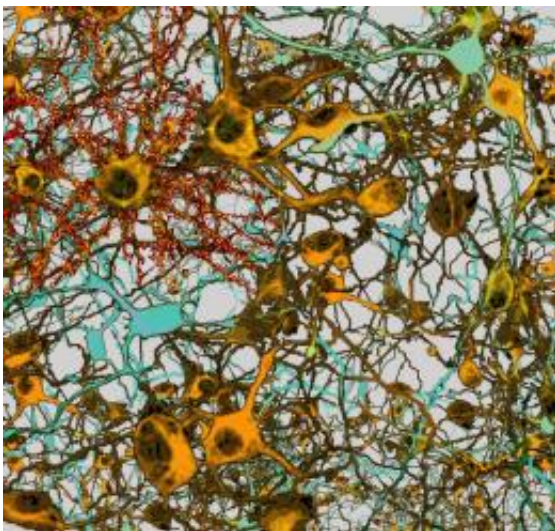


# Learning from the brain: Computer scientists developing new generation of neuro-computer

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Nerve cells are joined together by independent connections called synapses. © TU Graz/IGI

Intelligent machines that not only think for themselves but also actively learn are the vision of researchers of the Institute for Theoretical Science (IGI) at Graz University of Technology (Austria).

They have been co-ordinating the European Union research project “Brain-i-Nets” (Novel Brain Inspired Learning Paradigms for Large-Scale Neuronal Networks) for three years, and are launching a three-day

meeting of the participating researchers in Graz today, Monday, 1 February 2010. The scientists want to design a new generation of neuro-computers based on the principles of calculation and learning mechanisms found in the brain, and at the same time gain new knowledge about the brain's learning mechanisms.

The human brain consists of a network of several billion [nerve cells](#). These are joined together by independent connections called synapses. Synapses are changing all the time - something scientists name synaptic plasticity. This highly complex system represents a basis for independent thinking and learning. But even today there are still many open questions for researchers.

“In contrast to today's computers, the brain doesn't carry out a set programme but rather is always adapting functions and reprogramming them anew. Many of these effects have not been explained,” comments IGI head Wolfgang Maass together with project co-ordinator Robert Legenstein. In co-operation with neuroscientists and physicists, and with the help of new experimental methods, they want to research the mechanisms of synaptic plasticity in the organism.

The researchers are hoping to gain new knowledge from this research about the learning mechanisms in the human [brain](#). They want to use this knowledge of learning mechanisms to develop new learning methods for artificial systems which process information. The scientists' long-term goal is to develop adaptive computers together which have the potential to revolutionise today's information society.

The three-year project is financed by the EU funding framework “Future Emerging Technologies” (FET), which supports especially innovative and visionary approaches in information technology. International experts chose only nine out of the 176 applications, among which was “Brain-i-Nets”. Partners of the research initiative worth 2.6m

also include University College London, the Ecole Polytechnique Federale de Lausanne, the French Centre National de la Recherche Scientifique, Ruprecht-Karls-Universität Heidelberg und the University of Zurich.

Provided by Graz University of Technology

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