



Nokia Research Center

Nokia Research Center, founded in 1986, is Nokia's corporate research unit of about 500 employees. It is part of the Office of the Chief Technology Officer that drives Nokia's position as a thought leader in the converging worlds of internet and mobility.

Nokia Research Center's mission is to renew Nokia through strategic and long-term research. "Renew" means thinking beyond where the rest of the company is thinking, thinking differently from the rest of the company and having the responsibility to refresh and reinvent the company.

Nokia Research Center's vision is to become the global leader of open innovation for human mobility systems of the fused physical and digital world, giving birth to the growth of businesses for Nokia.

Though Nokia Research Center has been conducting research for more than 20 years at Nokia, this does not mean that it has settled into a routine way of working. Today, Nokia Research Center is very much a living organization, always ready to renew itself and blaze new trails. Nokia Research Center has been transforming itself in many ways - today the organization reflects dual approach to innovation to seek core technology breakthroughs and identify new business opportunities through exploratory systems research.

Nokia Research Center cooperates with many leading academic institutions and other technology companies in many research projects. Nokia works with approximately 100 universities globally. Nokia Research Center works in open innovation mode and has built network of leading universities:

- MIT, USA
- Stanford, USA
- Tsinghua, China
- Cambridge, UK
- Tampere, Finland
- Helsinki, Finland
- Oulu, Finland
- EPFLÐZ, Switzerland

Some recent examples of the Nokia Research Center's cooperation projects:

- Morph

The Morph concept was conceived out of a scientific partnership between Nokia Research Center (NRC) and the Cambridge Nanoscience centre for the Museum of Modern Art in New York. Morph is a concept that demonstrates the ultimate functionality that nano-technology might be capable of delivering: fully flexible materials, a revolutionary self cleaning shell and transparent electronics.

- 100 cars project

Nokia Research Center Palo Alto is developing a system to provide real-time traffic information based on speed and location data from GPS-enabled mobile devices carried by motorists. Building from the Nokia Maps service available today, this provides a glimpse into the future with the mobile device as personal travel assistant. Nokia Research Center is working with UC Berkeley on this project.

One of the main targets of Nokia Research Center is to create IPR (Intellectual Property Rights) for Nokia. In this the unit has been very successful, with about half of Nokia essential patents originating from Nokia Research Center.

In short

Nokia Research Center (NRC) looks beyond Nokia's existing business and product development to challenge current strategies and to stimulate renewal in the company's direction. Working closely with all Nokia business units, NRC's research explores new frontiers in digital services, physical-digital connections, human interaction, data and content technologies, device architecture, and access and connectivity. NRC promotes open innovation by working on research projects in collaboration with universities and research institutes around the world. For more information, see our website: <http://research.nokia.com>

Key figures on R&D in Nokia (Dec. 2007)

- Global network with R&D centers in 10 countries.
- Over 30,400 people in R&D. This represents 27% of Nokia's total workforce.
- Nokia's R&D expenditure totaled EUR 5.6 billion, or 11.1% of net sales.

Nokia Research Center open innovation network

Nokia Research Center works in open innovation mode and has built network of leading universities:

In August 2008 the **University of Oulu** and Nokia, together with the VTT Technical Research Centre of Finland, Oulu Polytechnic, Technopolis and City of Oulu, announced the establishment of a joint research center, Center of Internet Excellence, in Oulu, Finland. The new center will bring research teams from the various parties involved in the initiative under same roof to exceed critical mass in innovation, co-creation and dissemination of research results.

In April 2008 Nokia and the Swiss Federal Institutes of Technology in Lausanne and Zurich (**EPFL and ETH Zurich**) announced the establishment of a joint long-term research program. Nokia Research Center opened a laboratory in Lausanne in June creating a vibrant community linking researchers from Nokia and the Institutes of Technology. This open model of collaboration has already been successful for Nokia Research Center elsewhere. Nokia collaboration with the Ecole Polytechnique Fédérale de Lausanne (EPFL) and the Eidgenössische Technische Hochschule Zurich (ETH Zurich) will focus on helping people benefit from a world where they are connected to each other, to the Internet and also to information from the surrounding physical world. Access to the "Internet of Things" from a mobile device will allow people to collect information from their physical environment, filter it based on their location or preferences and share with their friends or communities.

In April 2008, Nokia announced the expansion of its research activities with the opening of a research lablet on the Otaniemi campus of **Helsinki University of Technology**. At the same time Nokia Research Center and Helsinki University of Technology announced a joint strategic research program in the area of mobile communications technologies. Nokia Research Lablet Otaniemi will work in an open mode with various laboratories of Helsinki University of Technology. This means establishing joint research programs and daily interaction between Nokia and university researchers who will share the same facilities. Nokia is looking forward to future collaboration with the new Innovation University - consisting of Helsinki School of Economics (HSE), University of Art and Design Helsinki (TAIK) and Helsinki University of Technology (TKK) - after their merger in August 2009. Nokia hopes the Innovation University will be a leading innovation hot spot in mobile technologies and systems.

In March 2007, Nokia Research Center and the Helsinki University of Technology, Finland, had announced an agreement to work together on a key strategic collaboration in nanotechnology research.

In May 2007, Nokia Research Center and **Tsinghua University**, China, announced the establishment of a research framework and a facility dedicated to long term joint research programs. The agreement is the first of its kind in Asia for Nokia Research Center. Tsinghua's professors and students will collaborate with Nokia researchers on a wide range of topics; some global, others focused specifically on Asia.

In May 2007, Nokia Research Center and the **Tampere University of Technology (TUT)**, Finland, announced the creation of a new framework to tighten open and innovative collaboration in their research activities. TUT is the first and central collaboration partner in the planned Nokia Innovation Center Tampere, Finland, opening later in the year. The aim of the center is to create a model for research based on open innovation, where information flows freely between collaborators.

In March 2007, Nokia Research Center and the **University of Cambridge, UK**, announced an agreement to work together on an extensive and long term programme of joint research projects. Nokia Research Center has established a research facility at the University's West Cambridge site and collaborates with several departments – initially the Nanoscience Centre and Electrical Division of the Engineering Department – on projects that, to begin with, are centred on nanotechnology.

In November 2006, Nokia Research Center opened a facility located in the heart of Silicon Valley, Palo Alto. Further, Nokia also announced a three-year agreement with **Stanford University** to develop joint research projects on collaborative mobile computing and applications. As part of the agreement, Nokia and Stanford focus on joint research activities that incorporate new project-oriented courses on mobile computing and services. Given their close proximity, researchers from Nokia and Stanford work together using the Stanford campus community as an experimental testing ground for new technologies and services developed by Nokia Research Center.

In April 2006, Nokia Research Center and the **Massachusetts Institute of Technology**, Computer Science and Artificial Intelligence laboratory (CSAIL), opened the Nokia Research Center Cambridge, MA, USA, to foster more open innovation with the research community with the goal of advancing the state-of-the-art in mobile technologies.