

Research projects vie for EU's €1bn funding prizes

'Grand challenge' finalists selected

Two to be chosen from shortlist of six

By Clive Cookson in Budapest

Europe has shortlisted six "grand challenges" as flagship research initiatives, including developing robots as personal companions and building a supercomputer simulation of the human brain.

Two winning projects will each receive €1bn (\$1.5bn) in funding over 10 years.

Neelie Kroes, European Commission vice-president, announced the finalists on Wednesday at the Future and Emerging Technologies conference in Budapest. The aim was to produce "successes that will be remembered, not just for today, but for a lifetime," she said.

The contenders will each receive €1.5m from the Commission's Future and Emerging Technologies programme to work up their

proposals before winners are chosen late next year.

The projects are expected to involve large networks of university and industry researchers across Europe and beyond.

"With the flagships it is not just about the excellence of the science," said Robert Madelin, Europe's director-general for information society and media. "Will it be possible on scientific grounds to tell the six projects apart in a year's time? I think not. The winners will have to be determined by non-scientific priorities."

Although Switzerland is not a member of the European Union, it is a full participant in EU research programmes and two of the shortlisted projects are led by the Ecole Polytechnique Fédérale de Lausanne.

Perhaps the most futuristic is EPFL's Guardian Angels, which will use computing and imaginative energy research to "create the ultimate smart device that will assist humans from infancy to old age".

The guardian angel will "scavenge for energy", for example by tapping the heat and movements of the human body.

Two projects concentrate on finding new ways to process vast amounts of data that are impenetrable using today's computers.

The most wide-ranging is the FuturICT Knowledge Accelerator, which would create a computer simulation of the whole planet, encompassing everything from climate to population movements and the economic system. Within this there would be several "crisis observatories" running gigantic data mining operations to warn of impending disasters such as financial crashes, emerging epidemics and environmental instabilities.

The other data-intensive project will apply IT to medicine to find better ways to apply all the health information gathered from the Human Genome Project and various biobanking projects to individual patients.

The contenders

● **Graphene Science and Technology** Graphene is the wonder material of the 21st century, discovered by Andre Geim and Konstantin Novoselov (last year's Nobel physics prize winners) at Manchester university in 2004. Graphene could replace silicon in many electronic applications.

● **Guardian Angels** Tiny devices without batteries that act like autonomous personal assistants. They could sense, compute and communicate, potentially even while travelling through your bloodstream.

● **The Human Brain Project** An extension of the existing Blue Brain project at the Ecole Polytechnique Fédérale de Lausanne in Switzerland. Simulating the brain on a computer could transform neuroscience and medicine.

● **FuturICT Knowledge Accelerator** Uses computers to analyse vast amounts of complex data and to model human and natural systems across the globe. The idea is to predict natural disasters and to manage man-made ones.

● **IT Future of Medicine** Personalised medicine – tailoring treatment to the patient – will require molecular, physiological and anatomical data from individuals to be combined with globally integrated medical knowledge.

● **Robot Companions for Citizens** Soft-skinned and intelligent robots will be developed with perceptive, cognitive and emotional skills. These "sentient machines" will perform roles from looking after elderly people to performing rescues in natural disasters.