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RESULTS MAGAZINE

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Special feature



Research for regions: a coherent research area for Europe
Interview with Dr Anu Reinart of EstSpace

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Working on research together

Part of Europe's success is in its collaboration and solidarity. The European Union has already been a remarkable achievement. The European Research Area (ERA) is seminal to this Union as strength in numbers and in minds helps give Europe not only a competitive edge in the global economy but also in its overall research and in its innovation. The aim of the ERA is to give researchers ample opportunity in an EU-wide open space for knowledge.

Máire Geoghegan-Quinn, the European Commissioner for Research and Innovation, is mandated to take the lead in making the 'fifth freedom' a reality. The fifth freedom entails providing attractive conditions and effective governance for carrying out research in Europe. It should also ensure the free circulation of researchers, knowledge, ideas and technology across the EU.



*Europe's 271 regions each have their own particular strengths. The development of a coherent research area across all these regions is underway. We wanted to highlight some of these developments along with all the latest EU-funded research. This is why we decided to dedicate this issue of research*eu results magazine to 'Regions for research: a coherent research area for Europe.'*

We speak to Dr Anu Reinart, director of Estonia's Tartu Observatory. She is also the lead researcher of the EU-funded EstSpacE project. EstSpacE is working towards enhancing space research potential of Estonian scientific institutes by collaborating with other European partners as well as the ESA. Dr Reinart shares her experiences with us and provides a compelling insight into her work at EstSpacE.

We start off the issue by first delving into the human brain and exploring the root causes of chronic brain conditions like Parkinson's. The article, listed in the biology and medicine section, discusses how researchers are focusing their efforts on an important and somewhat enigmatic portion of the brain called the basal ganglia, which is responsible for motor control and cognitive aspects of behaviour.

The energy and transport section leads with an article on the need for greater investment in wind power research.

An article on forging new ties between researchers leads the environment and society section. The article discusses an EU-funded project that is strengthening the research capacity and cooperation in central European countries.

In our IT and telecommunications section, we see how European research is attempting to better archive raw footage. The research will help broadcasters search, retrieve and use raw footage with much greater ease.

The industrial technology section leads with a story on a project that will help Estonia reach for the stars. Estonian researchers are collaborating with other European partners and the ESA. The project is a model on how to integrate other European countries into the fold of space research.

The issue then ends with a list of exciting events and upcoming conferences in the field of research and technology.

*We look forward to receiving your feedback on this issue and on the research*eu publications in general. Send questions or suggestions to: research-eu-results-magazine@publications.europa.eu*

The editorial team

Want more information on the contents of this issue?

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- Technology Marketplace: <http://cordis.europa.eu/marketplace>
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- Thank you to Dr Anu Reinart of EstSpacE for her contribution to the 'special' dossier in this issue

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Frequent acronyms

ERA	European Research Area	ICT	information and communication technologies
FP5/6/7	Fifth/Sixth/Seventh Framework Programme of the European Community for research, technological development and demonstration activities	IST	information society technologies
		R & D	research and development
		SMEs	small and medium-sized enterprises

Probing an ancient part of the brain

An international group of researchers is studying the incidence of brain cancer in adolescents to see if mobile phones and environmental factors play a role.

European scientists are studying motor control and cognitive function to gain a better understanding of the basic mechanisms used to control movements. Their work will throw light on what causes chronic brain conditions like Parkinson's, attention deficit hyperactivity disorder (ADHD) and many others.

The EU-funded scientists are focusing their efforts on an important and somewhat enigmatic portion of the brain called the *basal ganglia*, which is responsible for motor control and cognitive aspects of behaviour.

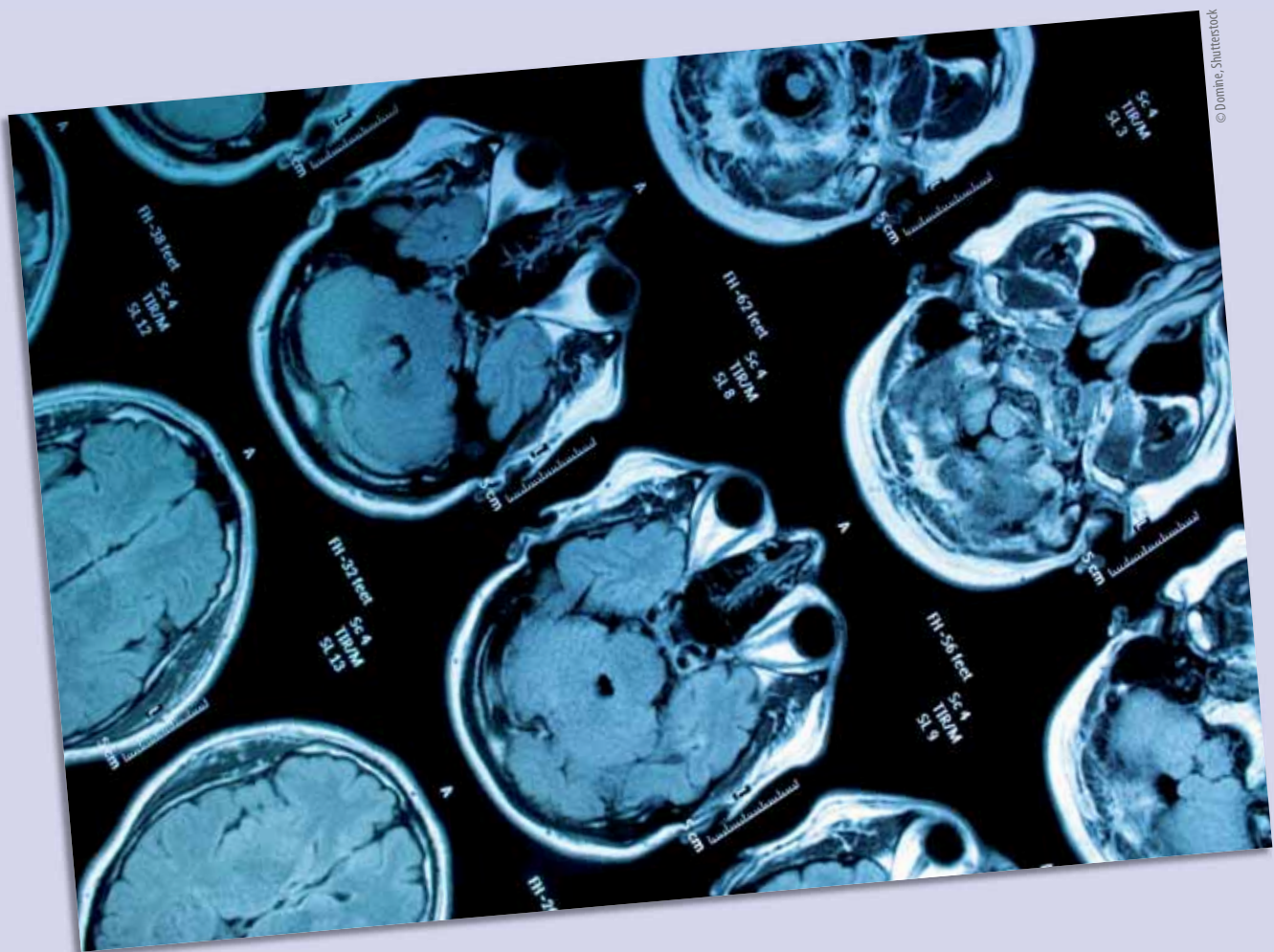
The *basal ganglia* are a group of structures in vertebrate brains that act as a cohesive functional unit. If one imagines the human brain as a bowler hat, perched at an angle on a hat stand, then the *basal ganglia* is in the centre, about 3 cm from the bottom.

Now European researchers at the Select-and-act ⁽¹⁾ project are probing the area using a variety of advanced tools to understand exactly how it works. The research is important both for the basic science it will explain, and for the new light it will shine on central nervous system diseases like Parkinson's, Huntington's and ADHD.

'The *basal ganglia* is associated with a variety of functions, including voluntary motor control, procedural learning relating to routine behaviours or habits, eye movements, and cognitive and emotional functions,' explains Sten Grillner, coordinator of the Select-and-act and professor at Sweden's prestigious Karolinska Institute.

The focus of Select-and-act's research is a key structure within the *basal ganglia*, called the *striatum*. The *striatum* plays a critical role serving as a filter for signals coming from the cortex and thalamus. Mr Grillner explains that sensitivity of the *striatum* is set by dopamine, and it is important for Parkinson's disease. Too little dopamine, and the circuits in the *striatum* do not activate. Too much and they cause involuntary movements, called hyperkinesias, with obvious relevance. Similarly, 5-HT and histamine have other impacts.

The cerebral cortex is a key area for memory, attention, perceptual awareness, thought, language, and consciousness, while the thalamus relays sensation, spatial sense and motor signals to the cerebral cortex and the *basal ganglia*. The cerebral cortex and thalamus work in close interaction with the *basal ganglia*.



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What the *striatum* did next

The cortex and thalamus acquire data about what needs to be done next, and the *striatum* receives that information and uses it to help determine which actions should be performed at a given instant, playing an obvious and important role in motor control and coordination.

'The focus of our research is on the *striatum* because that is the structure in the brain that is largely responsible for the selection of behaviour,' says Mr Grillner.

'So if you need to turn left or right you have separate circuits in the brainstem to do that. But you need another structure to decide which circuit should be activated at a given moment, and that is a primary role of the *striatum*.'

The Select-and-act team consists of five research groups, with complementary expertise, which have been systematically studying the *striatum* in a matrix of related and relevant ways.

The Grillner laboratory is exploring the operation of the microcircuits in *striatum* at the molecular, cellular and synaptic level by recording from several nerve cells at the same time using the *striatum* from both rodents and a primitive vertebrate, the lamprey.

Meanwhile the Bolam laboratory in Oxford is looking at the fine structure of specific types of synapses in the *striatum* and how different modulators like dopamine, 5-HT and histamine affect the microcircuits of the *striatum* using different physiological techniques.

*'The focus of our research is on the *striatum* because that is the structure in the brain that is largely responsible for the selection of behaviour.'*

At the Royal Institute of Technology in Stockholm the Lansner/Hellgren laboratory is making computer models of the *striatum* and its interaction with the cortex and different motor centres. The models are based on the detailed biological and morphological findings of the Grillner and Bolam laboratories. 'The models allow us to test whether our biological results can account for the operation of the different circuits.'

An *in vivo* study is taking place at the Graybiel laboratory at MIT in Cambridge, USA. There, researchers are studying *striatum* activity using rodent models, recording simultaneously a number of nerve cells in the microcircuits of the *striatum* when the rat is running. The rats are also trained to turn left or right according to where they expect to find food and the team can see how these actions are engaged

by the *striatum*. 'So one can learn when the different circuits come into action,' says Mr Grillner.

Finally, the Bergman laboratory of the Hebrew University, Jerusalem is studying the activity of neurons in the *striatum*, together with dopamine cells that signal reward in the behaving monkey. The monkey is trained to detect and interpret different cues indicating rewards or simply air puffs. The test situation allows for an analysis of the function of the *striatum* under more complex conditions.

'By combining the approach of the five laboratories we get to understand the mode of microcircuit operation in the *striatum* and how these microcircuits are operating during simpler tasks in rodents and more complex tasks in primates,' says Mr Grillner, adding that the combination of research techniques makes Select-and-act unique.

The team got a big surprise when they discovered how long the *striatum* has existed. 'We compared the circuits in mammals with the circuits in one of the first type of vertebrates to occur in evolution, which is the lamprey,' he says. The lamprey is very old, evolving 560 million years ago when it diverged from the main vertebrate line. It is one of the most primitive vertebrates still available for study.

'But it surprised us to learn that already 560 million years ago the basic design and the properties and the connectivity of these nerve cells had evolved. Mammals only developed 130 million years ago and humans appeared just 200 000 years ago. So the entire control structure of the *striatum* was ready very early on in vertebrate evolution and has not been changed much since then,' Mr Grillner notes.

Research will continue for another year. 'The end point for this project will see us develop an understanding of *striatum* microcircuits and how they are modified by different modulators like dopamine, 5-HT and histamine,' Mr Grillner explains.

While the team has achieved a lot so far, the scientist says work remains on the project itself, although important new insights have been gained. 'This kind of research needs, however, to continue for a long time in order to understand the intricate mechanism that underlies the complex function of the brain,' concludes Mr Grillner.

The Select-and-act project received funding from the Health initiative of the Seventh Framework Programme (FP7) for research.

(1) 'The role of *striatum* in selection of behaviour and motor learning — neuronal code, microcircuits and modelling'.



Boosting plant biotechnology research in Bulgaria

Following the conclusion of an independent evaluation, a specific action plan has been defined with the aim of building up Bulgaria's research capacity in plant biotechnology.

The Agrobiointitute (ABI), which belongs to the Agricultural Academy of Bulgaria, makes an important contribution to the country's agricultural economy through biotechnology. Yet, there is always room for improvement.

The EU funded project Plantbioserv⁽¹⁾ aimed to focus ABI on its research, training and networking potential. Three different experts in the fields of plant biodiversity, plant abiotic and biotic stress, and molecular plant

genetics were called in. Excellent co-operation with the staff of the ABI helped ensure a successful outcome to the project.

Several recommendations have been made following an analysis of ABI's strengths, weaknesses, opportunities and threats (SWOT). The suggested actions are expected to deliver immediate results and help facilitate ABI's participation in international research programmes such as FP7. This in turn is expected to create new career opportunities.

The SWOT findings have been shared not only with the ABI scientists, but also with farmers, journalists and others through a number of different events and media, including a bilingual website (www.plantbioserv.com).

(1) 'Biotechnology approaches in agrobiointitute at the service of crop breeding'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.
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EU-funded scientists sequence fungal disease genome

EU-funded researchers have sequenced the genome of a major fungal disease that affects various cereal crops including barley. Presented in the journal Science, the research could help bolster our understanding of the evolution of plants.

of the fungus facilitate a disease's adaption and fight against a plant's defences.

They add that new agricultural techniques can be developed, making it easier to keep infection at bay and sustain the health of cereal crops. Ensuring that plants stay free from disease is also a mega step towards securing food on our planet.

The team decoded the genome of *Blumeria*, which causes powdery mildew on barley. This mildew impacts many cereal crops, fruits and vegetables in northern Europe. Plants that fall victim to this mildew become covered in powdery white spots that spread all over the leaves and stems. As a result, plants are unable to produce crops which in turn affects the overall agricultural output.

Farmers use several methods to stop the mildew from surfacing, namely



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The study was funded in part by the Bioexploit⁽¹⁾ project, which is backed with almost EUR 16 million under the 'Food quality and safety' thematic area of the EU's Sixth Framework Programme (FP6).

The researchers, led by Imperial College London (ICL) in the UK, say their study helps shed light on how parasites within the genome

fungicides, crop rotation and genetically resistant varieties. The problem, however, is that the fungi evolve much too fast for the techniques to work. The mildew evolves quickly because multiple parasites within the genome, so-called transposons, help it to conceal itself and act without setting any warning bells off. The host plant is 'confused' since the target molecules used by the plant to detect the onset of disease are altered.

According to the team, they found large numbers of transposons within *Blumeria*. 'It was a big surprise,' says Dr Pietro D. Spanu from the Department of Life Sciences at ICL, the lead author of the study, 'as a genome normally tries to keep its transposons under control. But in these genomes, one of the controls has been lifted. We think it might be an adaptive advantage for them to have these genomic parasites, as it allows the pathogens to respond more rapidly to the plant's

evolution and defeat the immune system.'

The results of this study will give scientists the boost they need to design new fungicides and resistance in food crops, particularly because they provide insight into how the mildew can adapt so quickly. 'With this knowledge of the genome we can now rapidly identify which genes have mutated, and then can select plant varieties that are more resistant,' Dr Spanu explains.

They could also monitor the spread and evolution of fungicide resistance in an emerging epidemic, according to the team. 'We'll be able to develop more efficient ways to monitor and understand the emergence of resistance, and ultimately to design more effective and durable control measures,' Dr Spanu adds.

The researchers say mildew pathogens are a type of obligate parasite, which

means they cannot live freely in the soil and need their plant hosts to ensure their survival. This dependency forced the pathogens to figure out a way to disguise themselves and shoot down the plant's defences.

'We've now found this happening in lots of fungi and fungal-like organisms that are obligate pathogens,' says Dr Spanu, adding that the costly genome inflation could therefore be a trade-off that makes these pathogens successful. 'Non-obligate pathogens are not so dependent on their hosts, as they can live elsewhere, so they are less dependent on rapid evolution.' Researchers from Germany and France contributed to this study.

(1) 'Exploitation of natural plant biodiversity for the pesticide-free production of food!'

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Psychological interventions key for keeping depression at bay

One of the most common mental health disorders among the elderly is depression, and things are not getting any easier since the ageing population continues to increase. Researchers from Sweden's Nordic School of Public Health have found that psychological interventions play a critical role in preventing depressive symptoms among people who are 65 years and older.



Their study was funded in part by the Dataprev (1) project, which clinched EUR 997 621 under the EU's Sixth Framework Programme (FP6) to enhance the evidence base in policy research for mental health promotion and protection.

The researchers assessed various forms of psychosocial interventions and determined that social activities hold the most weight for giving mental health of older adults a boost. The results of their study were published in the *Journal of Aging and Health*.

'Meaningful social activities adapted to the older adults' individual needs and abilities should be recognised in the planning of older care,' explained Anna Forsman, PhD student at the Nordic School of Public Health, and the lead author of the study.

The researchers also found no significant effect for interventions centred on physical exercise, skill training, support groups, reminiscence, or interventions with combined content.

The study was based on systematic searches in 11 electronic databases until October 2009. The main objective was to compile and assess evidence-based knowledge and good examples on how to prevent the onset of depression and promote good mental health among the elderly.

Coordinated by the Academic Centre for Social Sciences in the Netherlands, the Dataprev project brought together researchers from the Czech Republic, Spain, Austria, Poland, Finland and the UK.

In another study on depression, researchers from the Nordic School of Public Health and the University of Gothenburg have found that Swedish women use two times more antidepressants than men.

A large proportion of both men and women only ever complete one prescription of antidepressants.

‘This can be an indication of choices being made to end treatment before the recommended time,’ says Dr Karolina Andersson Sundell, a researcher at the Nordic School of Public Health.

The team performed a register study of young adults who bought at least one antidepressant in 2006. They found that between 4 % to 13 % of Swedes aged 20 to 34 use antidepressants. Women represent a large portion of that group.

The study shows that of those who use antidepressants, every tenth also buys antipsychotics, and some only bought their medication once, showing that the drug was not used optimally.

‘What we need to do now is to monitor this for a longer period of time to see if they return and purchase antidepressants again, at a later stage,’ Dr Andersson Sundell points out. ‘We currently lack knowledge regarding the reasons for why only one purchase is made, meaning additional studies are required. Previous international research however indicates that patients often make this choice independently and seldom inform their prescription provider why they decided to stop taking the medication.’

The team discovered a higher mortality rate among both women and men using antidepressants in combination

with mood stabilisers. But lithium use did not follow this pattern.

‘One possible reason is that lithium users receive better follow-ups,’ Dr Andersson Sundell says. ‘Increased mortality was also seen among the group of individuals who filled prescriptions for both antidepressants and antipsychotics. Further studies are needed to map the reasons for the elevated mortality rates.’

(1) ‘Developing the evidence base for mental health promotion and prevention in Europe: a database of programmes and the production of guidelines for policy and practice’.

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EU works to fill gaps in regenerative medicine

Europe’s involvement in regenerative medicine mainly focuses on technological sub-sectors, creating a host of economic, political and bioethical considerations that require attention.

The two most active Member States in Europe’s regenerative medicine (RM) industry are Germany and the United Kingdom. In a study of European versus global engagement in RM, the ‘Regenerative medicine in Europe: emerging needs and challenges in a global context’ (Remedie) project reveals comparatively little commercial involvement in Europe with no primary human embryonic stem cell (HESC) therapies currently being developed commercially.

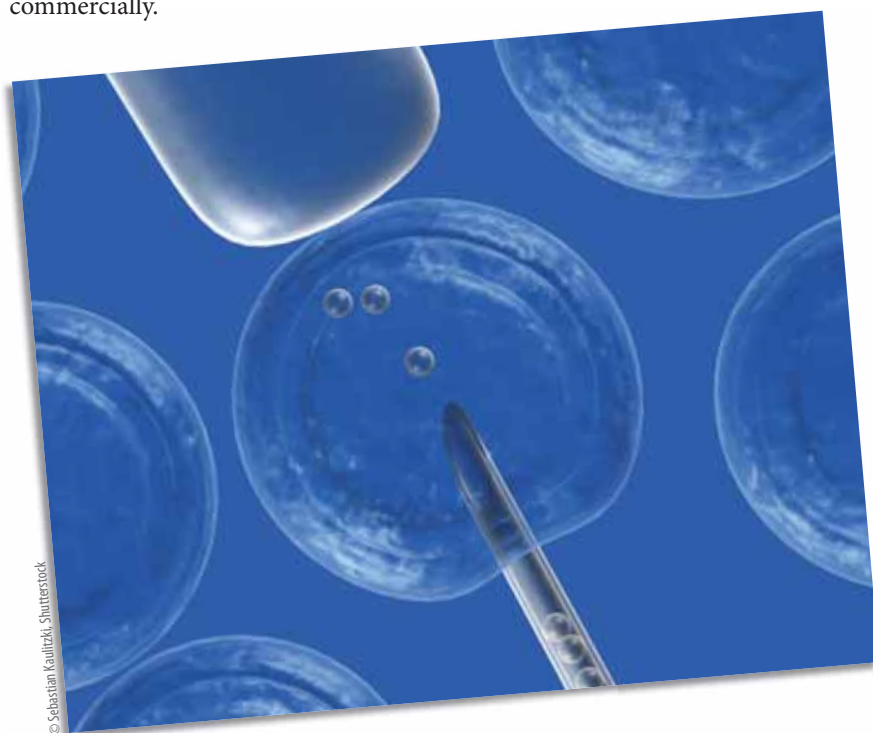
Building on a platform of research experience, academic and policy networks, and data relevant to the field, the three-year Remedie collaborative project examines the economic, political and bioethical implications for Europe of current and future global developments in RM.

Research over the first 18 months of the project indicates that, commercially speaking, two overriding factors are

likely to drive the development of RM and tissue-engineering firms in Europe: the overall financial health of the global industry, and the strength of the scientific base in firms operating in the EU. Recognising the need for an improved governance system, Remedie mapped the regulatory regimes of all 39 countries active in RM. Only seven countries (all European) have chosen the most restrictive ethical approach. Remedie’s work has identified certain gaps relating to bioethical and legal matters, such as there being no European-wide market of oocytes (immature ova) currently available for research and no mechanisms regulating their procurement for such purposes.

As global activity in the RM field progresses at a fast pace, there is great need to heed medium- and long-term implications for European regulators, the corporate sector, and health care systems and patients in different Member States. The project’s main objectives are to provide an in-depth analysis of Europe’s competitive position in the globalisation of RM, the requirements of successful innovation in the field, and which policies the EU needs to develop to secure a global advantage in the field.

Funded under the FP7 specific programme Cooperation under the theme ‘Socio-economic sciences and the humanities’.
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Researchers unravel DNA's protection against UV light

The effect of sunlight on our skin often helps people feel healthy and happy, but while tanning may be a desired side effect, it can also initiate damaging processes that lead to serious illnesses such as skin cancer.

Researchers in Austria have succeeded in unravelling the shielding mechanisms that allow DNA (deoxyribonucleic acid) to protect itself from the exposure to the UV (ultraviolet) light emitted by the sun. The results were published in the journal *Proceedings of the National Academy of Sciences* (PNAS), a US publication.

Scientists led by Hans Lischka, a professor at the University of Vienna's Institute for Theoretical Chemistry in Austria set out to decipher the ultra-fast processes of the photostability of the nucleobases, without which DNA and RNA (ribonucleic acid) would suffer rapid degradation from UV rays.

The researchers said the process under scrutiny was 'simple, yet highly complex', adding that 'as soon as the UV light excites the electrons into a higher energy level, ultra-fast decay brings them back to its original state.' According to them, 'In this way electronic energy is converted into heat.' Despite the complexity of this process, Prof. Lischka's team explained that it 'occurs in an incredibly short time dimension, in up to a quadrillionth of a second'.

Prof. Lischka, together with his colleague Mario Barbatti, now a member of the Max Planck Institute for Coal Research in Germany, and experts from the Czech Academy of Sciences in Prague, created a vivid dynamic picture of the photostability of the nucleobases using innovative computer simulation techniques.

They showed how the DNA components — the nucleotides that are responsible in DNA and RNA for the formation of base pairs — protect themselves against decomposition under UV irradiation. The scientists said the main innovation of their study

was 'in the detailed calculation of the coupling of the electronic dynamics with that of the atomic nuclei'.

They managed to achieve this with the help of worldwide unique quantum chemical methods developed at the Institute for Theoretical Chemistry. 'The calculated states of motion of the nucleobases show a quite remarkable dynamic behavior in time that spans several orders of magnitude,' the team said. The scientists explained that these orders of magnitude went from 'the pico/trillionth to the femto/quadrillionth-second range.'

'Computational effort of these studies was enormous' and hence the results were also only achieved thanks to the extensive use of the combined computer resources of Vienna's academic institutions.

The researchers said the newly developed methods could be used for the elucidation of dynamics in DNA nucleobases, and also for studies of photophysical processes in DNA itself and in the area of photovoltaics which is of high technological interest. 'The new methods allow a better understanding of the fundamental processes of transport of electronic excitation energy and of charge separation for production of electricity,' the scientists concluded.

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Cell modifiers to aid autoimmune disease treatment

Thanks to their potential for anti-inflammatory activity, the inhibition of p38 protein kinases shows promise in the treatment of autoimmune diseases provided that suitable, respondent patient populations can be identified.

Mitogen-activated protein kinases (MAPKs), such as p38, have been researched at length regarding their potential in the treatment of both inflammatory and neurodegenerative diseases. Although they are responsive

to extracellular stimuli, these protein kinases can have major impacts on cell pathways and expression. This enables them to regulate a wide range of cellular activities and can thus be a strong ally in various disease models. However,

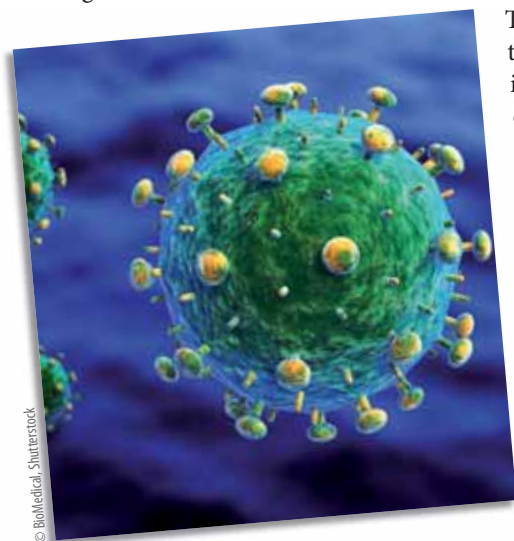
their role depends on identifying patients who will respond positively to cell modification by effectively binding inhibitor proteins, which is where the EU-funded 'Novel anti-inflammatory compounds for autoimmune diseases' (Kinacept) project comes in.

Kinacept is investigating the chemical make-up of p38 inhibitor compounds in efforts to enhance their application in a responsive patient population. Identifying such a population is challenging as patients vary in their

physiological conditions, stage of disease, and the ways in which the protein binding occurs.

Kinacept intends to solve the problem at all levels.

form of the p38 MAPK protein. Such data will make it possible to single out p38-dependent, drug-responsive individuals who can then be included in clinical trials. Kinacept is doing this by profiling the expression of p38 in existing patient-tissue collections, correlating protein levels of p38 kinases, and identifying possible ratios of inflammatory markers or p38 proteins associated with disease.



The team is preparing analogues of the existing compounds, conducting preclinical models for various disease afflictions, examining how the compounds behave in human tissue models, selecting a pre-clinical candidate patient class, and examining p38 expression in irritable bowel disease (IBD) and rheumatoid arthritis (RA) subtypes at various stages of disease.

The project is making strides in segmenting patient populations, particularly in identifying those with high levels of p38a — one

Funded under the FP7 specific programme Capacities under the theme 'Research for the benefit of SMEs'.

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Association studies can explain cell stress response

Oxidative stress is involved in ageing, Alzheimer's, atherosclerosis, cancer, Parkinson's and other complex diseases. Research into how cells protect the human body against it is gaining momentum.

Phenoxigen ⁽¹⁾, an EU-funded project will develop models for predicting the regulatory response to oxidative stress. Genome-wide association studies are used to investigate genetic variations associated with particular diseases.

A genotype is an organism's actual set of genes, while a phenotype is the visible expression of the character and traits of a genotype. Introduce environmental influences and it is easy to understand how the three create complex inter-relationships in disease expression.

Phenoxigen is using fission yeast as a model organism to gain a systems-level understanding of how cells protect against oxidative damage, and thus get greater insight into the interplay of the three variables.

The project is working to build a genetically and phenotypically diverse library of yeast strains with distinct stress sensitivities. Using genome-wide analyses, the different strains of fission yeast will yield information about how natural genetic variability affects a cell's ability

to cope with stress and its regulation. This will apply at different levels and under various genetic backgrounds.

The project participants have already achieved successes in RNA sequencing, targeted proteomics, robot-assisted automatic phenotyping methods and new computational methods for identifying respective genetic loci. The four-member consortium will use a multidisciplinary and complementary approach, while ground-breaking computational methods will validate the mathematical models.

The efforts of Phenoxigen will establish a framework to be used for research into complex systems, such as response networks, will improve association studies in human cells and enhance biological insights into the links connecting genotype, environment and phenotype.



(1) 'A systems approach linking genotype and environment to phenotype: oxidative stress response mechanisms in fission yeast'.

Funded under the FP7 specific programme Cooperation under the theme Health.

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Fortifying nutrition for children and women in Africa

An EU-supported team is testing new approaches to optimising the iron and zinc fortification of staple foods. Improving traditional processing methods will enhance micronutrient uptake and bioavailability.



In efforts to help reach the Millennium Development Goals (MDGs), the EU-funded Instapa ⁽¹⁾ project is working to improve the overall health and development of women and children in sub-Saharan Africa (SSA). This important initiative uses a food-based approach to fighting malnutrition. It is particularly concerned with those individuals who suffer from an inadequate intake of iron, zinc and vitamin A.

The first two years of the five-year project were dedicated to the development and carrying out of various studies and procedures in SSA. Over this period, data gathered helped update recipe booklets, while various dishes have been selected to undergo process optimisation in order to boost nutritional intake.

To enhance retention of micronutrients, and strengthen immune function and cognitive development, Instapa

will test the effects of biofortification, fortification and post-harvesting on improving millet-, sorghum-, maize- and cassava-based foods. The project will do this by evaluating the genetic potential of staple foods for increasing micronutrient and anti-nutrient content, and assessing the degree of success when introducing biofortified staple foods in local farming systems.

Instapa is also concentrating on capacity building, information sharing and reinforcing scientific and technological excellence in staple food-based approaches across Africa and Europe. The project has a regularly updated website and has already issued its first newsletter for project partners. In Benin, Burkina Faso, Kenya and Mali, training needs assessment of small and medium-sized enterprises (SMEs) and local food processors has started and initial project results have been presented at international forums.

(1) 'Novel staple food-based strategies to improve micronutrient status for better health and development in sub-Saharan Africa.'

Funded under the FP7 programme Cooperation under the theme 'Knowledge based bio-economy,' <http://cordis.europa.eu/marketplace> > search > offers > 6073

Targeting new malaria counter measures

Malaria is spread by mosquitoes. The Malvecblok ⁽¹⁾ project is an EU-funded initiative that has investigated mosquito biology in order to develop new ways of controlling infection.

Malaria is one of the world's deadliest diseases and is caused by a micro-organism known as *Plasmodium*. The parasite is passed from an infected individual to a female mosquito when it takes a blood meal and then transmitted by the insect's bite to the next host. One of the main transmission routes of the disease is a species of African mosquito, *Anopheles gambiae*.

The Malvecblok project comprises European and African partners who are investigating mosquito biology and

its interaction with the *Plasmodium* parasite. For the first time, the consortium has integrated the key aspects of *A. gambiae* biology, including its reproductive biology and effect on immunity, and the transmission of *Plasmodium*. Scientists have also proved the importance of laboratory experiments for studying natural populations of *A. gambiae*.

Molecular mechanisms that regulate *Plasmodium*'s ability to form spores have been studied in both the



laboratory and in natural populations. Project partners have found that the genetic diversity of the *Plasmodium* parasite enables it to resist the mosquito's immune system. This has had important implications for designing mosquito control measures.

Scientists also studied the role of polymorphism in genes controlling reproduction and immunity on mosquito populations and malaria transmission.

Polymorphism is the occurrence of two or more different forms of the same species in a population.

The consortium has successfully developed state-of-the-art training programmes for exchanges of personnel. The new knowledge developed by the project will help promote Europe's scientific competitiveness and have a positive impact on global health issues.

(1) 'Population biology and molecular genetics of vectorial capacity in *Anopheles gambiae*: targeting reproductive behaviour and immunity for transmission-refractory interventions'.

Funded under the FP7 specific programme Cooperation under the theme Health.

<http://cordis.europa.eu/marketplace> > search > offers > 6110

Perfecting anaesthesia

A novel technique of measuring a common anaesthetic drug in the breath under surgery will help doctors gauge dosage and avoid complications.

General anaesthesia is often necessary before surgical operations, but it remains a tricky component of surgery that must be monitored closely. There is an acute need to monitor anaesthetic concentrations in the patient's blood stream during surgery.

The Intelsens ⁽¹⁾ project, fully funded by the EU, set out to develop a new way to monitor the patient's levels of propofol — one of the most common anaesthetics. The project is proposing a gas sensor to identify trace levels of the anaesthetic in the patient's breath.

Currently, the effectiveness of propofol-induced anaesthesia is only assessed according to symptoms presented by

the patient. The ability to monitor exhaled trace levels of propofol in patients does not currently exist but would dramatically improve the level of control over its administration.

The project team succeeded in developing a new optical sensing concept to trace levels of propofol in the breath. This is expected to improve healthcare quality by tailoring dosage to individual needs, while reducing clinical recovery times and postoperative care, along with associated costs.

Upon injection, propofol is transported into the blood stream and traces of the drug appear in the exhaled breath. In medical feasibility studies using mass

spectrometry and gas chromatography the volume of propofol in parts-per-billion had previously been estimated but the techniques were unsuitable for surgery.

After many tests using ultraviolet and infrared rays to measure propofol, the team elaborated the most optimum strategy for optical detection of the drug. The technology relied on what is known as photoacoustic spectroscopy (PAS), built to measure ultraviolet absorption. Laser excitation was also used in the process, and successful equipment was ultimately developed and fine-tuned.

The project proved the concept beyond doubt and was accomplished through active collaboration between physicists, chemical engineers, medical professionals and commercial medical systems developers. The results have raised interest in other research institutes and industrial systems manufacturers.

A follow-up project is aimed at a clinical evaluation of the PAS technique for online propofol monitoring in patients undergoing surgery. The novel techniques have also shown great potential beyond the current application in fields such as atmospheric trace gas sensing, exhaled breath disease diagnostics, industrial process monitoring as well as pollutant detection in the liquid phase.

(1) 'Integrated laser sensor for exhaled anaesthetic agent monitoring'.

Funded under the FP7 specific programme People (Marie-Curie actions).

<http://cordis.europa.eu/marketplace> > search > offers > 6159



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ENERGY AND TRANSPORT

EU must invest more in wind power for 20 MW turbines to become reality

Giant 20 megawatt (MW) wind turbines are feasible and could provide a cost-effective way of expanding Europe's offshore wind capacity and providing cheaper electricity, according to a report from the EU-funded 'Integrated wind turbine design' (Upwind) project.

The Upwind project received EUR 14.5 million from the 'Sustainable development, global change and ecosystems' thematic area of the Sixth Framework Programme (FP6) and the study was published at the European Wind Energy Association's (EWEA) annual event in Brussels, Belgium.

The EWEA forecasts that wind energy will meet 26 % to 34 % of Europe's electricity demand by 2030, with almost as much electricity coming from offshore turbines as from those onshore. The latest report from Upwind cites that 20 MW machines could be one way of reaching these levels of production by providing several times more electricity at lower costs than that produced by today's turbines.

Indeed, while the report suggests that such technology is possible, it also warns that producing such machines would be complicated. It states that it would not be possible simply to upscale the technology used to produce the 5 MW turbines that are already in operation. Instead, it says that a new, innovative, tailored design would be required to make 20 MW turbines work.

'Upwind found that making a 20 MW machine is not as simple as just upscaling today's 5 MW turbines,' commented Jos Beurskens from the Netherlands' Energy Research Centre (ECN), who led the project along with the Upwind coordinator Peter Hjulær Jensen from the Danish Technical University Risø (DTU). He said that the project had helped identify how such large turbines could be constructed. 'We identified key innovations to the design, materials and way the turbine is operated,' noted Mr Beurskens.

Mr Beurskens believes 20 MW turbines could be in operation by 2020. He backs calls for more funding, adding that his scenario would only be feasible providing these large — scale turbines are 'the cheapest option.'

Among the main innovations Upwind suggests for a 20 MW wind turbine is the need to change the layout of a wind farm by lowering the power output of the first row of turbines to allow for higher overall wind farm efficiency. Moreover, the report notes that the future smart wind turbine would be able to adapt its position and the pitch of its blade to local wind conditions.



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The study also mentions a variety of ways that blades should be changed to improve efficiency and make them easier to transport. Finally, it highlights how technological advances would allow future wind turbines to be better maintained than the current generation of machines.

Promoted through the Research Information Centre.
<http://ec.europa.eu/research/infocentre> > search > 20593

Wind turbines examined to improve technology

A series of reports on wind turbines, their mechanical systems, loads and rotor blades will improve their construction and workings.

The EU-funded project 'Procedures for testing and measuring wind energy systems' (Protest) will deliver a batch of reports aimed at improving the construction and day-to-day working of wind turbines. These will examine a variety of subjects including present-day procedures for developing mechanical systems of wind turbines and areas for improvement.

Much focus will be on design loads, with reports looking at various aspects of this subject including whether the set of design load cases currently used is adequate for not only determining the global rotor and tower loads, but also for determining the design loads for mechanical components. If not, the project team will specify additional load cases. It also plans to recommend practices for component modelling.

All of the reports will be applied to three case studies and findings from the case studies used to update the

recommended practices and procedures. Moreover, all results from the Protest project will be submitted to the relevant standardisation committees on wind energy, and they will be published at wind energy conferences and workshops.

The results are intended to better specify the procedures for prototype measurements in order to bring the design and development process of mechanical components to the same level as the design and development process of rotor blades.

The report describing wind turbine mechanical systems, taking into account the current design and simulation models and feedback from prototype

measurements, has been completed. A major result, according to the researchers, has been the development of a new method applied to the pitch system. This method contains six steps that should be followed to set up and use a so-called 'measurement campaign' to validate or improve the component model.

Funded under the FP7 specific programme Cooperation under the theme Energy.
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The search for better offshore wind turbines

The current problems in the operation and management of offshore wind turbines are being investigated by EU researchers in a bid to help the Union meet its target of producing 20 % of its energy from renewables by 2020.

The EU Council of Ministers agreed in March 2007 that renewable energy would supply at least 20 % of the EU's energy demand by 2020. Provided sufficient emphasis is placed on research and technological development (RTD) and the marketplace, wind power — in particular offshore wind energy — should

make the most substantial contribution to this target.

However, various issues are hindering this development and the EU-funded Reliawind ⁽¹⁾ project plans to highlight what needs to change. Current offshore wind operation and maintenance (O&M) costs are too high. This means that high feed-in tariffs are needed to encourage private investors to enter the market. The researchers want to change this paradigm by encouraging offshore wind to be deployed with similar operational performance and O&M costs as onshore through better availability and lower energy costs.

It plans to manage this transition by studying how reliability affects the design,

operation and maintenance of wind turbines, the results of which should lead to a new generation of offshore, and onshore, turbines for the market beyond 2015. According to the research team, future turbines should be built using a modular design that is more resistant to environmental conditions and permits the replacement of components simply and quickly. Turbines fit for purpose post-2015 should also have their components monitored better and be subject to more accurate diagnosis when a problem arises. The project team also wants to develop preventive maintenance algorithms to help anticipate failure.

(1) 'Reliability focused research on optimizing wind energy systems design, operation and maintenance: tools, proof of concepts, guidelines & methodologies for a new generation'.

Funded under the FP7 specific programme Cooperation under the theme Energy.
<http://cordis.europa.eu/marketplace> > search > offers > 6139



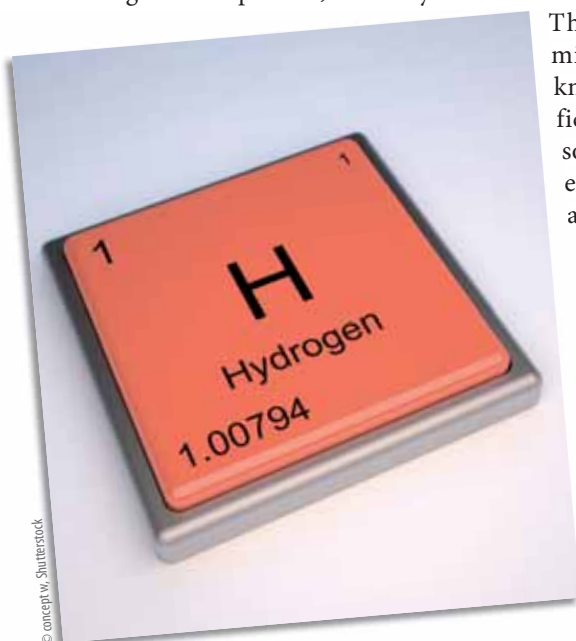
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Throwing light on converting solar energy into hydrogen

European scientists are working to develop an artificial device to convert the energy from the sun into hydrogen.

By exploiting sunlight, leaves can split water into oxygen and hydrogen at ambient conditions. During photosynthesis, hydrogen (H₂) is used to reduce carbon dioxide (CO₂), giving rise to various organic compounds, even oily

compounds which can be used as fuels. However, a specific enzyme, hydrogenase, may lead to non-negligible H₂ formation even within natural systems under certain operating conditions.



The EU-funded Solhydro-mics⁽¹⁾ project is using this knowledge to develop an artificial device that will convert solar energy into H₂ with 10% efficiency by water splitting at an ambient temperature.

This device will comprise three parts. First, an electrode exposed to sunlight that will carry Photosystem II (PSII) — the enzyme that governs this process — or a PSII-like chemical mimic, which will be deposited on a suitable electrode. Second, a membrane to enable the transport of both

electrons and protons via, for example, carbon nanotubes or titanium dioxide (TiO₂) connecting the two electrodes and ion-exchange resins, such as Nafion. Thirdly, a cathode will carry the hydrogenase enzyme or an artificial hydrogenase catalyst to recombine the protons and electrons into pure molecular hydrogen at the opposite side of the membrane.

The complicated tasks of enzyme purification and enzyme mimic development, enzyme stabilisation on the electrodes, membrane development, and ultimately the design and manufacturing of a proof-of-concept prototype, will be carried out by Imperial College London in the UK, the Politecnico di Torino in Italy and the GKSS research centre on polymers in Geesthacht in Germany, in conjunction with experts from four high-tech small and medium-sized enterprises (SMEs).

(1) 'Nano-designed electrochemical converter of solar energy into hydrogen hosting natural enzymes or their mimics'.

Funded under the FP7 specific programme Cooperation under the theme Energy.

<http://cordis.europa.eu/marketplace> > search > offers > 6068

BEE writes the book on biomass assessment

Much has been made about Europe replacing fossil fuels with biomass. The creation and adoption of a harmonised approach to evaluating these valuable resources will help ensure that biomass lives up to the hype.

Biomass can be exploited to produce energy in an environmentally sustainable manner. It comes from a variety of sources and can take on many different forms. Unfortunately there remains a great deal of uncertainty regarding estimates of the potential of biomass to power Europe.

The EU-funded 'Biomass energy Europe' (BEE) project aims to increase the accuracy and reliability of biomass assessments by establishing a common methodology. The first phase of the project involved reviewing a number of recent biomass studies.

Analysis by BEE's multidisciplinary team of experts helped identify best

practices applied in different regions and to different types of biomass. This knowledge has subsequently been transformed into two handbooks addressing the topics of methods and data sources respectively.

The handbooks are already being put into practice in the context of several BEE illustration cases. The word is also being spread to stakeholder and potential user communities, which range from forestry to agriculture to waste management, through an aggressive information dissemination campaign. Additional exposure is also being gained by collaborating with another relevant EU research project.



Funded under the FP7 specific programme Cooperation under the theme Energy.

<http://cordis.europa.eu/marketplace> > search > offers > 6150

Second-generation ethanol to be more sustainable

The need to ensure that second-generation ethanol from lignocellulosic feedstocks is sustainable is being investigated by researchers from the EU-funded Babethanol ⁽¹⁾ project.

EU researchers are working to make sure that the production of second-generation ethanol is based on a 'moderate, environmentally friendly and integrated' transformation process that will be applicable to a range of lignocellulosic feedstocks.



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The new process, called CES, will be an alternative to the current costly practices, which most notably include pre-treatments that require significant energy, water, chemical products, detoxification and waste treatment. CES will be developed and tested from laboratory to semi-industrial pilot-scale with different feedstocks.

During the first period of the project, several lignocellulosic materials were selected according to their expected potential for conversion to second-generation ethanol. These include blue agave bagass (BAB), a fibrous residue from the manufacturing of tequila, palm oil empty fruit bunches (POEFB), a fibrous residue from the manufacturing of palm oil, corn cob, a grainy residue from the harvest of corn and the production of sweet corn (CC), and barley straw, a fibrous residue resulting from the harvest of barley (BS).

The project team will also investigate other potential feedstocks native in Latin America and western Europe. Priority will be given to biomasses with high carbohydrate content, low lignine content and which are not competing with human and animal feed. The costs along the supply chain for the collection, pre-processing, transportation, storage and handling while waiting for processing will also be major criteria for the selection.

The scientists have likewise been studying the operating conditions for the biomass pre-treatment, concluding that the process should be performed at a rather low temperature — lower than 100 °C — to minimise energy consumption and cellulose degradation.

(1) 'New feedstock and innovative transformation process for a more sustainable development and production of lignocellulosic ethanol'.

Funded under the FP7 specific programme Cooperation under the theme Energy.

<http://cordis.europa.eu/marketplace> > search > offers > 6125

Energy experts create new smart metering standards

Smart utility meters that help control prices and monitor consumption have come a long way in the EU. Now, a single set of standards is needed to implement this formidable technology across the continent.

Smart meters can measure gas, electricity and water consumption efficiently and wirelessly. The technology is known professionally as advanced metering infrastructure (AMI) and has created value for energy consumers, utility companies, metering operators and retailers. AMI provides more accurate metering and billing and facilitates supplier switching and helps both the utility companies and consumers control costs more efficiently. They can even help consumers track their CO₂ emissions, taking environmental awareness to the next level.

However, due to the lack of unified standards for these systems, there is little interoperability among them, which prevents their adoption on a large scale. The EU-funded 'Open public extended network metering' (OPEN) project is creating standards that can help to deliver interoperability between devices produced by different manufacturers. It will specify a comprehensive set of open and public standards for AMI agreed by relevant stakeholders in the field to support electricity, gas, water and heat metering.

Partners in the project include leading worldwide electricity, water, gas and heat meter manufacturers, as well as research institutions and large utility providers in Europe. The partners are identifying and filling the knowledge gaps that enable relevant industries to agree, implement and embrace the new set of international standards.

The project is taking advantage of the existing international and European standards, technologies and solutions, adapting them to the specific needs of AMI and furthering research and technological development activities where necessary.

To achieve its goals, the project has investigated regulatory issues concerning AMI/smart metering in Europe and identified the requirements of the various stakeholders.



It reviewed the latest different technologies and selected the most suitable for the development of standards. Another

objective has been to ensure that the requirements of AMI/smart metering will be met in a cost-effective manner.



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Extensive testing is now being carried out on newly developed system elements to ensure their viability. The final OPEN meter proposal for standards will then be submitted to the relevant standardisation organisations. These include the European Committee for Electrotechnical Standardisation (Cenelec) and the International Electrotechnical Commission (IEC).

In short, the new standard suite will aim to remove barriers to the large-scale deployment of smart metering systems and build a truly advanced metering infrastructure. The energy sector, consumers and even the environment will stand to benefit from these standards for smart metering.

Funded under the FP7 specific programme Cooperation
under the theme Energy.

<http://cordis.europa.eu/marketplace> > search > offers > 6127

Energy framework to tackle security of supply problems

The EU-funded project Secure ⁽¹⁾ worked on a framework to address security of supply issues in the energy sector inside and outside the EU.

The framework takes into consideration all issues related to security of supply, including geopolitics, price formation and the economic and technical design of energy markets inside and outside the European Union.

The scientists set out to develop energy security indicators for all the major energy sources, namely oil, natural gas, coal, nuclear and renewables, in order to identify risk factors and quantify the EU's exposure to volume and price risks

in the short and long terms. This includes the potential impacts of severe accidents and terrorist threats.

This meant evaluating the costs and benefits (both measurable and perceived) of energy security for different energy supply and demand scenarios to help policy-makers introduce the most appropriate institutional, political and industrial solutions. This includes aiding the European institutions and national governments to achieve the right energy mix taking into consideration energy security and sustainability requirements.

The researchers also looked at the need for the EU to develop stable relations with energy exporting countries and external partners, and to build efficient regulatory frameworks that address incentives and obligations for energy companies and consumers. They also looked into optimising the synergies among Member States to improve security of supply, and defining sound public service missions to compensate for potential market failures.

(1) 'Security of energy considering its uncertainty, risk and economic implications'.

Funded under the FP7 specific programme Cooperation
under the theme Energy.

<http://cordis.europa.eu/marketplace> > search > offers > 6199



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Vital groundwork for R & D cooperation

A European-funded project is seeking to strengthen the research and development fundamentals in central European nations, and bring them closer to the rest of Europe.

The Czech Republic, Slovak Republic and Poland have banded together to form the 'Central European research and development area' (Cerada) with the aim of boosting coordination and cooperation among relevant institutions and R&D stakeholders.

Cerada has catalogued current R&D activities in the region as well as their exploitation potential. The data includes 150 research profiles and 800 partnerships. The project partners have produced strengths, weaknesses, opportunities and threats (SWOT) studies and documentation describing how the Cerada joint space will take shape.



On the skills and know-how front, Cerada has developed a training programme focused on R&D project management and technology transfer issues, to ensure professionals are available for future activities.

Cerada has laid the groundwork for attracting SMEs and major industrial players to the region. And it has encouraged academic and private-sector researchers to work together through workshops, seminars, round-table discussions and expert meetings and conferences.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.

<http://cordis.europa.eu/marketplace> > search > offers > 6153



For the good of the 'greater region'

A European network will bring fruitful exchanges for research and education in Saarland, Luxembourg, Lorraine and Liege.

One invaluable feature of a united Europe is its diversity and different approaches to research and learning. The EU-funded Uni-Salll (1) project represents a unified exchange and mobility programme for the four main universities of Saarland, Luxembourg, Lorraine and Liege, right in the heart of Europe.

Uni-Salll links four mobility centres in these universities to enable researchers and students to travel to other universities in the network. The aim was to give the students and researchers significant opportunities to learn from their peers and exchange ideas or research. The initiative was linked to

the EU's Euraxess project which promotes academic exchange, employment and relocation within Europe.

The project partners — i.e. the universities in the network — developed a scheme for training visits from the first year. The mobility teams from different universities worked on training tools and content of visits from other institutions.

They developed sophisticated welcome packs which include



relevant data on establishing themselves in the host institution and country. Uni-Salll also printed leaflets outlining its mission, distributing them at various events and conferences, and set up a website in 2009.

Key visits took place during this first year of the project to launch the initial phase. The partners visited and inaugurated the newly renovated Université de Liège Student Mobility Centre. They also visited the Euraxess Service Centre at the University of Nancy. The

partners prepared the workshop for the Euraxess Network Conference which took place in Potsdam, which focused on structuring visits to other academic institutions. The term 'greater region' refers to a common area for higher education, research and innovation in the heart of Europe, incorporating the areas included in the project.

Once in full swing, Uni-Salll is expected to bring up to a 50 % increase in incoming and outgoing researchers in the greater region. The project will offer positive

socio-economic impacts as well as promote exchange, mobility, education, travel, and the pursuit of knowledge.

(1) 'Network of mobility centres of the Universities of Saarland, Luxembourg, Lorraine and Liège'.

Funded under the FP7 specific programme People (Marie-Curie actions).

<http://cordis.europa.eu/marketplace> > search > offers > 6119



Montenegro plans its future of research

The University of Montenegro (UOM) has responded to the country's development needs by expanding its research capacity with help from the EU-funded Evolunimont (1) project.

Better research cooperation with European partners, more participation in the EU's Seventh Framework Programme (FP7), and better defined quality standards, information exchange and research best practices are all considered important to Montenegro's future. The EU-funded Evolunimont initiative was set up to evaluate research activities and improve strategic research planning at UOM.

The project has helped the university draw up a profile of its research capability and quality factors. This work enables informed decisions to be made when conducting strategic research planning that supports regional and national economic development. The Evolunimont project also raises awareness of the importance of strategic planning among the research community and general public.



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The framework created by UOM has helped to establish standards and gain insights into better ways to evaluate research and research management. Information on best practice, together with the framework can be disseminated online and through workshops.

Success of the Evolunimont initiative can help promote better management of resources in Montenegro and increase the competitiveness of local SMEs. The project should contribute to the economic growth of the country and help create jobs, thereby improving quality of life in the country.

(1) 'Evaluation of research activities and strategic planning of research at the university of Montenegro'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.

<http://cordis.europa.eu/marketplace> > search > offers > 5937



Recap, recount and reaping success

The 'Mediterranean innovation and research coordination action' (MIRA) project has proven successful since its inception in 2008. It has now become a model encouraging scientific interaction and cooperation.

The MIRA project set out to establish various goals to promote and encourage scientific collaboration by using innovative methods and technologies. The team's efforts have been both rewarding and successful.

In strengthening and coordinating science and technology research in the EU, MIRA has established a collaborative platform between scientific communities to promote dialogue and establish thematic priorities.



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The aim of this dialogue is to connect and facilitate cooperative initiatives and interaction between Member States and other political bodies.

MIRA has identified areas of common interest and value, and developing groups which have participated in a number of projects, such as Estime ⁽¹⁾ and Asbimed ⁽²⁾. As it moves forward, MIRA brings to the fore its network of research institutions and

technology transfer services, all of which aim to provide an institutional basis for EU-MPC S&T cooperation.

MIRA has also developed a web portal that serves as both an information outlet and a repository for its document library. Key information provided not only includes current activities but also enables users to get a better idea of future plans.

(1) 'Evaluation of science, technology and innovation capabilities in the Mediterranean countries'.

(2) 'Assessment of the bilateral scientific cooperation between the EU Member States, accession, candidate and Mediterranean partner countries (MPC)'.

Funded under the FP7 specific programme Capacities under the theme 'Horizontal actions and measures in support of international cooperation'.
<http://cordis.europa.eu/marketplace> > search > offers > 6008



Europe boosts expertise for the University of Sofia

Thanks to the work of the EU-funded Everest ⁽¹⁾ project, an EU action plan is helping to boost the chemistry department of Sofia University in Bulgaria.

Considered the primary institution of higher education in the Bulgarian capital, Sofia University is liaising with the European Commission to boost its expertise in certain fields. In particular, an EU-sponsored team recently evaluated the research quality and capability of the university's faculty of chemistry.

A team of five independent evaluators was selected by the European Commission to undergo a SWOT analysis of the faculty. SWOT stands for strengths, weaknesses, opportunities and threats. It is considered an important tool in the drive for upgrading

and advancing any organisation or institution.

Several challenges were identified as priorities in the SWOT analysis, in coordination with both the evaluators and faculty members. Interestingly, one of these was the high number of teaching hours (180 to 360 hours/year) compared to the European average of 120 hours/year.

Moreover, lack of funding for maintenance and infrastructure, as well as lack of equipment has been identified as major issues. A need to hire highly experienced professionals was also underlined.

Other issues to address are lack of post-doctorate opportunities for students and lack of international experience among young scientists.

The SWOT analysis has already been used to prepare an action plan for future development and improvement of the faculty. The final version of the action plan was approved by the faculty's steering committee at the end of the project. The plan was even recommended for dissemination among the other faculties of the university as a model of good practice.

The independent experts issued recommendations to both the university management and the state authorities on how to improve Bulgarian science and research policy. The evaluators concluded overall that, considering the lack of advanced equipment and infrastructure, research output and international cooperation are strong, reflecting high competence in different fields.

Once the plan is implemented, the likelihood of the faculty becoming a global player in its field, on par with other European universities, will boost Bulgarian research.

(1) 'Evaluation of the research quality and capability of the faculty of chemistry, University of Sofia, and defining of an action plan'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.
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EU helps Bulgarian institute aim for global excellence

European advisory team ascertains the quality of Bulgaria's Academy of Sciences and prepares the way for it to earn a 'quality label'.

Established in 1869, the Bulgarian Academy of Sciences has been a cornerstone of higher education for almost 150 years. Since the turn of the century the academy has seen a need to address newer technologies and continually modernise its programmes.

It is a field that falls under the information and communications technology (ICT) banner at the academy.

Evalipp has assigned an external advisory team, set up by the European Commission, to examine the institute's R&D potential in this discipline.



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With this in mind, the EU-funded Evalipp project has set out to 'Evaluate the Institute for Parallel Processing of the Bulgarian Academy of Sciences'. Parallel processing refers to the simultaneous use of more than one processor in computers to execute multiple tasks.

The team is assigning a 'quality label' to research teams in certain well-defined ICT areas. It is also undertaking a detailed 'Strengths, weaknesses, opportunities and threats' (SWOT) analysis and formulating a respective action plan to advance the institute.

Ultimately, the 'quality label' aims at transforming the institution to a regional unit of excellence with solid participation in large research clusters and infrastructures.

Through the support of Evalipp, the academy is now demonstrating to Bulgarian funding agencies the high R&D quality of the research teams. It is also working on attracting PhD students and those seeking post-doctorate degrees. On a global level, this is strengthening the position of the institution in the European Research Area, invigorating international cooperation and encouraging participation in further projects.

Based on its expertise with respect to computer sciences and ICT, the department is now operating as an interdisciplinary centre, further strengthening its already solid international position. This allows it to attract external (including EU) funding and contribute to the economic development of Bulgaria.

In all, the advisory team has concluded that the Bulgarian Science Academy is a first-rate scientific institute operating well at an international level. This has been underlined by the number of studies the staff have published, as well as their participation in international projects and organisation of scientific events. The future for the academy looks bright.

Funded under the FP7 specific programme Capacities under the theme Potential/Regional.

<http://cordis.europa.eu/marketplace> > search > offer > 5958



EU research cooperates with southeast Asia

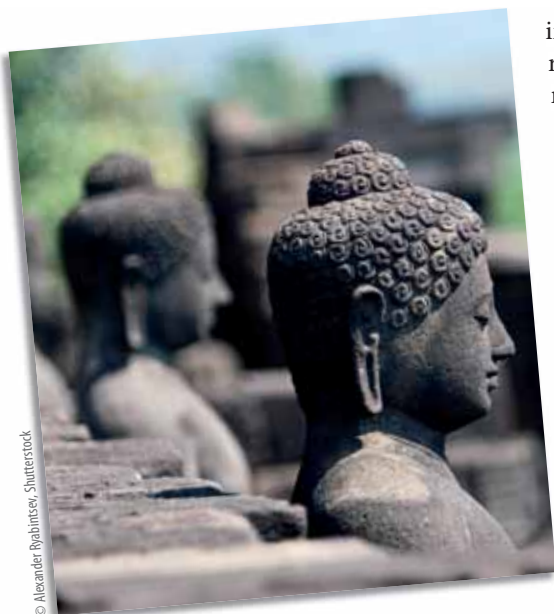
Collaboration between European researchers and their counterparts in southeast Asia (SEA) has many benefits, including new medicines, improved economic performance and a better quality of life for citizens.

The SEA-EU-net ⁽¹⁾ project has been established to increase scientific and technological (S & T) cooperation between southeast Asia and Europe

by taking a strategic and focused approach. The initiative supports the EU's internationalisation policy by increasing collaborative research in the

Seventh Framework Programme (FP7) through partnerships.

Activities include conducting joint forums to provide information about FP7 and highlight initiatives between the Association of southeast Asia nations (ASEAN) and the EU. Challenges facing the initiative involve raising awareness of opportunities,



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improving connections among researchers, establishing partnerships and S & T programmes and synchronising funding systems.

As well as encouraging S & T cooperation the project also provides a basis for addressing global challenges through a sustainable approach. The initiative also acts as a network for the different stakeholders, such as universities, industry, government, civil society and donors, which strengthen research capacity.

The project will increase bi-regional cooperation between SEA countries of ASEAN and Member States and associated states of the EU.

(1) 'Facilitating the bi-regional EU-ASEAN science and technology dialog.'

Funded under the FP7 specific programme Capacities under the theme 'Horizontal actions and measures in support of international cooperation'.

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A better grasp of pollution

Pollution research in countries like Serbia and Slovenia can help the whole region. The EU is enhancing their capabilities and infrastructure in this field.

Pollution is a major environmental concern of the 21st century. The EU is taking steps to support academic institutions that study pollution and report on it.

One of these initiatives is the RESTCATERCE-NIPMSS ⁽¹⁾ project, aimed at reinforcing the S & T potential of two emerging research centres which study natural and industrial solid pollutants. The first is the Faculty of Mining and Geology of Serbia at the University

of Belgrade (UB-FMG), focusing on the Mineralogy-Crystallography and Petrology-Geochemistry Departments. The second institution is the Geological Survey of Slovenia (Geozs) with specific focus on the Department of Geochemistry and Environmental Geology. Under the project, these institutions are establishing strategic partnerships with each other and with the Institute of Geosciences, Division of Mineralogy, at the University of Frankfurt, Germany.

The project aims to strengthen international cooperation, networking and partnerships among these institutions and to set up a brain-gain environment. It is also improving material research standards at the UB-FMG by upgrading facilities, as well as exploiting RTD results of both the Geozs and UB-FMG. This is set to position the Serbian and Slovenian universities as national and regional centres of excellence.

Upgrading and renewing crucial facilities at the UB-FMG involves the purchase of several new systems that measure and analyse pollution as well as setting up the necessary infrastructure for these systems to operate. Noteworthy among the new equipment is the scanning electron microscopy with X-ray microanalysis (SEM/EDS) which produces an image of a sample's composition.

Reinforcement of international networking is also part of the project's mandate, involving staff mobility and knowledge transfer. In this respect the project organised a workshop in October 2009 at Geozs entitled 'Applied environmental geochemistry: anthropogenic impact on human environment in SE Europe'.



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The issue of brain-gain at the education and research level was addressed through a course on SEM-EDS in April 2009. Another course was on micro-analytical techniques in earth science and was held during February 2010 in Belgrade. Two young researchers were also employed at the UB-FMG to bring a fresh perspective to the study.

Networking and dissemination of project results are being supported by the project's website, in addition to presentations and international events

(e.g. the WIRE conference in Granada, Spain) among other initiatives. Contacts and inter-institutional exchanges among the project's participants and with other institutions have increased considerably, and the project is doing its part to support the goals of the European Research Area.

Lastly, human and technical research capabilities at the UB-FMG and GeoZs are being reinforced, as these institutions become leaders in their field. A dynamic research atmosphere, increased participation in EU

programmes and the valuable research coming out of these institutions all bear witness to the project's work ethic.

(1) 'Reinforcing S & T capacities of two emerging research centers for natural and industrial pollutant materials in Serbia and Slovenia'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.
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Civil society, where next?

In the rush to exploit the natural wealth of some regions, society has often overlooked the adverse consequences that may result. An independent study suggests it is time to adjust perspectives, find viable alternatives and listen to local concerns.

The exploitation of natural resources in certain regions has led to the exclusion of wealth and benefits for some indigenous populations. In many cases, globalisation has bypassed the concerns of native populations, bringing disruption, environmental destruction and regional conflict. A new study presents a fresh look at regionalisation and provides an alternative approach to the exploitation of natural wealth.

The Alternative regions ⁽¹⁾ project presents several noteworthy findings. For example, one supports incentives for the stewardship of a region's wealth by native populations in an effort to

ensure long-term goals and mutual inclusion of benefits. This would help to safeguard natural resources such as water, land and seeds.

Civil society groups in Latin America, for example, have tabled a number of key initiatives which have been perceived as counter to the economic liberalisation of a region. The media have often portrayed such groups negatively. The study goes to great lengths to allay such fears with comprehensive research into finding alternatives.

Such alternatives would enable all parties to overcome the socio-economic

deficits embedded in the contemporary exploitation of regions. The study also stipulated alternatives for their democratic inclusion in the governance of such regions.

The completed project has compiled its findings into an 80 000-word document, which is given extra weight via its conclusions that have been derived from both academic and field research. In addition, it addresses complex issues in a number of publications, tackling such themes as globalisation and security.

It has also considered economic regions, such as the EU, Free Trade Area of the Americas and SPP (security and prosperity partnership of North America) giving them the framework to develop a means to analyse their official mechanisms. It has done so in an effort to include civil society in the policy decision-making process.

Through international conferences, workshops and seminars, the research aims to contribute towards critical governance studies and to bringing about change through better governance principles.

(1) 'Alternative regionalisms in an age of globalization — the role of civil society'.

Funded under the FP7 specific programme People (Marie-Curie actions).
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Engaging the public in the climate change debate

What better place than your local science centre, museum or aquarium to learn more about climate change from Europe's experts and get involved in finding solutions?

A great deal of information has been disseminated to the public in recent years regarding the topic of climate change. The challenge is to move beyond this initial phase and actually get citizens to take up the fight against climate change.

The objective of the EU-funded project 'Action on climate change through engagement, networks and tools' (Accent) is to use science centres, museums and aquaria as vehicles to engage the public in a dialogue with the scientific community and other stakeholders.

Research has been conducted on the best ways to reach out to citizens, both young and old. A questionnaire has also been used to gather feedback about the public's initial perceptions about climate change.

Consequently, a campaign entitled 'I Do' was designed and launched during a high-profile event in Copenhagen, Denmark. The backbone of this campaign is its website. Interested individuals and organisations can download guidelines for targeted educational activities from the site and can also upload information about upcoming events in their area.

Feedback gathered from the Accent participants will help determine which types of measures have proved most successful in encouraging communication and participation on this important subject.

Funded under the FP7 specific programme Cooperation under the theme 'Socio-economic sciences and the humanities'.
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Rocky shore biodiversity

Ecologists have studied biodiversity and resilience in communities of marine organisms along the rocky coast of Liguria in north-western Italy to determine how ecosystems function and respond to disturbance.

Better understanding of the mechanisms behind changes in an ecosystem's biodiversity remains one of ecology's greatest challenges, but is crucial to successful coastal management and conservation.

The EU-funded project 'Biodiversity and connectivity in the resilience of coastal marine communities' (Bioconnectence) has studied the ability of bottom-dwelling marine organisms along the intertidal zone of a rocky coastline to recover from disturbances.

The intertidal zone is the area exposed to the air at low tide but at high tide is underwater.

Researchers carried out a biodiversity survey of this zone along the Ligurian coast. Biodiversity can be described as the number and variety of animal and plant species within a region. The scientists also performed experiments across a number of sites to assess the role of ecosystems in influencing recovery rates, thereby assessing resilience.

A major review of ecological resilience was also undertaken in an attempt to marry the current differences between theory and practical research in the field and laboratory. The project's findings have provided important data on environmental conditions as well as the abundance and diversity of rocky shore plants and animals.

Project partners also collected data on little studied organisms, such as shrimp-like amphipods and *syllid* and *nereid polychaete* worms, which live among small turf algae. These samples required painstaking identification and counting in the laboratory.

Algal turf dwelling fauna have contributed to increased estimates of species



richness along rocky shores, compared to traditional visual sampling techniques. Bioconnectence's sampling strategy enabled patterns to be identified over a range of spatial scales,

thereby gaining greater information on the spatial scale of biodiversity change along the coast. Recognition of the importance of turf dwelling organisms in terms of biodiversity has encouraged

fresh studies into the utilisation of primary food resources and overall food web structures. A food web is a community of organisms made up of several interrelated food chains. Scientists are particularly interested in the importance of detritus generated within the turf habitat.

Data from the Bioconnectence project will help policy-makers, scientists and conservationists improve coastal management particularly designated marine protected areas and their role in preserving biodiversity.

Funded under the FP7 specific programme People (Marie-Curie actions).

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Women shaping science

A platform bringing together female scientists' organisations from Europe and beyond has been established to counter the current under-representation of females in science and to make their voice heard.

Few networks of women scientists Europe-wide have the capacity or expertise to enter into the European research policy debate. The EU-funded project 'European platform for women scientists' (EPWS) was launched in March 2006 to act as the missing link between female scientists and policy-makers. Special emphasis was placed on supporting existing national, regional and international networks of female scientists.

The platform started to reach out to networks across Europe through surveys

and questionnaires. Besides collecting information about their main field of interest and activities, the ultimate objective of such efforts was to tell them about the EPWS and encourage them to join in.

In less than three years, EPWS evolved into a network of 104 organisations working for the promotion of equal opportunities in research across 39 countries, reaching out to more than 12 000 female researchers in Europe and beyond. And it continues to acquire new members today.

The network met for the first time in autumn 2006, held its first general assembly in 2007, enjoyed the success of its first annual conference in 2008 and the latest in 2010. The conclusions from all meetings, stressing the need to include gender issues in research programmes, were provided as input to public consultations of both the European Research Area and European Research Council.

As women in science are still outnumbered by men at all levels, the EPWS proposed changes to increase the participation and advancement of female scientists and engineers. In addition, by networking across institutes and national borders, women have made a concerted effort to penetrate the 'old boy network.'

Yet, in spite of its increasing impact, high visibility at European level and the acknowledged crucial nature of its work, EPWS continues to face financial difficulties. Initially funded by the European Commission through its Sixth and later the Seventh Framework Programme, since 2009 the platform has been supported by its members working on a voluntary basis.

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<http://cordis.europa.eu/marketplace> > search > offers > 6063



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Good practice database to support women in research

A European project is examining strategies used to promote the presence of women in decision-making positions in public institutions.

The EU-funded project 'Practising gender equality in science' (Prages) studies good practices in enhancing women's participation in science-oriented academic and research institutions throughout Organisation for Economic Cooperation and Development (OECD) countries. The project determines if and

how gender-equality-oriented measures are implemented in research management. Data has been collected and classified for the evaluation of favourable strategies, at both national level and that of individual institutions, and made available for use by interest groups.

The project integrates the most relevant results in the fight against vertical segregation in social, professional and political areas and sheds light on why women are excluded. It also investigates the resistance by the scientific community to recognise and manage the social and gender dynamics that drive scientific research.

Prages has made its database of good practices accessible to the public via the internet. This tool contains over 100 programmes implemented in universities, research institutes and science and technology-related companies aimed at promoting and maximising female resources. Each programme

is described and the results of its evaluation are given according to three main areas: creating a friendly environment for women researchers; promoting awareness of the gender dimension in science and technology priorities, design and use; and supporting female leadership. Each record also lists factors that either enabled positive outcomes or led to obstacles.

To help university leaders and administrators pursue the above three strategic objectives, the 'Guidelines for gender equality programmes in science' tool contains 31 specific recommendations and 61 concrete lines of action. These are accompanied by examples of best practice, with tools for action suggested and advice offered on how to increase the programmes' overall quality.

The project achieved this comprehensive and useful body of information through extensive networking, questionnaires, and quality evaluation and identification of successful solutions. The database and guidelines can be downloaded from the project's website.

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Making science cool

The main goal of the EU-funded 'Young people and images of science on websites' (Yosciweb) project has been to improve the way youngsters view scientists and science, and to encourage them to pursue a career in it.

Young people in Europe appear to be losing interest in science. Negative stereotypes about scientists and the work they do are common among today's youth. This could have a serious long-term effect on Europe's scientific skills

base, which is crucial in maintaining a competitive economy in the global market place.

Researchers from the Yosciweb consortium have carefully studied websites dedicated to popularising science. Searches of popular scientific websites have revealed that negative stereotypes of science and scientists predominate. A series of detailed personal interviews have also been conducted with youngsters between 12 and 17 years old.

Following the findings, researchers have drawn up a set of recommendations for creating websites that would appeal to young people. These have included the use of positive images showing scientists

as normal people. More informative and accessible text, interesting pictures, and links to school-related tasks should also be used, according to the project team. Use of multimedia and easy navigation was also considered vital for a website's success.

Results from the Yosciweb project indicate that science websites should incorporate interactive features to make the website more entertaining and appealing to youngsters. Yosciweb will provide tools and methods that can increase the impact and efficiency of scientific communication aimed at young people.

The Yosciweb project is helping build Europe's knowledge economy by encouraging youngsters to take a greater interest in science and technology.

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Need footage in a rush?

How can broadcasters and filmmakers keep track of their ever-growing archives? A team of researchers has developed a system to automatically analyse, index and search for video content, making reuse of raw footage much easier.

Broadcasters have thousands of hours of unprocessed videos sitting in their databases. Many of these 'rushes' could be used for future work, but they often sit gathering virtual dust because programme producers and journalists — usually working to tight deadlines — cannot quickly assess what footage they contain.

'Programme makers may use only a few seconds or minutes out of hours of footage that they shoot,' says Dr Oliver Schreer from the Fraunhofer Institute for Telecommunications/Heinrich-Hertz-Institute in Berlin.

'At the moment broadcasters may do some manual annotation of unedited footage but it is a very time-consuming process and much of the footage remains unclassified and therefore unused,' continues Dr Schreer. 'What they really need is automated methods to organise this material.'

Working under the EU-funded project 'The retrieval of multimedia semantic units for enhanced reusability' (Rushes), Dr Schreer headed a team from European research institutes and the technology industry who looked at how to make the reuse of this type of raw video content much easier.



The prototype system that they developed automatically analyses and labels video footage, making the indexing and cataloguing much simpler. Meanwhile they also created a user interface to improve the management and searching of large multimedia repositories.

'Current video databases will present individual images from videos but the user has limited ability to understand and analyse footage. We wanted to create tools that can present video content in a much better way,' he says.

Collaborative development

The team involved professional and general users throughout the development of the system. A first step was to assess the industry's current workflows and technologies, identifying areas for improvement and additional needs.

'We worked closely with Basque broadcaster ETB to build our prototype,' says Dr Schreer. Once the system was designed, user input tested and validated it.

'We asked journalists and archivists to investigate the different functionalities of the system,' he adds. 'This feedback was vital as we really wanted to provide a solution that met the industry's needs.'

The system analyses and categorises raw videos using semantic indexing principles. The team first created a series of algorithms which can detect certain types of objects or content in a video and then automatically generate metadata to describe it.

For instance, the system can detect faces (which indicates the presence of people), regular shapes (which shows man-made environments), different types of vegetation, or even different types of camera motion.

It is also able to classify different types of audio such as speech, music, noise or silence; different types of water, including sea, oceans, rivers or harbours; or identify common objects such as buses, dogs and ships. And a flashlight detector can help to indicate press conferences or news interviews.

'We adapted and combined existing technologies used in image search and retrieval for video, but also created some aspects from scratch, such as the camera movement detector and the 3D shape detector,' he says.

Another set of algorithms used the generated metadata to cluster and summarise rushes' content, creating groupings of content that aid browsing and further processing.

'The metadata model at the heart of the system was quite novel,' says Dr Schreer.

Fast retrieval

A key consideration of the project was to make a user interface that can enable users to access video content much more efficiently. 'Searching through footage takes a lot of time for journalists, so we wanted to give them new tools to enable them to explore video databases more quickly and help them to reuse content,' says Dr Schreer.

The Rushes system features a series of browsing and visualisation interfaces ranging from simple text-based searches based on keywords, to semantic and visual browsing. The technological concepts behind these tools are the system's grouping of content based on hierarchical clustering, semantic context matching and relevance feedback.

'The system takes the temporal structure of the footage into account, telling the user much more information about how it is organised and helping to put it into context. This enables the users to find relevant content and the specific parts of it they want much more easily and quickly,' he adds.

Future outlook

The team demonstrated the prototype that they developed under the project, which lasted from February 2007

to July 2009, at a number of major technology events across Europe including the CEBIT telecommunications fair in Hannover. 'The feedback that we got was good, with the industry thinking this could be really helpful,' says Dr Schreer.

Individual project partners are now further developing certain aspects of the prototype, with some lasting co-operation continuing. 'The project results will be seen in commercial products which should help broadcast professionals,' he predicts. Rushes received funding from the EU's Sixth Framework Programme (FP6) for research.

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Central Europe embraces ICT

Regional and cross-border cooperation are vital to the health of the European information and communication technologies (ICT) sector. With this in mind, Central Europe is transforming itself into a new ICT hub.

The Central European or Centrope region — comprised of the Czech Republic, Hungary, Austria, and Slovak Republic and — has an ambitious plan in mind to fortify the ICT sector and technology transfer. The EU-funded 'Centrope ICT technology transfer project' (CITT) project is mapping the region to build a virtual ICT community. This involves an ICT cluster study, a technology transfer tool, strong web presence and business support measures.

The CITT action plan has already been articulated, with a clear vision for a future regional ICT cluster. Based on in-depth market research and

benchmarking of clusters in Europe, an ICT network strategy and business plan for the first years of operation have been completed. The ICT cluster has been organised with central headquarters in Vienna, alongside regional subsidiaries and local associations. The plan describes in detail how the cluster will be set up in three phases over a period of three years.

The project has also established an active weblog (noweurope.com) representing a lively platform to disseminate results and ideas, as well as to network with SMEs and researchers. The weblog enables readers to provide feedback easily and be involved in the project.

On a more professional level, the CETEX R & D platform (www.cetex.org) has been developed as yet another arena for exchange, appealing to high-level contributors and consumers. Contributors include owners of technologies or know-how, while consumers are defined as those looking for technology or know-how. Research results and innovations, demands for cooperation, development of ideas, patents, research results and technology requests are also part of the CETEX platform. The website was tested, fine-tuned and made available in all four Centrope languages, as well as in English.

Overall, the project has made great strides in marketing and disseminating its initiatives, while important analysis of ICT-related best practice examples for technology transfer in Centrope has been prepared. In March 2010, the 'First ICT clustering & technology transfer conference in Centrope' gathered around 100 experts from the region in a lively discussion in Vienna. Among other events, the conference was seen as the culmination of a successful project that spurred important technology exchanges in the region.



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under the theme 'Regions of knowledge'.

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Grid computing links Europe and China

Efforts to improve international research cooperation between China and the EU received a boost thanks to the work of grid-computing specialists in both regions.

Research is an increasingly global endeavour. In 2007, an EU-funded project set out to improve the link between European and Chinese computing grids and enable researchers to carry out joint research in data-heavy fields like aerospace, pharmaceuticals and meteorology.



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The first challenge of the EU-funded project, called Bridge ⁽¹⁾, was to make the software systems that manage the European and Chinese grids compatible. The European grid infrastructure (GRIA) and Chinese CNGRID (GOS) provide comparable services, but were organised differently.

The Bridge team worked to bridge the main gaps between GRIA and GOS by building a new software superstructure to access them and tap their capabilities. The system included new gateways into the two grids plus a shared platform to manage overall workflow,

access needed applications and translate higher-level commands into steps that each grid could carry out.

In doing so, the team addressed key interoperability issues, such as policy management (trust relationships, security policies, access rights), resource and capacity management (providing services under different constraints), and data processing and storage.

The project set up three joint application showcases, using distributed workflow and data access technology. The aerospace simulations proved tougher than expected, according to the partners,

because different parts of their simulations took place in different research centres. Optimising the flow of work from centre to centre was therefore a huge challenge. Despite this, the Bridge team set out to determine optimal wing flap parameters to maximise lift and minimise noise during aircraft landing. And they succeeded.

The enormous amounts of data in meteorology, the second of Bridge's showcases, also posed a challenge. However, by the end of the two-year project, the researchers had achieved their goal of linking major meteorological databases

using a hybrid grid infrastructure based on GRIA and GOS.

New drug development is time-consuming and costly. Powerful computers can help by simulating the processes of the body in search of potential matches between millions of small molecules and proteins that play vital roles in disease-causing organisms. A molecule that binds strongly to a key protein has the potential to be turned into a potent new drug.

Bridge researchers set out to integrate four different 'docking tools' — programs that calculate bonding between a small molecule and a particular protein — which were running in distributed locations in Europe and China. They were able to test millions of molecules for promising candidates against, for example, malaria or the H5N1 bird flu virus. This successful four-pronged approach produced promising results, according to reports, and the Bridge infrastructure has already been adopted in Egypt to target the malaria parasite.

The Bridge team was eager to present these promising results at various conferences in China and Europe. The Chinese partners, in particular, have organised many workshops, where industrial partners from the relevant Chinese industrial sectors participated.

(1) 'Bilateral research and industrial development enhancing and integrating grid enabled technologies'.

Funded under the FP6 programme IST
(Information society technologies).

<http://cordis.europa.eu/marketplace> > search > offers > 5912



EU research connects with Latin America

Building on a strong research community in Latin America, the EU stepped up collaboration and dialogue with the region through a dedicated strategic cooperation project.

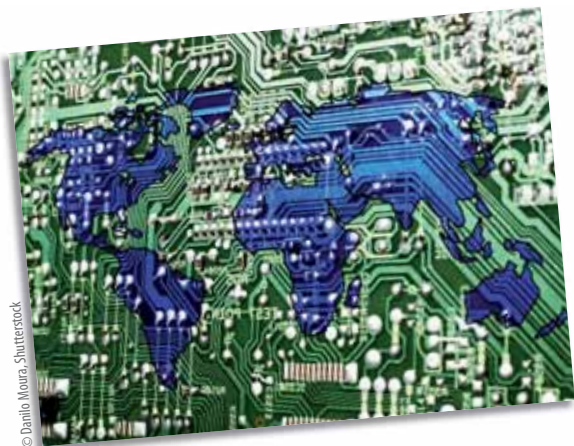
The European project 'Widening IST networking development support — Latin America' (Winds-La) brought together a multinational and multi-stakeholder community of European and Latin American researchers, policy-makers and other research actors to find common areas for collaboration specifically in ICT research.

The project helped to gather key issues and actors for cooperation between the two sides. A number of conferences were organised which helped to disseminate information on European research and development (R&D) to Latin American stakeholders including private industry and civil society.

The project, spanning two years, organised three major research conferences in Latin America, two seminars in Europe and a final conference in Brussels to boost dialogue and cooperation between the regions.

Winds-La built on existing research communities in Latin America and highlighted the priorities of the EU's Seventh Framework Programme (FP7).

Activities included providing information on European and Latin American



research projects, as well as their results and the actors involved. Winds-La's collaboration services also provided a platform to put prospective actors together.

An open consultation process was achieved which both sides hoped would lead to a consensus-based roadmap for future R & D collaboration.

The consortium behind the project included seven partners from three Latin American countries (Argentina, Brazil and Mexico) and three European countries (Belgium, Germany, and Spain).

The project has produced tangible results, raising the profile of Latin

American research partners in the EU. Furthermore, the standing of Winds-La as a research hub in Latin America has increased markedly since its launch in 2007. This was best seen from the direct involvement of other countries in the region that were not in the consortium such as Bolivia, Chile, Colombia, Ecuador, Paraguay and Uruguay.

The upwards trend of Latin American research actors taking part in FP7-ICT was also largely attributed to the success of Winds-La.

Funded under the FP6 programme IST
(Information society technologies).

<http://cordis.europa.eu/marketplace> > search > offers > 5946



IT technology to build new EU-Brazil partnership

Due to its ongoing success in the Sixth Framework Programme (FP6), Brazil and Europe have established further initiatives to sustain and foster even greater cooperation under FP7.

The EU-funded BB.Bice ⁽¹⁾ project is the product of previous FP6 efforts and the continued involvement, interaction and cooperation of Brazilian interests with deliverables established within FP7 actions. In particular, it aimed to foster and enhance science, technology and innovation between Brazil and Europe.

The BB.Bice looked to disseminate information and established a communication area that developed several actions. A primary achievement was a website focusing on the scientific, technological and entrepreneurial communities. It hosts news of FP7 calls, as well as events, meetings, and information on international co-operatives.

BB.Bice can measure its success in a number of ways, including the development of a service area providing assistance and a guide to participating in Brazilian co-ops. It also hosts a document area, an electronic newsletter and a well-developed search feature for partnerships, to name but a few.

The newsletter is most important as it provides a number of added benefits. First, it broadens awareness of Brazilian interests in the FP7 actions, and brings credibility to BB.Bice's activities. It is also disseminated in Portuguese and English with a special emphasis on FP7 calls. In addition, it ensures a continued flow of information with three other Latin American countries with which Brazil has bilateral cooperation agreements.

With such success already under its belt, continued development holds great promise for expanding European and Latin America's interests.



(1) 'New Brazilian bureau for enhancing international cooperation with the European Union'.

Funded under the FP7 specific programme Capacities under the theme 'Horizontal actions and measures in support of international cooperation'.

<http://cordis.europa.eu/marketplace> > search > offers > 6124

Improved weather forecasts

Clouds have been studied as part of an EU-research project that has developed an improved model for weather forecasts.

Interaction between clouds, aerosols and solar radiation from the sun in the form of heat and light is a major source of uncertainty in predicting weather and climate conditions. Clouds can be affected by a range of factors including aerosols, which are fine solid particles or liquid droplets suspended in the atmosphere.

Thanks to satellite technology it is possible to monitor clouds continuously from space. Researchers from the EU-funded Joint-assimilation ⁽¹⁾ project have used existing satellite data on aerosols, clouds and precipitation to gain greater insights into cloud processes. The information has been applied to a state-of-the-art weather research and forecasting (WRF) model.

The model has enabled better analysis of the interaction between clouds and large-scale processes and improved ways

of studying cloud structures and their properties. The impact of aerosols on climate and weather has also been assessed using this analysis.

Integration of microwave brightness data into the model has increased the accuracy of precipitation forecasts for up to two hours, but made only a minor difference to long-term forecasts. This is because variables such as winds, relative humidity and temperature cannot be deduced from satellite microwave observations alone.

Nevertheless, scientists have found that an improved understanding of processes within clouds can have a significant impact on precipitation forecasting. Therefore, a simplified procedure has been devised to identify the conditions for aerosols most consistent with observed infrared radiation data.

Models developed by the Joint-assimilation project can be used to give more accurate forecasting of storms and resulting flash-floods, thereby improving the quality of life of EU citizens.

(1) 'Joint assimilation of satellite aerosol, cloud, and precipitation observations in numerical models to support climate and hydrologic applications.'

Funded under the FP7 specific programme People (Marie-Curie actions).

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EU creates tsunami early warning system

EU-funded researchers have helped develop an early warning system that will protect vulnerable communities from tsunamis and avoid future terrible losses of life such as that suffered in Indonesia and Sri Lanka in December 2004, and more recently in Japan.

EU support for the research came from the EU-funded project 'Distant early warning system' (DEWS), which received just over EUR 4 million from the 'Information society technologies' (IST) thematic area of the EU's

Sixth Framework Programme (FP6) to develop an advanced interoperable tsunami early warning system for strong early warning capacities.

When a 1 600 kilometre (km) segment of the Indian tectonic plate jolted downward off the coast of Indonesia six years ago, it provoked one of the strongest earthquake ever measured (a magnitude of 9.2) and tsunami waves 30 metres high. The resulting devastation brought home the urgent need for a system to give populations at risk from a tsunami as much warning as possible.

Germany was the first to take action with a joint German-Indonesian tsunami detection and warning system (GITEWS).

The EU decided to take this innovation further by funding and launching DEWS in 2007 to provide protection to all Indian Ocean nations.

'It's almost impossible to give numbers, but if DEWS had been in place in December 2004 a very large number of lives could have been saved,' said Andreas Küppers of the Helmholtz-Zentrum Potsdam, German Research Centre for Geosciences (GFZ), the researcher in charge of DEWS.

The project is now being used to detect and analyse seismic events in the Indian Ocean, quickly assess their potential to unleash a tsunami, and warn at-risk countries through a network of detectors including broadband seismometers, land and ocean-surface based GPS instruments, tide gauges, and ocean bottom pressure control devices.

The data generated by these instruments is streamed via communication satellites to a central station in Jakarta, Indonesia for processing. SeisComP3 software, developed by the GFZ, rapidly determines the magnitude and location of a seismic event. 'The former systems



needed 11 or 12 minutes to detect a signal and locate the source,' said Professor Küppers. 'The same can now be done in four minutes.'

Once the system detects an earthquake powerful enough to create a tsunami, it begins to analyse and model the risk of a tsunami. However, even with powerful computing capabilities, it would take too long to model a tsunami in real time.

So DEWS researchers use libraries of temblors of different magnitudes and source locations, coupled with detailed simulations of the waves they would create along the Indian Ocean coastline, to determine which areas are at risk.

In addition to this time challenge, the DEWS team has also had to cope with the difficulties of having to warn 20 countries in a multitude of languages, many of whom do not see eye-to-eye politically. 'It is a multilingual system that can distribute different messages to different people in different languages,' Prof. Küppers pointed out. 'It was even more difficult politically to get all the players together at one table, but we are well on our way to overcoming those problems as well.'

Researchers are now turning their attention to Europe and countries there at risk from tsunamis, namely those bordering the Mediterranean and the northeast Atlantic. They are even advocating the development of a new

profession — that of the 'early warning engineer' — to offer maximum protection to vulnerable communities.

'If you want to tackle these problems properly, you have to take the time and effort to involve everybody,' said Prof. Küppers. 'So we'd like to see people acquiring a new full-scale profession and be able to take care of the whole early warning field.'

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<http://ec.europa.eu/research/infocentre> > search > 20313

Europeans target better web access for people with disabilities

For people around the world the internet has become the first port of call for most information. However, researchers in Hungary believe that much of the information posted on the web does not meet the demands of users with disabilities. Writing in the International Journal of Knowledge and Web Intelligence, the research team explains how theoretical and practical dimensions of screen structure.

One of the main aims for posting on the internet is to reach as many people as possible. That usually means achieving a prominent position in the search engine results pages, providing legible and attractive enough information so that potential readers desire to read it and to ensure that it meets the demands of users with disabilities. Researchers from the University of Szeged believe that only if all these criteria are fulfilled does a website become truly accessible.

Medical informatics expert Erzsébet Forczek explained that access to the internet has become essential for all members of society. Physical access is a prerequisite but the availability, retrieval and processing of information on the web must be supported by information technology.

'Information on the web is global in the sense that it can be seen or used by anyone around the world,' said Ms Forczek. However, she pointed out that for information to become global, it is not sufficient merely for it to appear on

the web. 'It has to be searchable, and its contents identifiable and interpretable, since immediately available information is crucial in economic and business life, in education, in research, in healthcare and in virtually every other sphere of life,' she suggested.

'We have to consider how disabled people can access the information available on websites and how they can utilise it,' she said, adding that 'by providing additional physical accessibility, we can extend the group of end-users.'

Ms Forczek investigated how well the needs of the visually impaired are addressed by websites, especially those offering multimedia. Similarly, she found that those with

hearing impairments are often excluded from audio media. 'The most important principle of accessibility to a web page is to provide alternatives for the different media applications and their navigating functions,' she said. Similarly, software that addresses the issues faced by people with special needs is essential for accessibility.

Ms Forczek explained that aspects of web design that must be considered for ensuring as wide an accessibility as possible include, in particular, a syntactically and semantically correct web page that can be parsed correctly by assistive software.



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The use of style sheets to allow a page to be rendered fully in alternative formats is also important, as is the clarification of the meaning of any acronyms used.

Other important aspects to improve accessibility include the provision of alternative texts for non-textual information, such as images and audio files, the provision of synchronised

alternatives to time-dependent media, like audio applications or videos, and the provision of full navigation via the keyboard so that mouse control is not a prerequisite for accessing the information.

Ms Forczek suggested that in addition to these considerations metadata must be used correctly to make the information

more readily available through a search engine. 'Consideration of these issues is inevitable, since they all help to reach a wider circle of end-users,' she said.

Promoted through the Research Information Centre.
<http://ec.europa.eu/research/infocentre> > search > 20393

Beyond the X-ray

Safer, cheaper and more accurate imaging technology promises to speed up medical diagnosis and treatment in a wide variety of applications.

X-rays have long been popular for taking images of bones and internal organs, but the more advanced technology of positron emission tomography (PET) represents a more precise imaging method. PET is a medical imaging technique which produces an accurate three-dimensional image of the body's internal workings. However, it is much more costly than X-rays (around EUR 300 to 500 per scan) and requires substances called radioactive pharmaceuticals or radiopharmaceuticals to operate.

In modern imaging techniques, radiopharmaceuticals — which fall within the field of nuclear medicine — are used effectively as tracers in the body. Tracers are materials used to track or define substances or systems in human organs, from the thyroid and lungs to the liver and blood.

The EU-funded 'Radiochemistry on chip' (ROC) project plans to design a micro-device that can synthesise these radiopharmaceuticals more readily and cost-effectively.

The project is working on the design, fabrication and implementation of such a device by bringing together chemists, academics and engineers via an interdisciplinary approach.

The planned device would involve a micro-fluidic architecture, designed to manipulate fluids on a very small scale. This requires the use of emerging technologies under the field of micro-reactors (usually below 1 mm in size) and micro total-analysis systems (which shrink chemical laboratory processes on to a microchip). This is bound to improve efficiency and safety of the micro-device under development.

By the end of the project, the team plans to have a fully working device based on a micro-fluidic modular concept. The ROC prototype will be able to synthesise several tracers more quickly and efficiently than ever before, lowering the prices of PET scans significantly. The whole discipline of PET scanning will be simplified and more readily available, facilitating laboratory research in this respect. Most importantly, safety standards — such as radiation levels — are set to improve as well. With this new micro-device, the next generation of PET imaging and scanning is on the horizon.



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Funded under the FP7 specific programme Cooperation under the theme 'Nanoscience, nanotechnologies, materials and new production technologies'.
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Estonia reaches for the stars

A little country with a lot of potential, Estonia is proving its worth in the area of space research. The results represent a true example of successful European integration.

European collaboration in space research is essential if the continent's space endeavours are to grow. While nations in old Europe such as Britain and France have shaped European space research for many years, newer European nations like Estonia have much to contribute.



Through the EstSpacE ⁽¹⁾ project, funded almost entirely by the EU, the research potential of Estonian scientific institutes in the field of space research is being added to existing European expertise. The project is also enhancing collaboration across Europe, particularly with initiatives of the European Space Agency, while intensifying space research in Estonia. The achievements speak for themselves.

Six high-level researchers were recruited by Estonia's Tartu Observatory bringing with them a wealth of knowledge. The researchers belong to different fields such as remote sensing (ground and vegetation mapping), radiation, metrology, radio electronics, optoelectronics, and photometry of stellar objects. The initiative has also raised the number of visiting researchers, lecturers, contacts, workshops and conferences.

Within the framework of the project, seven international scientific workshops on space research/technology and

disseminating scientific information were organised in 2008-10 and one large scale conference 'Boosting the competitiveness of business and science: satellite services in modern society' in May, 2010. European collaboration has resulted in two new projects funded by EU. The first is the 'Strategic partnership for improved basin-scale water quality parameter retrieval from optical signatures' (Waters), with the Tartu Observatory coordinating a consortium of six European partners. The second is 'Electric sail propulsion technology' (ESAIL), again with the Tartu Observatory being one of the partners in a consortium led by the Finnish Meteorological Institute. Both projects fall under the Seventh Framework Programme for research.

Ongoing networking is also taking place with the 'European supersites for atmospheric aerosol research' (Eusaar), as well as Finnish-Estonian cooperation in atmospheric sciences and forest ecology (Smear-Gaw). This is significantly advancing the integration of Estonian research potential into the European community. Worthy of note as well is Estonia's participation in the 'Nordic aquatic remote sensing' initiative, or Nordaquarems.

Meanwhile, the Tartu Observatory is maintaining the Aeronet measurements in Tõravere, within Estonia. Aeronet stands for the 'Aerosol robotic network of ground-based sun photometers' and measures atmospheric aerosol properties. The observatory is also taking advantage of the Aeronet facilities for research.

Ultimately, all these cooperation mechanisms and achievements are acting as a model to integrate other European countries into the fold of space research, underlining Europe's primacy in the field.

(1) 'Expose capacity of the Estonian space research and technology through high quality partnership in Europe'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.

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Watch this space!

Coming up in issue 4 of *research*eu results magazine* a special dossier on 'Innovative modes of transport: where would we be without cars?'



Interview

Working together to reach beyond the stars

Regional research cooperation throughout the EU is an endeavour that not only promotes the very best in science and research; it also stimulates the common pursuit of knowledge. Space research is one such area.

Space has no discernible boundaries and represents a cogent example of scientific collaboration both within the EU and throughout the world. The international space station is a testimony of that collaboration and its extraordinary end result.

Working together and defining common goals is an expansive illustration of the European Research Area (ERA). It binds together the brain power of the brightest luminaries and those curious enough to attempt to unravel the nature of the universe. Indeed, space has long mystified humanity. Mapping the stars helped sailors thousands of years ago navigate wide distances across the oceans. Constellations helped explain through myth and story-telling the mysteries of life and nature. Parallels can be drawn today. The mysteries of nature and the universe remain elusive and captivating. But the search for answers could in turn help us navigate through the labyrinth of issues of global proportions — climate change, energy, health...

Our featured scientist in this issue is the director of Tartu Observatory in Estonia which has a long tradition of excellence in astronomy and space. Dr Anu Reinart is an expert in remote sensing and is leading the EU-funded 'Expose capacity of the Estonian space research and technology through high quality partnership in Europe' (EstSpaceE) project. She is also a former Marie Curie Fellow, has led other research projects in Sweden and in Estonia, and has published more than 30 peer-reviewed articles.

Dr Reinart speaks to *research*eu results magazine* and discusses how partnerships and science can help give the European Union the leading edge in space research and exploration.

• Your project, EstSpaceE, seeks to enhance the potential and research capacities of Estonian scientists in space research and technology, including remote sensing. Can you explain how this works in practice?

Tartu Observatory has been for over 200 years the leading centre of astronomical research in Estonia. It also has an internationally acknowledged competence in remote sensing of the natural environment. Tartu Observatory's research strategy brings together scientific and public goals. This enables us to respond to the challenges that modern technologies, political situations and economic needs create. EstSpaceE is a three-year project that started in 2008. Its general objective is to enhance the potential and research capacities of Estonian scientists in space and atmospheric research, space technology and remote sensing by supporting and mobilising human and material resources and developing strategic partnerships with other research groups in Europe.

The added value of the project to Estonia is that the partnerships enable us to focus better on future research efforts. It also supports closer cooperation by Estonia with the European Space Agency (ESA). And finally it facilitates the participation of Estonian scientists in the Global monitoring for environment and security (GMES) programme, as well in the most relevant activities in the European Research Area and global space community.

EstSpaceE has definitely increased international collaboration. New updated research infrastructure and complementary competence of researchers has led to broadened research topics — studies in the modern physics of astroparticles, applications for water remote sensing, development of specific space technology, etc.



Dr Anu Reinart

We have proved our competence through twinning workgroups and collaboration with key research and industry partners in Europe via international networks such as Eusaar, Aeronet, Nordbalsat, and Noraquarems (see page 35).

It has also been important that we have been able to extend sources for financing. EstSpaceE has motivated researchers to more actively prepare proposals at the international level. So far, this has resulted in two new FP7 projects: 'Strategic partnership for improved basin-scale water quality parameter retrieval from optical signature' (WaterS) and 'Electric solar sail technology' (ESAIL), as well as two more contributions as an end-user; namely 'Downstream observatory organised by regions active in space' (Doris Net) and 'High resolution freshwater monitoring' (Freshmon).

New ideas and information about European space research and technology has been distributed at seven workshops and seminars, two summer schools, and one large-scale space downstream conference called 'Boosting the competitiveness of business and science: satellite services in modern society.' These events have brought together more than 700 international researchers, public authority representatives and entrepreneurs. The events helped to disseminate RTD results on the international stage and enhance the general public's knowledge of the science behind it. For our part, we raised awareness about Estonia's achievements in space research and culture to the ERA by participating in more than 70 scientific events.



• *The European Research Area has several ambitious objectives. One of them is to guarantee the free circulation of researchers, knowledge and technology throughout Europe. Can you explain how your collaboration with other EU researchers has contributed to this?*

We wish to stimulate young people to pursue careers as researchers. Currently there are several young students preparing their PhDs on the topics of space science or earth observation. We directly contribute to post-doc research but we also provide unique opportunities for young researchers. We help them to start a career, broaden and deepen their scientific horizon, and acquire other mind-sets. We also help them to work on the practical application of research results through cooperation with SMEs or other research centres.

Secondments and a range of networking opportunities have made transnational knowledge-sharing and new research training possible, as well as strengthening and enriching international cooperation. Indeed, many joint

scientific publications and workshops focused on the process of knowledge sharing and skills development.

Estonian space research and technology capacity has been acknowledged by ESA and the Estonian government. In 2010, the 'Plan for European cooperating states' (PECS) was signed and 12 projects have already started this year. Tartu Observatory is carrying out two of them in cooperation with the EU-funded projects 'Services based on optical radiometry applications for aquatic environment' (Oraqa) and 'Emission line star classification in the Gaia catalogue' (GAIA-ELS).

• *Fifty years ago, the Russian cosmonaut Yuri Gagarin embarked on his pioneering flight into space. Today, an international space station is orbiting earth. What do you think European space research will have achieved in the next 50 years?*

This is really a tricky question. When Arthur C. Clarke wrote his famous *Space Odyssey* series over 50 years ago he actually described a lot of

technology we use today — telecommunication, large flat screens with moving images or mobile phones. So, maybe the right answer to the question 'what will be achieved in the next 50 years?' has already now been written in some science fiction book!

Seriously, I believe that, as one of the most technology-intensive sectors, space research will help us find new energy solutions and more sustainable use of natural resources. Thanks to operational global monitoring systems we will be able to understand the earth's environmental changes and adapt our activities to improve the outcome. I also hope that new propellants and relevant technologies will make it possible for humans to go beyond the solar system and take exceptionally long journeys for the benefit of research and satisfy our curiosity. Hopefully, we will have the knowledge to understand what dark matter really is and the role of dark energy in the universe. But most likely this quest will just throw up new riddles to solve. I guess space is a never-ending source of inspiration!



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• ***In your opinion, what are the main challenges that European space research funding has tackled?***

The European Union is developing its own space policy to ensure its independence in this important field of knowledge and to shore up the economic benefits. Space research and technology development must support this goal. Global challenges like our changing environment, energy efficiency issues and rapid population growth are forcing countries to look for new and innovative technologies. Space technology has a significant role to play in meeting these challenges.

Space research is widely acknowledged as one of the most innovative fields of science, and plays an important role in economic growth, innovation and entrepreneurship. And of course space science and technology enables space exploration and improves our understanding of the nature of the universe.

Space inspires the young generation to start careers in science and technology, which is one of the most important factors for sustainable development of the economy.

Space activities provide invaluable tools for environmental monitoring and protection, security, crisis management, communication and navigation. Space applications can also provide a significant pull for terrestrial technologies, e.g. advanced intelligent systems. Space inspires the young generation to start careers in science and technology, which is one of the most important factors for sustainable development of the economy.

The telecommunications segment represents the largest and the most mature downstream segment of the space sector. It comprises two main components: telecommunications and broadcasting, with a distinction being made between fixed and mobile services. Evolution of digital technologies over the last few years has led to the

convergence of the satellite telecommunications services sector with growing requirements in terms of flexibility and bandwidth.

The use of satellites for location and navigation purposes is rapidly expanding, although only one system, the US global positioning system (GPS) is fully operational today. Developed by the US Department of Defense to maintain troop contact and position, GPS consists of a network of at least 24 satellites launched in medium earth orbit and regularly replenished and modernised. European civil system Galileo is also well underway. It is expected to complement and compete with GPS from 2012. By combining the two systems, users will be ensured better reliability than could be achieved with either system alone.

Earth observation is one of the earliest applications of satellites. Commercial earth observation satellites are still relatively new. Technology has played an important role in the development of earth observation systems. In particular, advances in optical and radar sensor technologies have made possible the development of satellites that are smaller, cheaper and more agile. The EU started the GMES programme to combine space infrastructure, modelling and contact measurements into one user-driven system. The output will be distributed to users via services. This is the European contribution to the 'Global earth observation system of systems' (GEOSS).

• ***What drew you to this field? As a schoolgirl, did you ever imagine you would be doing this?***

Estonian space history is impressive. We just celebrated the 200-year anniversary of Tartu University's Observatory. History of professional astronomy in Estonia is rich in achievements and traditions. Astronomers from Tartu have played an important role in understanding distance scales in the universe and in shifting cosmological paradigms. Wilhelm Struve was among the first in the world to measure the distance to the star Vega in 1835/6. In 1922, Ernst Öpik showed that the Andromeda nebula is another galaxy outside the Milky Way. He also realised that thermonuclear reactions

are the energy source of the stars. In the 1970s, Jaan Einasto with his colleagues discovered dark matter and a regular large-scale structure of the universe. These are real-world and well-known discoveries!

Also in the 1970s, the scope of astronomy in Estonia was extended to space research by building and launching instruments for atmospheric studies onboard Soviet spacecraft and space stations. I was seven years old when American astronauts first studied the moon in detail.

Physics was my first choice of study after I graduated from high school. I continued with a PhD thesis on environmental physics. I did my post-doctoral studies at Uppsala University, Sweden, with an EU Marie Curie Individual fellowship. I worked on a project with the Swedish National Space Board that led me to research satellite remote-sensing applications. I then returned to Estonia to continue my career at Tartu Observatory with a Marie Curie reintegration grant in 2004. That was followed by several national and international projects until 2010 when I became director of the Tartu Observatory.

Truly, I did not dream about this, but the work I am doing now is very challenging. Joining the European Union in 2004 opened up new prospects for space activities in Estonia. In 2010, Estonia signed the PECS agreement with ESA.

The present-day space research and technology community in Estonia consists of about 70 researchers, a majority of specialists working at the Tartu Observatory. However, we have close collaboration with Tartu University, Tallinn Technical University, Estonian University of Life and we are very open to international partners.



All eyes on the skies

Creating a pan-European network of observatories and astronomy related facilities is bound to bring more valuable results and observations about the universe than ever before.

Europe is a large continent that can observe the skies from different angles, and its experts continually come up with myriad observations, hypotheses and discoveries related to astronomy.

However, the size of the continent, its varying systems and different strengths also means there is no single unified community or network to coordinate these valuable efforts.

Opticon is providing a framework that encourages joint action to improve the quality of Europe's facilities and train new astronomers, especially those from central Europe. It is focusing on modern research methods, developing innovative technologies and enhancing research quality. Opticon will ultimately help Europe to outline future developments in astronomy and map a strategic plan for the continent's research infrastructure in this field for the future.

Efforts are well under way to achieve these objectives, building an active consortium to tackle the different initiatives involved. Such a plan ensures that astronomers are able to carry out advanced research on state-of-the-art facilities. It will also allow astronomical communities in Europe to develop scientific plans for their own future facilities. With this, the full potential and synergy of European players in the sector will take astronomy on the continent to unprecedented levels.

Funded under the FP7 specific programme Capacities under the theme Infrastructures.

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The 'Optical infrared co-ordination network for astronomy' (Opticon) project is an EU-funded initiative that is planning to combine the power of diverse initiatives in this field. It is bringing together national and international agencies and organisations which fund, support, develop and operate Europe's facilities for optical and infrared astronomy. This applies to both night-time or classical astronomy, as well as daytime or solar astronomy.



A Russian doll of science and technology

Numerous opportunities to collaborate with Russia on science and technology are drawing the EU closer than ever to this multi-faceted, research-minded federation.

Russia has been a formidable leader in science and technology (S&T) since the early days of space exploration, atomic energy and computer technology. Both Europe and Russia can benefit from exchange of knowledge and collaboration in different areas of S&T by combining their knowledge and enhancing collaboration.

The Bilat-Rus ⁽¹⁾ project, funded by the EU, is enhancing the bilateral S&T partnership with the Russian Federation. The project aims to contribute to the sustainable implementation of the 'Common space on research, education and culture', an initiative set up between the EU and Russia in 2003. Bilat-Rus is also working on strengthening the participation of Russia in the

EU's Seventh Framework Programme.

The project aims to facilitate information dissemination, raise awareness on joint initiatives and enhance future EU-Russian cooperation across all S&T themes. It is creating a knowledge base for emerging issues related to sustainable cooperation, while stoking existing and upcoming joint thematic EU-Russian working groups on S&T cooperation.

The project has already established a new web portal on joint S&T initiatives (www.st-gaterus.eu).

The portal offers comprehensive information about the Russian S&T landscape as well as funding information from the EU and Russia for implementing joint scientific projects.



A database of key Russian institutions has been developed together with another EU-funded project and a user-friendly tool has been implemented to this effect.

The content of the web portal features results of Bilat-Rus initiatives, as well as those from other EU-funded projects targeting Russia. The portal holds a valuable database of so-called 'programme owners' and a partner search tool. Relevant policies, programmes and projects are also listed on the website, as well as a calendar of events, a newsletter and other important databases.

Beyond the website, many important initiatives have been established. An advisory hotline between Russian and EU National Contact Points (experts who help with EU programmes and matters) has been set up. In addition, an expert meeting on success factors for Russian participation in the EU RTD framework programme was organised in May 2009, in Moscow. Good practices of the EU-Russian joint working groups have also been defined.

Ongoing and upcoming activities under this project include regular updating of the web portal, a quarterly newsletter about EU-Russian S & T cooperation,

and a series of events and workshops. More initiatives for the future have been outlined with the European Commission. The relationship between Russia and the west has changed forever, and for the better, and Bilat-Rus is one solid example of how both sides can reap the rewards.

(1) 'Enhancing the bilateral S&T partnership with the Russian Federation.'

Funded under the FP7 specific programme Capacities under the theme 'Horizontal actions and measures in support of international cooperation.'

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Appetite for innovation

The University of Novi Sad (UNS) contains Serbia's only scientific-research unit that specialises in feed technology issues. Lack of investment however has meant that researchers struggle to access EU level projects.

An EU-funded project aims to address this and enable Serbian researchers to realise their potential and actively participate in cross-border initiatives. The project is also of significant strategic importance to the region: the agro-food sector is one of the most important economically, and is one of seven national R&D priorities defined in Serbia's scientific and technological development strategy 2009 to 2014.

The Feed-to-food ⁽¹⁾ project was initiated following the signing of the memorandum of understanding associating Serbia to the EU's Seventh Framework Programme (FP7). Its principal goal has been to reinforce research potential at the Centre for Feed and Animal Products, part of the University of Novi Sad's Institute for Food Technology.

The project, which is due for completion this year, has already achieved a number of positive results, and the project partners say they have many reasons to be satisfied with the progress made so far. Research capacities have been improved, networking with EU research institutions has been increased and researchers now have solid experience of taking part in EU research.

Furthermore, in the scope of project's activities, important EU research institutes have accepted the UNS as a participant in FP7 projects, and the project partners are ready to form new research consortia and to make new proposals. Good communication with project beneficiaries has been achieved, something which will be continued following project completion.

Reinforcement of the research centre has also been achieved through the purchase of pilot plant equipment for activities such as milling, mixing, drying-cooling and vacuum coating. A new research pilot plant laboratory was ceremonially opened on 29 September 2009 by professor Viktor Nedovic, assistant minister for international cooperation and European integration in Serbia's Ministry of Science and Technological Development. The laboratory is now capable of providing training and research opportunities to scientists, researchers and students in the feed and food industry.

The centre has also been able to employ additional researchers, a technician and one experienced researcher. These developments, say the project partners, will significantly strengthen their research potential. The project partners

are also now highly proactive, and are active members of the European Commission's food cluster initiative.

The Feed-to-food project can therefore already be seen as a success. The project has enabled project partners to reinforce their own research capabilities and has helped to integrate Serbia into the European Research Area.

(1) 'Reinforcement of Feed-to-food Research Center at Institute for Food Technology of the University of Novi Sad.'

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Innovative bio-packaging that can replace plastics

An ongoing European research project is developing new environmentally friendly materials that can replace oil-based plastic films used in packaging for food and other goods.

According to recent figures, over 16 million tonnes of flexible packaging are used each year across Europe. The majority is used for food and ends up in rubbish bins after a short life span. The environmental impacts are significant — much of this material does not degrade when put into rubbish dumps, whilst other waste treatments, such as incineration, release pollutants into the earth or water. And because many of these materials are plastics derived from fossil fuels, they also add to climate change.

A team of researchers is developing new paper-based materials that can compete with plastic films and other flexible packaging in terms of performance and cost, but with much lower environmental impacts.

‘The flexible packaging that we are developing is recyclable,’ says project coordinator Dr David Guerin from the Centre Technique de l’Industrie des Papiers, Cartons et Celluloses in Grenoble, France. ‘The new materials will biodegrade in less than six months, compared to the 200-year period required for materials such as polyethylene, and will be made from more than 70 % bio-based materials.’

With partners from research institutes and the food and packaging industries, the team has developed a number of new techniques using renewable materials reinforced with nano-particles and innovative coatings. ‘The required properties of flexible packaging are very demanding. We needed to be able to match the barrier properties of plastic films with regards to grease, water, oxygen and water vapour,’ says Dr Guerin.

Technical details

The combination of the different novel approaches can produce low-weight — 50 to 90 g/m² — materials with different levels of barrier properties. The first step to making low- and medium-barrier papers was to make a paper-based substrate with significantly improved barrier properties in combination with water-borne coatings made from renewable materials including different forms of starches.

Researchers in the EU-funded project Flexpakrenew⁽¹⁾ also proved the concept of applying micro-fibrillated cellulose (MFC) at the very early steps of the paper formation. They established that this addition resulted in a significant decrease in the air permeability of the material, which effectively means better protection for goods contained in the packaging.

‘The dimensions of MFC fibres are about 100 times smaller than traditional cellulosic fibres,’ notes Dr Guerin.

In order to create a suitable water-borne coating, the team assessed different starches, hemicelluloses, bentonites (sedimentary clay derived from volcanic ash) and plasticisers (organic chemicals that make materials more flexible, resilient and easier to handle). They demonstrated the potential of the hemicellulose xylan, which is derived from the Birch tree, and defined the optimum combinations of these different elements.

Surfaces

To produce higher barrier films, the team looked at two innovative surface treatments which can be applied to the new reinforced materials: solvent-free chemical grafting and vacuum coating. Chromatogenic grafting is a chemical process which allows the molecular grafting of cellulosic materials with long chain fatty acids.

‘We found that [grafting] significantly reduces the sensitivity of the coated layer to water and water vapour. We were able to get perfect water repellence and a very low water vapour transmission rate,’ says Dr Guerin.

Meanwhile progress was made in using vacuum coating to further improve gas barrier properties, which is very demanding due to two factors. Materials must be very smooth and remain unchanged when put in a vacuum chamber. ‘We had encouraging results in overcoming these factors,’ he adds.

Another focus has been on developing an antibacterial coating that can prolong the life of food, without delivering unacceptable quantities of preservatives. They have tested the use of preservatives in a starch layer that would be in contact with the food, as well as a sustained release mechanism using preservatives embedded in capsules. The team is now refining these preservatives, especially ensuring that they will comply with food contact regulations.

Next steps

Assessing the environmental benefits of the new materials has been important throughout the project which began in September 2008. The researchers used life-cycle assessment techniques to look at the impacts throughout the production, use and disposal of the new materials. This enabled them to select the most sustainable materials and compare them with the current materials used commercially.

‘We are confident that we have fulfilled the environmental aims of the project,’ says Dr Guerin. ‘The second generation of our demonstrators were much more efficient than the first, but we still need to improve them.’



Work is still needed on improving the compatibility between the material layers and reducing the number of coats needed. 'At the moment we need three water-based coatings applied in the papermill, but the maximum possible with industrial machines is two,' he adds.

Into the final year of the three-year project, the focus is now on optimising the pilot technologies for use at a commercial level. 'Our overall goal is to show that there is a great interest

for industrialists to invest in such technologies,' says Dr Guerin. 'Our project concentrates on flexible packaging, but because the required properties are so demanding, the developments made here can be easily transferred to other paper grades and applications.'

With the ubiquitous nature of packaging and the huge quantities of materials it uses, the progress made in this project has the potential to make a significant improvement to overall sustainability.

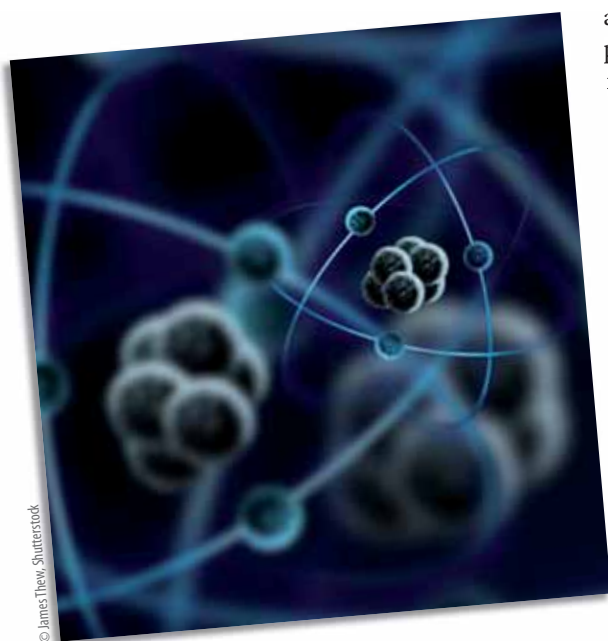
The Flexpakrenew project received EUR 3.28 million in funding from the EU's Seventh Framework Programme (FP7) for research. For more details on the project and its partners, visit: www.flexpakrenew.eu.

(1) 'Design and development of an innovative eco-efficient low-substrate flexible paper packaging from renewable resources to replace petroleum based barrier films.'

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Hunting space neutrinos below ground

A new pan-European operated underground facility is set to isolate and study neutrino activity, a phenomenon normally observed in space. Astrophysics is the study of physics in the universe, covering a wide range of topics from celestial bodies to temperature and density beyond our planet. One important part of astrophysics is neutrino astronomy, which requires sophisticated infrastructure, and which ironically is usually located underground.



A research team plans to ascertain whether Europe has the technical and human capability to lead future underground science by building the next-generation underground neutrino and rare event observatory. Key questions in particle and neutrino physics can only be answered by constructing new giant underground observatories to search for rare events and to study sources of terrestrial and extra-terrestrial neutrinos.

The EU-funded Laguna ⁽¹⁾ project is examining the possibility of building

an international multi-purpose facility to study neutrino astrophysics. Laguna is a collaborative project involving 21 partners, including academic institutions from Denmark, Finland, France, Germany, Poland, Spain, Switzerland and the United Kingdom.

The consortium also includes industrial partners specialised in civil and mechanical engineering, as well as rock mechanics. Together, they will assess the feasibility of such a facility and

corresponding infrastructure needed to create a deep underground neutrino observatory including the latest neutrino detectors and covering anywhere from 100 000 to 1 000 000 m³. Such a facility can provide new and unique scientific opportunities, and very likely lead to fundamental discoveries in the field of particle and astroparticle physics.

In addition, Laguna is involved in upgrading and building existing underground laboratories to study a rare process called proton decay, as well as

terrestrial, solar and atmospheric neutrinos. Matter and anti-matter will also be studied in conjunction with CERN.

Laguna is studying underground infrastructures and engineering at different sites, and has already eliminated some that were not ideal. The study is looking at socio-economic, environmental and political issues as part of the site selection process.

The scientific impact of the project is also being examined, and dissemination of information is underway. A website for the general public has been developed and Laguna was presented in various workshops, continuing to attract and involve scientists worldwide.

Basic designs for the detector tanks have been devised and many engineering studies regarding the tanks have been undertaken. Laguna is also identifying potential safety and environmental risks for liquids, such as argon, to be used and transported through tunnels.

Once completed, the project will greatly contribute to the enhancement of the European Research Area (ERA) by strongly supporting new ways of doing science in Europe.

(1) 'Design of a pan-European infrastructure for large apparatus studying grand unification and neutrino astrophysics.'

Funded under the FP7 specific programme Capacities under the theme Infrastructures.
<http://cordis.europa.eu/marketplace> > search > offers > 6158

Optical alternative to silicon for future electronics

Silicon chips are struggling to meet the increasing need for computing power. Photonic crystals are one of the solutions European researchers have explored to make optical chips a reality.

Thanks to their organised structure, photonic crystals can conduct light in a particular wavelength, stopping other frequencies from interfering with the correct functioning of the crystals.

As early as the 1980s, researchers were able to replicate such photonic crystals which could be used in the electronics

industry. However, there was a downside. They proved to be extremely expensive to build.

The EU-backed PHAT ⁽¹⁾ project was able to develop a photonic crystal that is much easier and cheaper to fabricate, and ready to be integrated into silicon chips.

But integration of photonic crystals into silicon chips is not easy. There are difficulties related to the size of the optical components which tend to be much larger than their electronic counterparts.

The PHAT researchers combined two- and three-dimensional photonic crystals. By doing so, all-optical computer chips could shrink to a

fraction of the size of standard silicon processors.

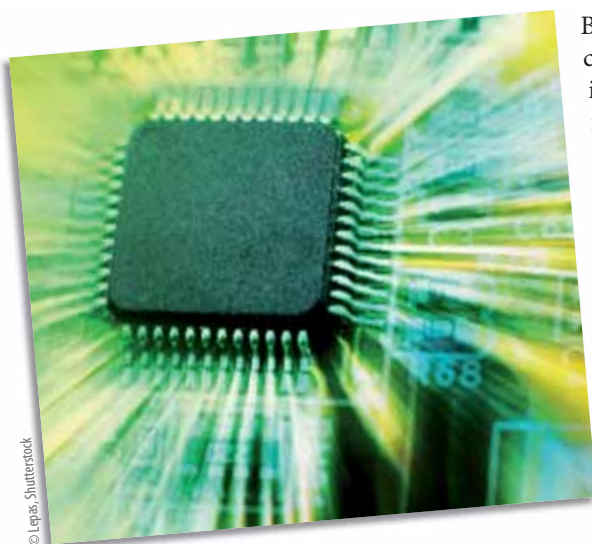
Specifically, artificial opals were assembled out of 10 silica beads with the diameter of just a few hundred nanometers, bringing together both two- and three-dimensional crystals. The PHAT project ended in 2007 with the successful fabrication of the first three-dimensional photonic crystal integrated with waveguides, which channel light to where it is needed.

The crystal fabrication method was patented by two of the project partners, the Tyndall National Institute, Ireland and the Technical Research Centre of Finland. This is a significant advance in photonic crystals, and brings us a step closer to all-optical chips for computers and communication systems.

(1) 'Photonic hybrid architectures based on two- and three-dimensional crystals'.

Funded under the FP6 programme IST
(Information society technologies).

<http://cordis.europa.eu/marketplace> > search > offers > 6166



Keeping up to date on nanotechnology safety

A powerful database and website on the safety of nanotechnology, complete with an elaborate search engine, will keep the public and other stakeholders well informed about the latest developments.

Nanotechnology is all the rage for European industry and promises of advanced products, technologies and solutions in many fields are slowly but surely becoming a reality. On the other hand, while cautiously welcoming its benefits, society is sometimes uncomfortable with nanotechnology, questioning how nano-particles affect our health and environment, for example.

The EU-funded NHECD project, which stands for 'Nano-health-environment commented database', is an initiative which addresses these concerns. The project team wants to use recent advanced research results to build a novel and useful automatic database

regarding the impact of nano-particles on health and the environment.

The database should then allow faster extraction of data on nanotechnology, featuring online tools developed by European experts in toxicity. The project team has proven skills in information technology, particularly in databases, data warehousing and text mining, in addition to being well versed in the toxicity of nano-particles.

NHECD is based on text mining methods and algorithms that improve upon traditional searching (e.g. author names, journals, keywords) to more sophisticated searches (e.g. whether

the paper contains graphs). It zooms in on specific information extracted from the scientific paper itself, sifting through a large amount of documents. The unique features of NHECD should allow different user groups to easily access, locate and retrieve information relevant to their needs. The creation of the NHECD knowledge repository will enrich public understanding of the impact of nano-particles on health and the environment. It will support safe and responsible development and use of engineered nano-particles, offering a useful instrument for implementing relevant regulatory measures.

In more detailed terms, the database will serve many communities from regulators to scientists, companies, new activities and the general public concerned with all aspects of nano-particle toxicity. The database and the internet site will also provide expert





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cooperation and information exchange in this evolving domain, where toxicity should be considered in advance.

The system is being hosted and maintained by an expert software company based in Europe. It includes a robust content management system (CMS) as its backbone, containing raw data, scientific papers and relevant publications. It also includes a mechanism for automatically updating its knowledge repository, yielding an ever-growing collection of data on environmental and health effects following exposure to nano-particles.

The project has made much progress so far, with the creation of a sophisticated backend system, an advanced search system, elaborate content and much

more. The beta version is already being tested, and links with experts in the field such as scientists and regulators have been established. The database and website are ready for the next phase, communicating the project's purpose and moving on to the official launch.

The final database will be manually and automatically updated with information that can be accessed through the internet by the public and by interested organisations. Information gathering, in-depth analyses and presentations will keep the database updated and provide an easy-to-use interface for complex queries.

Funded under the FP7 specific programme Cooperation under the theme 'Nanoscience, nanotechnologies, materials and new production technologies.'
<http://cordis.europa.eu/marketplace> > search > offers > 6196

Europe in the laser limelight

A new laser facility will beam Europe into technological primacy, creating the 'flash camera' of the molecular world.

Laser technology is playing an important part in research, touching on many important fields from medical imaging to national defence. One technology, the free electron laser (FEL), is considered particularly versatile (or tuneable), opening up a whole range of applications. About a decade ago, an advanced type of FEL laser was

launched, called the single-pass free electron laser. Research centres worldwide were keen to explore this new discovery and to apply it in different ways.

The EU-funded IRUVX-PP ⁽¹⁾ project now intends to harness this power in a new European facility, known as

Eurofel. Several European countries are supporting the building of national FEL facilities which are now joining forces to create and operate Eurofel. This facility will offer complementary sources and instrumentation that is unsurpassed in the world.

Eurofel partners will integrate national FEL facilities into a distributed European facility to fully exploit the complementary features and expertise of individual member facilities and maximise benefits for all involved.

The consortium is also setting up policies to facilitate access to this facility, offering world-class service in response to the needs of the research community. The goal is to make optimum use of existing resources and fully exploit the complementary expertise and features of individual member facilities.

The project has already reviewed and defined the core activities of the future Eurofel consortium and prepared comprehensive reports for establishing the joint facility. This includes a detailed description of its mission, envisioned activities, budget estimates, internal procedures and more.

In more scientific terms, the new FEL technology combines wide and



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continuously tuneable wavelength radiation with ultra-short pulses and the coherence of lasers, yielding much more power. It covers the terahertz, infrared, visible and ultraviolet spectrum up to hard X-rays, producing extremely short (femtosecond) flashes of light with unprecedented intensities at short wavelengths. In other words, FELs are the flash cameras for the

molecular world, adding the femto-second timescale to nanometre microscopy. This can be used to observe intricate phenomena and opens the door to numerous scientific disciplines ranging from the physics of atoms, molecules and clusters to plasma physics, chemistry, nano-sciences, materials and biomaterials. The results are expected to lead to the development

of novel technologies ranging from micro-electronics to energy.

(1) 'Preparatory phase of the IRUVX-FEL consortium'.

Funded under the FP7 specific programme Capacities under the theme Infrastructures.

<http://cordis.europa.eu/marketplace> > search > offers > 6129

Robotic machinery advances European industry

Robot-like machines, more accurately known as mechatronic equipment, might be the answer to keeping European industry competitive.

If Europe wants to reinvent itself as an industrial powerhouse and counter the migration of industry to less expensive manufacturing countries, it must remain at the cutting edge of technology. One way to achieve this is to upgrade equipment and machines used in industrial production processes. The relatively recent emergence of mechatronic concepts, which combine active devices with a certain degree of intelligence in mechanical structures, enables industry to improve industrial performance.

The EU-funded 'Production dependent adaptive machine tool' (Chameleon) project is currently investigating an advanced approach to exploiting intelligent devices that are integrated into machine tools. The project team wants to equip machine tools with a variety of active intelligent devices to create more flexible configurations for production processes and increase performance.

Parameters for these devices could be set automatically and intuitively, with

different options that activate equipment in a smarter way. As a result, production machines could then be rapidly configured according to different and even conflicting conditions or performances. For example, hard steel requires a rigid machine for roughing and cutting, whereas aluminium requires high-speed machining using light, highly dynamic equipment. A mechatronic machine could be programmed to handle both, saving on both space and production costs.

In other words, a base mechanical structure equipped with an assortment of intelligent devices could be configured as a different type of machine depending on the selected gadgets and required result. The machine's resulting characteristics and performance could be adapted to different machining processes, creating the ultimate chameleon-like machine tool concept.

Work is under way to develop the concept of an intelligent 'head' for machining tools, as well as the whole structure design of the machine and an intelligent control system. Such a system can only lead to smarter, cleaner and less expensive production techniques that will reinforce Europe's progressive role in machining and industry.



Funded under the FP7 specific programme Cooperation under the theme 'Nanoscience, nanotechnologies, materials and new production technologies.'

<http://cordis.europa.eu/marketplace> > search > offers > 6176

The following upcoming events were selected from the event diary of the Directorate-General for Research and from the CORDIS event calendar.

For further information on past and upcoming events, please visit:

<http://ec.europa.eu/research/events>

<http://cordis.europa.eu/events>

Artificial intelligence in space: intelligence beyond planet earth

A workshop entitled 'Artificial intelligence in space: intelligence beyond planet earth' will take place on 17 July 2011 in Barcelona, Spain.

An enduring part of research on artificial intelligence is understanding how to simulate human behaviour in robots that operate in space. Because of this, methods rooted in artificial intelligence research are increasingly finding their way into applications in areas related to space engineering.

Co-organised by the advanced concepts team of the European Space Agency and the artificial intelligence group of the Jet Propulsion Laboratory of the National Aeronautics and Space Administration, the event will look at the most recent applications and advances related to artificial intelligence and space. It will also review the current state of the dialogue between the two domains and discuss future perspectives.

The workshop will be part of the 22nd international joint conference on artificial intelligence.

For further information, please visit:
<http://www.congrex.nl/11M10>

Third workshop on social mobile web

The third workshop on social mobile web will be held from 17 to 21 July 2011 in Barcelona, Spain.

The mobile space on the internet is evolving rapidly. With billions of users worldwide and advances in handset technology, the mobile web looks set to bring new opportunities and challenges. At the same time, people are increasingly using social networking websites. This has meant that more and more users are seeking novel ways of interacting with their friends and family.

The workshop is aimed at researchers and practitioners interested in the

mobile web and social web spaces, as well as stakeholders from social science, computer science and cognitive psychology.

Topics are set to include:

- novel social interactions on mobile devices;
- social mobile content sharing and distribution services;
- location awareness in social mobile services;
- context aware mobile services — beyond location;
- social mobile search and social mobile browsing;
- user evaluations of social mobile services;
- mobility, social networks and social network analysis;
- models of mobile social behaviour and mobile traces;
- innovative social mobile applications.

For further information, please visit:
<http://www.thesocialmobileweb.org>

Charge transfer in biosystems

A conference on charge transfer in biosystems will take place from 17 to 22 July 2011 in Obergurgl, Austria.

Charge transfer in biological molecules is an important topic because of its implications in chemical reactions in living organisms and for the potential exploitation in nanotechnology.

The measurement and theoretical description of the phenomena have been traditionally developed and carried out by chemists with standard instruments and tools. In the last couple of decades, with the advent of nanotechnology and the investigation of nucleic acids and proteins in this context, interest in charge transfer has risen in other fields, notably physics and engineering.

The conference will bring together scientists active in the theoretical and experimental investigation of charge transfer in biomolecules and complex systems to assess the latest in the field in terms of methods and knowledge.

There will also be significant possibilities for new cooperation initiatives. Young scientists pursuing a multidisciplinary career that bridges physics, chemistry, biology and engineering will also attend.

For further information, please visit:
<http://bit.ly/bpyxbC>

Workshop on service science and systems

The fourth Institute of Electrical and Electronics Engineers (IEEE) international workshop on service science and systems will be held in Munich, Germany from 18 to 22 July 2011.

While the service sector forms a growing portion of world economy, it still lags behind other industry sectors, such as manufacturing, in terms of overall productivity. This workshop will look at how the internet is creating a new wave of business and technical models, which promise to boost productivity in the service sector.

Service science is still in its infancy. Most momentum comes from traditional hardware and software vendors who, while possessing tremendous knowledge and experience in computing, are somewhat limited when it comes to service applications.

The workshop will be a forum for stakeholders to identify relevant modern technologies that can help promote service cycles. It will also enable them to examine novel service systems and applications in a variety of service industries. The workshop will bring together researchers and industry experts to share research results and practical experience, with a focus on tackling barriers towards reliability, interoperability, usability and productivity.

The workshop is the fourth in the series, but is being run under a different title, in response to growing interests from participants in the previous workshops.

For further information, please visit:
<http://compsac.cs.iastate.edu>

Multidisciplinary approach to designing intelligent environments

A conference entitled 'Multidisciplinary approach to designing intelligent environments' will take place from 25 to 26 July 2011 in Nottingham, UK.

Intelligent environments are interactive spaces with embedded systems and information and communication technologies (ICTs) which are designed to bring computation into the physical world. The term also describes physical environments in which ICT and sensor systems disappear as they become embedded into physical objects, infrastructures, and the surroundings in which we live, travel and work.

This workshop seeks to set up an 'intelligent environment' where participants will be able to understand each other without regard to background, culture, professional language or field of expertise. To achieve this, creative art (along with the more conventional methods, such as academic writings), will be used as a means of communication to deliver scientific achievements related to the topic of intelligent environments to a wide audience.

For further information, please visit:

http://privatewww.essex.ac.uk/~yvkova/SciT11/Scit_home.htm

Conference on advances in social networks analysis and mining

A conference on advances in social networks analysis and mining will be held from 25 to 27 July 2011 in Kaohsiung, Taiwan.

In recent years, social network research has advanced significantly. The development of sophisticated techniques for social network analysis and mining (SNAM) has been highly influenced by online social websites, email logs and instant messaging systems, which are widely analysed using graph theory and machine learning techniques.

Users perceive the internet increasingly as a social medium that fosters interaction among people, sharing of experiences and knowledge, group activities, community formation and evolution. This has led to a rising prominence of SNAM in academia, politics, homeland security and business. This follows the pattern of known entities that have evolved into networks in which actors are increasingly dependent on their structural embedding.

The event will be an interdisciplinary venue bringing together practitioners and researchers from a variety of SNAM fields to promote collaboration and the exchange of ideas and practices. It is intended to address important aspects with a specific focus on the emerging trends and industry needs associated with social networking analysis and mining.

For further information, please visit:

<http://asonam2011.im.nuk.edu.tw>

Doctoral symposium

A doctoral symposium entitled 'Twenty-fifth European conference on object-oriented programming' will be held from 25 to 29 July 2011 in Lancaster, UK.

The event programme will centre around a doctoral symposium and a PhD students' workshop. Both will enable early and late-stage PhD students to present their research and get detailed feedback and advice.

The goal of the doctoral symposium session is to provide PhD students with useful feedback towards the successful completion of their dissertation research. The experience is meant to mimic a mini-defence interview. Aside from the actual feedback, this helps the student gain familiarity with the style and mechanics of such an interview.

The second session is addressed primarily to PhD students in the early stages of their doctoral work. The goal is to allow participants to present their research

ideas and obtain feedback from the rest of the workshop attendees. Each participant will give a 10 to 15 minute presentation, followed by 10 to 15 minutes of discussions.

For further information, please visit:

<http://ecoop11.comp.lancs.ac.uk/?q=calls/doctoral>

European conference on artificial life — twentieth anniversary 'Back to the origins of life'

The European conference on artificial life — twentieth anniversary 'Back to the origins of life' will be held from 8 to 12 August 2011 in Paris, France.

Over the past two decades, biological knowledge has grown at an unprecedented rate, giving rise to new disciplines such as systems biology. During the same period, highly speculative ideas have matured, and entire conferences and journals are now devoted to them. Examples include synthesising artificial cells, simulating large-scale biological networks, storing and making intelligent use of an exponentially growing amount of data (e.g., microarrays), exploiting biological substrates for computation and control, and deploying bio-inspired engineering.

The event will leverage the remarkable development of biological modelling and extend the topics of artificial life to the fundamental properties of living organisms: their multiscale pattern-forming morphodynamics, their autopoiesis, robustness, capacity to self-repair, cognitive capacities, and co-adaptation at all levels, including ecological ones.

The European conference on artificial life is a biennial event that alternates with the US-based 'A life' conference series.

For further information, please visit:

<http://www.ecal11.org>

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