# Nano Profiler

## General Description

**Activity**

Played in a coffee shop situation, alone or together with other people
You sit at a table, with the table cloth on the table.
While having a drink, you start answering the questions and choose your way throught the test.
At the end you end up as one of the nanotypes and you can read about your knowledge, concerns and wishes about science and new technologies.
You can compare your outcome, with the one of your friends/family etc.
More information about the different topics will be available on the website lexicon.

± 5 min
1-10 persons

**Based on**

Political Profilers and knowledge tests
Which Famous Scientist Are You? http://www.buzzfeed.com/danward/which-famous-scientist-are-you-14vej#.hr7yllox65

**Innovative**

Communication of science in café, leasure context. Enjoyable and popular. Infomative rather than didactic. Online version available.

**Targetgroup**

All
specifically 16-45 years museum visitors

## Objectives

**Big idea**

To get an insight in what are people's interest in (nano)science and technologies.

**Learning goals**

As a result of playing this Nano Profiler, visitors will learn:
1. What is their own behavoir towards science and new technologies
2. What are their friends/families behavoir towards science and new technologies
3. Where they can find more information
4. Discuss with your table mates about this topic

**Main Message**

1. Every citizen has a different approach towards science and new technologies
2. This behaviour is not good or bad, just different
3. You can discuss your point of view

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| **Lead beneficiary** | Studio HB | Hannie van den Bergh |
| **Contributing Partners** | BfR | Anna Daun |
| | De Proeffabriek | Daan Schuurbiers |

# The evolution of the SeeingNano "nano types"

The SeeingNano nano types are based on the idea that people perceive nano risks differently according to their respective worldviews and cultural milieus. In creating the following nano types we started from a set of basic "risk types" suggested by the "cultural theory of risks"[1] and enriched them with empirical data gathered from previous EU and BfR[2] projects as well as interviews conducted in WP1.[3] Each of the resulting five nano types combines a particular set of characteristics including worldview, attitudes and risk perceptions. Each type is also associated with one or several "personas" created in WP1.

## Nano supporter

The nano supporter describes a certain type of the adult target group who is characterized by an individualistic worldview: The nano supporter appreciates new technologies as sources of societal progress and economic wealth. He/she believes in economies' self-regulation and is convinced that bad or risky nano applications will be sorted out by competitive market forces automatically. According to survey data, most nano supporters are male and part of middle/upper classes. To some extent, the persona of "Paul" belongs to this type.

**Scientist: Richard Smalley[5]**
Wikipedia:
Richard Smalley was a professor in Chemistry, Physics and Astronomy at Rice University in the US. In 1996 he won the Nobel Prize for Chemistry together with Harold Kroto and Robert Curl for their discovery of fullerene. Smalley was a leading advocate of nanotechnology and its many applications.

## Nano native

The nano native stands for a major part of the youngster target group, personified in "Henry". Although the nano native does not really know what nanotechnology is, the word "nano" sounds familiar to him/her – he/she knows nano sim cards and nano ipods and a whole range of fictional worlds "in which nanoscale phenomena are quite common"[4]. Youngsters have different worldviews, depending on which cultural milieu they live in. Thus, nano natives' positive attitude towards nanotechnology is not necessarily due to their familiarity with new technologies but might also be attributed to a lack of knowledge on the societal debates on this issue.

**Scientist: Amanda S. Banard**
Wikipedia:
Dr Amanda S. Barnard is a theoretical physicist working in predicting the real world behavior of nanoparticles using analytical models and supercomputer simulations. Barnard is a pioneer in the thermodynamic cartography of nanomaterials, creating nanoscale phase diagrams relevant to different environmental conditions, and relating these to structure/property maps. Her current research involves developing and applying statistical methods in nanoscience and nanotechnology, and nanoinformatics. In 2015 she became the first person in the southern hemisphere to win the Feynman Prize in Nanotechnology, which she won for her work on diamond nanoparticles.
Dr Barnard is currently based in Australia as Office of the Chief Executive (OCE) Science Leader at CSIRO, and heads CSIRO's Virtual Nanoscience Laboratory.

## Nano curious

The nano curious is associated with the target groups of the science and philosophy teachers and the non-scientific journalists. As the name implies this type is motivated by a scientific curiosity towards natural and technical phenomena. In the pure form, the nano curious perceives nanotechnology as neither good nor bad but is strongly interested in its functioning and effects on societies. However, most frequently, people who are

1 Douglas and Wildvasky (1982). "Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers"
2 Correia Carreira, Guido, Astrid Epp, Mark Lohmann, Gaby-Fleur Böl (2013). „Nanoview – Einflussfaktoren auf die Wahrnehmung der Nanotechnologien und zielgruppenspezifische Risikokommunikationsstrategien". Abschlussbericht
3 Literature, projects and interview sources are listed in the "persona" documents (see dropbox) as well as in the Deliverable D1.2 (see dropbox)
4 Sahin, N., and E. Ekli. 2013. "Nanotechnology awareness, opinions and risk perceptions among middle school students." International Journal of Technology and Design Education 23 (4):867-881.
5 Descriptions are taken from Wikipedia: https://en.wikipedia.org/wiki/History_of_nanotechnology

nano curious will exhibit a certain worldview and thus overlap with one of the other nano types. The nano curious is most strongly marked in “Philip”, “Christina”, “Samuel” and “Sophie”.

**Scientist: Richard Feynman**
Wikipedia:
The American physicist and Nobel laureate Richard Feynman gave a lecture at an American Physical Society meeting at Caltech on December 29, 1959 entitled: “There’s Plenty of Room at the Bottom”. This is often held to have provided inspiration for the field of nanotechnology. Feynman had described a process by which the ability to manipulate individual atoms and molecules might be developed, using one set of precise tools to build and operate another proportionally smaller set, so on down to the needed scale. In the course of this, he noted, scaling issues would arise from the changing magnitude of various physical phenomena: gravity would become less important, surface tension and Van der Waals attraction would become more important.

## Nano cautious

The nano cautious is typically found among middle-aged and elderly persons and even more among the target group of the retirees. The latter feel unable to assess and to handle new technologies as they are cut off from technological standards at the workplace. The nano cautious tends to a hierarchical worldview in favor for social stratification and a strong government. The government shall regulate risks in the interest of the population. One reason for his/her conservatism is the force of longstanding habits, another reason is a higher perception of vulnerability accompanying an old age. To some extent both “Laura” and “Paul” belong to this category. Considering our ageing societies it is not surprising that, according to BfR survey data, the nano cautious portrays the largest share of the adult population.

**Scientist: K. Eric Drexler**
Wikipedia:
K. Eric Drexler developed and popularized the concept of nanotechnology and founded the field of molecular nanotechnology. In 1980, Drexler encountered Feynman’s provocative 1959 talk “There’s Plenty of Room at the Bottom” while preparing his initial scientific paper on the subject, “Molecular Engineering: An approach to the development of general capabilities for molecular manipulation,” published in the Proceedings of the National Academy of Sciences in 1981. The term “nanotechnology” (which paralleled Taniguchi’s “nano-technology”) was independently applied by Drexler in his 1986 book Engines of Creation: The Coming Era of Nanotechnology, which proposed the idea of a nanoscale “assembler” which would be able to build a copy of itself and of other items of arbitrary complexity. He also first published the term “grey goo” to describe what might happen if a hypothetical self-replicating machine, capable of independent operation, were constructed and released. Drexler’s vision of nanotechnology is often called “Molecular Nanotechnology” (MNT) or “molecular manufacturing.” Drexler founded the Foresight Institute in 1986 with the mission of “Preparing for nanotechnology.”

# Nano sceptic

The nano sceptic is concerned with the potential risks of nanotechnologies on human health and the environment. Typically equipped with an egalitarian worldview he/she also feels that such kind of new technologies might reinforce social inequality. She/he fears that economic elites profit from nanotechnologies whereas the “normal people” are excluded from the benefits. Like the nano cautious, the nano sceptic demands strong government regulations in order to save the public from risky technologies. However, sometimes he/she might not trust the government because he/she suspects economic and political elites to support each other. According to BfR empirical data nano sceptics are typically female and belong to middle/upper classes or creative milieus. “Christina” and “Laura” belong to this type.

**Scientist: Bill Joy**
Wikipedia:
Bill Joy former Chief Scientist at Sun Microsystems wrote an article “Why the future doesn’t need us” in the April 2000 issue of Wired magazine. He argued that “Our most powerful 21st-century technologies — robotics, genetic engineering, and nanotech — are threatening to make humans an endangered species.” Joy argues that developing technologies provide a much greater danger to humanity than any technology before it has ever presented. In particular, he focuses on genetics, nanotechnology and robotics. …. After the publication of the article, Bill Joy suggested assessing technologies to gauge their implicit dangers, as well as having scientists refuse to work on technologies that have the potential to cause harm.