OUTCOME

nanoto TOUCH

PROJECT

LIVE NANO RESEARCH IN PUBLIC ACROSS EUROPEAN SCIENCE CENTRES AND MUSEUMS

SEVENTH FRAMEWORK PROGRAMME

SUMMARY

TAKING SCIENCE COMMUNICATION TO THE NEXT LEVEL

As our future is being shaped in research laboratories, it is important, more than ever, for society to comprehend the processes of science. With an ever increasing dependency on technology contrasting with a more and more sceptical, even critical public view of modern research, scientists face the challenge of re-integrating themselves into society.

For this reason, our NANO TO TOUCH project implemented a radical new approach to science communication in six science centres and museums throughout Europe. Over the last two and a half years, students from nano-research groups at local universities were relocated from their dark, inaccessible basement laboratories and brought into public view in science centres and museums.

Through this combination of communication expertise with scientific competence, the NANO TO TOUCH project took science communication a step beyond conventional approaches, initiating and encouraging a public understanding of research.

In total, over 70 young researchers discussed nanotechnology with more than 70,000 visitors, giving them insight into the making of science and offering them the opportunity to enquire into the individual motives of the young researchers.

Although the project has come to a highly successful conclusion, our efforts need to continue. In the Deutsches Museum, the very popular Open Nano Lab will continue beyond the end of the project. I can only encourage the other NANO TO TOUCH locations to do likewise, and would like to challenge museums and universities in other cities throughout Europe to consider initiating similar projects.

Wolfgang M. Heckl

Director-General of the Deutsches Museum,
Oskar-von-Miller-Chair for Science Communication
at the TUM School of Education

INTRODUCTION

ENGAGING IN LIVE SCIENCE ACROSS EUROPEAN SCIENCE CENTRES AND MUSEUMS

www.nanototouch.eu

NANO TO TOUCH is a project supported by the EU Seventh Framework Programme that aims to create innovative spaces where the public can learn about nanosciences and nanotechnology.

Most importantly, NANO TO TOUCH sets out to encourage visitors to European science centres and museums to interact with researchers in a totally new way - either by just stopping by to ask a question or observing the scientist's work as it takes place in the museum.

This exciting and innovative concept was coordinated by the Deutsches Museum in Munich, Germany. The idea of bringing nanoscience and technology closer to the public through "live" science and research was based on the museum's pioneering experience with a nanoscience researcher working in full public view inside the museum.

Partner science centres and museums joined forces with nearby universities to equip local researchers with practical science communications skills. The lab environment and research work were taken out of enclosed academic campuses and relocated into science museums and science centres.

In three Open Nano Labs in Munich, Milan and Gothenburg, visitors experienced the live day-to-day practices and processes of nanoresearch conducted by young scientists. In Mechelen, Tartu and Naples, young researchers were given the chance to communicate their work in specially designed Nano Researcher Live areas.

01

ECSITE

www.ecsite.eu

Ecsite is the European Network of Science Centres and Museums, linking science communication professionals in 400 institutions in 50 countries. Founded 20 years ago, Ecsite connects member institutions through projects and activities and facilitates the exchange of ideas and best practice on current issues.

Members include science centres and museums, science festivals, natural history museums, zoos, aquariums, universities, research organisations and companies communicating and engaging the public in science through accessible, interactive exhibits and programmes.

WHAT IS AN OPEN NANO LAB?

An Open Nano Lab is a fully functional nanoresearch laboratory located in the science museum's public space, where researchers from the local university partner spend a few months conducting their work in full public view.

Visitors gain new insight into the processes and methods used in a modern laboratory by observing how doctorate and graduate students gather, process and discard data and images from their instruments. The visit to the Open Nano Lab frequently gives rise to a dialogue between the researcher and the visitors. This exchange helps build meaningful connections between scientists and young people – providing models for the next generation of researchers.

WHAT ARE NANO RESEARCHER LIVE PROGRAMMES?

Nano Researcher Live programmes take live communication in science centres and museums to a new level. Exhibits, demonstrations and interactive presentations make up a nano environment centred on a live presentation area where scientists from the local partner universities explain and discuss their current work in a public forum.

PHOTOS:
01. The Open Nano Lab at the Deutsches Museum in Munich, Germany.
02. Looking through the window of science at National Museum of Science and Technology Leonardo da Vinci.

02

TRAINING, DISSEMINATION, EVALUATION

To prepare each science centre to develop their own Open Nano Lab or Nano Researcher Live programme, The National Museum of Science and Technology Leonardo da Vinci in Milan trained researchers and museum educators from partner institutions.

Two training workshops gave researchers tips on communication with non-expert publics and provided all partners with insight into the ethical and societal aspects of nanotechnology.

Ecsite, the European Network of Science Centres and Museums, took on the task of disseminating the project's objectives and results. It sought to engage science centres or museums and science communications professionals as well as scientists and researchers to take part in this exciting initiative. This report reveals the outcome of the initiative and offers advice to other centres that wish to set up a similar project at their institution in the future.

The Technical University of Munich evaluated the NANO TO TOUCH activities. A round up of the evaluation results can be found on pages 18 to 21.

OPEN NANO LAB

LOCATION

MUNICH, GERMANY

The Deutsches Museum and Technische Universität München partnered to develop an Open Nano Lab at the heart of the museum in Munich. The purpose of the lab was to bring young researchers into full view of museum visitors and encourage them to enter into public dialogue and debate on nanosciences and nanotechnology.

The lab is ideally located in the Centre for New Technologies, a new museum area focused on nano- and biotechnologies opened in 2009. This offers visitors a comprehensive insight into the benefits, risks and challenges of current nanotechnological developments whilst providing reference points for the researchers in their explanations.

Moreover, it also helped integrate the Open Nano Lab into the centre's programme, offering an introduction

to the subject matter through presentations and demonstrations before entering into dialogue with scientists.

This approach was particularly successful with school classes, introducing a great number of young people to the fascinating field of nanoresearch. In this context, the youthfulness of the scientists themselves stimulated an active peer-to-peer dialogue with this next generation of researchers.

The many internship applications from pupils wishing to be part of the Open Nano Lab of the Deutsches Museum conclusively testified the strong potential of this concept to attract and recruit young people to nanosciences.

In the course of the NANO TO TOUCH project a total of 23 researchers worked in the lab, directly interacting with almost 10,000 people. Due to its success, the Open Nano Lab will continue to operate after the end of the project. It will not only continue to contribute to the public debate on nanosciences and nanotechnology, but also inspire many young people to get involved and interested in the fascinating field of research.

PHOTO: Pupils interact with a researcher.

FIND OUT MORE...

With more than 47,000 square meters of exhibition space in the main building, 50 departments and about 1.3 million visitors per year, the Deutsches Museum is one of the biggest science and technology museums in the world.

Its unique collection of historical and modern exhibits documents the evolution of technology and science from the early beginnings to the present day. Interactive experiments, dioramas, films and multimedia systems supplement the display.

www.deutsches-museum.de

The Technische Universität München (TUM) is among the highest acclaimed universities in Germany and has produced several Nobel Laureates including Gerhard Ertl who received the Nobel Prize in Chemistry in 2007.

TUM boasts a strong profile in science and engineering. Alongside the traditional key areas addressed by technical universities, powerful links have also been established with the life sciences, ranging from nutrition and food sciences, biotechnology and bioinformatics to medicine. **www.tum.de**

LOCATION

GOTHENBURG, SWEDEN

NANO TO TOUCH

PHOTO: Children at Universeum take part in live sciences as it happens.

"We could discuss about human invented nanotechnology and how we make use of it. Our scientists in the lab worked with physical experiments with DNA strands, which of course is a fundamental part of the nano mechanism which drives all living things."

The NANO TO TOUCH laboratory at Universeum was located in heart of the centre, between the Aquatic Hall and The Rainforest, a natural path used by some 530,000 visitors every year. Although there is much passage in this area, it is a relatively calm spot - ideal for nano discussions between the scientists and our guests.

Since this place is located in the "living area", the centre could host live gecko lizards to explain their nano technique for climbing. They could also make use of other living plants and creatures to present nano-based phenomena in nature.

The NANO TO TOUCH project worked out very well at Universeum. There were a lot of internal discussions in the beginning about scientists being able to work in a public laboratory. There was also talk about whether guests would find it interesting and so forth. All these doubts were very soon swept away when visitors showed strong interest in the activities and discussions. The scientists enjoyed engaging in these discussions while they were actually doing a good day's work in the laboratory.

Nevertheless, it took some time for the whole infrastructure around the lab to settle. There are two working cultures in the centre when the science centre and the scientists are working together. In the science centre, the focus is on the guests. The scientists are supposed to interact with the guests and learn to meet school children and take part in the programme events.

Another challenge was how to man the laboratory. Scientists set up a rota and, during the summer months, undergraduate students worked on scientific projects in the lab. With all these logistic and cultural challenges and new routines it took about a year to establish a full satisfactory, working open laboratory.

During its time in Universeum, the NANO TO TOUCH project revealed that an open laboratory is an outstanding idea for scientists to meet people of all ages. In addition, it added a high value of scientific quality to Universeum and for the University it will probably lead to the publishing of two scientific papers. The project was a very good opportunity for all parts to share thoughts and to learn from each other both locally and on an international level.

FIND OUT MORE...

Universeum is Sweden's largest science centre, with a huge variety of interactive displays wrapped up in a high-tech building engineered for the future with sophisticated energy and recycling systems. There are six main exhibition areas including the Water's Way, the Ocean Zone, the Rainforest zone, Deadly Beauties section, the Kaleido zone and the Explora zone. **www.universeum.se**

Chalmers Technical University conducts research and teaching on a broad range of subjects related to technology, natural science and architecture. Its inspiration lies in the joy of discovering and learning. Underlying everything it does is a wish to contribute to sustainable development in Sweden and worldwide. **www.chalmers.se**

MUST NANO AREA

LOCATION

MILAN, ITALY

The Nanotechnology Area opened at the National Museum of Science and Technology Leonardo da Vinci (MUST) on 2 March 2010. Since then, visitors have been able to engage in dialogue with researchers from the Interdisciplinary Centre for Nanostructured Materials and Interfaces (CIMaINA) at the University of Milan.

In one year, the researchers engaged with more than 20,000 visitors (among them 4,000 students and 400 teachers). The area brings visitors closer to the lab and to the researchers. They can visit a small exhibition on nanotechnologies, encounter an interactive exhibit on solar cells and be involved in education activities.

Many visitors showed a strong interest in nanotechnologies as well as in the researchers' daily work, even if they were not informed about the topic or certain about what the researcher's work was about. The limit between science fiction and scientific research is not always very clear, but this can be a valid beginning for dialogue between experts and laypeople. The centre saw its researchers improving their communication skills and increasingly enjoying dialogue with visitors of different ages, types and interests. Both researchers and museum staff were able to experience in an empirical way that dialogue does not merely mean contact between laypeople and experts, but needs to be built on training and shared agendas.

Moreover, researchers discovered the effectiveness of education activities in communicating basic knowledge of nanotechnologies and in stimulating questions and discussion. For example, many teenage visitors asked researchers about their work and about the ways to become a nanotechnologist.

The collaboration between the museum and university has become so close that after the end of the project the two institutions will continue working together. A number of the CIMaINA graduate students use the museum for their training in communication by spending a period of time in the lab interacting with visitors.

"Recent research revealed that scientists who engage with society perform better academically. We hope that our researchers in the museum will confirm this results."

FIND OUT MORE...

The National Museum of Science and Technology Leonardo da Vinci opened in 1953 and is now the largest science and technology museum in Italy. Its mission is to disseminate scientific and technological culture, making it accessible to all. It is seen as a place for sharing dialogue and experiencing an interactive lab while discovering the greatest collection of models and machines from Leonardo da Vinci's drawings. **www.museoscienza.org**

The University of Milan's Interdisciplinary Centre for Nanostructure Materials and Interfaces (CIMaINA) has developed a deep understanding of the phenomena governing the interaction between inorganic

and organic surfaces at the nano- and microscale level. The centre merges competencies in material chemistry, solid-state physics, molecular biology and medicine, pharmacology, optical and electronic spectroscopy. **http://users.unimi.it/cimaina/**

PHOTO: Visitors in dialogue with researchers at the National Museum of Science and Technology Leonardo da Vinci.

RESEARCHER LIVE AREA

LOCATION

NAPLES, ITALY

The Nano Researcher Live area opened its doors in March 2010 and was set up by the Fondazione IDIS-Città della Scienza in close collaboration with the Istituto di Cibernetica "E. Caianiello" (CNR).

This live laboratory took centre stage in the main exhibition area and had the capacity to welcome some 30 pupils and their teachers. Visitors could gather around the circular information desk and nano demonstration area. The public experience was enhanced by regular demonstrations and hands-on experiments run by the science centre explainers and young researchers from the CNR research centre.

The exhibition showcased nano-related products and tools. It also highlighted topics in nanosciences and nanoresearch and described the activities of the partner research centres involved in the project. Children and adults were introduced to a variety of topics including the concepts of nanoelectronics and superconductivity.

Young researchers used a computer and an optical microscope linked up to a screen to directly show their work to the students. Demonstrations focused on using fluorescent nanocrystals and in vivo contrast agents for cell tracking. The researcher also discussed the potential biomedical applications and toxicological implications of these processes with visitors.

Other activities were developed to explain nanotechnologies in biological research and superconducting nano-sensors used to study the magnetic properties of small clusters of nanoparticles.

FIND OUT MORE...

Fondazione IDIS-Città della Scienza plays a leading role in communicating scientific knowledge and technological innovation in southern Italy. It helps to ensure a wide public involvement in science and technology, engaging in an open dialogue and establishing a knowledge-based society.

Events and cultural activities on science communication and public understanding of science take place at the science centre –hosting more than 350,000 visitors per year– as well as international and national projects on science and society, citizen participation in science and technology, science education and informal learning. **www.cittadellascienza.it**

The Istituto di Cibernetica "E. Caianiello" CNR is part of the National Research Council of Italy (CNR). Its mission is to develop advanced technologies in the fields of condensed matter physics, ICT, neurosciences and life sciences. The Institute is both active in highly specialised sectors and strongly oriented towards interdisciplinary cooperation. **http://www.cib.na.cnr.it**

PHOTOS: Images of the Nano Researcher Live area and events in the Città della Scienza science centre.

NANO TO TOUCH

LOCATION

TARTU, ESTONIA

Scientists from the University of Tartu worked alongside educational specialists from the AHHAA Science Centre and designed a dedicated Nano Researcher Live area to host live science events.

A nanotechnology themed exhibition with specialized presentation equipment was set up at the centre to seat an audience of 30 people. The static part of the exhibition was made up of nanotechnology themed photos, commercial nanotech products, hands-on experimental setups, scientific equipment and samples. Scientific samples included carbon nanotubes and fibres as well as plasmonic nanostructures from the university. Commercially available products used for the exhibition covered most of the industries using nanotechnology.

To increase interaction with visitors, trained explainers were onsite to answer questions about the exhibits. These young explainers were trained by the university scientists to become familiar with the exhibits and learn to engage in a dialogue with the visitors about nanotechnology and answer common questions.

The most popular format of events was the science theatre where scientists "performed" an informal show about a topic that was specifically tailored to the visiting audience. The researcher learned to analyse his/her audience to find the best possible approach to communicate with the crowd.

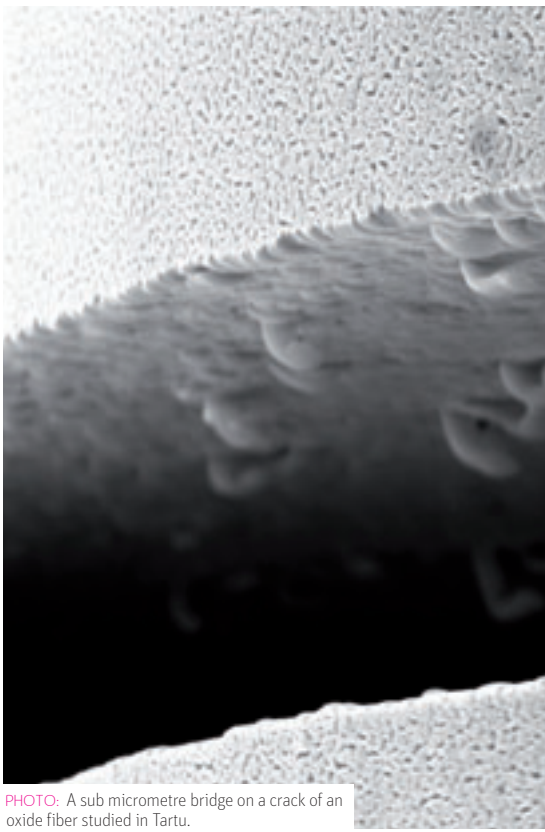
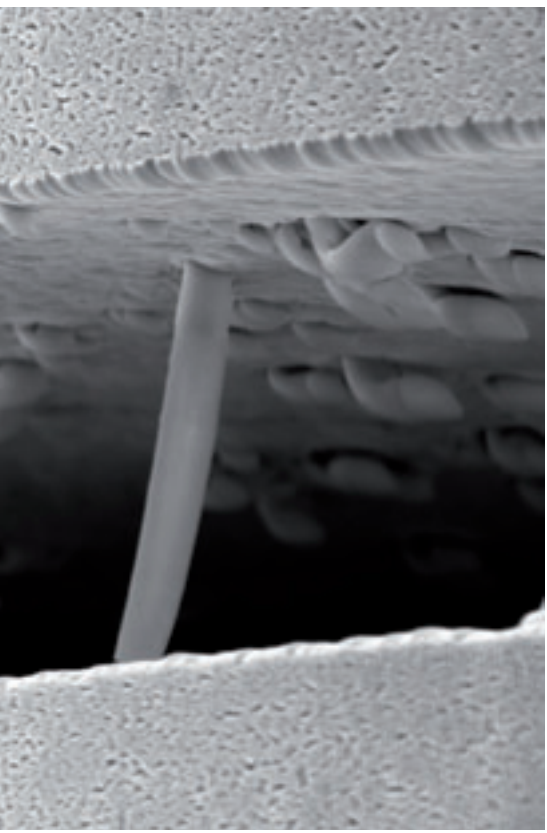


PHOTO: A sub micrometre bridge on a crack of an oxide fiber studied in Tartu.

Young scientists from the university's physics department were eager to take part in this event as they had already gained communication training at the university. Many of these young professionals also had some experience in science communication due to previous participation in similar projects. As a result, the centre had a young motivated team of scientists with good communications skills to fulfil the task of explaining and demonstrating various aspects of nanotechnology in an appealing manner.

The science theatre format was one of the most suitable types of event for school groups and other groups with an audience of about 30 persons. These events really got the public to interact with the researcher without consuming too much of the scientist's time.

PHOTO: The NANO TO TOUCH project is about communicating about science to all groups.



"We had the opportunity to use scientists, who may not have special communication training, and who usually are not motivated to continuously work as a science communicator. This method increased our target audience as well as the number of available and willing lecturers."

FIND OUT MORE...

AHHAA Science Centre was established as a special project of the Department of Research and Institutional Development of Tartu University. It has now made significant advances to become an independent contemporary science centre with cutting-edge science communication activities and displays. **www.ahhaa.ee**

The Institute of Physics was incorporated into the University of Tartu in 1997 to realise the aims of the newly independent Estonia with regards to science and education. It has been reshaped according to public demands and the scientific atmosphere in the region. It is now a highly autonomous research establishment **www.fi.tartu.ee**

LOCATION

MECHELEN, BELGIUM

NANO CORNER

PHOTO: An explainer at Technopolis shows how science can be fun and informative.

In February 2010, the Technopolis science centre opened the NanoCorner in close collaboration with staff from the University of Antwerp. The centre's demonstration, cleverly entitled "Klein, kleiner, nano" (or Small, smaller, nano) introduced visitors to the basics of nanotechnology through several live experiments.

Visitors learned how anti-fog spray can help avoid condensation on everyday items such as swimming goggles. Moreover, they looked at ferrofluid and saw how it behaves like a solid when put under a magnetic field. The demonstration also illustrated the sensitivity of our senses in detecting molecules just tens of nanometers in size.

The skyscan microtomograph helped PhD students show visitors how they work with particles invisible to the naked eye. The NanoCorner gave researchers a chance to explain the research projects they carry out in their laboratory. For visitors, it was a unique opportunity to gain insight into the daily work of a scientist and at the same time understand more about nanoproducts in daily life by actually touching the objects and directly interacting with the explainers.

Among the many interactive exhibits, they could see how stain-repellent textiles help stop clothing stains, black grill pans coated with an inorganic nanocomposite material reduce cooking time and make food crispier. Anti-fingerprint coating material protects metal surfaces and makes them easier to clean.

"Many visitors were unaware about how many nano products are already being used in daily life. They also didn't know the impact of nanotechnology on the environment."

FIND OUT MORE...

Technopolis is a science centre where people can experiment and find out about the how and why of countless technological and scientific phenomena. It is also a permanent platform for science and technology that evolved from a non-profit organisation, the Flanders Technology International.

It has more than 300,000 visitors a year bringing science and technology closer to people, enhancing the public's engagement in science and technology. **www.technopolis.be**

The University of Antwerp is characterised by its high standards in education, internationally competitive research and entrepreneurial approach. It has about 15,000 students, which makes it the third largest university in Flanders. 1,800 international students (exchange students not included) are registered at the University of Antwerp. **www.ua.ac.be**

SUCCESSFULLY

BRINGING NANOTECHNOLOGY CLOSER TO THE PUBLIC

The NANO TO TOUCH project was successful in breaking down the barriers between scientists and the general public - helping scientists get a better grasp of the public's understanding of science and nanotechnology. It also sought to change some of the stereotypes that laypeople have about researchers and highlight the growing role of technology in today's society.

How did this project help scientists develop and improve their communication skills and attitude towards science communication? Did Open Nano Labs and Nano Researcher Live events change visitors' attitudes and interest towards nanotechnology science and research?

The evaluation team set out to design a four-part survey conducted before, during and after the project.

➔ Study (I) focused on the scientists' experience during the workshops and training sessions and their work in the Open Nano Labs and Nano Researcher Live events.

➔ Study (II) looked at the public's impression and interest in nanotechnology and how they perceive the knowledge they have already acquired on the subject.

➔ Study (III) and study (IV) put the spotlight on the Open Nano Lab at the Deutsches Museum in Munich, Germany and examined how it is used by local staff as well as school classes and teachers. The data is currently being collected for these studies and should be available in 2012.

PHOTO: Visitors play with interactive exhibits in the Nano Area at the National Museum of Science and Technology Leonardo da Vinci.

WHAT DID THE SCIENTISTS THINK?

Scientists involved in the project expressed many positive opinions about different aspects of NANO TO TOUCH. They particularly benefited from the practical communication training. It taught them not to take the basic science knowledge for granted in the public and urged them to find the right level of communication to talk to various non-scientific audiences in an easy and understandable way.

Working in a team, they learned that they could carry out research while interacting with visitors. Meeting international staff at the science centre, they also discovered what other partners were investigating. This was helpful in broadening their research perspective.

Being part of the Open Nano Lab and Nano Researcher Live event also meant they could share aspects of their work and their own views on the status of nanotechnology today. They were particularly interested in finding out first-hand what the general public already knew about nanotechnology and what still needed to be explained.

Before the project began, there were questions and concerns from scientists on communicating about nanotechnology to children. Grasping the attention of younger and less scientifically-minded audiences to explain science in an easily digestible way was something they had to learn to do for this experience.

Carrying out research under the watchful eyes of the public is a challenge researchers don't encounter in most research labs. Therefore, faced with the live aspect of these events, they had to be equipped with the right tools to effectively react to unexpected questions.

"When you work in a university, everyone thinks in the same way. I believe it's really good to get out and talk to other people who don't work in your field. They can bring insight into topics that you don't usually think about."

01

02

03

04

PHOTOS:

01. Technopolis: carrying out experiments, youngsters learn more about nanoscience.
02. Deutsches Museum: gathering around the information desk during the NANODAY 2011.
03. Hands-on science at its best.
04, 05, 06. Working in a live lab was something new for scientists.

WHAT WAS THE PUBLIC'S PERSPECTIVE?

Most of the visitors to the science centres showed a neutral or positive attitude towards nanotechnology. Visiting the Open Nano Lab or taking part in a Nano Live Researcher event stimulated a positive opinion about nanotechnology and mostly improved their knowledge of the subject.

The general public was excited about the concept of the Open Nano Lab and Nano Live Researcher events. They rated the scientists' communication skills as high and believed these were influential in understanding the science concepts presented in the lab or during a live event.

They were particularly drawn to the scientists' personal opinion about the subjects under discussion and reacted well to hearing about personal experiences with science.

"I enjoyed talking to people and giving them a broader picture about nanoscience – showing them that science is not a dangerous and scary thing."

Visitors to the centres were between the ages of six and 82 years old, with an average age of 29. Over half of these participants were female and 40% of the total visitors held a university degree. Most visits lasted about 36 minutes.

05

06

DISSEMINATION

The general framework of the NANO TO TOUCH dissemination strategy relied on two approaches. Firstly, Ecsite, who was in charge of leading the dissemination efforts, provided partners with tools for local dissemination. Additionally, the work enlarged the overall number of project beneficiaries by presenting the NANO TO TOUCH objectives and results both to academics and to science communication professionals to inspire these actors to replicate the project's activities. In the first phase of the project, the main priority was to spread awareness about the NANO TO TOUCH initiative.

This was achieved by:

➔ Preparing a general action plan detailing actions to disseminate all stages of the project.

➔ Spreading information about the project to inter-

PHOTO: EU Commissioner for Research Janez Potocnik visits the temporary Open Nano Lab at the Ecsite Annual Conference 2009.

ested parties, such as researchers and professional communities, final users, other museums and interested sections of the public by means of communication through publications, presentations at conferences and workshops and dissemination through partners' network of contacts.
To assist the partners with their local dissemination efforts, Ecsite prepared and distributed, at an early stage of the project, a press release and a short description of the project objectives for partners' communication materials. Wider dissemination by Ecsite and Deutsches Museum involved presenting NANO TO TOUCH in relevant conferences such as ESOF 2010 (European Science Open Forum), as well as the Ecsite Annual Conferences during the project lifetime. A series of training workshops were scheduled to inform science communication professionals about the aims and methods employed by the NANO TO TOUCH consortium.

ECSITE ANNUAL CONFERENCE 2009

A fully functional temporary Open Nano Lab was installed at the Ecsite Annual Conference 2009, presenting STM research, nano-demonstrations, a nano-product display and information posters. Approximately 400 of the 1000 conference delegates visited the Open Nano Lab during the three days of the conference. Amongst the visitors was EU Commissioner for Research Janez Potocnik as well as many directors of museums and museum organisations.

The project was disseminated in various print media such as:

- Zentrum Neue Technologien
- The catalogue of the Centre for New Technologies
- Kultur und Technik
- The magazine for members and friends of the Deutsches Museum
- Il Sole 24 Ore Italian national newspaper

GUIDELINES

EXPANDING THE NANO TO TOUCH CONCEPT ACROSS EUROPE

NANO TO TOUCH merged communication and research in a powerful way to make nanoscience more understandable to general audiences. The project's strong network approach helped develop content and models that can be distributed and implemented in all educational and scientific communities.
These guidelines aim to provide a basis of information to professionals who would like to set up a similar live science experience in their own centre. Further information and advice can be found on the project website (**www.nanototouch.eu**) or by contacting the project coordinator (see last page).

RESEARCH IN PUBLIC IN AN OPEN NANO LAB

Scientists and their instruments play a central role in the Open Nano Lab. The university, science museum and science centre must work closely on finding the scientists and the research topics and offer space, communication and presentation expertise.

An Open Nano Lab includes:
➔ Workstations for nanosearch with visitor monitors
➔ A presentation area for demonstrating experiments
➔ Desk working places and a storage area
➔ Information boards and posters on nanoproducts, films about nano-effects, simulations on the function of SPMs and close up images of scanned surfaces.

SETTING UP A NANO RESEARCHER LIVE AREA

A Nano Research Live area combines permanent exhibits, demonstrations and interactive presentations. The live presentation area where scientists from a local partner university explain and discuss their current work.
Here are five tips to help scientists practice in communicating their work, address visitor concerns and challenge them to see their work within the wider scope of society:
➔ Give scientists the chance to present their work in public and enter into dialogue with the museum visitors.
➔ Prepare presentations in advance and set time for questions and casual discussion with the visitors.
➔ Discuss ahead of time presentation aids (such as posters, images, multimedia) and exhibits (such instruments, samples) needed to spark debate.
➔ Organise an event rota, coordinating date, participating researcher and topic to help scientists plan for the event and enable the science museum or centre to advertise the event.
➔ Arrange for basic communication training for participating researchers before the event. This should be organised by the coordinator using common background material. It is also a good idea for scientists who are new to the programme to visit a Nano Researcher Live event to observe the communication techniques used by their more experienced colleagues.

RESEARCH EQUIPMENT

Despite the public environment, the research conducted in an Open Nano Lab must be conducted in a process closely similar to investigations in a university laboratory, using identical preparation, measurement and evaluation equipment.
This guarantees that research results gained in an Open Nano Lab are identical in quality and relevance to those generated in the university. It also ensures that scientists don't waste time familiarising themselves with equipment or processes. They can fully concentrate on combining their research work with the new communication challenges they encounter working in public.

NANO-DEMONSTRATIONS

Demonstrations of various nano-effects enable the scientist to present the differences between the macroscopic and the nanoscopic worlds in a simple and easy-to-understand way.

NANOPRODUCT EXHIBITION

An exhibition of currently available nanoproducts helps show how nanotechnology is part of daily life. It should attempt to cover applications based on various nano-effects such as the antibacterial properties of nano-silver clusters or the water-repellent lotus effect. It should also include a selection of nanotechnology applications in medicine and sports, due to their importance and impact on society. A minimum of 20 objects is enough for a comprehensive overview of the nanoproduct market.

SCIENTIFIC GROUP

Strive to have a small independent scientific work group consisting of at least five people working in the lab. Aside from getting higher usage of the actual instruments, the task of communicating with visitors can also be shared, therefore helping other researchers concentrate more on their scientific work. A small working group ensures that young researchers can generate an ideal environment for scientific discourse and give visitors a more comprehensive insight into how modern research works on a day-to-day basis.
If possible, ensure that scientists have a quiet area where they can retreat from the visitors for a short time if necessary.

PRIVATE ENTRANCE

Scientific research does not know opening hours. To create optimum working conditions for the scientists, access to the Open Nano Lab needs to be assured outside of museum opening hours. It would be ideal to incorporate a private laboratory entrance in the vicinity of the Open Nano Lab.

MOBILE DEMONSTRATIONS

It is worth having various experimental and demonstration setups built on mobile carts for sample preparation or ferrofluid demonstrations. These can be wheeled into the laboratory or demonstration area when required.
Especially if most equipment has to be locked away at night for security reasons, this greatly reduces setup time for routine laboratory tasks. It also increases the effectiveness of visitor communication, as presentations profit from a greater variety of tried and tested demonstrations.


Deutsches Museum


Technische Universität München


MUSEO
NAZIONALE
DELLA SCIENZA
E DELLA
TECNOLOGIA
LEONARDO
DA VINCI


UNIVERSITÀ
DEGLI STUDI
DI MILANO


universeum


TECHNOPOLIS


Universiteit
Antwerpen


AHHAA


UNIVERSITY OF TARTU


IDIS


National Research Council of Italy


ecsite
European
Network
of Science Centres
and Museums

To learn more about
the project, visit
www.nanototouch.eu
or contact Paul Hix, Project Manager,
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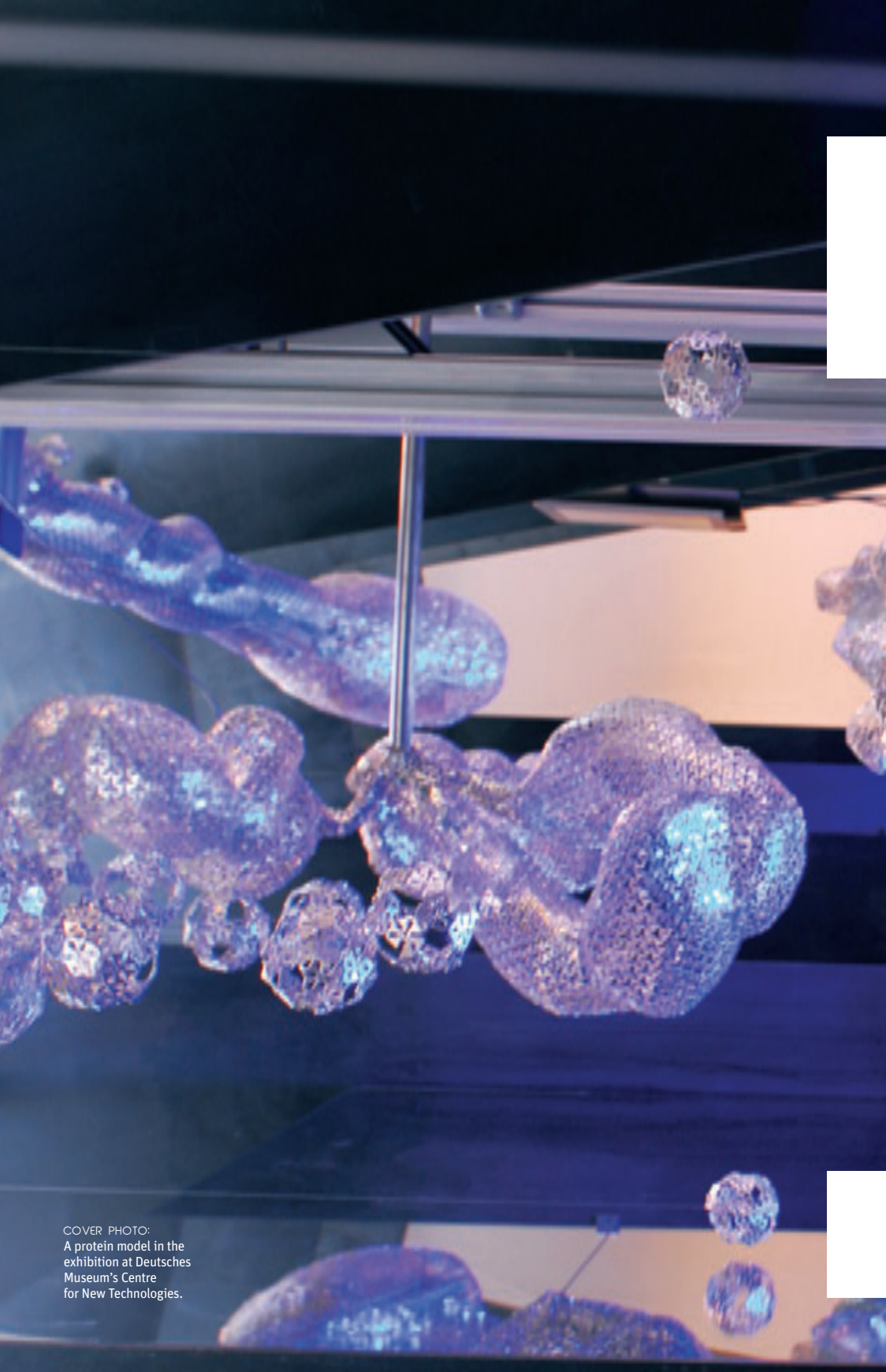

COVER PHOTO:
A protein model in the exhibition at Deutsches Museum's Centre for New Technologies.