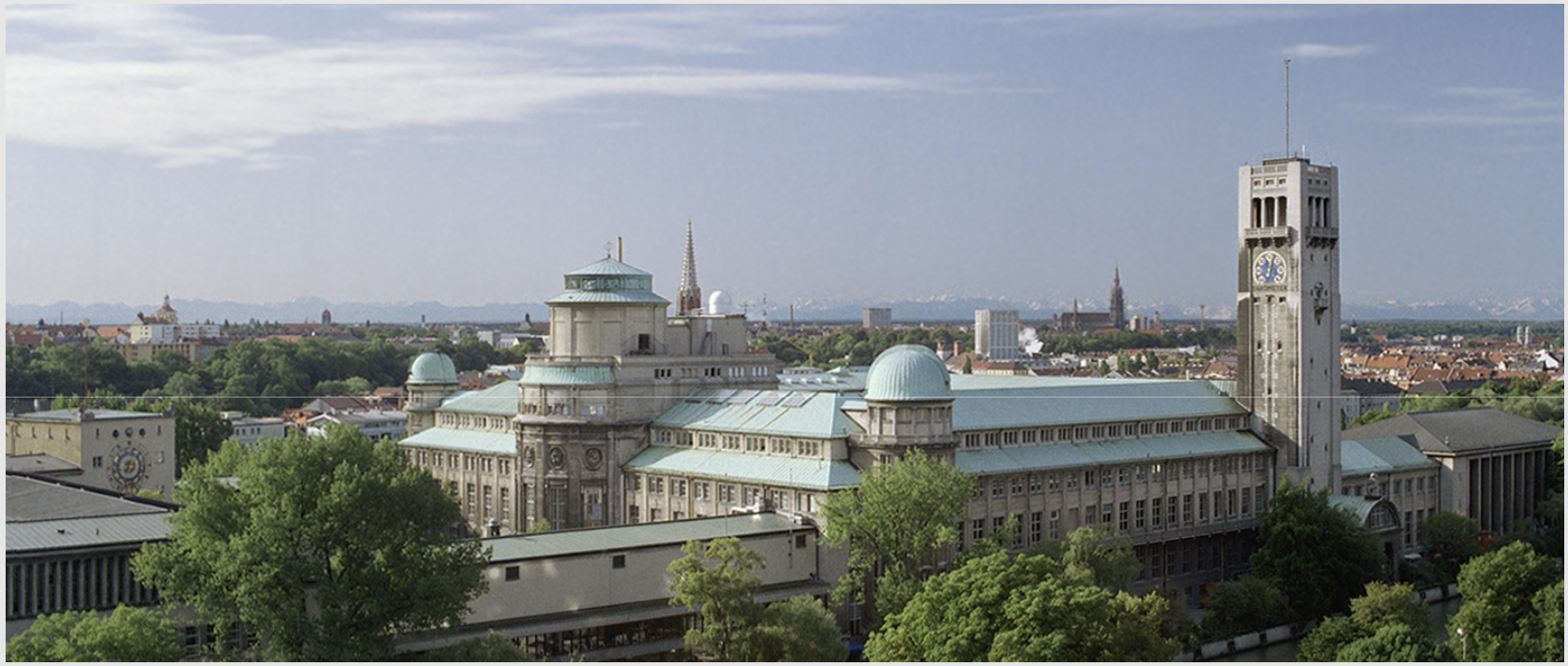
Deutsches Museum

Christoph Heininger



Nanotechnology in a Science Museum

3 August 2012

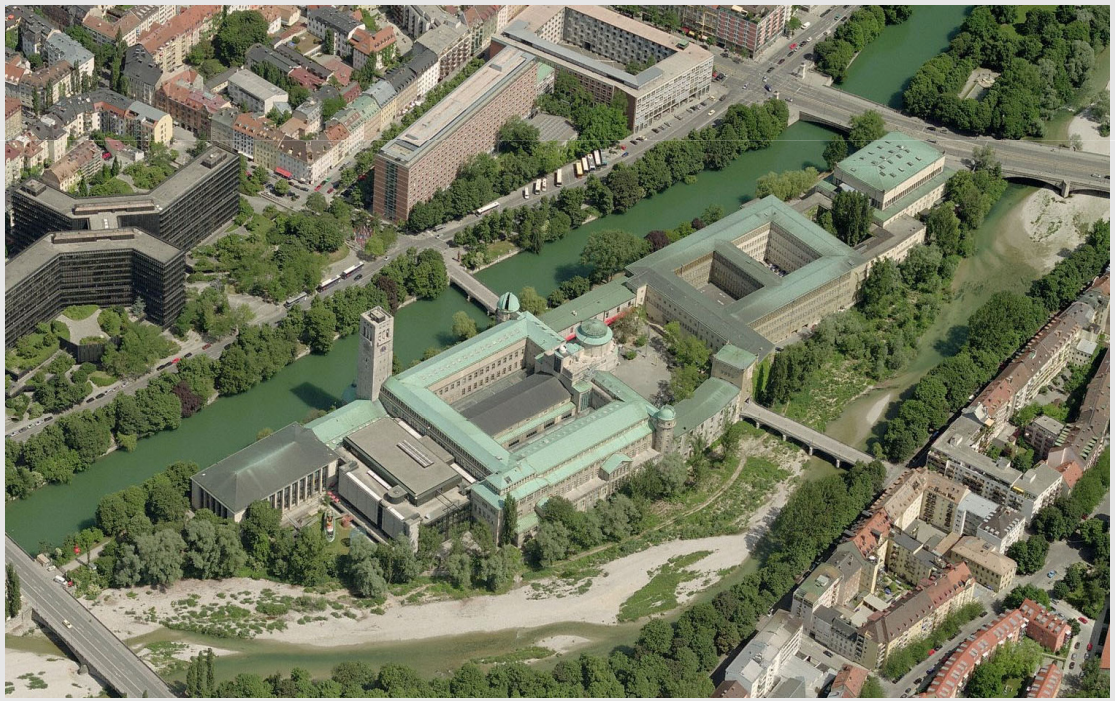
Erice International School of Science Journalism and Communication

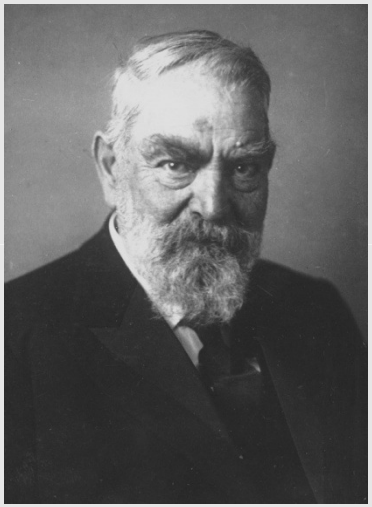
"The holy grail of science museums is not to provide someone all the knowledge they need, but to inspire them, to become a launching point."

John H. Falk

John H. Falk, Mark D. Needham. **Measuring the impact of a science center on its community**. *Journal of Research in Science Teaching*, 2011

- founded in 1903 by Oskar von Miller
- German Museum of Masterpieces of Science and Technology





Oskar von Miller

The Deutsches Museum back office

- 100.000 exhibits (20.000 on display)
- 73.000 m² exhibition space
  (main building: 51.000 m²)
- 500 permanent staff, 150 volunteers
- Library with >900.000 volumes, large archive
- Publishing house
- 1.4 million visitors annually
- In-house workshops from bookbinding to carpenter
- Restoration facilities

Deutsches Museum

Deutsches Museum Bonn:
Science and Technology in Germany after 1945

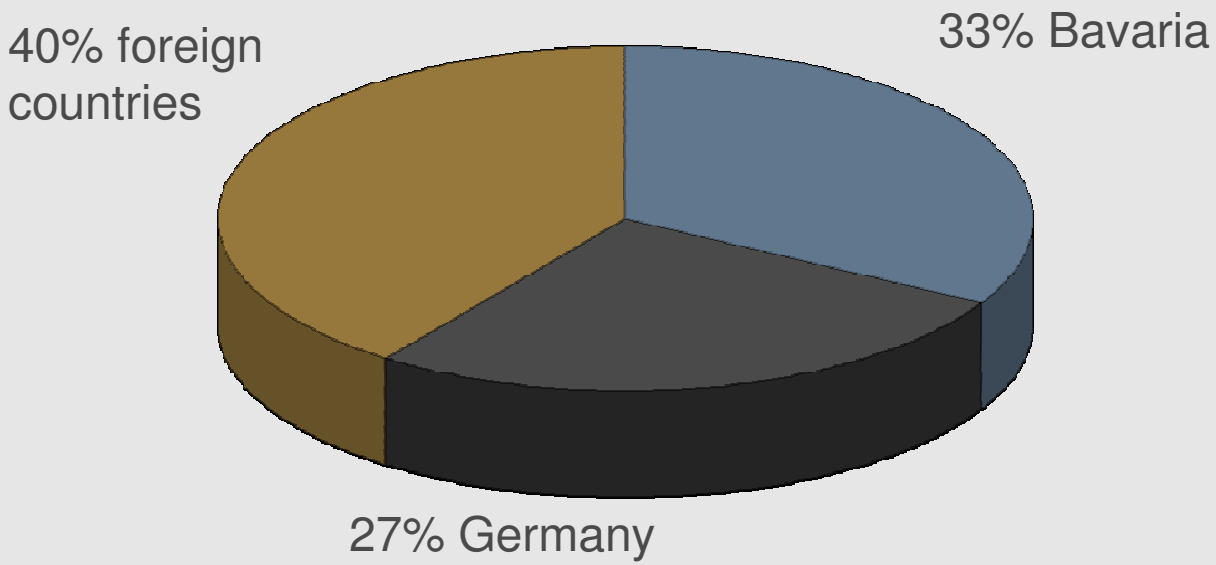
Flugwerft Schleissheim:
aerospace exhibitions

Verkehrszentrum:
Mobility and Transportation museum

Lokwelt Freilassing:
In collaboration with City of Freilassing: railroad engines

Deutsches Museum München:
Main exhibition and administration

Visitors of the Deutsches Museum



→ 10.000 school classes p.a.

Research at the Deutsches Museum

Focused on four main topics:

I. Center for collection and exhibition research
II. History of technology and science
III. Science, technoogy and the public
IV. Museology

Rachel Carson Center
Environment and Society

Münchner Zentrum für Wissenschafts- und Technikgeschichte

Nanotechnology is

- named by size from $0{,}1*10^{-9}$ m to $100*10^{-9}$m
- a cross sectional technology
- an often misused brand
- has often a complex theoretical background
- is often difficult to understand, because it contradicts every day experiences

The „Hall for Automobiles“

Finished 1937

The room is structured by dominant exhibits

The „Hall for Automobiles“

around 1980

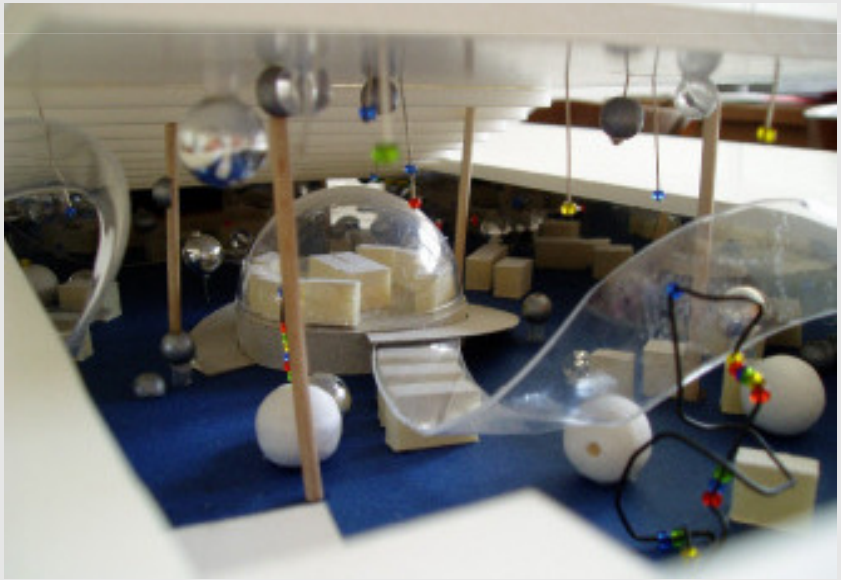
Deutsches Museum

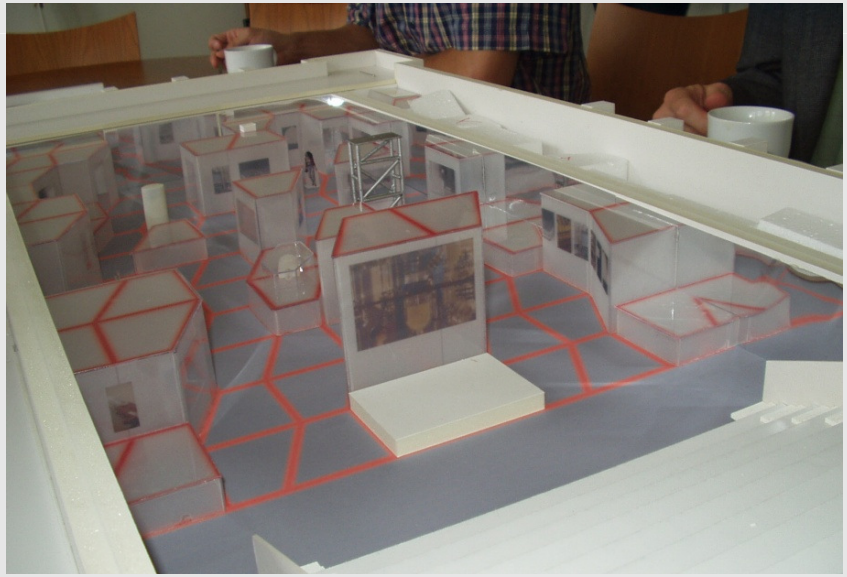
Initial ideas for the Center of New Technologies

-hands-on-experience, exhibition and engagement of visitors

-flexibility and room for events

- Integration of Bio- and Nanotechnology





The final design

Room now is structured by function and exhibition architecture

Global concept of the CNT:

- Knowledge transfer of complex scientific-technological topics
- Dialogue between science and the public

Deutsches Museum

Center for New Technologies

Opening: November 19, 2009

2.400 m² total area

5 partners from industry, science, and politics

Amgen GmbH
Federal Ministry of Education and Research
Max Planck Society
Fraunhofer-Gesellschaft
Helmholtz Association

- 450 exhibits (core exhibition)
- >50 t steel
- 70 computers, 220 monitors

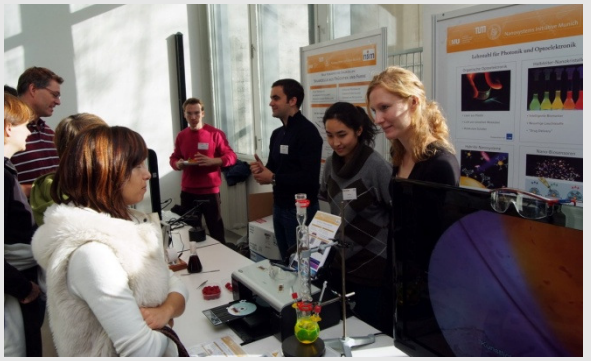
Open Research Lab

- real nano scientists inside the museum
- do their every day research work
- explain their work to the public
- discussion partner for continuative questions (nanotechnology, research in general, career choice, …)

Deutsches Museum

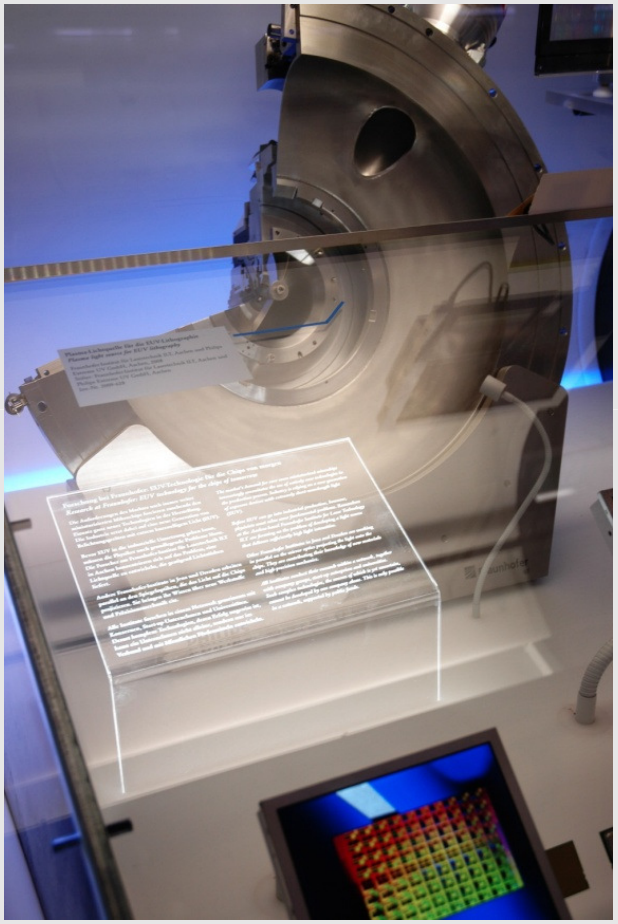
Nanoday of the Nanosystems Initiative Munich (Cluster of Excellence, Nano)

- event program around the nano exhibition
- plenary: talks, shows, kids program
- scientist ‘expo’ - bringing their experiments inside the museum



Scientific Partners

- support in development of the exhibition
  → “partner-stories”
- theme islands inside the museum
  → display window to latest research
- joint events inside the CNT
  → communication with the public

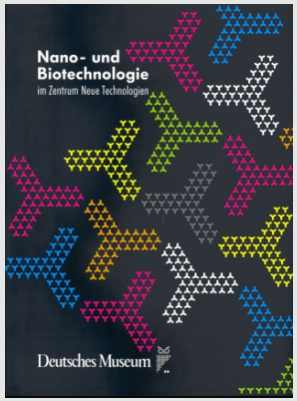


Deutsches Museum

Main Exhibition Nano- and Biotechnology

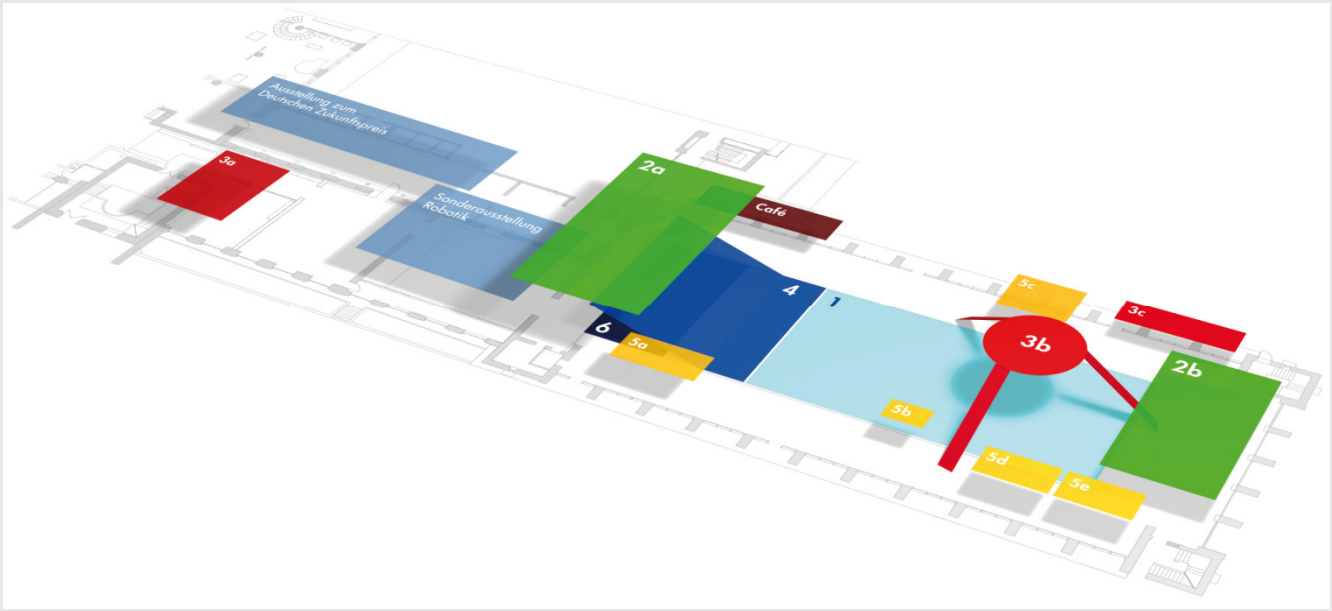
- connection of both topics to an integrated exhibition
- basics, research, application, risk-benefits discussion
- shown by original exhibits, interactive media installations and “hands-on” demonstrations
- high flexibility offers the possibility to react on current discussions

Exhibition catalog



Elements of the CNT

- Entrance: Exhibition “Deutscher Zukunftspreis”
- Auditorium
- Main exhibition: Nano- and Biotechnology



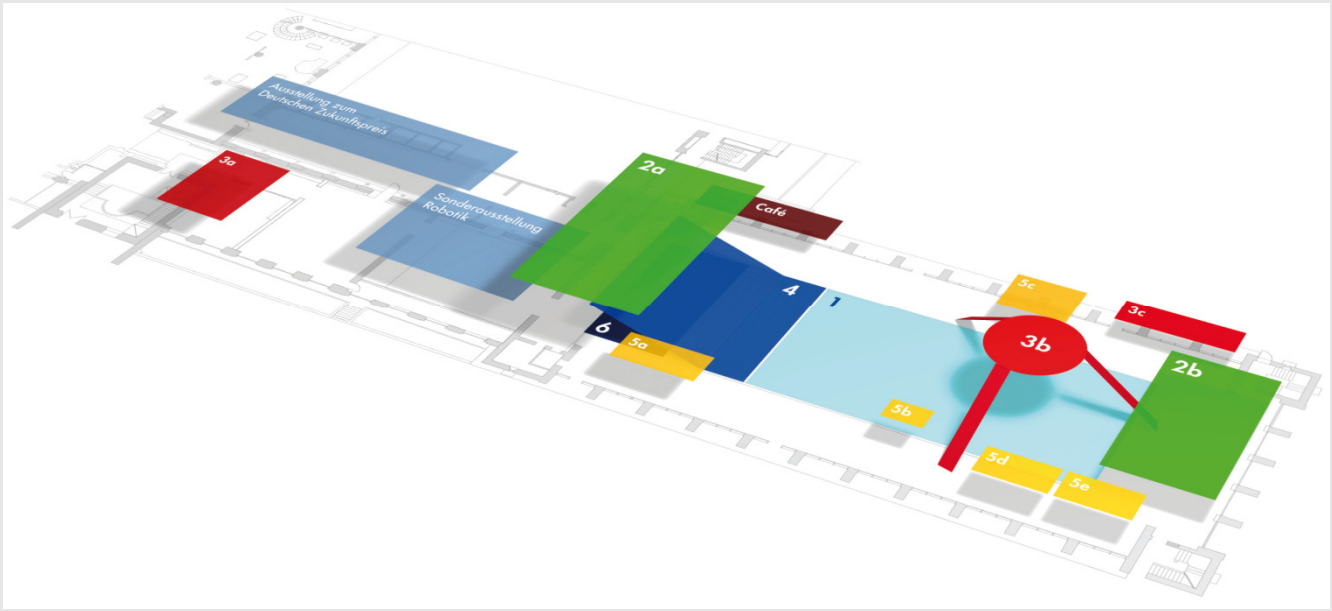
Deutscher Zukunftspreis

auditorium

main exhibition

Elements of the CNT

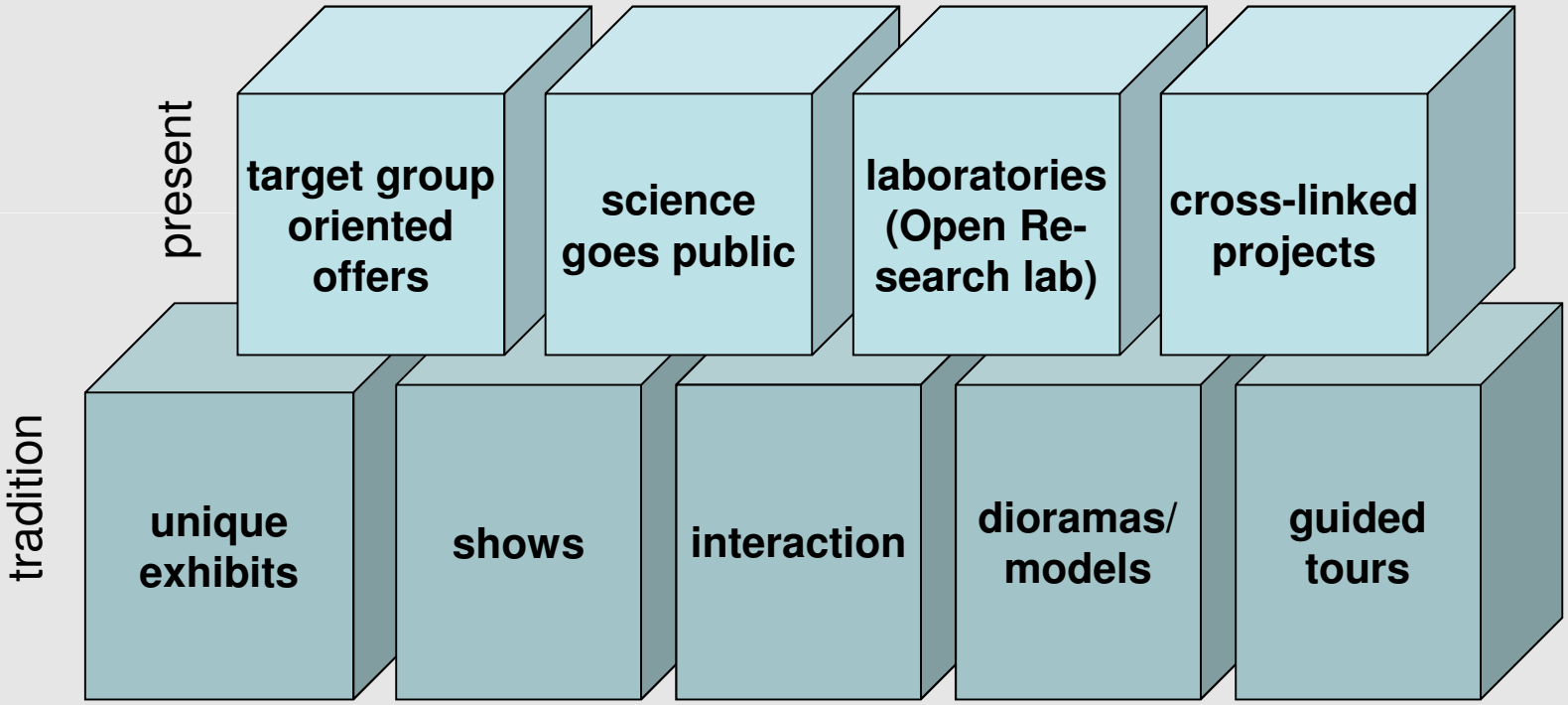
- three laboratories (DNA Visitors Lab, Open Research Lab, TUMlab)
- theme islands of the partners
- areas for special exhibitions

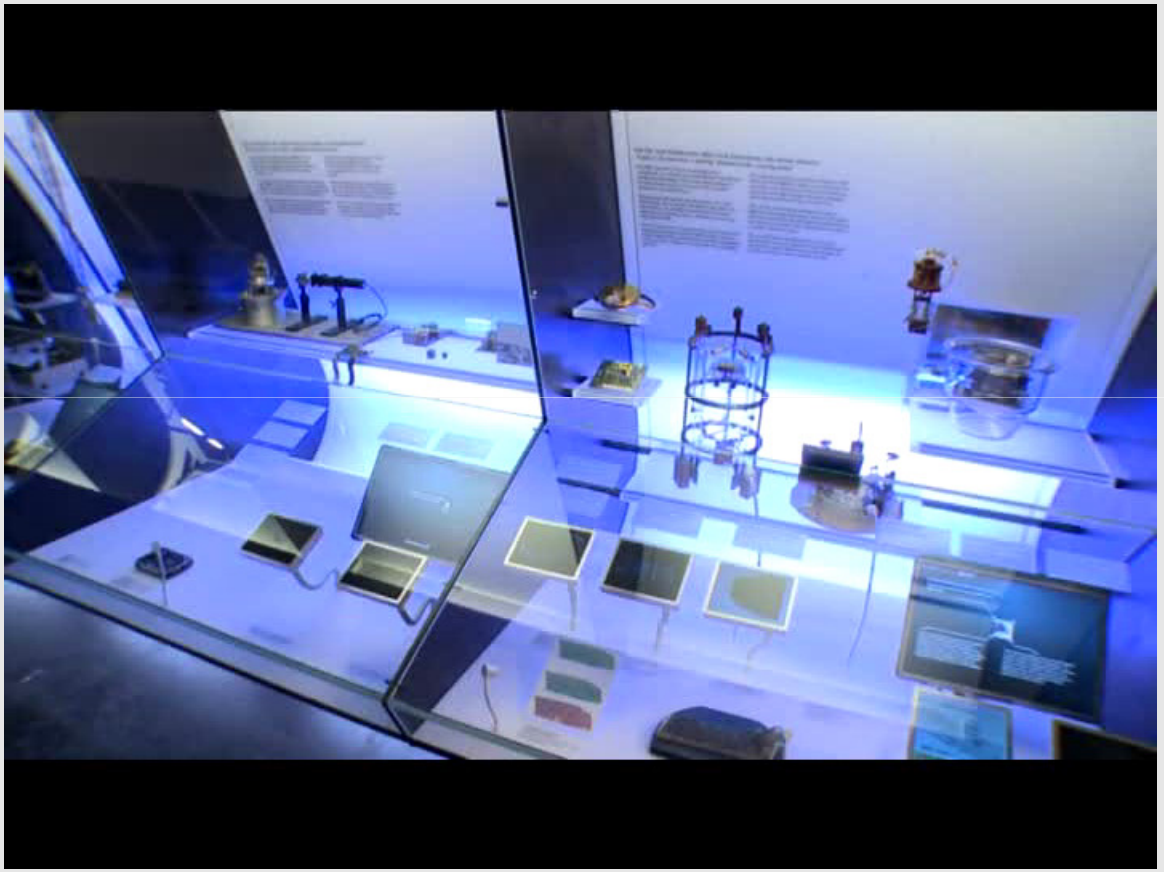


DNA Visitors Lab

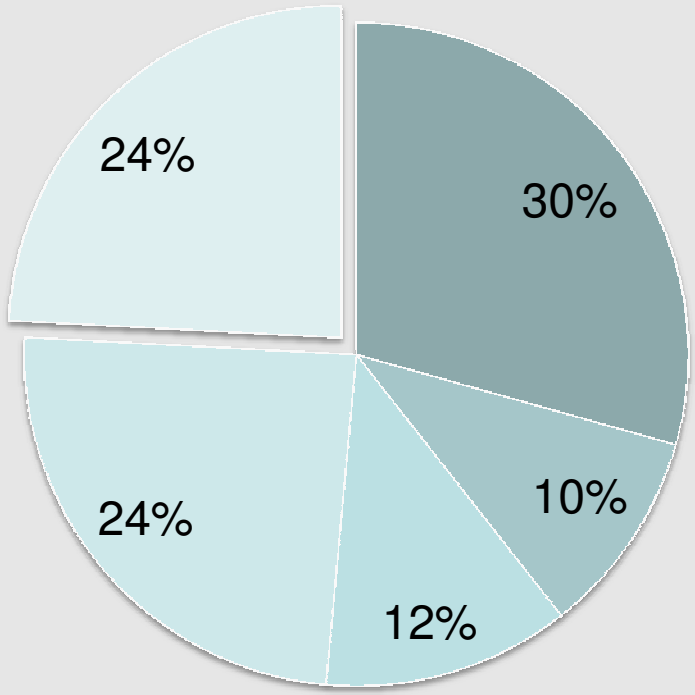
theme island

Building Blocks of Exhibitions in the Deutsches Museum



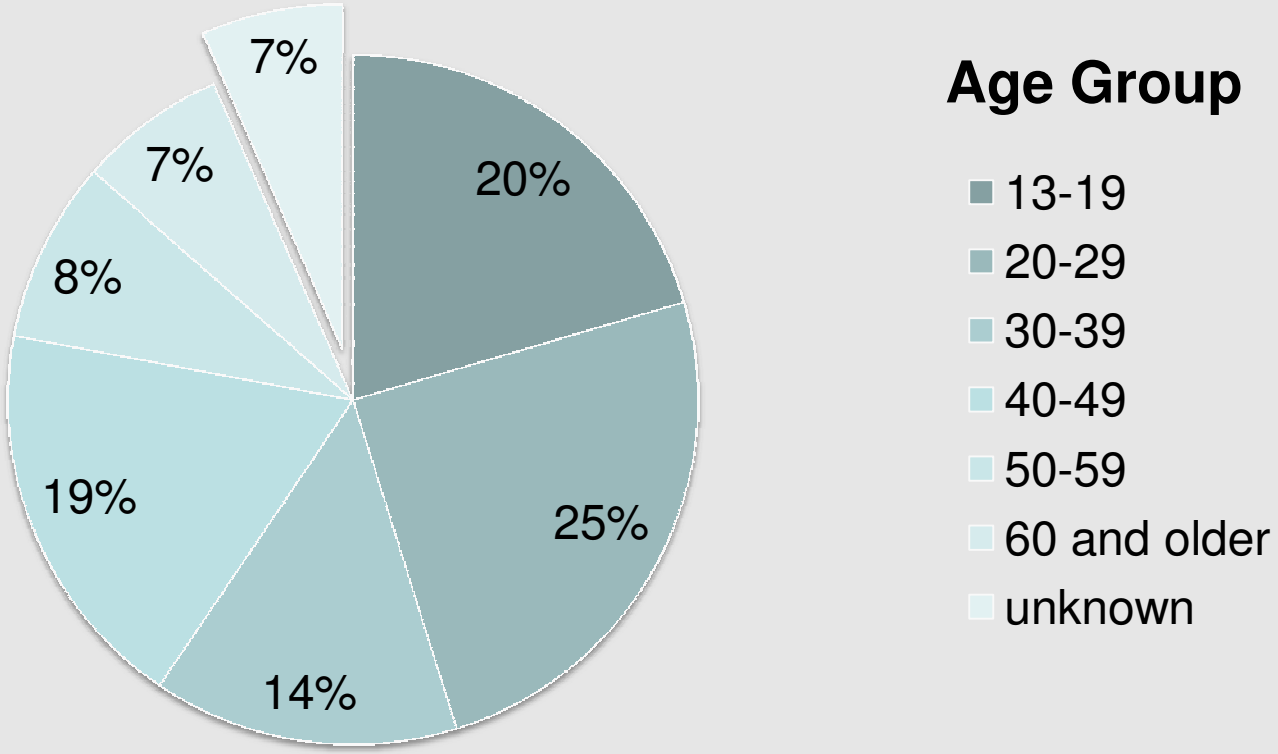


Visitors of the CNT



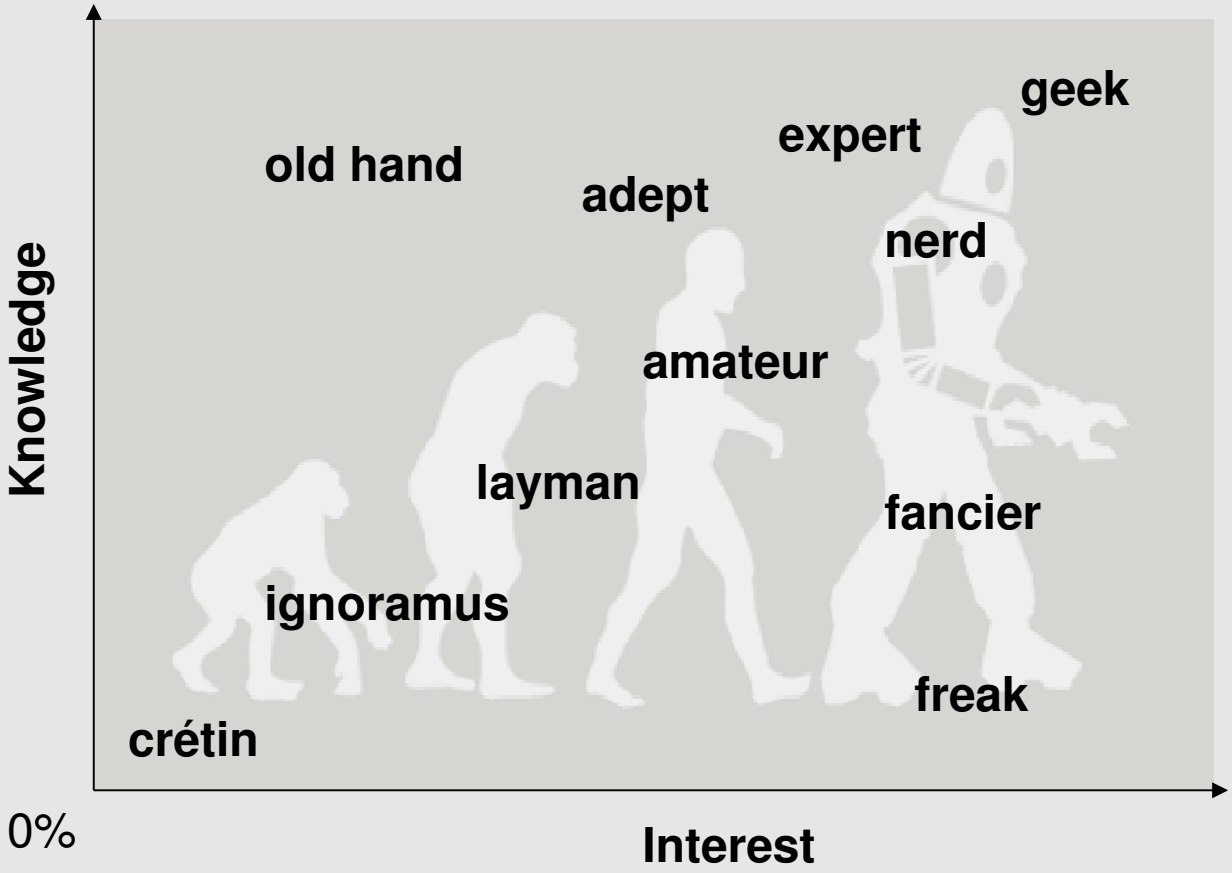
From Specht, Lewalter, TUM School of Education, 2011

Visitors of the CNT



From Specht, Lewalter, TUM School of Education, 2011

Whom do you want to adress ?

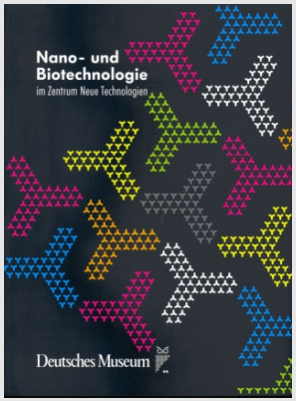


Escalation Concept

exhibit

web

catalog



literature

periodical

In depth information

Bonini paradox:

As a model of a complex system becomes more complete, it becomes less understandable.

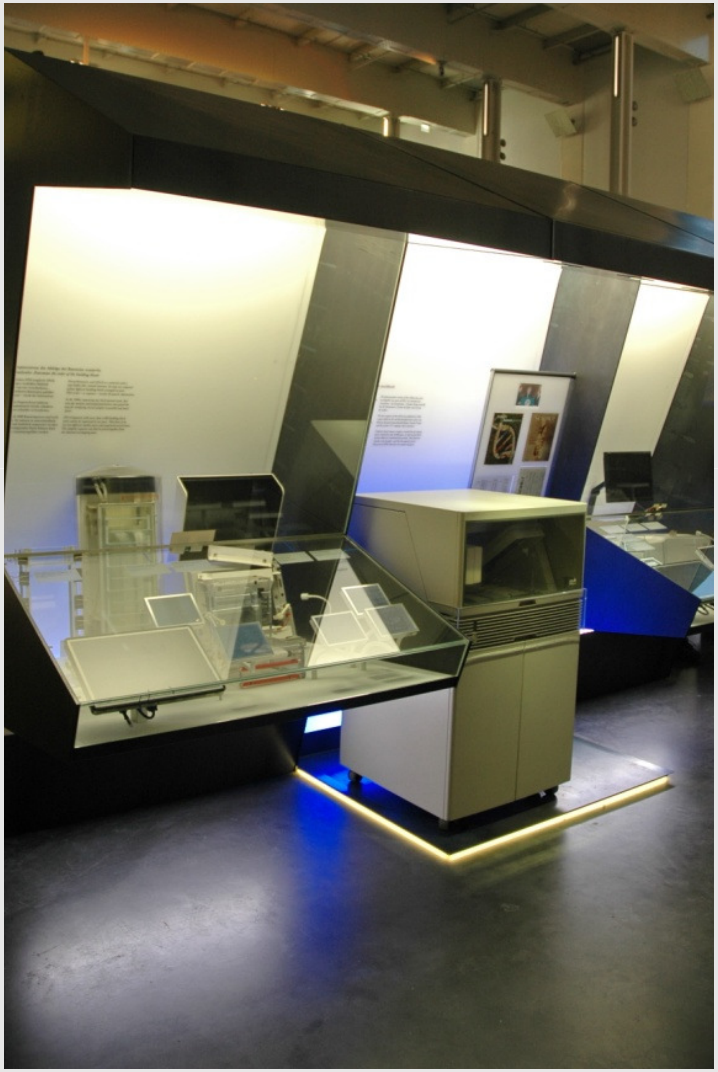
Charles P. Bonini: *Simulation of information and decision systems in the firm.* Prentice-Hall, Englewood Cliffs, N. J. 1963

Everyday Nano Products

Closes the gap between abstract science and every day life

Provides arguments about the relevance, usability and potential risk of nanotechnology

Introduces the economic aspect of nanotechnology



Gene Sequencing Machines

Displays tangible the development of tools for nano-, and biotechnology from handicraft work to usable devices.

Shows the metamorphosis from science to technology.

Connects bio- and nanotechnology

Scanning Probe Microscopy

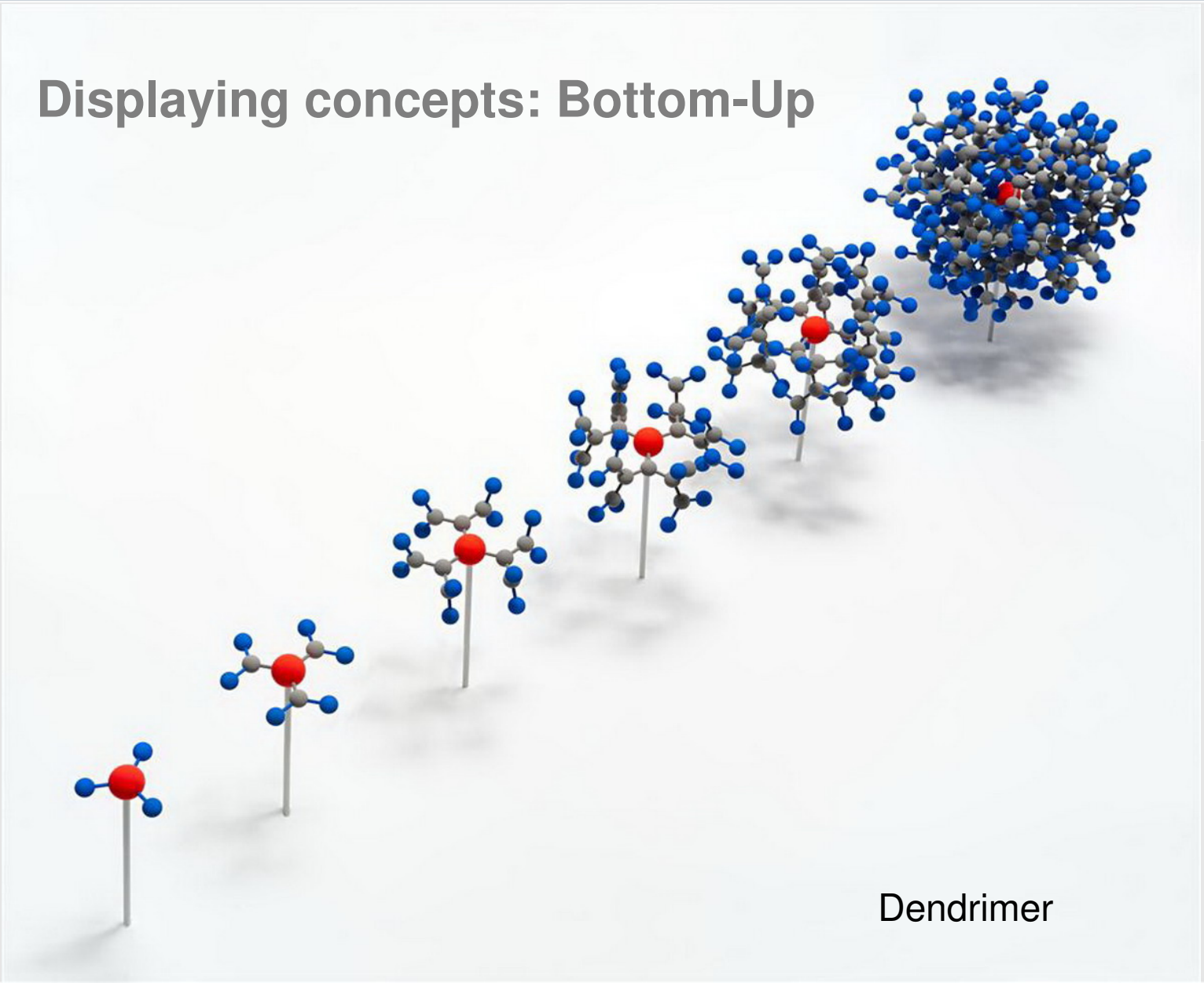
Shows the beginning of a break through Technology, from first idea to Nobel Prize

Many auratic objects with interesting background storys (Nobel Prize, Guiness Book of World Records)

It is an example for the impact of an idea

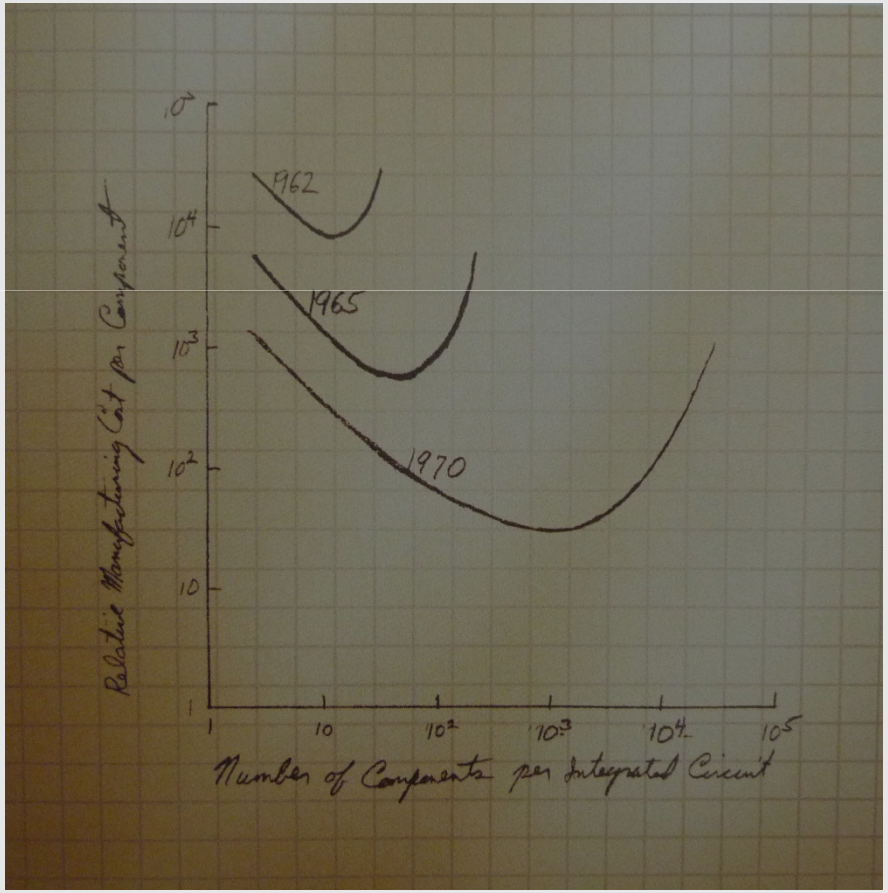
It is the classic tool of nanotechnology

Displaying concepts: Bottom-Up



Dendrimer

Displaying concepts: top down approach



Micro systems technology reaches the nanoworld

process technologies are top down strategies, e.g. lithography

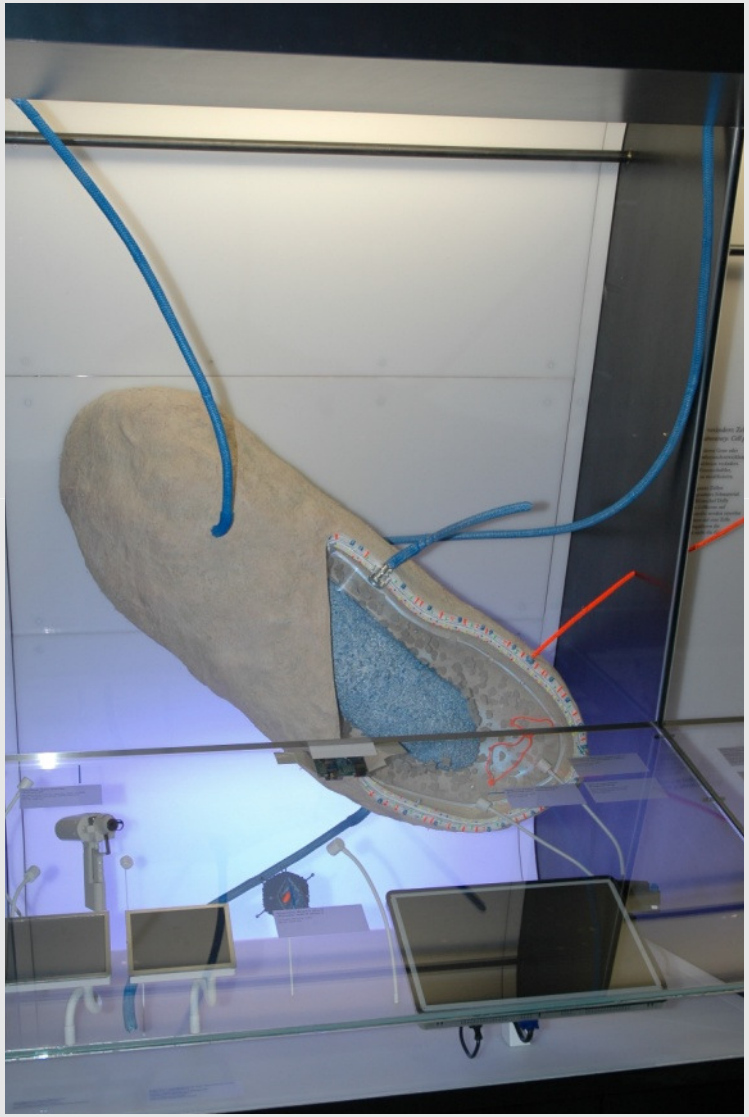
Dialog Station “genetic test”

Provides arguments in a controversial discussion

Inspires to form an independent opinion

Supports subsequent discussions

Encourages to engage in recent developments



Models (bacterium)

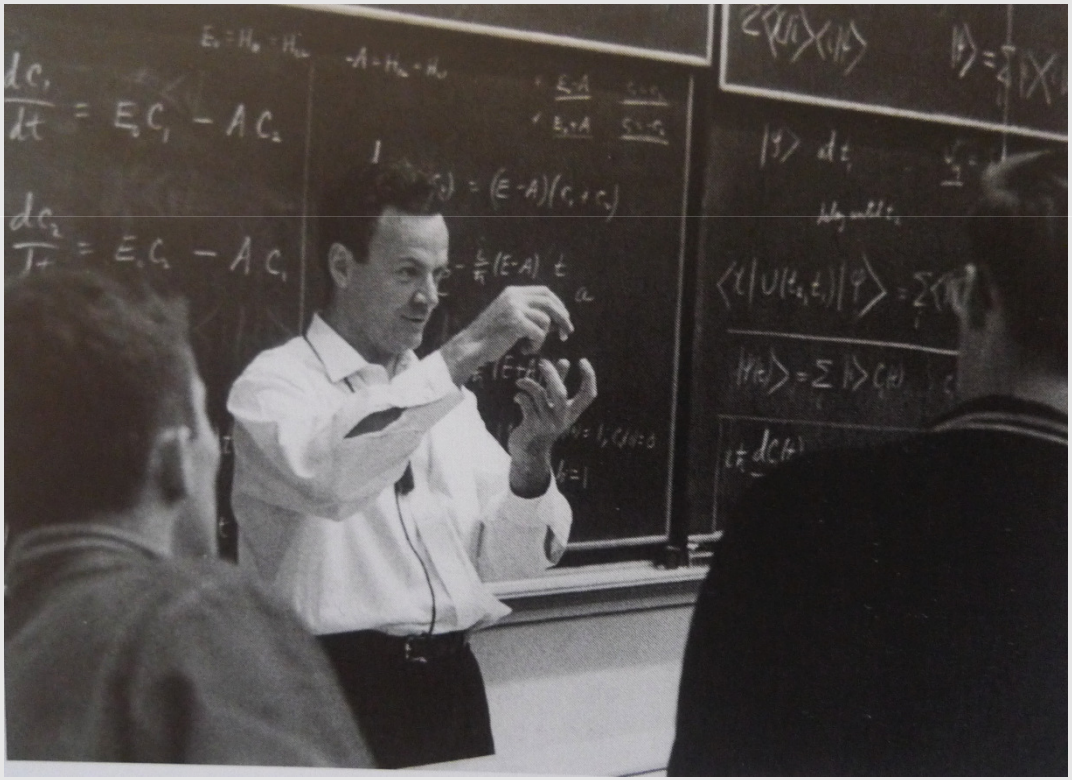
-virtualizes dependencies,

-makes unseen visible

-eases complexity

But:
Models may cause misconception, their perceivability is hooked to the predestination of the visitor

The founders Gallery



Science needs people !

Not a hall of fame, but stories about entrepreneurs, ideas, talents and visions.

Technicians, politicians, scientists, nobel prize winners and visionaires

Demonstrations (ferro fluid)

Enhance the intuitive comprehension of complex processes

Support a positive attitude to technology by entertaining the observer

Ease the explanation of difficult processes

The people behind-
An Interdisciplinary Team

Dr. Lorenz Kampschulte

nanophysicist

Dr. Sabine Gerber

biologist

Dr. Florian Breitsameter

chemist

Dr. Margherita Lasi

biologist

→DNA Visitor's Lab (max. 18 pers.)

Dr. Frank Trixler

mineralogist

→ Open Research Lab

www.deutsches-museum.de

And finally a message from the Ivory Tower

www.deutsches-museum.de

Contact: generaldirektor@deutsches-museum.de or contact me: c.a.h@web.de