since there is little more in common between these two types of nanotechnology than the size of the particles/DNA strands, some verbal juggling is required to connect supermarket products with research going on in the lab.

It is sometimes a challenge to give a proper view of what fundamental research is, and, importantly, what it is *not*. I have often been asked what product or device my research is expected to produce and not all visitors are happy with the explanation that fundamental research does not necessarily lead to immediate product development. On the other hand, this is an excellent opening point for a discussion about how scientific research is done and what drives me, as a scientist, to do research. Interestingly, most people are fine with my tongue-in-cheek explanation that I do research because it is *fun*. Of course it is important to point out that the research going



Experimenting in the Open Nano Lab

on in the lab *does* have a goal and that it is the taxpayer's full right to know how their government spends money.

As the discussions with the visitors often gravitate toward more general issues such as research politics, legislation, and education, it is often difficult *not* to express personal opinions. I tend to speak candidly about such things, but I am very careful to point out that the opinions are mine and not those of my employer.

One source of confusion is that we in the lab work with nano-sized DNA constructs and one of the other exhibitions is a DNA forensics lab. Many, if not most, visitors make the instant (and obvious) connection between "DNA" and "genetics", which is a bit unfortunate as we are a physical chemistry lab and not a molecular biology lab.

However, it is usually quite easy to convince them that we can use synthetic DNA as molecular Lego building blocks to construct large DNA assemblies. In this respect it is to our advantage that almost everyone has some form of knowledge about DNA and base pairing.

After about one year, I would call the Open Nano Lab in Gothenburg a success. We have done exciting research, and we have talked to hundreds of people about research and research-related issues. I hope and believe that we have stimulated an interest in science

among at least a few kids who will grow up to be the top researchers of the next generation.

Dr. Hans-Christian Becker,
Department of Physical Chemistry,
Uppsala University, Sweden



Layout of the Open Nano Lab

Kevin Shahbazi is studying nanotechnology engineering at the University of Waterloo in Canada. During a visit to the Deutsches Museum he noticed the Open Research Laboratory. Fascinated by the concept of combining his field of study with public communication, he applied for an internship in the Lab.

Interview with Kevin Shahbazi

What expectations did you have about the work in the Open Research Laboratory?

That I would have an active and hands-on research role, where I could discover and learn about self-assembly and nanostructures in a social environment where I could learn German. I certainly had a job tailored to my expectations.

Is it really possible to conduct research surrounded by visitors?

Personally, I enjoy having people who are interested in my work nearby. Usually visitors are relatively quiet and respect our work and when questions are asked or presentations are given, it gives me a good opportunity to take a break and use a different part of my brain.

What importance did science outreach have before and after your work in the Open Lab?

Before working in the Open Research Lab, I didn't at all realize how much effort is put into science outreach or why it is important. This is funny because it's outreach efforts like those taken by the Deutsches Museum that resulted in my career choice. By working at the lab, I realized that science outreach is important in that it may spark a person's interest in science in ways that a classroom does not. Science is always a developing field, so the more people involved the merrier.

Do visitors ask questions or is it important for the researchers to initiate communication?

The majority of the time, visitors would quietly watch the researchers doing their work and perhaps comment amongst themselves. I think that it's part of the job of the researcher to keep an eye for visitors who may be too shy to initiate a conversation. That being said, I think exhibit layout and design is a big factor in how visitors interact with an exhibit.

How did you explain your scientific work in the lab?

To put my research simply, I used the analogy of Lego pieces for nanoscale semiconductors. I

explained to the visitors that in this lab using appropriate measuring tools, we were observing and understanding how very small structures self-assembled.

Did the way you explain your work change during your internship?

Through practice, I realized that "getting to the point" with my research right away was the most effective method to keep a visitor's attention and understanding. I quickly learned which details of my work to omit and developed a "pitch", leaving other information to be answered if the visitor showed interest or asked questions.

Which output did this internship have for you?

This internship has given me an untraditional spin on an educational degree that promised a lot of traditional research work. Aside from furthering my knowledge and skill in nanotechnology research, I've gained international work experience, learned to summarize research to a general level and I've picked up German along the way. I also learned that outreach requires heavy amounts of improvisation and audience reading, and resembles teaching in many ways in that

active participation provides recipients with a better experience.

What did you learn about science communication with visitors?

I learned that too many details may confuse visitors and to stick to the point when answering questions, unless an appropriate reason warrants going on a tangent. It's important to be organized when explaining, especially when conducting outreach, and visitors really enjoy being able to ask questions and speaking, so don't ramble too much!

Did your point of view changed regarding basic research?

To be honest, I never thought research could be fun. I think the key is that you have to be picky when possible and enter fields that truly interest you. Finding a team that trusts you enough to give you more responsibility and to have control of your research is also difficult, but when this occurs, it really opens up many possibilities to be creative.

(This interview was first printed in 'Kultur & Technik 01/2010', ISSN 0344-5690)



Kevin Shahbazi

PDO'S EcOman Centre

"A gift to the nation"



Petroleum Development Oman's (PDO) brand new 700 m² EcOman Centre at Mina al Fahal is an engaging and eye-opening journey through the evolution and future of energy.

It is a thoughtful investment to help visitors, young and old alike, learn the possibilities of harnessing sustainable energy resources in their march toward an ever brighter future.

The centre consists of three themes: the 'Power Tower', 'Better World' and connecting these two, the 'Energy Journey'.

A consortium of Dutch companies:

Bruns - Main Contractor
development, engineering and production
Quinx - Jelle van der Toorn Vrijthoff
project management

Peter van der Toorn Vrijthoff - architecture
NorthernLight - design

The team realized the EcOman Centre in 18 months. The EcOman Centre opened March 21st 2011.

<< The Power Tower

Visitors will start their tour from the Power Tower which will educate them on the sources and impact of energy through technical illustrations, animations and interactive demonstration models.

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Relocating nanotechnologists: Challenges of displaying laboratory research in a museum

An interesting development is currently taking place in a number of European science museums: the move of university research laboratories into space accessible to visitors. Seen as a means to promote public understanding of research and to render research practice more accessible to visitors, such laboratories-in-the-museum have been set up in museums in the cities of Munich, Milan, Berlin, and Gothenburg. Putting research laboratories inside a museum and giving visitors the chance to encounter research raises a number of questions and challenges. How is a laboratory transformed during this process? How do researchers and visitors experience such laboratories? Does this move actually achieve its desired outcomes?

One such laboratory, the open research laboratory at the Deutsches Museum, carries out and shows "live" research in the field of nanotechnology. The aim of this laboratory is to display, explain, and discuss nanotechnology and, at the same time, to carry out research activities. At first sight, the open research laboratory at the Deutsches Museum looks like an ordinary laboratory. We see scientific equipment on benches, such as a scanning tunnelling microscope; there are computers, researchers, chairs, and desks; experiments are being carried out.

Moving and transforming a laboratory

When deciding to set up the laboratory, in collaboration with the Ludwig-Maximilians University in Munich, the researchers only moved instruments from the university that were deemed essential for running the laboratory. Yet, a number of things changed as the laboratory was relocated into the museum. To tackle the challenges around setting up a laboratory in a museum, the Deutsches Museum, based on its experience, recommends: that people should only work for a limited time in the laboratory (i.e. 3-6 months); that career young people (PhDs up to postdocs) should work in the laboratory; that it should be a small research lab (with 5-8 scientists); that it should have a private entrance and a "quiet room" to read and have meetings (Hix 2009). Also, monitors have been duplicated to enable visitors to see what the researchers see on their

computer screens. Further elements that were added include: a glass wall to separate the laboratory and the visitor; large video screens, demonstration objects, information boards, posters, leaflets and flyers.

Clearly, the laboratory-in-the-museum has to deal with a new, "extended" object-world. Not only must there be objects that enable researchers to carry out research work, but there is also a need for objects that *engage* the visitor, that is, objects that catch the interest of visitors and encourage them to approach, discuss and debate with the researchers. In effect, this laboratory is populated by objects that *perform* work (like a microscope), objects that *display* and *explain* work (like models used for demonstrations), and objects that *focus* and *frame* attention on the performance and explanation of work (posters and information boards, signs). Of course, one object might play several of these roles at the same time, and on occasion, there might be a clash when the object-as-display is the object-as-instrument that is actually used. Visitors have sometimes to be reminded that the microscope they see is not a model, but a real one. Visitors might be surprised to see objects that are used to perform work in an institution that usually displays "dead" objects.

Researchers' experiences

There are several challenges for the researchers who work in the open research laboratory: they have to be "on display"; they have to cope with a certain level of noise; they have to work within museum opening hours; they are not working inside their university for a certain period. There are also challenges in terms of motivation, rewards and credits: it is not always easy to motivate and recruit people to work in the museum, partly because of existing reward systems and the issue of people (not) getting credits for communication activities at university level. Challenges also lie in communication between the researchers and the visitors. In a museum, researchers do not only



The Open Research Laboratory at the Deutsches Museum, Munich

interact with peers but with a diverse audience, which means that they have to explain their research to lay people and thus limit their use of scientific terms. What is more, they have to initiate discussions with visitors and encourage them to ask questions.

Researchers themselves might feel uneasy with the idea of having to be on display at all times. This is why the museum came up with the idea of a "quiet room", a place where researchers can "retreat from the visitors" in a "more peaceful environment", when, for instance, they are writing, doing literature research or having meetings (Hix 2009: 29). Hence, not everything that scientists do is to be visible and displayed to the visitors. Displaying the laboratory and, at the same time, creating a space for discourse about science inside a museum certainly has a transformative potential. For researchers - and for the universities involved in these experiments - this move calls for new practices, new ways of communicating knowledge, new ways of reflecting about and assessing research work. For researchers, the laboratory-in-the-museum redraws the lines between essentially private and public space, between scientific research and science communication, and between experiment and experience.

Visitors' experiences

Some preliminary information about the visitors' experience shows that they already knew what a research laboratory looked like but that they had imagined it differently: they expected more instruments, fewer computers, and a bigger and a more spectacular setting (Pfuhl and Lewalter 2008). All in all, the majority of the visitors

reported to have liked the discussions they had very much and they commented positively on the comprehensiveness of the explanations given (Pfuhl and Lewalter 2008: 53). Yet, most visitors did not seem to have experienced their visit of the open research laboratory as a real "dialogue". When being asked what their visit made them think of, 26 schoolchildren said they felt the discussion resembled a "situation at school", 14 thought it looked like a "presentation/monologue", and 6 referred to it as an "informative scientific event". This clearly contrasts with only two persons describing it as a "situation of discussion after a lecture" and one other referring to it as a "round of research in-between friends".

The Museum's experience also shows that instilling a pro-active attitude in visitors and getting them to ask questions is anything but easy. Some visitors reportedly do not "dare to disturb" the researchers (Pfuhl and Lewalter 2008: 53). This resonates with the suggestion that the public "is not yet comfortable enough to explore new methods of science communication, [...] i.e. to stroll, to ask questions to the presenters, to engage in communication, to question [...] to look behind the scenes" (Yaneva et al. 2009: 86, see also Meyer 2010).

Final thoughts

The museum, as a public space able to bring research and the public together, is arguably a good place to open up the laboratory. In general, museums tend to be more open, accessible, and democratic than laboratories or universities. Museums also have a long tradition of credible public service; they are more welcoming than the elite university; they are physically accessible and have public-oriented facilities; and they can act as a mediator between publics and experts, and

some have started to hold consensus conferences and inquiry-based learning activities (Einsiedel and Einsiedel 2004: 80-81). A new role for science museums lies therefore in facilitating public engagement with research. The role that the laboratory-in-the-museum can play to foster this is certainly an issue that needs further investigation.

It must be noted, however, that although the open research laboratory at the Deutsches Museum enables interactions between researchers and the public that are visual and discursive, visitors are not allowed to enter the laboratory space, or to interact "hands-on" with objects. Hence, while putting a research laboratory behind a glass wall and into a museum certainly opens up research work to visitors, it does not eradicate the cognitive and physical distance that exists between researchers and the public - nor does it automatically turn visitors into researchers. The educational value of such settings thus needs to be further analysed and compared to similar settings in other museums.

Moving the laboratory into the museum is an interesting and potentially counter-intuitive move, since throughout the history of science most movements have been in the opposite direction (throughout which the laboratory was to be spatially and socially organised to turn it into a highly demarcated, protected, and confined space). Putting research and researchers on display inside a museum means rethinking and reorganising the laboratory's material and social architecture. It entails setting up an experimental space for knowledge production, substituting opaque walls with transparent ones, extending the laboratory's object-world to accommodate objects that perform, display, explain - and focus attention on - work, and, last but not least,



The Open Research Laboratory of the Rathgen Research Laboratory in the Altes Museum, Berlin

creating and signposting a space to discuss and interact with visitors. Perhaps the crucial issue is to find the right balance between setting up a space that is not confined, that reduces the distances between experts and laypeople, that opens up private spaces to public view and public debates, and assuring that this setting caters for a legitimate and robust knowledge production.

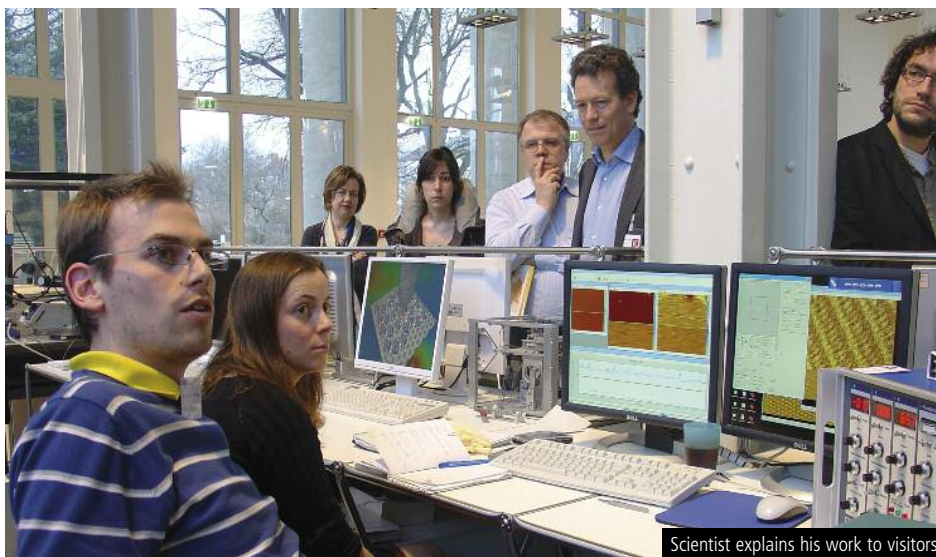
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Scientist explains his work to visitors

Behind-the-scenes science on display at the Darwin Centre

Three hundred scientists and you wouldn't even know it. That was the situation before the Darwin Centre opened at the Natural History Museum, London. Now we offer a 'chefs table' experience for those wanting to get up close to our scientists. Views into labs, specimen preparation rooms, storage spaces, write-up areas and historic collections are all part of the new environment, together with daily talks by science staff and special guests.

Back in 2002, the first phase of the Darwin Centre opened. The purpose-built wing houses 22 million alcohol-preserved zoological specimens, alongside new laboratories and offices for the many scientists working on them. The second phase, which opened its doors to the public in September 2009, offers a similar service for the vast plant and insect collections. What makes the new building particularly special is that, for the first time, visitors are able to glimpse the inner workings of the Museum.

The Darwin Centre has three principal aims:

- to safeguard the collections - through state-of-the-art storage of 20 million plant and insect specimens
- to create high quality research facilities delivering relevant research that has impact
- to provide greater public access by facilitating people's views and insight into a working science facility

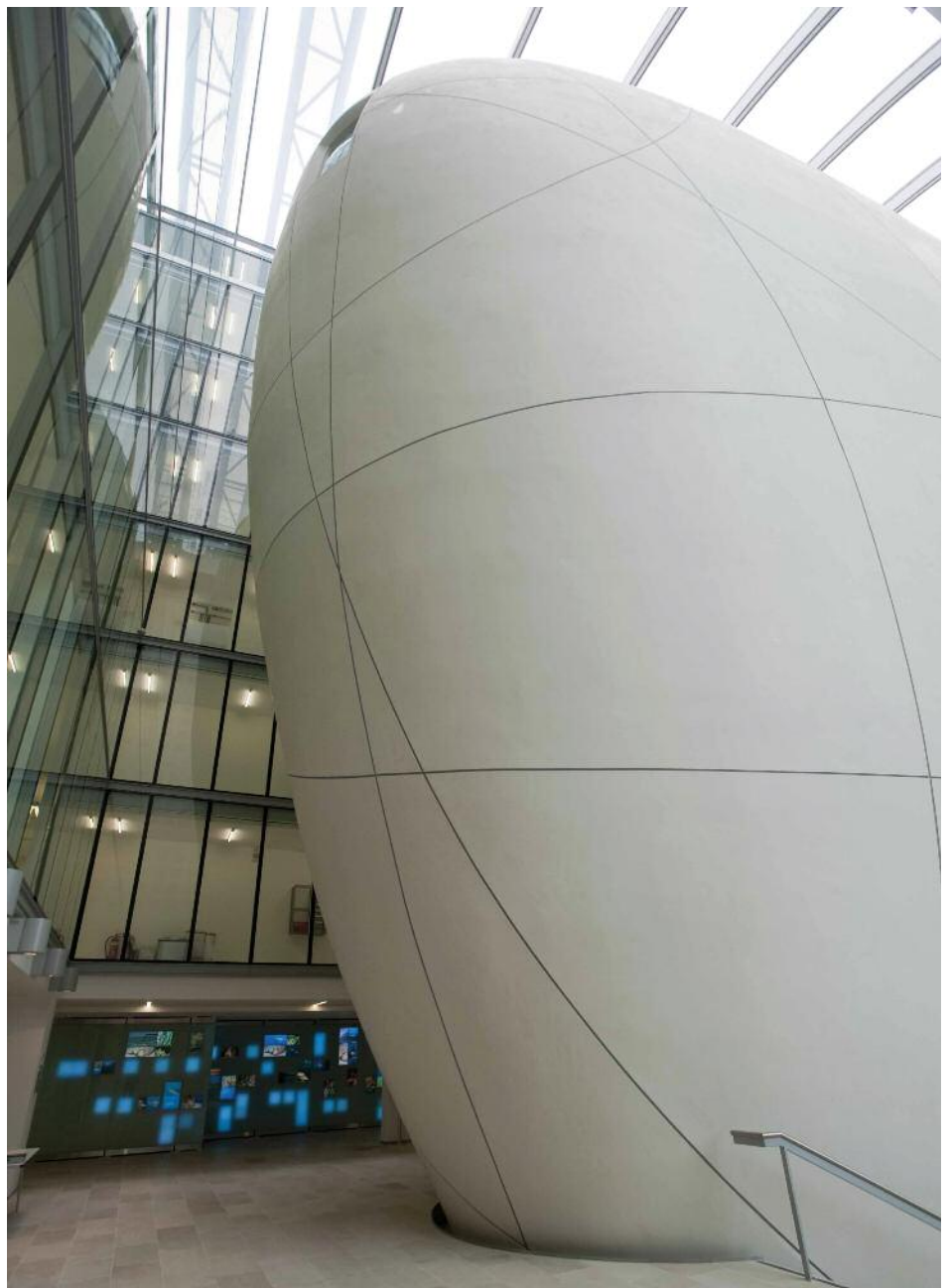
The hundreds of Museum visitors that arrive every day notice the contrast between the new wing and the original Waterhouse Building. Taking the form of a giant Cocoon encased in a glass box, the Darwin Centre is as ambitious and daring a piece of architecture as the Waterhouse Building was in its day. C F Møller Architects, from Denmark, were responsible for its conception and the building perfectly captures the spirit of the Museum as a cutting-edge research centre and a protective storage vessel for collections.

Constructed of concrete and finished in polished Venetian plaster criss-crossed by subtle stainless steel strips, the cocoon is eight storeys high and home to more than 20 million dried plant and animal specimens in some 3.3 kilometres of specially designed cabinets. The top three floors, as well as containing science areas, house *Cocoon*: the part of the development to which the public are invited. This innovative gallery explains how the collections are stored and why they are relevant, as well as giving insight into the scientific research that goes on every day at the Museum. The five lower floors are

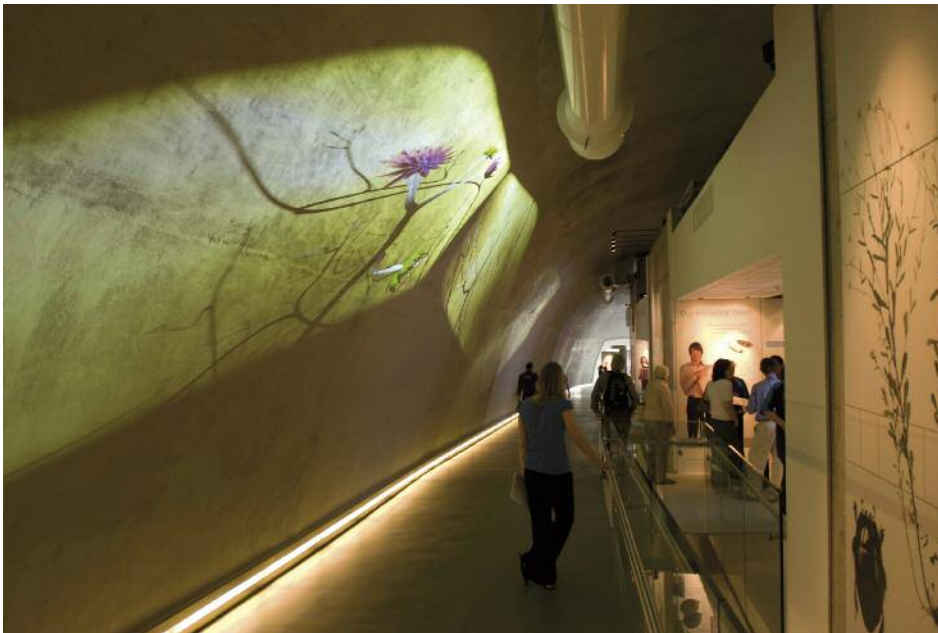
devoted to high-grade storage and laboratory facilities for the botany and entomology collections. What can visitors expect from *Cocoon*? First, they will notice a somewhat different approach from the rest of the Museum. In this dynamic space, we not only present what we know about the diversity of life on Earth, but also talk about how we know it,

look at scientific questions and reveal more about how scientists approach their research. Here, we open up a hidden world and show real scientists engaging in real science.

During their journey, visitors have an opportunity to view the molecular laboratory where scientists might be extracting DNA from specimens or setting



The Cocoon and the Climate Change Wall in the Darwin Centre at the Natural History Museum, London. The cocoon holds 20 million entomology and botany specimens as well as a new visitor space. At 60 metres long, 12 metres wide, 300 millimetres thick and 3,500 square metres, the eight-storey Cocoon is the largest sprayed concrete, curved structure in Europe.



Visitors in Cocoon in the Darwin Centre at the Natural History Museum, London. Up to 2,500 people a day travel through Cocoon, an awe-inspiring new public space that opens up the Museum's hidden scientific world



Visitors at the Decoding DNA space in Cocoon in the Darwin Centre at the Natural History Museum, London. Visitors survey the molecular lab at the Museum, which supports a huge variety of research projects including an ongoing study to identify the 3,500 species of mosquito. Visitors can see scientists extracting DNA from specimens and using a DNA-handling robot to automatically pipette hundreds of samples an hour

up a DNA-handling robot to automatically pipette hundreds of samples of DNA each day. Another viewing area displays scientists analysing data from the molecular laboratory.

Further down in the cocoon, visitors have a clear view of the specimen preparation process in action and a two-way microphone allows visitors to talk to scientists about what they are doing. Work can include pinning insect specimens or mounting dried and pressed plant specimens. Opposite, large windows into the imaging laboratories show where scientists use compound microscopes to study specimens and use herb scan machines to make high quality images of herbarium sheets to be shared with scientists around the world.

There are also opportunities to view science in action beyond the environment of Cocoon. The Angela Marmont Centre for UK Biodiversity at the atrium level of the Darwin Centre offers views into UK biodiversity research - an area used by amateur naturalists and professional scientists.

That's a little about the experience for our visitors, but what about life in the labs and on-view areas for the Museum's scientists? Opening the doors to the public a year and a half ago didn't signal the end for progressing how these new working environments operate. Dialogue between scientists and the Public Engagement team continued after the scientists shifted into the pristine glass-sided offices and labs of the Darwin Centre from the older, familiar architecture of the gothic Waterhouse Building. Monitoring how these spaces work in practice and identifying future development opportunities to create the best possible workspaces continue to be priorities. We can be sure that the

core work of our scientists - who perform vital research ranging from identifying mosquitoes fighting the spread of malaria to monitoring and improving vegetable crops - is visible to a wider audience than ever before.

Raising the public profile of the Museum as a scientific research institution is a positive step forward and one that is achieved not just by observing a scientist through a window, but through the dynamic approach of Cocoon. Take, for example, the concept of the Virtual Scientist Guides. Visitors taking their first step into Cocoon are greeted by four Museum scientists projected on the wall who act as virtual guides throughout the experience.

These four were chosen from our Entomology and Botany Departments, not only to talk about how they came to work at the Museum and their passion for their subject, but also to appear on text panels and in many of the interactive exhibits. This prompts the visitor to explore more aspects of their work, and makes it easier for the visitor to build a fuller picture of a scientist's role in the Museum. When visitors reach

the end of their experience at the Darwin Centre, we hope that for many it is just the beginning of a new relationship with science. By revealing what we do behind the scenes, we aim to share our passion for the natural world as well as our desire to understand our place on Earth and influence its future.

Louise Fitton
Senior Interpretation Developer
Natural History Museum, London, UK



The Preparing specimens space in Cocoon in the Darwin Centre at the Natural History Museum, London. Visitors can watch and speak to Museum scientists as they pin insects, press botany specimens collected from around the world, and conserve specimens

CHEMISTRY - FROM TECHNICAL MAGIC TO MAGIC TECHNOLOGY

VilVite has launched a new science show about the history of chemistry as part of its Year of Chemistry activities. Beginning in ancient Greece and travelling to modern times, the show points to some of the big inventions and failures. Scents, bangs and smoke are ingredients. The show is aimed at children five years and up.



Contact: sad@vilvite.no
www.vilvite.no

GRONINGEN NIGHT OF ARTS & SCIENCE

This year's 'Night' celebrates scientific and artistic creativity in the beautiful historic city of Groningen, the Netherlands, on 4 June 2011. As a highlight the Science LinX 'Church of Science' showcases cutting-edge molecular and nano sciences in a magical setting. 'The Night' is organized by the city's universities, hospital, modern art museum and municipality, proving that Groningen is a true city of talent.

Contacts:
b.i.pander@rug.nl (Night of Arts and Science),
b.j.van.de.laar@rug.nl (Science LinX)
www.denachtvankunstenwetenschap.nl

ENJOY SCIENCE LIVE AT THE ROYAL SOCIETY SUMMER SCIENCE EXHIBITION!

The Summer Science Exhibition offers a unique opportunity to directly question leading scientists about the exciting advances they are working on,



The Royal Society Summer Science Exhibition

from bionic vision to improving airport security, solar fuel to bat conservation. With over 20 fascinating interactive exhibits showcasing research from around the UK, you can try your hand at the science shaping our world today. Join in for a host of free events and activities throughout the week. Free entry for all.

Contact: +44 207 451 2244,
events@royalsociety.org
www.royalsociety.org/sciencelive

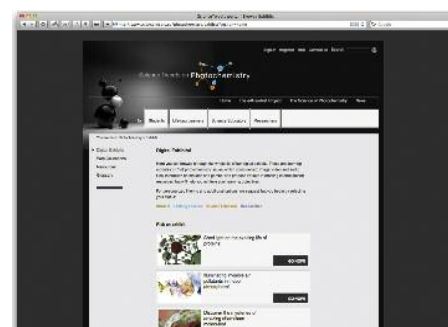
THE E.KNOWNET PROJECT: PHOTOCHEMISTRY MADE SIMPLE AND DIGITAL!

Find out more about 'hot issues' in photochemistry research, told in a simple language, on the ScienceTweets platform (www.sciencetweets.eu). The platform, which is a result of the e.Knownet project (www.e-Knownet.eu), is aimed at lifelong learners, students, science educators and photochemistry researchers. e.Knownet was co-funded by the Lifelong Learning Programme and coordinated by the Eugenides Foundation, Greece.

Contacts:
Glykeria Anyfandi or Christina Troumpetari at public@lists.e-knownet.eu
<http://www.sciencetweets.eu>

'THE C-TEAM: WE ARE CHEMISTRY': PROMOTING CHEMISTRY AT DISCOVERY CENTER CONTINIUM

Discovery Center Continium in Kerkrade, the Netherlands, is currently the headquarters of the C-Team - a special exhibition featuring five characters who communicate the wonders of



chemistry in everyday life by engaging young visitors to find solutions to today's challenges. Each character demonstrates another aspect of chemistry and functions as a role model to make chemistry more accessible and comprehensible. Runs until 18 September 2011.

Contact: info@continium.nl
www.continium.nl and www.c-team.nl

WATER - A PRECIOUS RESOURCE

This travelling exhibition was recently inaugurated at National Science Centre, Delhi, India, under the



National Council of Science Museums, India - an Ecsite member. The exhibition highlights critical issues about water management, diseases, conflicts, costs, quality, crisis, harvesting of rain water and water availability that will affect the world in the coming decades. Information is conveyed through exciting interactive exhibits, displays, multimedia resources, 3D sculptures and models.

www.ncsm.org.in and www.ncsm.gov.in

'SCICINEMA' COMING SOON TO A CINEMA NEAR YOU!

In this unique series, a top researcher leads a dialogue about a hot issue in current scientific research, followed by the screening of a relevant feature film. The series is the result of collaboration between The Bloomfield Science Museum Jerusalem and The Jerusalem Cinematheque and uses the cultural and social atmosphere of the Cinematheque venue to encourage dialogue on hard science issues among the general public.

Contact: vardag@mada.org.il
www.mada.org.il/en/

"LESSONS OF MARIE SKŁODOWSKA CURIE"

From 1907 Marie Skłodowska Curie and other scientists in the laboratories of the Paris University

ran classes for children and conducted experiments with the young students. Copernicus Science Centre in Warsaw, Poland, has produced special experiment sets for elementary school teachers which are based on the notes of Curie and her student Isabelle Chavannes. The sets include class scenarios for teachers and pupils as well as materials and equipment necessary to carry out the experiments. Training for teachers is also planned.

The sets are created in cooperation with La Maison des Sciences.

Contacts:
pawel.wojcik@kopernik.org.pl and
anna.dziama@kopernik.org.pl

"WANDERING TO THE STARS" AT TECHMANIA

An interactive model of the solar system will be installed on a street in Plzeň, Czech Republic. The planets will not only provide a means of communicating hard science but will also correspond with weekly activities starring sportsmen from first-class football, hockey or basketball clubs.

The athletes will not only discuss their experiences with hard science, but will also participate in many games and quizzes with a broad audience. Techmania strongly believes that the unusual connection between astronomy and sports stars can be an asset for hard science

communication. The event runs from June until September 2011.

Contact: Tomáš Moravec,
tomas.moravec@techmania.cz
www.techmania.cz

INFORMATICS PROGRAMME FOR VISITORS WITH VISUAL IMPAIRMENTS

Monastir Sciences Palace in Tunis, Tunisia, is running an on-going training course for young people who are blind or visually impaired. Courses are offered to primary and secondary school students on how to



use the JAWS application, analyse texts and voice, practice some intellectual games and how to navigate the internet. English language training is offered in conjunction with the courses.

Contact: hedia.benghenaia@psm.rnu
Website: www.psm.rnu.tn



Interactive model of solar system on a street in Plzeň, Czech Republic

PLAYDECIDE GAMES ON RARE DISEASES

As of February 2011, Hungary and Denmark are the two leaders in terms of Polka PlayDecide sessions organised (each organised more than 10% of sessions). PlayDecide sessions were played in 18 countries, of which 16 EU/EEA member states (plus Brazil and Canada).

You are welcome to organise more sessions. The more sessions you organise, the more likely you will receive an Award, visit:

www.playdecide.eu/getinvolved/projects/12

PLACES

The PLACES OPEN web platform is up and running and project participants are busy setting up their City Partnerships. The website is already populated with helpful links to "science in society" events and resources. Visit www.openplaces.eu to learn more about the science communication institutions and European cities engaged in PLACES.

Contact project coordinator Antonio Gomes da Costa for information about the project or how you can get involved: agomesdacosta@ecsite.eu.

6TH SCIENCE CENTRE WORLD CONGRESS, CAPE TOWN, SOUTH AFRICA, 4-8 SEPTEMBER 2011

Ecsite is a partner of this not-to-be-missed international event that promises to attract science communication professionals from around the globe. Congress registration is now open, with discounts offered to early registrants and delegates from countries with a low gross national income. All discount offers expire 6 June 2011.

www.6scwc.org.

ECSITE ANNUAL CONFERENCE, COPERNICUS SCIENCE CENTRE, WARSAW, POLAND, 26-28 MAY, 2011

More than 800 participants are heading to Europe's main science communication conference at the end of this month! This year's conference features 75 sessions and more than 300 speakers.

Look for the registration link on the right-hand side of the conference web page.

Please note:

You must be logged out of your Ecsite account before you can create a conference profile and fill out the online registration form. The preliminary programme containing session descriptions, practical info and details about the exciting social programme is available in pdf form on the conference website.

Pre-Conference workshops: This year's pre-conference brings insightful workshops from Ecsite's THE Group and Nature Group, the launch of Ecsite's brand-new research and evaluation group (REV group), as well as sessions about exhibit labeling and accessibility. Be sure to register for pre-conference events via the online registration form.

Haven't booked your Business Bistro booth yet?

We still have some last-minute spaces available.

Book online - it's fast and easy:

www.ecsite.eu/annual_conference/business-bistro

ECSITE ELECTIONS 2011

The Ecsite Annual General Meeting (AGM) is set for Friday, 27 May, 10:15 - 13h30, during the Annual Conference. Six Board positions, including President, are open for election.

All Ecsite members are invited to attend the AGM, but only Full Members may vote. The meeting will also feature the adoption of Ecsite's revised Internal Regulations, the Statutes of Ecsite as well as the Annual Activity and Financial Reports.

XPLORE HEALTH

Do you want to know more about innovative ways to spark curiosity for health research?

Come to the Ecsite Annual Conference session, "Let's research!", on 27 May at 12.00 in the Red room. You will also have the opportunity to participate in a real lab experiment about drug development! The Xplore Health Outreach Committee, composed of five science centres (At-Bristol and Centre for Life, UK; Copernicus Science Centre, Poland; Domus, Spain; Jardin des Sciences, France), is preparing specific events aimed at testing experiments, games and materials developed for the project.

A full list of events and activities will soon be available on the project website: www.xplorehealth.eu/.

OPEN SCIENCE RESOURCES

Ecsite is offering a limited number of travel grants to take part in the free Open Science Resources workshop on May 25th, 2011 as a part of the pre-conference programme of the Ecsite Annual Conference. In the workshop, science centre and museum professionals have the opportunity to learn about using digital resources for educational activities and to connect with other institutions.

Participants will also be able to share their own educational materials on the Open Science Resources portal (<http://www.osrportal.eu/>).

For more information, contact Jennifer Palumbo, jjalumbo@ecsite.eu.

Do you have conference-related questions? Contact Aliko Giannakopoulou at agiannakopoulou@ecsite.eu or by mobile phone at: +32 473 414574.

We look forward to welcoming you in Warsaw!

Euroscience Open Forum (ESOF), Dublin, Ireland: Call for proposals ends 30 June 2011

The call for proposals for this pan-European event ends 30 June 2011. The event will bring together 6,000 scientists, business leaders, government officials and international media to discuss the best of European science and to address all of the major global challenges: Energy, Climate Change, Food and Health. The Forum takes place 11-15 July 2012.

www.dublinscience2012.ie/event

The Third International Conference on Science in Society, Washington, DC, USA 5-7 August 2011

Key themes addressed by the Conference include the social impacts of science, the values and ethics of science, the pedagogies of science, the knowledge-making processes of science, the politics of science and the economics of science. Participants will include researchers, teachers, administrators and policy makers.

<http://science-society.com/conference-2011/>

NEW Pilots Training Course, Trieste, Italy, September 2011

A new edition of the "Pilots Training Course for Museum Explainers, Educators and Young Scientists involved in outreach programmes" is coming in September 2011. It's a five-day interactive and intensive annual summer school that will include workshops, debates and presentations from experienced European trainers. The course is aimed at explainers (also called animators, guides, edutainers, facilitators, mediators, pilots, etc.) who work in science centres, museums, science festivals or outreach programmes of research institutes and universities and come into face-to-face contact with the public. Grundtvig Grants are available! The code for the course is: BE-2011-183-001.

www.ecsite.eu/activities_and_resources/trainings/pilots-training-course

1st PLACES Conference, Paris, France, 22-23 September 2011

The Science Communication Policy Symposium, cornerstone of the 2011 conference, will map policy requirements for a model of the European City of Scientific Culture, establishing concrete policy recommendations for the EU, national, regional and local levels. Come to the 1st PLACES Conference and be an integral part of science communication policymaking in Europe. To confirm your attendance, contact Antonio Gomes da Costa, PLACES Coordinator: agomesdacosta@ecsite.eu. Visit

For more information www.openplaces.eu

12th international public communication of science and technology conference: Proposals due September 2011

Proposal deadline for this conference is September 2011. Proposals are welcome from areas such as science journalism, science communication and science in society research, science museums, and communication activities by research institutions. Presentation formats will include paper presentations and roundtable discussions; a Science Communicators' Corner, a PCST Keywords' arena, a Book Club and a 'Science in the Kitchen' space; exhibitions, theatre performances and videos. The conference takes place in Florence, Italy 18-20 April 2012

www.pcst2012.org

2011 ASTC Annual Conference and Exhibit Hall, Baltimore, Maryland, 15-18 October 2011

The Association of Science - Technology Centers hosts the world's largest science communication event, ASTC 2011: Knowledge that works, from theory to practice. New Yorker staff writer Michael Specter is a featured speaker at this year's event. Get programme and travel details here:

www.astc.org/conference/

Advancing Science, Serving Society Annual Meeting, Vancouver, Canada, 16-20 February 2012

The Annual Meeting of the American Association for the Advancement of Science (AAAS) is the most important general science venue for a growing segment of scientists and engineers who are interested in the latest advances as well as multidisciplinary topics and the influence of science and technology on how we live today. Thousands of leading scientists, engineers, educators, and policy-makers interact with one another and with hundreds of members from national and international media.

www.aaas.org/meetings/

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