

# DECK 50





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# A new place for participatory science communication at the NHM Vienna

*Katrin Vohland & Markus Roboch*

Through a participatory process, we have developed a wonderful vision for the Natural History Museum Vienna: “The goal of the Natural History Museum is to make a significant contribution to sustainable development in Austria, Europe, and the world. We want to achieve this through our excellent disciplinary, interdisciplinary, and participatory research, by opening up our collections digitally, through innovative, inclusive, and inspiring approaches to science communication, and by making the museum carbon neutral by 2030.”

Deck 50 is an important physical and virtual place of science communication to realize this vision. At Deck 50 we strive to achieve dialogue and discussion with various social groups on the major issue of the relationship between humans and nature. The topics are wide-ranging, encompassing everything from values in nature conservation to fisheries policy or sustainable practices in clothing production. We want to talk to farmers, biotech companies, scientists from other disciplines, and NGOs. We want to develop new products and solutions together, with the focus on sustainability and in an open innovation process.



Developing open innovation processes for the Natural History Museum, drawing on the infinite knowledge in the collections and related research, and opening up research processes are not only part of the new NHM strategy, but also a focus of science policy at European level. Just as the EU hopes Open Science will strengthen research, safeguard quality of life, and address global challenges such as climate change and biodiversity loss, the NHM also wants to make its own contribution. In a fun and inspiring environment such as that offered by Deck 50. We look forward to welcoming you!



# Crucible of a new museum culture

*Christopher Lindinger*

How does something new come into being? What sparks the enthusiasm that forms the breeding ground for new ideas?

As an opposite pole to uniformity, something new comes about when different perspectives, characters, or disciplines meet and interact – when somebody dares to take a different approach.

Such „creative collisions“ rarely happen by themselves. Instead, they require certain environments and opportunities to foster them. They demand visible, stimulating, and inviting spaces designed to be open enough to stimulate the need for participation.

Deck 50 is such a place – a place of inspiring exchange between researchers and the public, a place of enthusiasm for science, a place able to create something new by bringing together different spheres.

These intentions not only shape the appearance of Deck 50 – they are also intrinsic to the genesis of the project.

The beginnings of Deck 50 date back to 2014 and a meeting with Iris Ott at the Science Centre World Summit in Mechelen. Though we come from different museum worlds, we shared the vision that today's exhibition locations have a changed commitment and a new responsibility, especially towards the younger generation. During intensive conversations on the panels, during the breaks, and during the flight back, we sketched out initial project ideas. This enthusiasm born in Mechelen and the common will to initiate a transformation process drove us to initiate Deck 50 – regardless of the fact that it took years to get the necessary decisions and funding.

As well as its immediate value for teaching and learning activities at the NHM, Deck 50 has a symbolic value that extends far beyond the boundaries of the Natural History Museum – as a crucible of much-needed change in the museum culture of the 21<sup>st</sup> century.



# Idea & objective

*Iris Ott*

Housing over 30 million objects in its collection, the Natural History Museum Vienna (NHM Vienna) is one of the most important natural history museums in the world. In addition to an impressive display collection and exhibitions on socially relevant topics, the museum also performs basic research in the various fields of earth, biological, and human sciences. This makes the museum an important center of excellence for public issues and one of the largest non-university research institutions in Austria. For decades it has been not only researchers at the museum but also interested citizens who have made a significant contribution to this work. In future, such participation in research processes will be made even more accessible to the public. The aim is to bring research and society closer together through active participation and to establish the museum as a voice and location for this exchange.

People today want to get involved and be part of the decision-making process – not only in politics and society, but also when they visit museums. They wish to be freed from their passive role as mere recipients of information and instead become active co-creators and collaborators in educational activities and design processes. They strive to contribute their experiences, opinions, and views as (everyday) experts. The advantages of fostering such cooperation integrating visitors lie above all in those areas where the local, practical knowledge of the community overlaps and combines with the systematized knowledge of research departments. The debates that take place at these intersections underline how research is conducted and contribute to a

better understanding of research issues in the wider population. At the same time, such exchanges make research work more relevant to society and therefore create greater acceptance in the population of this research work and its results.

The participation of citizens in scientific activities dates back to the 18th century. At the NHM Vienna in particular, interested individuals have made and continue to make a significant contribution to many research and collection activities. Citizen Science is currently experiencing a considerable boom – not least thanks to the digital revolution of recent years.





While many citizen science projects use digital platforms and benefit from the opportunities offered by virtual access, exchanges between researchers and the general public also require physical spaces. This basic idea of citizen science is to become reality with the development and implementation of a dedicated space at the NHM Vienna – Deck 50. The name is based on the old numbering system used for the halls in the museum. The word “deck” stands for a platform and promenade, a launchpad and landing site for ideas, research and discussions. Conceived as a communication platform with multiple perspectives, Deck 50 has been designed to be an open space for innova-

tion and experimentation in which new knowledge is generated and consolidated together through participatory formats so that it can flow into scientific research. Deck 50 sees itself as a never-ending work in progress, where formats are constantly expanded and changed, and socially relevant issues are addressed and integrated.

# Participation as a spatial concept

*Jakob Illera*

What can architecture do to support and promote participation?

Deck 50, the NHM Vienna's new science communication area, serves several different purposes. As well as putting on exhibitions, the museum also hosts events, lectures, and workshops. This diverse museum profile has been used to develop clearly defined areas which should be immediately understandable without the need for explanations.

Since there are always two sides to communication, when it comes to teaching and learning activities related to science it is important to involve both sides: researchers and visitors. The space must be a place which speaks to people, but without being overly rigid. It should be flexible and variable, but it should not be chaotic.

The space is therefore divided into several areas. The boundaries between these areas sometimes blur, but then emerge again clearly. The Meeting Zone also serves as a seating area, with a Stage and with Boundary Objects integrated into interactive stations. Opposite the Meeting Zone is the Laboratory with a Workshop – a little like a UFO which has suddenly landed – inviting participants to observe and investigate.

Almost half of the 260 square meters are taken up by the Stage. This consists of a seating area with space for up to 60 people and an 11-meter-long LED wall which can be used for multimedia purposes. The Stage and seating area extend along the

length of the room, thereby bringing the speaker and audience close together. This proximity helps remove barriers between the speaker and the audience, enabling a more direct way of working together at events and lectures – participation becomes easier, science is brought closer to the people.

In day-to-day museum work, the area around the Stage is a Meeting Zone. The seating area is a little like a mountain slope gently nestling into the surrounding space. Natural materials, comfy seating, and a color design characterized by different shades of green create a pleasant atmosphere which invites visitors to linger –





a place of peace and relaxation which appears to grow larger with natural daylight and views of the surrounding area, that connects with its environment both outside and inside.

Opposite, like a panoramic mountain vista, the 11-meter-long LED wall with an installation by the Ars Electronica Futurelab invites visitors to immerse themselves in virtual worlds. They can use a scanning station integrated into a large mobile drawing table to create different worlds that are immediately visible on the LED wall. The LED wall is sufficiently bright to operate Deck 50 in daylight – an essential factor for a pleasant and effective working environment.

As well as natural daylight, Deck 50 is lit using a lighting system with various programmed settings that can be adapted to a wide variety of needs and moods (lecture, workshop, or open museum). The acoustics, which have been dampened using a range of methods, help support the desired mood.

On the other side of the room is a steel construction that divides the space vertically into two levels. The lower area is equipped with a Laboratory with white overhead lighting, creating a sterile design to imply serious scientific research without further explanation. Sheet glass make it possible to look in and out at the same time – to



observe and be observed. Workshops for different age groups are offered in this Laboratory. Display cases provide space for scientists to present objects related to the respective workshops. When no workshops are taking place, the Laboratory is freely accessible to visitors. Special workshop boxes are available for visitors to work on and document at their leisure.

On the roof of the Laboratory, as it were, there is a workshop area for school classes. With its red lighting, designed to be both activating and stimulating, this Workshop forms a counterpart to the quiet laboratory area. This is the place for lively exchanges between scientists and pupils or other visitors. The Laboratory and the Workshop area both are equipped with specially designed tables which can be converted quickly and easily from a large table into small groups of tables.

The Boundary Objects are located between the seating area and the Laboratory. Appearing like large rocks, they mark the significance of the themes they address – themes which transcend the borders between science, society, culture, and politics. They will be redesigned on a regular basis by different departments at the museum.

Making science communication tangible – that is what the new Deck 50 is supposed to be about. The Boundary Objects aim to encourage visitors to discover science in a playful, hands-on, and accessible way using 3D-printed steel items that would otherwise be impossible to touch, or through the visual creation of content using voice and sound input, or by means of an exhibition showcase overlaid with a transparent smart monitor – quite literally making science communication transparent.

# Participatory interventions between art, technology, and society

*Marianne Eisl & Stefan Mittlböck-Jungwirth-Fohringer*

Since the mid-1990s, the research work carried out at the Ars Electronica Futurelab in Linz has focused on the interaction between art, technology, and society. At the heart of this triangular relationship lie human beings. This raises crucial questions: How do new technologies and scientific discoveries affect our lives? And what role does the dialogue between individuals and science play in overcoming challenges relevant to the future of humanity? Advancing precisely this dialogue and curating the necessary points of contact between science and society were the objectives when it came to designing and implementing Deck 50. Many current scientific issues must first be made accessible in order to involve broad sections of the public – not only to find answers away from the well-trodden tracks of knowledge transfer, but above all to ask the right questions in the first place.

Science shapes our daily lives in ways which go unnoticed by most. It grows continuously, adapts to changing fields of application and constantly delivers new findings to redefine and develop itself further. However, the people who are directly affected by its impact often have little influence on the areas of research which determine scientific developments. One of the main reasons for this is that scientific publica-

tions are usually written in highly technical jargon that requires very specific prior knowledge to be understood; this makes it difficult for the general public to access this content and effectively participate in future-oriented discussions/discourses on specific topics. This imbalance between the often-cited ivory tower and society as a whole needs to be levelled out. To do so, opportunities must be created to find and shape points together where members of the public can connect with science-related issues.

One possible way to simplify complex information is to transform hard-to-grasp topics into a format closer to the realities of daily life. This makes it possible for citizens to address these issues at a level more familiar to them. By turning scientific content into tangible, hands-on and emotional experiences it is possible both to reach a wider audience and to ensure that the knowledge gained lasts long in the memory. Creating tangible points of contact lays the foundations for public participation in scientific research – a foundation consisting of interest, relevance, and reference to oneself. These facets open up the opportunity for society to engage more intensively with scientific matters, to enter into dialogue with scientific questions, and to become part of these questions themselves.



Deck 50 gives form to this ambitious strategy through interactive stations, stage, and laboratory formats as well as a platform hosting different workshops. Overall, Deck 50 aims to communicate the NHM's research work at different levels, encouraging society to participate and thus involving citizens in the research process. Research topics are made accessible via three communication levels: the information channel presents a research topic in an interactive, appealing, and easy-to-understand way; an object from the museum collection establishes the link between science and society; and a participatory element encourages visitors to get involved. These three elements are brought together in small islands offering optimal conditions for high-quality visitor contributions. They make it possible to engage with content in depth, to think about one's own position on a certain topic, and to take a moment for reflective participation. All participatory formats have been designed as framework systems and can be adapted to different topics. Depending on the type of participation and the degree of engagement, the Deck 50 tools can be adapted to suit the requirements of different research areas. For example, visitors are invited to share new perspectives, discuss different social motivations, provide information on their own behavior as part of a demographic study, or contribute personal data to a projection.

The challenge when it comes to designing learning formats – be they participatory, interactive or direct, i.e. touching real-life objects – is to create „minds-on“ experiences. On the one hand, these represent a significant part of the museum's educator-led content; on the other hand, they allow enough freedom for visitors to incorporate new knowledge into their own constructed reality. In this context, „minds-on“ means that a format offers ways to connect to individual prior experiences and thus makes content more tangible and easier to understand. This, in turn, makes it easier for the participant to absorb the knowledge acquired and apply it in future settings. If we can succeed in reaching this point, where knowledge takes on personal meaning, we can encourage large parts of society to actively participate in scientific discourse and shape our common future together with scientists.

# Deck 50 as a social learning space: laughing and learning together

*Agnes Mair & Iris Ott*

Studies in the US, Australia, UK and Denmark have shown that 60–70 % of people visit museums with their family. 25–35 % come as part of (school or adult) groups, while only 5 % visit museums alone (1). These figures correspond to our own observations at the NHM Vienna and show that learning is a socio-cultural process: learning involves other people – we learn through interactions, conversations, gestures, emotions, and by observing others.

A space for all, Deck 50 aims to make intergenerational learning possible in a fun and entertaining way. Deck 50 makes the link between research and society visible and tangible for different age groups. It is a space for researching, experimenting, chatting with experts, exploring interactive exhibits, and taking part in sustainable participation processes. The focus is on mutual enrichment through new perspectives, with greater weight being given to the opinions and views of individual citizens. This takes place within a framework of learning activities and innovative dialogue activities as well as close cooperation with the museum's own researchers. The space is attractively designed in terms of content, aesthetics, and media. It should draw in visitors initially hesitant to get involved.

Diversity is a fundamental principle. The furniture and the exhibits at Deck 50 have therefore been designed to allow a high degree of flexibility. In order to realize this

principle in the design and content of the activities on offer. This makes it possible to exchange ideas and opinions on the topics raised at the participatory stations. Citizen Science projects can be integrated with little effort. The level of participation varies and failure is not only allowed but also planned for.

Each station is easily accessible, including for wheelchair users. The atmosphere of the room invites visitors to linger – there is free Wi-Fi and a range of charging options for mobile phones. A spacious seating area has books to browse through and invites participants to chat with other visitors.

Deck 50 is equipped with state-of-the-art technology, but this technology can be accessed in an easy and playful way. A participatory format on the 11-meter-long LED wall is aimed to appeal especially (but not only) to younger visitors, who are invited to bring immersive worlds to life. These interactive virtual worlds are intended to spark visitors' imagination and encourage creative engagement with the objects in the collection. Drawings made at a large table on the themes of water, caves, or the museum are inserted into the virtual world at a scanning station and thus showcase the different perspectives of a wide range of visitors. These contributions remain visible to subsequent visitors, giving the space an individual atmosphere and providing inspiration for future drawings.



The LED wall is also a digital presentation surface for innovative and entertaining show formats for all age groups. If required, the seating areas can be turned into audience seating stands. Thanks to the proximity between the speaker and the audience, everything that happens in this Stage area takes place in close dialogue. There is also the possibility, for example, for visitors to take part in surveys using their own mobile phones by scanning a QR code. The results of the poll can then be integrated immediately into the live lecture.

Another spatial element for intergenerational learning is the Laboratory. Open labs are available for mixed audiences (families, individual visitors). Here, visitors can experience together how science works; they can observe and draw conclusions independently.

All activities at Deck 50 are developed and implemented together with scientists from the museum and/or with external partners. The activities are linked to the realities of the users' lives. The input created by visitors is stored in a visible and attractive way for subsequent visitors, but also flows into the research and thus contributes to the NHM Vienna as an institution. In this way, the museum departs from its authoritarian position and instead becomes a learning resource for everyone – museum staff and visitors alike. Visitors, on the other hand, step out of their role as learners. The strengths of all participants form a creative basis for new knowledge acquired in a fun, playful way.

# Four eye-catching pieces of furniture as research tools

Marianne Eisl, Karina Grömer, Vera Hammer, Christoph Hörweg, Andreas Kroh, Iris Ott, Viola Winkler & Frank Zachos

Much research work does not follow a fixed pattern of thinking. Instead, it requires new, open paths that can be tested and pursued – but also discarded and abandoned. A digital system integrated into four pieces of participatory furniture at Deck 50 provides the flexibility needed to easily share the content shown and process the data generated for research purposes, adapting to the rapidly changing priorities of a wide range of research areas.

Each of the four pieces of furniture has been designed in close collaboration with the scientists of the NHM. Each addresses a different research topic. One or several items from the museum's collection, known as "Boundary Objects" (2), serve as points of reference. An information level conveys the necessary basic knowledge without polarizing, so as not to prescribe to visitors any specific line of thought. All participatory elements have been designed for easy accessibility to create an inclusive experience regardless of height, age, or mobility. Touchscreens can be operated while standing or sitting; seating areas and interaction surfaces provide enough space for wheelchair users.

The Boundary Objects as well as the digital content shown are interchangeable, but the four pieces of furniture differ in their respective mediation and participation strategies: *Self-Knowledge*, *Opinion*,

*Stock-Taking*, and *Change of Perspective* reflect the different aspects and approaches under which specific topics are viewed from multiple perspectives. The choice of the appropriate item of furniture depends on the research question, the desired form of participation, and the intensity.

## Self-Knowledge

The *Self-Knowledge* furniture makes it possible to record one's own observations and compare them with those of other visitors. No or very little prior knowledge is required; however, the information provided is relevant for various research purposes. Current questions relate to edible marine animals. The answers collected are made visible on a virtual globe, taking into account where each participant comes from. Topic-specific hands-on objects help to recall relevant experiences or stimulate a cognitive process.

The NHM Vienna is conducting research on the evolution, phylogeny, diversity, and ecology of marine animals – including many edible ones such as sea urchins and crabs, but also non-edible ones such as corals. Unlike most habitats on earth, there are vast areas of the oceans and their creatures we know little about. Exploring them, however, is a race against time. Fishing, sewage, rubbish, tourism, and industrial use as well as mixing of fauna due to the unintentional transport of species over



large distances have permanently changed the oceans and led to the extinction of numerous groups of organisms.

For the participatory station *Self-Knowledge*, paleontologists and zoologists from the NHM Vienna have chosen the explosive topic “Food from the Sea” to encourage people to think about their own eating habits. After all, marine animals are a popular but also finite resource on which a large part of the world’s population depends.

Sea urchins and sea cucumbers have been cast in synthetic resin to present them in the most lifelike way possible. Shells of giant barnacles have been arranged into a mini-diorama to show how these crustaceans grow on rocky terrain. A lobster has been preserved in polyethylene glycol to position its limbs in a natural posture.

To provide an additional hands-on experience and to better highlight individual morphological details of the animals, micro-CT scans have been produced. Characteristic regions of the body surfaces have been greatly enlarged and integrated into the station in the form of bronze 3D prints.

Two interactive monitors provide information about the animals on display and about WoRMS – the World Register of Marine Species, a global project on marine life with Citizen Scientist participation. A simple question-and-answer game allows visitors to compare their own eating habits with those of other museum visitors. This gives researchers an insight into which kinds of seafood the visitors know about and which types of seafood they eat frequently.

### **Opinion**

The furniture *Opinion* provides scientists with an insight into current opinions on an issue. Visitors can give their personal opinion on a specific question through voice and word input. These opinions then virtually flow around the exhibited Boundary Object and thus form a “work of art”. At present, an oversized weaving device as a hands-on Boundary Object represents a link to research on textile production.

The NHM Vienna conducts interdisciplinary research on clothing, design, and craftsmanship over the course of history, based on textile finds in Central Europe dating



from the Stone, Bronze, and Iron Ages. A special focus is on the Hallstatt salt mine, where remains of textiles over 2,500 years old have been discovered – very high-quality pieces, some of them featuring colorful patterns, intricately crafted using the simplest of tools.

In the 21<sup>st</sup> century, however, textiles have become mass-produced goods – a trend known as “fast fashion”. Such goods are often produced under questionable conditions (exploitation of workers, unnecessarily long transport routes, chemicals polluting the environment). This is why many people are getting more and more into making their own textiles – “do-it-yourself” has become a big trend. Re-learning old techniques and designs is also an important contribution to preserving this intangible cultural heritage.

Then, as now, clothing was and is used as a non-verbal means of communication. In order to capture the widest possible range of meaning and symbolism in clothing, the museum’s prehistorians invite visitors to participate in a Word Cloud on the question “What does clothing mean to you?”.

Another opportunity to collaborate is the Citizen Science project “Weaving Techniques”. Citizen Scientists are invited to actively participate in research on millennia-old tablet weaving designs. Via posts on the internet (Pinterest and Instagram), “(craft) knowledge” from around the world is made accessible to the crowd. Participants can learn how certain items were made and, for example, how much time it takes to make them. The sum total of all this input provides research with valuable clues about the significance of textile handicrafts to economic, technical, and social history.

## **Inventory**

To raise awareness of the fact that each and every one of us has an impact on society – no matter how small – the *Inventory* item of furniture gives visitors the opportunity to access information via a transparent touch screen and also to provide information on their own behavior together with demographic data. The transparent display is incorporated into the front of a display case fitted into the wall. It currently contains rare raw materials which are



needed to produce mobile phones. Via the display screen, visitors can take part in a survey on the number of mobile phones they have in their household. The information is added to the data already collected from other visitors, analyzed and shown as an overall result. The visitor gets to see how much he/she personally contributes to the total, while researchers get an idea of the current figures. Overall, the collected data can contribute to a significant (scientific) statement with regard to the research topic under discussion.

The topic “Mobile Phones” aims to raise awareness in our throwaway society to the rapidly increasing depletion of resources. Mobile phones are synonymous with disposable modern consumer culture and the valuable mineral raw materials such electronic devices require. Through sensible recycling, many of these materials can be reused. In addition to “recycling”, topics such as “mining of critical raw materials”, “child labor”, and “urban mining” are also addressed.

Around 60 different raw materials go into a mobile phone. A selection is currently presented at the *Inventory* station, with de-

tails on their properties and uses. The other minerals and ores mentioned can also be viewed in the museum’s mineralogical display collection.

The station is intended to raise awareness among visitors to the raw materials situation and help to ensure that fewer electronic products are carelessly thrown away. Visitors have the chance to recycle their own mobile phones as part of a cooperation with the national radio station Ö3.

### **Change of Perspective**

The *Change of Perspective* furniture offers an open and free playing field in which opinions and views on a specific topic can be shared with the museum team and other visitors. A drawing app makes it possible to design the environment around a controversial museum object. As *Deck 50* launches, it will feature taxidermically preserved wolf – a species worthy of protection, a predator and fairytale villain. The works created by visitors appear directly behind the free-standing object on an LED wall and illustrate different perspectives on one and the same object.



Wolves have a bad reputation among many people. Even fairytales talk of the “big bad wolf”. Now that wolves are repopulating many areas where they were once wiped out by humans, including parts of Austria, we find ourselves again confronted with wolves and the problems they pose. Wolves are, of course, not “evil”. Instead, they are predators that hunt not only deer or wild boar but also sheep or calves when the opportunity arises. This leads to conflicts with farmers, especially livestock farmers. Wolves are strictly protected by law and have the right to find a “new” old home in Austria. We will have to get used to living with wolves again. Indeed, we owe a lot to wolves – they are the ancestors of all domestic dogs, which are ultimately nothing more than domesticated wolves.

The wolf station offers the opportunity to get up close to a real wolf and get an impression of its size and appearance. Information texts provide details on the biology of wolves and tips on how to behave if you ever come across a wolf in the wild. In video interviews, museum visitors talk about their attitudes towards wolves, while researchers, shepherds and conservationists also have their say. Visitors get a good impression of what wolves mean to the various stakeholders, what fears and problems there are, and what can be done to ensure humans and wolves live alongside each other in the most peaceful way possible. Visitors are also encouraged to contribute comments, suggestions, drawings, etc. digitally. The resulting highlights can also be interesting for researchers.

# A laboratory as a knowledge workshop

*Agnes Mair & Iris Ott*

The Laboratory is an experimental field and knowledge workshop. It is here that visitors experience how science works, can observe for themselves and confidently draw conclusions. The focus is on research as a process and acquiring scientific knowledge as an experience in its own right.

Trained educators support visitors in scientific and artistic workshops, while scientists present their practical methods. The Laboratory has two levels. The lower level focuses on the research work at the NHM Vienna and gives visitors the opportunity to learn about scientific methods used in the museum. The clear, cool, bright-white ambience is ideal for detail work, microscopy, and simple experiments. It is designed to stimulate thought processes.

The upper level focuses on a playful and creative approach to science and research. It offers space for freer working and implementing one's own ideas. The all-red ambience is intended to stimulate creativity and promote a playful approach to research. Here, people can experiment with various materials and work on new approaches to solutions. The results are clearly visible to subsequent visitors.

The Laboratory is primarily designed for students and adults who register in advance for workshops. On weekends there are „Open Labs“ for the general public for which no registration is required. School groups use the Laboratory primarily on weekday mornings and afternoons, adult groups and the general public (adults and

children) on evenings and at weekends. For workshops with a large number of participants, working groups can be divided between the two levels. All furniture (tables, seating, etc.) in the Laboratory can be moved to create the optimal layout for a wide variety of workshops. The Stage area can also be incorporated for larger groups and settings.

Glass fronts make the Laboratory appear larger than it is. When the doors are open it is possible to interact with other areas of Deck 50, for example with a presentation taking place on the Stage. If workshops require a more private or quiet atmosphere, or if other visitors are not to be disturbed, the doors are kept closed.

## **Formats in the Laboratory:**

### **Open Labs**

How does science work at the NHM Vienna? Open Labs invite visitors to learn the basics of scientific work, understand research methods, have a go themselves, and draw conclusions.

All the necessary tools are waiting in prepared boxes: original objects, research tools, and tablets with information and instructions. Step by step tasks are solved, results noted, and new insights gained. At the end of the process visitors receive “their research work” via QR code and can therefore go back over their work at home. The research areas of the NHM Vienna also determine the content of the Open Labs.



The wide range of topics ranges from mineral identification to bio-archeology to taxonomy. The topics are regularly changed and continuously expanded.

### **School workshops**

The two labs at Deck 50 offer plenty of space and new opportunities for school classes. Tried-and-tested workshops from previous years will be continued, but can be expanded to include digital aspects. New workshops will emerge and incorporate the Deck 50 infrastructure – from the LED wall to the content and functions of the interactive hands-on stations.

### **Getting to know diversity**

In cooperation with scientific associations, a series of workshops is currently being developed to raise awareness about the major topic of biodiversity. The aim of this “School of Taxonomy” is to inspire more members of the general public (“lay persons”) to take an interest in the taxonomic basics of biology. As a “school of observation”, the museum aims to arouse interest in biodiversity with regular events, deepen knowledge about the many various forms of biodiversity, and at the same time also intensify links between fieldwork, collection, and research.

# A stage as a communication amplifier

*Iris Ott*

The museum becomes a stage on which science can be experienced and made understandable. The stage serves as a communication amplifier, where above all current topics relevant to society find a place. The overarching goals are to stimulate explorative learning, to communicate scientifically sound information, but also to leave room for personal perspectives. Deck 50 is a constant “work in progress”, i.e. the programs are constantly being expanded and changed. Socially relevant issues can be responded to immediately.

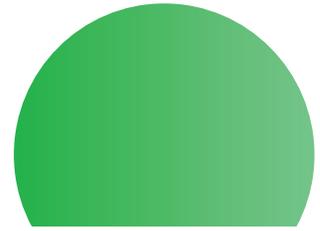
The stage offers researchers an ideal platform to present their work live or to comment on current topics – always in dialogue with the audience. The museum will also increase its efforts to cooperate with organizations and educational institutions in local communities and thus expand its radius of action to the neighboring districts.

Experts from various institutions and disciplines working with different teaching and learning approaches are invited to present their work on stage. In this way we aim to create sustainable, long-term educational and research cooperation which will tie into each other and intensify even more the network for active participation in research.

There is space for up to 60 people in the seating area, while the steps can also be used as tables if the audience is asked to work together in groups. The spatial design of Deck 50 puts the space between the seating area and the LED wall (and the projection screen behind it) in the center of attention. A mobile lectern can be positioned for any event within a few minutes. When no shows are taking place, the seating area serves as a chillout zone where people are invited to sit down and chat with other visitors.

# Live Microtheater

*Andreas Hantschk*



Using powerful microscopes and cameras, trained science educators present tiny organisms in an XXL format. The high-contrast LED wall measuring 11 × 2 meters presents live images from research microscopes combined with matching photos and film clips.

Since the shows feature live animals and plants, no two performances are the same. The “stars” are bacteria, tiny protozoa, water fleas, insect larvae, and other microscopic marvels. Unexpected behavior and surprise appearances from unexpected species make for exciting moments.

The focus is on the shared view through the microscope, which is made possible thanks to state-of-the-art technology. Visitors can participate by observing together with experts, contributing their own objects or experiences, and exchanging their opinions with other participants. In this way the microtheater becomes not only a stage where science can be experienced and understood, but also a platform for communicating current topics.

Many organisms just about visible to the naked eye reveal fascinating details when magnified to ten times their normal size. Stereomicroscopes are used, for example, to examine the various developmental stages of mosquitoes and other insects – creatures many people often only know about through annoying everyday encounters.

Tiny objects such as bacteria, single-cell organisms, algae, or even our own blood cells need up to 1,000× magnification to become visible to the human eye. This requires powerful research microscopes which highlight low-contrast objects and provides fascinatingly lifelike up-close perspectives. Presenting tiny microorganisms in real-time to a live audience is one of the specialties of the microtheater.

Such insights into a world invisible to humans in everyday life fascinates visitors and educators alike. After the presentations the audience is invited to have a go at operating the microscopes themselves with the help of expert guidance.





# Science Quiz

*Andreas Hantschk, Agnes Mair & Bernhard Weingartner*

This interactive show combines research-based learning with a playful competition format, drawing on the multimedia features at Deck 50 and rounded off with amazing live experiments. Lasting 20 minutes, each show focuses on a selection of museum objects centered around a single theme.

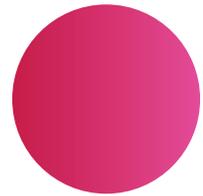
One question is asked about each object. The participants must then choose from four possible answers. An experiment is then carried out to show which answer is the right one, but the result is not always clear – and sometimes is more than one right answer. This process aims to raise understanding among participants about the evidence-based approach used to acquire scientific knowledge.

The experiments illustrate the connection between the museum's "static" objects and chemical and physical processes. They are intended to raise interest in natural sciences and to encourage people to see the exhibited objects in a wider context and discover the connections between them.

Voting is carried out using a clever, easy-to-use tool. Those who want to participate receive a square card with a QR code and vote for one of a maximum of four possible answers by holding the card in a certain direction. A camera records the cards and automatically logs all the answers. After each question, participants can see how previous visitors voted. At the end of the show there is an overall ranking and the numbers of the cards with the highest total scores are shown. Those who want to go up on stage and receive plaudits for their performance can do so, while those who prefer to remain anonymous and enjoy their success in silence can remain seated.

The well thought-out concept of this format enables very efficient handling. A single educator can – after receiving the necessary training – moderate, control the multimedia elements, and carry out the experiments.

# Augmented Reality Dinosaur Show



*Ursula Göhlich, Mathias Harzhauser, Agnes Mair & Konstantin Höbart*

The dinosaur show aims to make the life and habitat of dinosaurs an interactive and participatory experience using augmented reality. Based on real skeletons and the latest scientific findings on the physique and behavior of these animals, the team from 7reasons – in cooperation with the NHM Vienna’s paleontologists – have created new 3D reconstructions of the animal and plant world of the Mesozoic. These 3D models were then brought to life using computer animation. Although the dinosaurs are clearly the “stars of the show”, the landscapes and the prevailing vegetation have also been painstakingly reconstructed in great detail. A high-resolution infrared depth camera films visitors and allows them to immerse themselves in this augmented reality world and interact with the dinosaurs up close. NHM educators can freely navigate through the different scenes and thus vary the focus of the show according to the target audience. This technology does not require VR goggles and creates an up-close-and-personal experience for all participants.

The show takes visitors on a journey back in time. Two scenes offer insights into the terrestrial ecosystems of the Triassic and Jurassic periods. The third scene invites participants to dive into the tropical sea of the Cretaceous period. These experience levels are connected by “wormholes” through which the audience travels before landing in the middle of events in the next age. Visitors keen to learn more about what they have seen in the animations need only go down two floors – all the scenes refer to

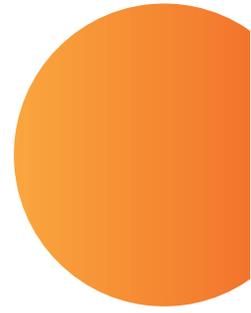
exhibits on display in the main collection, for example the *Diplodocus* skeleton in Hall 10 and the new *Plateosaurus* skeleton in Hall 8 (from spring 2022).

Visitors to the dinosaur show not only learn hard facts about the appearance and behavior of the animated creatures, but are also captivated and involved in the scenes by unexpected and sometimes humorous events. Where else can you find yourself up to your neck in (dinosaur) poo?



# Meet a scientist

*Pedro Frade & Iris Ott*



These 20-minute show formats invite scientists to present their work live – always in dialogue with the audience.

Images, videos, and animations on the LED wall, authentic objects on stage and audience surveys are all part of the show. The presentation follows a script with the aim of building a relationship between the audience and the scientist, arousing curiosity about the research work and linking the scientific topic to everyday life.

In his presentation, coral reef researcher Pedro Frade reveals the “secret of coral slime”. To inspire and encourage future researchers in the audience, the curator of the Evertibrata Varia collection begins by

giving an insight into his own personal research biography.

He then presents his research work in detail, featuring not only pictures and videos on the LED wall but also original objects. The audience is involved via an interactive voting system and is allowed to comment on topic-related questions such as “Why do corals have slime on their surface?”. Several answers are available: To survive when they come into contact with air? To grow bacteria? To keep their surfaces clean? Because they have a cold? Voting is carried out anonymously via cards captured by cameras or using a QR code downloaded onto the participant’s mobile phone. The result can be made displayed immediately on the LED

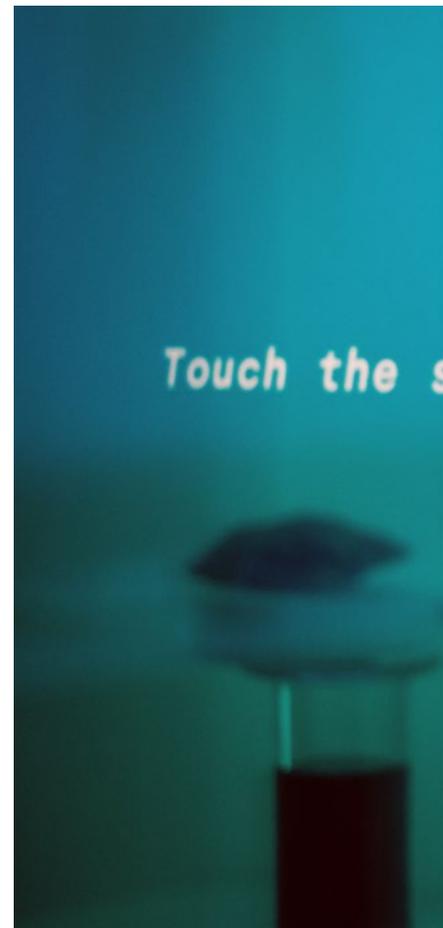


wall. This makes it possible to react spontaneously to the opinion of the audience, to offer additional information, to create lightbulb moments through small quizzes, or to illustrate the topic through references to everyday life.

This enables members of the audience finds out for themselves, with more or less assistance, that corals live in interaction with thousands of bacteria. How do these bacteria help the corals? Often there is not just one correct answer to questions like these – and ideally a dialogue or discussion develops. Just as the audience learns from the scientist, so the scientist learns from the audience, their experiences and expectations, and from the analogies that arise in answering the questions.

The show concludes with a take-home message for the audience.

Corals actually actively breed beneficial bacteria. As long as this community of bacteria remains in balance, the health of the coral animal is assured. There are clear parallels to our own relationship with bacteria. The audience is therefore invited to reflect on human dependence on diverse bacteria and to perceive bacteria not only as something threatening, but also as reliable partners for a healthy life.



# Making innovative room technology easily accessible

*Helmut Pristacz*

Deck 50 has been developed so that visitors themselves can interact and thereby become part of the system. The aim is to invite visitors to actively participate in selected topics by getting involved in the hands-on stations. The design and user interface of these stations have been developed with the Ars Electronica Center in order to ensure not only that they are easy to use and maintain, but also that they can be redesigned with relatively little effort. Visitors benefit from the user-friendly

interface on the touchscreens, while the NHM Vienna staff benefit from the simple and clear operation of the CMS (Content Management System).

The CMS is controlled via a tablet connected to the Deck 50 network. The web-based user interface has been programmed so that the entire room can be switched on or off with a single button, while each station can also be turned on and off separately if required.

screen / Bildschirm berühren



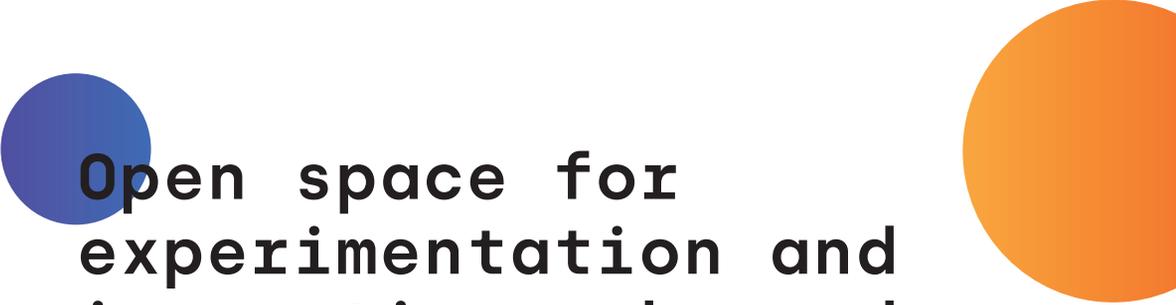
The 11-meter-long LED wall provides an impressive stage for presenting scientific topics. Content stored in the CMS can be shown at the same time as a “live image” from a notebook or tablet. It is also possible to involve visitors in a presentation, for example by having them take part in a live survey by voting anonymously using voting cards captured by two cameras or using a QR code displayed on the LED wall that they download onto their mobile phones. The sound system and lighting technology provide effective effects to complement the presentations on the LED wall.

Deck 50 combines the conventional with the innovative. Visitors are invited to draw in the classic way using pencil and paper, then the works can be uploaded to the large

LED wall at a scan station and – brought to life with movement and embedded in an immersive world – made visible to everyone in the room.

The services are as diverse as they are multi-layered. Visitors chill out in the seating area and browse through books freely available on integrated bookshelves. At the same time, they charge their digital devices at one of the various charging stations incorporated into the furniture.

From a technical point of view, Deck 50 appears to be a closed system. However, the modular CMS in the background leaves plenty of potential for developing future formats.



# Open space for experimentation and innovation: where do you want to go?

*Ines Méhu-Blantar & Iris Ott*

With its architecture, modern technology, and opportunities for innovative communication, Deck 50 offers an optimal starting point for a lively discourse and promotes the flow of knowledge between cutting-edge topics currently occupying society: climate change, the environment, biodiversity, digitalization, artificial intelligence, nutrition, health, use of resources, ethics, space research, and many more. Current challenges as well as future scenarios will be examined from different perspectives. This, in turn, demands easy access to knowledge, dynamic exchange, creativity, and the inclusion of as many different participants as possible. Especially with regard to innovations and new technologies, there is a need for holistic reflection, a sustainable participation process in the area of tension between science and society.

## **Knowledge transfer research**

The human factor plays a decisive role in all the topics, projects, and ideas that animate Deck 50. Social developments in the wake of the current pandemic in particular make clear the extent to which emotions can override cognitive processes and influence our actions, decision-making, and interpersonal communication.

What effect are we exposed to as interaction partners or observers? How complex

are the processes that take place when we – individually or in groups – marvel, grasp, reflect, and learn? What are the principles we use to filter information – and what has to happen for us to fundamentally change our behavior? Under what circumstances do we engage in interactions with unfamiliar partners? Deck 50 has been designed in such a way that interdisciplinary knowledge transfer research is constantly incorporated and thus becomes the driving force for inclusive usage strategies, new educational concepts, and future spatial design.

## **Art and design as a vector**

Creative visualization of participatory processes in the form of joint results means even complex data becomes emotionally tangible; this creates an additional level of teaching and learning that facilitates access to multidimensional content. Innovative outputs can subsequently be made visible in analogue and digital galleries as well as in the public space at Deck 50 – gathering results and stimulating innovation at the same time.

Companies that are aware of their Corporate Social Responsibility (CSR) are invited to take on “knowledge sponsorships” in order to actively promote participatory and creative knowledge transfer on specific topics.



### **Open doors – open minds**

Deck 50 has been designed as a dynamic platform for innovative topics. It offers optimal conditions for involving scientists from all disciplines, citizens, associations and NGOs/activists, artists, representatives of politics and business, and companies in discussion and knowledge-generating processes. Projects and ideas catalyzed within the framework of Deck 50 are characterized by inter- and transdisciplinary approaches and are oriented towards the most pressing social issues of our time.

The added value is that new knowledge is generated jointly and anchored sustainably through participatory formats in order to subsequently flow into new scientific questions. In addition, jointly gained insights and emotional experiences are made visible as signposts for the future.

**"Knowledge creation is collaborative, and interdisciplinary approaches are essential to 21st century problem solving – for this we need everyone, not just a few. Open doors – open minds." (3)**





## Imprint

Publisher: © 2021 Natural History Museum Vienna, w. A. ö. R. All rights reserved. Für den Inhalt sind die Autoren verantwortlich.

Editorial staff: Katrin Vohland and Andreas Kroh, Natural History Museum Vienna, Burgring 7, 1010 Vienna, Österreich, E-Mail: [verlag@nhm-wien.ac.at](mailto:verlag@nhm-wien.ac.at)

Editor: Iris Ott

Recommended citation: Ott, I. (Ed.) (2021): Deck 50. – 36 pp., Vienna (Verlag des Naturhistorischen Museums Wien).

Zitiervorschlag (Einzelbeiträge): Illera, J. (2021): Participation as a spatial concept. – In: Ott, I. (Ed.) (2021): Deck 50. – p. 8–10, Vienna (Verlag des Naturhistorischen Museums Wien).

Layout: Department of Science Communication

Technical support: Josef Muhsil-Schamall

Printing: Gerin Druck GmbH, Wolkersdorf

Link zur Offenlegung gem. §25 MedienG:  
<https://www.nhm-wien.ac.at/impressum>

Proof Reading: Brigitta Schmid and Andrea Kroh

## Image credits

Cover; p. 2, 5, 7, 9, 10: Mag. Gebhard Sengmüller

p. 3, 24, 33: Christina Rittmannsperger

p. 12–19, 22, 27–30, 32, 34, 36: Stefan Gergely

p. 20: Ars Electronia Futurelab

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# DECK 50

Together with the Ars Electronica Futurelab, a unique space was created – a combination of a modern laboratory, a stage with an eleven-meter-long LED wall and an open zone for interactions with interactive furniture. The setting invites to discover, try out, discuss, acquire knowledge, ask questions, and contribute ideas.

Deck 50 is intended to become a lively place that is constantly evolving through an intensive exchange of ideas between museum employees and visitors. Much more than before, we want to offer the opportunity to take an active part in what is happening in the museum. The collaboration between external partners and the museum's researchers is of particularly importance to us.