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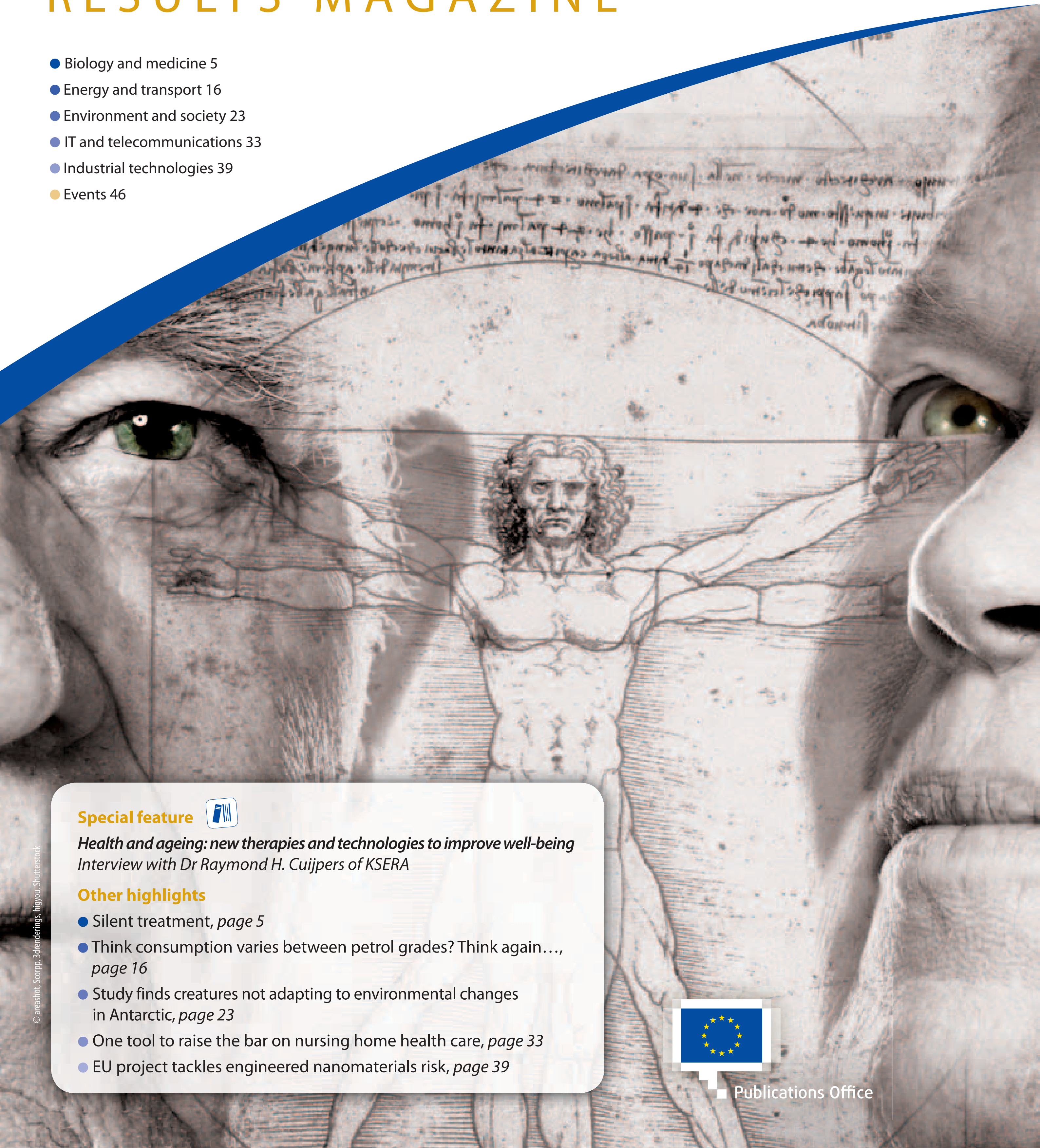

Special feature

Health and ageing: new therapies and technologies to improve well-being
Interview with Dr Raymond H. Cuijpers of KSERA

Other highlights

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Ageless living

Five decades of stability, prosperity and peace in Europe have contributed to a remarkable increase in life expectancies which have risen on average by six years compared to 1960. And it is expected to increase by another five years over the coming four decades.

From 2012, the population aged 60 years or over is set to increase by about two million people per year, but the European working-age population will begin to shrink. The growing disparity between the age groups raises questions on health care and living conditions; especially among the older generations. To help raise awareness about the issue, the European Commission designated 2012 as the European Year of Active Ageing.

Technology and science can help provide care and ensure high living standards are maintained for future generations. The EU is already working on research projects that can alleviate the additional pressure on health-care services from an expanding number of elderly citizens and research*eu results magazine *wants to highlight just a few of those.*

This is why we are dedicating this issue's theme to 'Health and ageing: new technologies and therapies to improve well-being.' We speak to Dr Raymond H. Cuijpers, project coordinator at the EU-funded 'Knowledgeable service robots for ageing' (KSERA). KSERA is developing a 'Social assistive robot' (SAR) to support the elderly in their daily activities, provide care and, in particular, help them manage chronic obstructive pulmonary disease (COPD) themselves.

But first we start off the issue with an article in the biology and medicine section on how hearing impairments among the elderly can bring about a sense of isolation.

The energy and transport section leads with an article on a comparative study between different commercial petrol grades. The research shows how to best measure fuel consumption in motor vehicles.

Next in the environment and society section we take a closer look at the Antarctic. Scientists have found that organisms in the region are unable to adapt fast enough to changes in the environment.

In our IT and telecommunications section, EU researchers are developing an assessment tool to evaluate the health-care needs of the elderly in nursing homes.

The industrial technology section leads with a story on the risk assessment criteria for engineered nanomaterials.

The issue then ends with a list of 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: cordis-helpdesk@publications.europa.eu*

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- Technology Marketplace: http://cordis.europa.eu/marketplace
- Research Information Centre: http://ec.europa.eu/research/infocentre
- Thank you to Raymond H. Cuijpers of the KSERA project for his contribution to the 'special' dossier in this issue

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Watch this space!

Coming up in issue 7 of *research*eu results magazine* a special dossier on 'Infectious diseases: international leadership in tackling major health concerns'.

Silent treatment

Not many people like to grow old. Your hair goes white, your mobility decreases and for some, the hearing goes. Impaired hearing (not complete hearing loss) is usually under-diagnosed in elderly patients. A group of European researchers are now advocating early intervention as part of routine care.

European demographics clearly show an ageing population. This has led to a growing percentage of elderly people relative to the workforce. The median age in Europe is set to increase from around 37 in 2003 to around 52 by 2050, according to the Brookings Institute. In fact, the elderly population in Europe will increase by 77 % between 2010 and 2050, according to the European Commission.

This ageing population will bring additional pressures on society, not to mention the greater care needed for the elderly. Deafness is customarily associated with age, and is generally accepted as such: you grow old, you get deaf, and nothing can be done about it. Historically, the importance of having good hearing has been underestimated. Older people who suffer from hearing loss get frustrated by the general lack of communication. This can consequently lead to hearing loss being associated with depression and unwillingness to mix with others and further adds to the burden of those suffering from this condition.

Despite hearing loss being quite prevalent in older people, it is largely under-diagnosed, and as a result, under-treated. Deafness is not an ailment that can be seen, and therefore quickly diagnosed and taken care of. It occurs over a longer period of time, which is one of the main reasons why it has escaped early intervention among the elderly.

Precisely because this is such a major issue among the elderly an EU-funded project named 'Assessment of hearing in the elderly: ageing and degeneration — integration through immediate intervention' (AHEAD III) started work in 2008 to find evidence on the effects hearing impairment has on adults and especially the elderly. 'Deafness,' says project leader Ferdinando Grandori, 'until a few decades ago, was erroneously and incredibly associated with other types of disability, even mental retardation.'

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The project, which runs from 2008 to 2011, seeks to raise awareness among key stakeholders (policy-makers, administrators and health-care professionals) involved. It is analysing the costs and feasibility of large-scale or nationwide programmes of hearing screening and intervention among adults, and at the same time presenting benchmarks these screenings have to adhere to. 'Almost all the classical methods for hearing screening do not screen for the ability of understanding speech, especially when there is background noise,' explains Mr Grandori.

Disability versus dysfunction

AHEAD III, made up of 17 partners in 13 European countries, is developing guidelines on the way screenings should be carried out in various formats. These include the newly proposed methods of telephone and internet screening. However, these benchmarks and guidelines have to be closely tuned to local or national social and economic conditions. Whatever the screening used, AHEAD III is emphasising the need to identify early hearing disabilities and not just hearing dysfunctions.

The study is focusing on a number of aspects concerning hearing loss which are all interconnected. It is carrying out an etiological assessment (what the cause for hearing loss in elderly people is), and epidemiology of age-related hearing loss (studying patterns of hearing loss at the population level). Once this has been established, the main effects of age-related hearing loss and the methods used for screening can be examined.

AHEAD III managed to apply the World Health Organisation's (WHO) international classification of functioning, disability and health (more commonly known as ICF), to the screening of and intervention on adult hearing loss. The ICF is a standard used by the WHO to classify health components of functioning and disability. The partners then pinpointed the most relevant causes and patho-physiological mechanisms which occurred in hearing impaired adults.

The social consequences of hearing loss are prevalent both in the affected individual, as well as in the people he/she associates with on a daily basis. Loneliness and depression as a result of isolation caused by the inability to communicate with friends and loved ones can steadily set in. There is also the frustration on the part of others who want to communicate with the affected individual but find their efforts thwarted and then having to adapt. 'Deafness produces isolation,' says Mr Grandori. 'In the medium to long term, relationships can be greatly distorted and the deaf tend to quit any type of communication.' Coming to terms with hearing loss can be a long and dark road that few elderly people would want to take.

Psychological and social impacts, too

This is an important aspect the researchers are concentrating on: the psychological and social impact of hearing loss in adults.

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'Pure tone audiometry' (PTA) is used to identify the hearing threshold levels of an individual, determining the degree, type and configuration of hearing loss. AHEAD III has identified a benchmark for screening with PTA.

As the European population ages, the need to prevent, delay and reverse the functional decline of the elderly becomes even more pressing. This is why the project has evaluated adult hearing screening methods and technologies used. Once these screenings were successfully carried out, the project looked at whether any of the interventions on hearing impaired patients were successful.

Indeed, the team researched this matter in depth, and reviewed the literature on screening technologies, as well as on intervention strategies, to get a more complete picture of how effective current methods are. AHEAD III has been in contact and reviewed current efforts under way in both the United States and in Europe on screening methods, to get a broader perspective.

Mr Grandori hopes the project will raise awareness among the general public and health professionals. It could lead to new devices being used for screening hearing ability and pilot campaigns being launched in a number of countries. With technological development continuing apace, we will no doubt see some major changes being introduced in the years to come in hearing screening.

AHEAD III is based at the National Research Council in Rome, Italy and is funded under the FP7 specific programme Cooperation under the theme Health.

Promoted through the CORDIS Technology Marketplace.
http://cordis.europa.eu/marketplace > search > offers > 5951

New approach to assessing mental disorders in elderly

There is a noticeable lack of reliable data regarding the extent of mental disorders in the EU's elderly population. A new direction in health services and policies can help to correct this.

Knowledge about mental health in the elderly is very important in relation to such stressors as reduced activity, social isolation and physical distress. Although various studies at national and transnational levels have been carried out, more information is required on the frequency and occurrence of mental disorders in the ageing population across the EU. One reason for this is a lack of suitable diagnostic instruments and an inadequate approach to gathering information, interpreting results and implementing appropriate change in health services.

The EU-funded Mentdis_ICF65+ ([1]) project aims to correct the current state of affairs. The study aims to develop and adapt reliable diagnostic assessment instruments appropriate and valid for an elderly population. It also aims to collect data on the prevalence, incidence and natural course and prognosis of mental disorders. The approach includes an assessment of health service needs, determining the extent to which older people are using existing services and which, if any, specific barriers are present in their use.

The 'Composite international diagnostic interview' (CIDI-Elderly) was carried out and expert focus groups guided its adaptation and pre-testing for feasibility and acceptability. The English and German CIDI-Elderly language versions were finalised and translated into French, Hebrew, Italian and Spanish.

Among its achievements, the Mentdis_ICF65+ study is hoping to develop diagnostic assessment instruments specific to the needs of the elderly. These will measure the severity of mental disorders, quality of life, activities and participation, and the use of services in different European countries. The impact of the project will bring about positive change in health care and offer a base from which to implement necessary changes in health policies.

The Mentdis_ICF65+ is based at the Universitätsklinikum Hamburg-Eppendor in Hamburg, Germany.

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(1) 'Prevalence, one-year incidence and symptom severity of mental disorders in the elderly: relationship to impairment, functioning (ICF) and service utilisation'.

Funded under the FP7 specific programme Cooperation under the theme Health.
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Interview
Robots come of age

Dr Raymond H. Cuijpers

Key medical advances along with secure and stable societies means people have longer and more active lives. In Europe, fertility rates are on the decline. Yet life expectancy is increasing two and half years for each passing decade and nearly 25 % of the population will be over 65 by 2020. Because of it, the European Commission is funding research projects to address the socio-economic challenges of an ageing population.

Important questions remain on how to make up for the inevitable shortage of care-givers as an increase in the number older people places additional pressure on health-care systems. Some scientists and researchers are looking at ICT for possible solutions that could enable the older population to live more independently and with a higher quality of life.

But can ICT fulfil the needs of an ageing population? The EU-funded project 'Knowledgeable service robots for ageing' (KSERA) is proposing one innovative solution. They are developing a 'Socially assistive robot' (SAR) that will help older persons, especially those with chronic obstructive pulmonary disease (COPD). The robot will assist in daily activities, care needs and provide the means for effective self-management of COPD.

We speak to KSERA's project coordinator Dr Raymond H. Cuijpers. Dr Cuijpers studies how robots can autonomously interact with humans in a natural and fluent way so that they can help improve the quality of life of older persons. Dr Cuijpers is an expert on visual perception and its relation to computer vision.

He is currently assistant professor at the Eindhoven University of Technology and is the author of over 22 publications in journals and conference proceedings on human perception, human motor control, artificial intelligence and cognitive robotics. He shares with us his compelling insights into the science behind his project and the role of ICT in helping the elderly for future generations.

Your project, KSERA, is in the process of developing a socially assistive robot that helps elderly people, especially those with chronic obstructive pulmonary disease (COPD). Providing effective health aid and services to people also requires establishing a bond based on trust. How do you intend to forge a bond based on trust between a robot and an elderly person suffering from COPD? Why focus on COPD?

Trust is difficult to acquire and easy to lose. Nowadays people expect things to work out of the box in a user-friendly way, and it should be affordable, robust and reliable. With the current state of affairs in robotics that is just not going to happen. The most advanced systems are currently expensive, fragile or both. So why invest in research?

The most challenging aspect of any artificial system that is supposed to interact with real people in a pro-active way is the human-robot interaction. A robot can nowadays fetch objects involving already many complicated issues like navigation in cluttered environments, robust object recognition in changing lighting conditions, and dexterous manipulation of objects without a decent sense of touch. Much and rapid progress is made on all these issues, but notice how it does not involve real people.

Even if you had a robot that can robustly navigate, recognise objects and dexterously manipulate objects, it still does not know how to approach and address a person. These seemingly simple tasks involve detailed knowledge about how humans interact. One of the aims of the KSERA project is to use knowledge from (cognitive) psychology and human motor control in order to obtain proper human-robot interaction that is natural and smooth. For example, in KSERA the robot continuously monitors where a person is directing his visual attention to. If the person looks at the robot, the robot will know and establish eye contact. Only then will the robot be in a position to communicate effectively with this person.

In order to gain trust the 'SAR' must prove its worth by repeatedly and reliably showing that it can perform certain tasks or assist in certain ways. There are some profound difficulties. Real robots' performance is nowhere near what robots can do in the movies and consequently expectations are too high. The robot must by its behaviour set the right expectations. A notorious example is speech. It is easy to produce complicated sentences via speech but a full-fledged sentence invites full-fledged replies. Unfortunately, speech recognition is in practice extremely difficult. Even a simple yes or no has poor recognition when not using a headset, because of reverberations from walls, background noises, voice pitch and dialect. These real-world phenomena completely destroy recognition of even the simplest utterance.

Another way to stimulate trust is to have a robot with social skills which is able to act as a social agent. It is commonly held that a socially intelligent agent performs better with respect to user acceptance, entertainment value and is more persuasive. However, this may be one of the hardest problems in artificial intelligence (AI) today. People can bond more easily with gold fish than with robots. In our view this has to do with how people process information even on a neurophysiological level — the social agent's behaviour needs to be predictable in a way that a human's built-in machinery for inferring goals and intentions from observed behaviour works best. Consider for example a robot grasping objects in a very unnatural way because it is moving one joint at a time. From an engineering point of view this is a simple way to do things, but for a human observer it is next to

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impossible to make sense of the movements, because the neurophysiological machinery for inferring the goal of observed actions fails.

Lastly trust comes from the context within which a robotic system operates. There are many ethical issues with robots providing care. Who is liable when something goes wrong? Any assistive artificial system must therefore be embedded in a properly organised care system. In KSERA the Israeli health-care institute Maccabi is closely involved in the design process. If there is a failsafe health-care organisation backing up the robotic system, it is also safe for the user to put trust in the system.

COPD is an age-related chronic obstructive pulmonary disease that is expected to become the third cause of death in 2030. For these patients monitoring air quality is important for preventing exacerbations, so it makes sense to research technological solutions as air quality is relatively easy to measure. In KSERA we go one step further and research how a robot can augment such a system with the aim of not just preventing exacerbations but also improving the quality of life. In this sense the KSERA solution applies to older people in general.

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Can you elaborate on the technology and provide an example of how the robot could help an elderly person with COPD? Can you explain the innovation behind the robot?

In the KSERA project we use the Nao robot from Aldebaran Robotics. This robot is a 60 cm tall humanoid robot that is very versatile. It looks friendly and harmless which is a big advantage in terms of user acceptance, but it is very limited in manipulating objects. As such it is unable to fetch most objects or lift and support people. This might seem a big disadvantage, but suppose a robot was able to do all this, how does it know when to do what? As mentioned before, one aim of KSERA is to obtain acceptable and natural human robot interaction, which occurs even with the simplest tasks. In KSERA these tasks include providing information about the weather and air quality, providing medical reminders, setting up video communication with external care or with family and friends, monitoring health parameters or doing health exercises together with the older person.

In this way the KSERA system addresses user needs of COPD patients in particular and older people in general. The KSERA system consists therefore of a smart home environment and domotic system in which the humanoid robot is fully integrated. Apart from the human-robot interaction issues outlined above another major effort of KSERA is to integrate the various systems. Currently, we have a scenario in which the robot approaches a person to remind him of taking a blood-oxygen measurement. The measurement device is wirelessly connected to the smart home part of the KSERA system. When the measurements are received the robot gives feedback about the measurement. Unfortunately, there exists no standard to connect all the various devices together let alone to integrate it with a proactive robot.

ICT has a vital role in society. Yet only 10 % of those over 65, for instance, use the internet. Is this because ageing is not considered in the design of mainstream products or is it because the elderly do not necessarily see the practical benefits of some digital technologies?

It is clear that computers and other ICT devices are typically designed for young people by young people. However, I think the biggest problem has been the rapid development of ICT in society. Nowadays, I see more and more people of all age groups using ICT devices. A portable music player is no longer a gadget for youngsters. Another development is that ICT is changing from being very technical to ubiquitous and user friendly. ICT interacts with people, the people interact with each other, and the technology is invisible behind the scenes. These two trends together plus the fact that people using ICT today also get older will make that this relatively low participation of elderly in the use of internet will quickly disappear. In the KSERA project the potential end-users are involved in the design process right from the start and several user studies are being conducted to assess whether older people appreciate the newly developed functionalities as intended. This should ensure that the KSERA prototype will be well-appreciated by elderly.

Between 2011-13, the EU and Member States, along with the private sector will invest more than EUR 1 billion in research and innovation for ageing well. What can we expect to see as a result of this investment? And how do you see ICT affecting the elderly in 10, 20 or even 30 years time?

It is an enormous amount of money, but it is not as much as Japan and the USA are investing. Thus, it is not a question of whether we or the elderly will be affected by ICT, but rather how soon and to what extent the EU will play a part in this. I think the social and cognitive skills of artificial systems are an area where the EU can still benefit much from research investments because this area is relatively strong in the EU. So what to expect? First of all wireless technology and smart systems have advanced to a level where ubiquitous systems will take a more and more profound role in the homes of people. In 10 years time every appliance will be

connected to the internet of things (seemingly) displaying smartness of its own. For elderly in the need of care this means more and more technology from smart homes and domotics will enter the homes of users. ICT technology like that of KSERA will help people to live longer at home. In the meantime we are on the brink of another ICT revolution: the acceptance and integration of robotic agents into society. The signs are there if you are willing to see them. In 20 years time it will be normal to have a robotic companion.

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

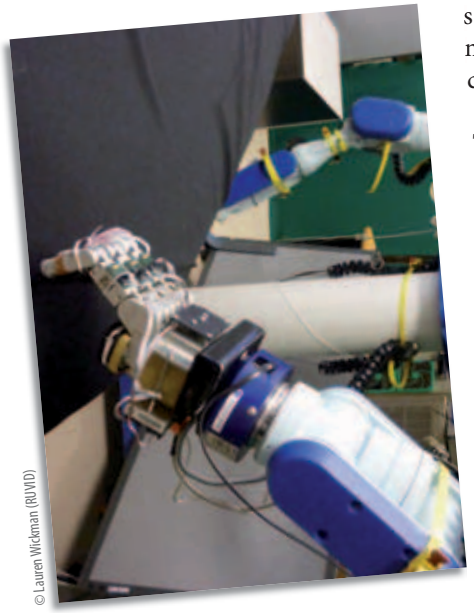
As a child I never imagined working on socially assistive robotics. Although I could have imagined working with robots, I suppose, as I have always liked science fiction. I also have always liked mathematics and physics, so it may be no surprise I ended up studying physics. However, it is only in the last three years that I started working in the field of socially assistive robots. After a PhD in visual perception, post-docs in the areas of human motor control, artificial intelligence and cognitive psychology, the area of socially assistive robotics brings all these research areas together because the robot of the future is proactively interacting with people. In addition this field of research addresses strong societal needs. Perhaps you wonder why the strong societal needs are not the first on the list of things that drew me to this field? Well, what can I say? I'm still a physicist.

A project applies neuroscience to robot vision

Research centres present the results of an EU-funded study which has attempted to replicate in robots human behaviour such as vision, grasping objects and spatial perception.

After three years of intense work, members of the EU-funded Eyeshots ([1]) project have made progress in controlling the interaction between vision and movement. As a result, they have designed an advanced three-dimensional visual system synchronised with robotic arms. This system could allow robots to observe and be aware of their surroundings as well as remember the contents of those images in order to act accordingly.

'For a humanoid robot to successfully interact with its environment and develop tasks without supervision, it is first necessary to refine these basic mechanisms that are still not completely resolved,' says Spanish researcher Ángel Pasqual del Pobil, director of the Robotic Intelligence Laboratory of the Universitat Jaume I. His team validated the findings with a system built at the University of Castellón in Spain. The system is a robot head with moving eyes integrated into a torso with articulated arms.



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The team made the computer models based on animal and human biology. Experts specialised in neuroscience, psychology, robotics and engineering worked together on the models. The study began by recording monkey neurons engaged in visual-motor coordination.

The saccadic eye movement was the first feature of the human visual system that the members replicated artificially. Saccadic eye movement is related to the dynamic change of attention. 'We constantly change the point of view through very fast eye movements, so fast that we are hardly aware of it. When the eyes are moving, the image is blurred and we can't see clearly. Therefore, the brain must integrate the fragments as if it were a puzzle to give the impression of a continuous and perfect image of our surroundings,' says Dr Pobil.

Using this neural data, the experts developed computer models of the brain's region that integrates images with movements of both eyes and arms. This integration differs greatly from what is normally carried out by engineers and experts in robotics. The Eyeshots consortium set out to prove that when humans make a grasping movement towards an object, the brain does not previously have to calculate the coordinates.

'The truth is that the sequence is much more straightforward. Our eyes look at a point and tell our arm where to go. Babies learn this progressively by connecting neurons,' says one of the Spanish researchers. Eyeshots have also simulated these types of learning mechanisms by using a neural network that allows robots to learn how to look, how to construct a representation of the environment, how to preserve the appropriate images, and how to use their memory to reach for objects even if these are out of their sight at that moment.

'Our findings can be applied to any future humanoid robot capable of moving its eyes and focusing on one point. These are priority issues for the other mechanisms to work correctly,' points out Dr Probil.

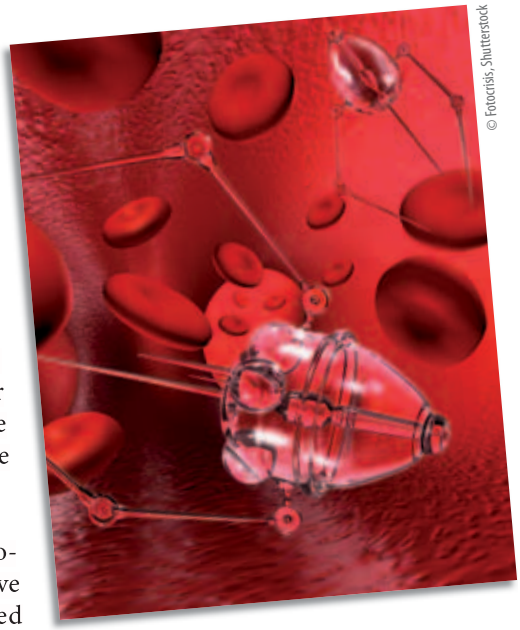
Eyeshots was funded by the European Union through the Seventh Framework Programme and coordinated by the University of Genoa, Italy.

(1) 'Heterogeneous 3-D perception across visual fragments'.

Promoted through the Network of Valencian Universities for the promotion of Research, Development and Innovation (RUVID).

Sensors that make sense

Advanced tiny sensors and probes based on nanotechnology are improving medical diagnosis and may even be used to create microelectronics.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Biosensors are small devices used in medical science and environmental science, among others. They can interact with the body or environment to give data or a diagnosis. One type of biosensor, called an affinity biosensor, analyses biomolecular interactions such as proteins in the body. The technology is important in medical diagnosis although, until recently, it had not been perfected.

The EU-funded Nanosens (1) project investigated how nanoparticles modify the transducer in a sensor. The transducer is the electrode that comes in contact with the body. The project set out to modify the biosensor's chemical properties by using nanoparticles to improve or optimise the performance of its surface.

The project aimed to alter the surface of DNA sensors to make them more efficient without using chemicals or substances in the sensors. These types of biosensors are known as 'reagentless' and do not depend on chemicals to operate. Instead, the use of electrochemical molecular beacons (E-MB) was envisaged. These are extremely tiny probes that detect specific chemicals. Using these principles, and after rigorous testing, a set of positive results emerged to improve the manufacture of biosensors.

The project designed new protocols for structuring the conductive surface of the biosensors based exclusively on electrochemical techniques. The approach allows for the versatile, rapid and cost-effective solution at nanolevel to improve conductive surfaces in biosensor probes. The technology may also be applied in the microelectronics industry or to prepare nanosensors. The project has helped science come up with sensing elements that can be used as low-cost diagnostic tools in several fields.

The Nanosens project was based at the Public University of Tarragona in Tarragona, Spain.

(1) 'Nanoparticles: their application in the development of electrochemical molecular beacon biosensors'.

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

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Subgrouping diabetics for better health care

Better diagnosis and classification of diabetes patients means they can be better cared for.

The EU-funded CEED3 (1) project is setting the foundations for improved clinical care according to patients' diabetes subgroup. The first step in this direction requires development of diagnostic tools that will classify and place patients in various subgroups. This calls for a well-defined process that will discover genetic and non-genetic biomarkers, validate study samples, develop a clinical application and distribute the application.


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CEED3 is on its way to achieving these goals by bringing together findings from various studies and clinical observations. The project members are focusing on identifying patients with specific subgroups of monogenic diabetes, and non-diabetic and diabetic individuals presenting a high risk for rapidly deteriorating blood sugar levels (hypoglycaemia). These two areas have been identified as needing improved care.

Striving to translate scientific discoveries to improved care for these patients, CEED3's work to date has been to define the role of known tests in order to differentiate maturity onset diabetes of the young from type 1 and type 2 diabetes, and developing a comprehensive clinical model based on multiple clinical criteria.

Early results are encouraging and show potential for more accurately differentiating among diabetes subgroups. CEED3 has integrated existing datasets to enable identification of genetic biomarkers for type 1 and type 2 diabetes as well as blood glucose levels after a fasting period and beta-cell function.

These are cells in the pancreas that release insulin.

At present, the project is working to establish cohorts that fit strict criteria. This will facilitate the validation of biomarkers and clinical criteria in the project's next phase. The team plans to disseminate results via an upcoming education programme for physicians and nurses active in the field of diabetes.

CEED3 is based at the University of Exeter in Exeter, United Kingdom.

(1) 'Collaborative European effort to develop diabetes diagnostics'.

Funded under the FP7 specific programme Cooperation under the theme Health.
http://cordis.europa.eu/marketplace > search > offers > 6332

Smiling offers life satisfaction

Researchers in Europe continue the good fight against age-related impairments and in favour of social inclusion. Experts from the EU-funded Smiling (1) project focused on tackling injuries caused by falls by training the elderly to walk on uneven ground while carrying out another activity.

The result? A pair of computer-controlled shoes that simulate changes in the height and slope of the ground beneath a user's feet during active walking. Current data show that 33 % of people aged over 65 years have a higher risk of falling or have experienced falling. Not only do falls cause physical injury, but they can result in emotional trauma and compel the person to significantly reduce their mobility. The best way to hinder potential falls is to boost movement capabilities, the Smiling partners say.

Mobility not only enhances a person's sense of well-being, but it allows them to take part in a wide range of daily activities, such as maintaining ties with family and friends and going shopping.

The Smiling consortium, consisting of 11 experts in 4 EU Member States (Italy, the Netherlands, Slovakia and the UK) plus Israel and Switzerland, believes its innovative approach will compel users 'to solve new motor problems in real time by inducing variable environments that need active response and problem solving from the target population.'

The partners say a training programme tailored to the needs of the individual teaches users to walk with the Smiling shoes while they carry out other tasks like speaking or playing with a ball. 'The brain is stimulated to learn, or re-learn, new motor strategies to make safer and effective these daily actions,' says the project coordinator, Dr Fiorella Marcellini. 'The continuous change of positions of the motors of the shoes step by step stimulates an uneven ground and makes the exercise more challenging and unique.'

What sets Smiling apart from other projects is its multidisciplinary approach. Smiling encourages a restructuring of the rehabilitation process in ageing with the help of advanced technologies and new training procedures.

'The scientific innovation of the Smiling project is based on the chaos theory and dynamic systems theory,' Dr Marcellini explains. 'From a technological point of view, the system is an important example in the mechatronic field. The Smiling system could be used in fitness clubs and health centres, with the aims of improving the walking and balance of older people and to prevent and counteract falling, and also at home, in the future.'

The coordinator points out that integrating highly innovative system components, as well as validating the proposed solution with real users and key professionals, represented a major technological challenge for the Smiling partners.

Commenting on how the partners plan to commercialise the project's product, Dr Marcellini says: 'The Smiling system, as it is today, is ready for the next phase of value-engineering. Early results from clinical validations have provided the designers and developers with concrete feedback about technical reliability and have supplied some early ideas about the soundness of the concept, i.e. the use of the system as a training system for fall prevention. The main product developed and included in the project exploitation plan is the Smiling-pro system, dedicated to therapists, clinicians, physiotherapists and fitness instructors for the elderly. Therefore, the target customers are mainly the geriatric hospitals and clinics, which, in Europe, this means approximately 30 000 potential customers, or the elderly fitness centres, which give roughly another 68 000 potential customers.'

The consortium says that apart from the elderly, others who stand to benefit from their work include major clients of rehabilitation centres, hospitals and nursing

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homes in Europe and abroad. 'With the demographic ageing of these societies one may say that significant public resources have to be allocated to these populations,' Dr Marcellini comments.

'Smiling provides a simple solution, very innovative, easy to use and, therefore, interesting to buy from health-care providers for saving public money,' he adds. 'Other beneficiaries of Smiling outcomes will be health-care professionals and operators, in the sector of rehabilitation, due to the innovative and customisable ICT solution and training programme. An implementation of the fall prevention programme will be provided by the research side of the Smiling project.'

The coordinator points out how Smiling 'is a good example for the development of future ICT systems on mobility and rehabilitation for the 'Eighth Framework Programme' (FP8) and the 'Ambient Assisted Living' (AAL) Joint Programme, as well as in the virtual reality sector, both for research and entertainment environments.'

One of several EU-funded research projects investigating mobility and fall prevention in the elderly, Smiling will effectively offer significant feedback to the research world. As for what the future holds, 'a value-engineering would focus on weight and size reduction, application of the principles of modularity for component replacement and repair and further emphasis on improving reliability,' the coordinator says. The Smiling partners plan to further collaborate in research projects at the European level.

Smiling received EUR 2.25 million under the EU's Seventh Framework Programme (FP7). Smiling is based at the Istituto Nazionale di Ricovero e Cura per Anziani in Ancona, Italy.

(1) 'Self mobility improvement in the elderly by counteracting falls'.

Promoted through the Research Information Centre.
http://ec.europa.eu/research/infocentre > search > 19753

Hydrogels to take on cancer

A new compound made of organic and inorganic materials promises to improve imaging, drug delivery, and even the elimination of cancer tissue.

Cancer is a leading cause of death in Europe and affects many peoples' lives, either directly or indirectly. It produces considerable suffering and drastically affects patients' lives, often with long periods of hospitalisation. This puts significant financial stress and social pressure on the medical system, governments and families.

In response to these challenges, the EU-funded Hot Shot ([1]) project is tackling cancer treatment in novel ways. It combined the unique physical properties of nanoscale materials with current technology to develop effective agents for tumour imaging and therapeutics for cancer treatment.

Hot Shot developed new substances (classified as hydrogels) that are based on peptides (specific types of amino acids) and inorganic nanoparticles. The hydrogels are designed to serve as drug delivery systems with controlled release and in thermal ablation, a process which removes undesirable tissue through heat. The hydrogel can also be used as contrast agents in tumour X-ray imaging to yield a much clearer picture of cancerous tissue.

After extensive laboratory research and testing, the Hot Shot team synthesised peptides with the desired properties, i.e. those that respond to specific temperatures and pH levels in the body. Several nanoscale materials were also included in the hydrogels, such as silica and gold. These materials were procured through international collaboration with universities in Europe and the US. The organic-inorganic composite was then successfully synthesised and tested.

Under Hot Shot, ongoing collaboration with the London Centre for Nanotechnology has also led to the development of similar compounds used for detecting prostate cancer.

Overall, the project was very successful in achieving its aims and won the 2009 June Wilson Award of the London Materials Society. The results have also been featured in a major journal in the field of nanotechnology.

Thanks to Hot Shot's initiatives, new treatments against common types of cancer may soon be in the making and may ultimately alleviate the suffering of millions.

Hot Shot was based at the Imperial College in London.

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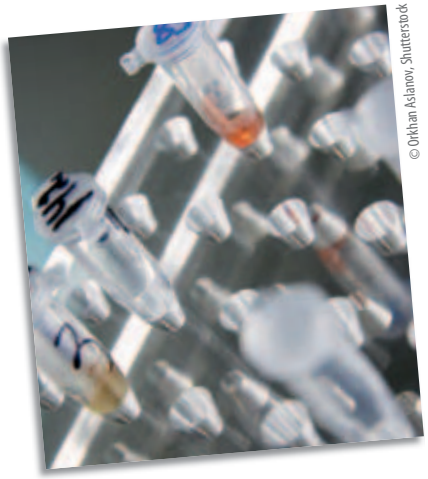
(1) 'Rationally designed supra-molecular bio-inorganic hydrogels for tumour therapy'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6136

Expanding stem cells for successful transplantation

Blood and marrow transplantation are effective treatment for disorders of the blood system. But there are challenges when it comes to finding donors and grafting successfully.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Medical research is looking for more efficient ways to avert complications and serious health issues that can arise with transplantation. The major issues that need to be addressed in this quest are the lack of suitable donors, failed grafting, and graft versus host disease.

The EU-funded Stemexpand ([1]) project is working to find ways of increasing the number of human hematopoietic stem cells from umbilical cord blood and also of mesenchymal stem cells (MSCs). These can be used for transplantation in cases of blood disorders such as leukaemia.

The approach will put in action stem cell regulators that can stimulate self-renewal and an abundance of hematopoietic stem cells. In the case of cord blood samples, this will generate suitable donor samples and drive down mortality due to lack of donors. It will also allow for better short-term and long-term engraftment after transplantation, which will reduce complications and increase successful outcomes.

Researchers are also studying how to improve hematopoietic stem cell transplantation by co-transplanting MSCs. The project aims to define the conditions under which they can be expanded. Their use also has potential for reducing the frequency of graft versus host disease.

The Stemexpand team, based at Lund University in Sweden, discovered factors which boost stem cell survival. They succeeded in delineating genes and important pathways for stem cell regulation and have singled out 12 short hairpin RNAs (shRNAs). Usually used to silence gene expression, for the purposes of this study they show promise in being able to radically expand hematopoietic cells in culture. Bone marrow MSCs have been characterised and compared among various surgical procedures.

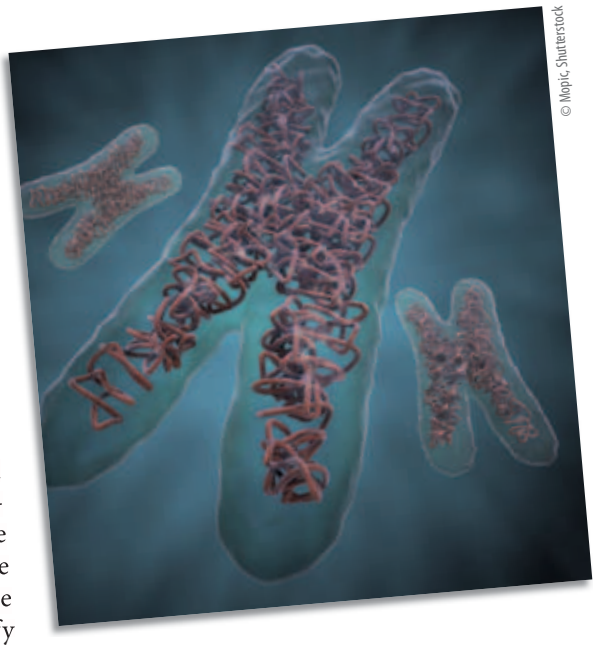
The project members are now trying to secure approval in France for a phase one transplantation trial that will use expanded umbilical cord blood stem cells. Two pre-clinical trials have already been performed, and others are underway.

(1) 'Stem cell expansion — expansion and engraftment of haematopoietic and mesenchymal stem cells'.

Funded under the FP7 specific programme Cooperation under the theme Health.
http://cordis.europa.eu/marketplace > search > offers > 6280

Engaging genetics to the maximum

By cross-referencing novel genetic discoveries with lifestyle and environmental data, scientists may be onto something very important. The results could one day help develop new cures for diverse conditions.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This is an exciting time in human genetics and genomics. Novel disease-susceptibility genes are being identified through new technologies that look for disease associations across the whole genome. However, individual studies to detect important genetic variants are limited by many factors. To identify more genetic variations contributing to disease and uncover complex genetic interactions that also consider environment and lifestyle factors, a wider-scale epidemiological approach is required.

The EU-funded 'European network for genetic and genomic epidemiology' (Engage) project wants to achieve this through a massive database of genes from over 600 000 subjects. Genome-wide association data, which enable better comparison of genes, are available for over 100 000 of these subjects. This allows the project team to identify novel gene variants susceptible to disease that are undetectable in individual studies. Engage is evaluating the clinical and public health relevance of novel disease and trait-susceptibility genes, demonstrating that these findings can be used as diagnostic and prognostic indicators for common diseases. This helps reveal a better understanding of risk factors, disease

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progression and the differences in patient responses to treatment.

Engage, based at the University of Helsinki in Finland, has already worked with other projects in genetic studies, identifying key genetic information that influences a wide range of medically significant traits. These include obesity, serum glucose, lipid levels, blood pressure, smoking and nicotine dependence, vitamin D deficiency, lung function, birth weight, and type 2 diabetes.

Over the past year, Engage has developed a combined system of informatics, data access, data harmonisation and ethical practices for sharing genotype and phenotype data at the individual level. The data are currently supporting the project efforts in analysing more genetic information. Ongoing data harmonisation efforts that incorporate information on lifestyle and environment are enabling partners to explore the joint effects of genes and environment on important biomedical traits.

In total, the Engage team published more than 45 studies in the first half of the project. These include a number of project-led disease gene identification studies in high-profile journals, as well as coverage in the mainstream press.

Funded under the FP7 specific programme Cooperation under the theme Health.
http://cordis.europa.eu/marketplace > search > offers > 6325

Budding yeast to reveal the secrets of DNA repair

Budding yeast is being used to discover more about meiotic recombination — a common method of DNA repair in large complex organisms as well as microorganisms such as bacteria.

Meiosis is a special kind of cell division that helps sexually reproducing populations adapt and evolve. Meiotic recombination begins when programmed DNA double-strand breaks (DSBs) are set in action by the Spo11 protein. This is an enzyme that cuts the DNA molecule due to receive new genetic information.

Scientists know that DSB sites in the yeast *Saccharomyces cerevisiae* don't just randomly place themselves along chromosomes. They also know that certain genomic areas in the yeast are more likely to form DSBs than others. Histones also play a part in this process. These are the main protein components of chromatin found in cell nuclei of eukaryotes and are responsible for arranging DNA into its most basic structural form — the nucleosome.

The EU-funded EMRES (1) project aimed to discover how histone modifications are involved in choosing and activating sites where meiotic recombination is set off. All work was done using the model organism *S. cerevisiae* (budding yeast).

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EMRES researchers based at the Curie Institute in Paris constructed a number of deletion mutants in order to block genes coding for histone-modifying enzymes. Meiosis was followed and extensively described from the meiotic s phase, DSB and crossover formation, and sporulation efficiency through to spore viability. The 'chip-on-chip' technique, used to measure binding sites for proteins, was used for genome-wide distribution of H3K56ac. This marker is vital for the proper assembly of nucleosomes and maintaining genome stability during DNA replication. This mapping showed a random distribution process of the H3K56ac histone mark, and no correlation was found between the sites of meiotic DSB formation and H3K56ac.

Having changed the original experimental strategy due to early study results, project partners developed a new, more adaptable means of examining histone modification during meiosis — a plasmid shuffling-based screen. After testing the screen, EMRES concluded that mutations of histone H3K4R and H3K4Q markers reiterate the effect of set 1 deletion, which increases the capabilities of mutants following DNA damage. Following this, the research team was able to proceed with testing all the established histone mutants on the process of meiotic recombination.

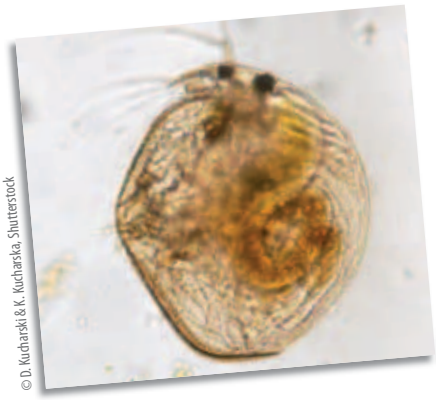
(1) 'Establishing the meiotic recombination-initiation epigenetic code in the yeast *Saccharomyces cerevisiae*'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6356

New techniques for studying marine food chains

Biologists need to know how plankton responds to climate change, pollution and toxins in the marine environment. This information can provide scientists with a greater understanding of the role of plankton as food for commercially important species higher up the food chain.

European researchers have used large artificial enclosures of water, known as mesocosms, to carry out studies on marine plankton. Mesocosms enable large-scale experiments to be conducted in conditions that resemble the natural environment. Because of their cost and complexity these facilities have only been developed in a few sites around the world.



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The EU-funded Mesoaqua ([1]) project has established an international mesocosm network, providing scientists with access to a range of environments, from the Arctic to the Mediterranean. Project partners have achieved a world first by using mesocosm-based experiments to investigate the combined effect of increased temperature and carbon dioxide (CO_2) levels on marine plankton.

When CO_2 dissolves in seawater it forms carbonic acid, as a result increasing levels of CO_2 are causing the oceans to become more acidic. The Mesoaqua consortium, based at the University of Bergen in Norway, has studied the effect of increasing acidity on an important, but little studied group of plankton called *Appendicularia*. Researchers have found that *Appendicularia* are much less negatively affected by increasing levels of acidity than crustaceans, which are the current dominant zooplankton.

Data collected by the Mesoaqua initiative will give scientists a clearer understanding of climate change and ocean acidification on marine food chains. This information will increase the level of knowledge about populations of important fish food species.

(1) 'Network of leading mesocosm facilities to advance the studies of future aquatic ecosystems from the Arctic to the Mediterranean'.

Funded under the FP7 specific programme Capacities under the theme Infrastructures.
http://cordis.europa.eu/marketplace > search > offers > 6350

Cryogenics gets the nod in structural biology studies

Large protein complexes such as the 26S proteasome have been widely studied. Their two major components are the core particle and the regulatory particle. European researchers are keen to learn much more about these subunits.

The 26S proteasome is a large mass of molecules made up of some 35 subunits. While the proteolytic core particle (CP) has been extensively researched, there is a lack of knowledge about the regulatory particle (RP).

The EU-funded 26S Proteasome ([1]) set out to study the makeup of the RP's subunits. To do this, researchers used various techniques to label subunits, and map their position within the 26S proteasome by single particle 'Cryo-electron microscopy' (CEM). This is a powerful way of studying the complex's three-dimensional organisation. However, the resolution is still inadequate to fully outline and assign RP subunits.

During the first phase of the project, based at the Max Planck Society in Munich, three chromatographic steps were used to purify the 26S proteasome ahead of antibody labelling. One CP subunit and five RP subunits were successfully labelled. In the second phase, the 26S Proteasome project focused on localising the Rpn10 subunit, for which a new purification and labelling method had to be developed. The particular method provides means for one-step affinity purification, and the proteasomes are labelled with the help of the specific interaction partner.

Project members used biochemical techniques to analyse the structural integrity, proteolytic activity and subunit reactions of the affinity-isolated and labelled proteasomes, which were then used to perform single particle CEM analysis. This gave researchers the means of mapping the attachment site of the nuclear-enriched protein Dsk2 on the 26S proteasome complexes and ultimately localising the Rpn10 subunit.

(1) 'Subunit localisation of the Drosophila 26S proteasome by means of 3D cryo electron microscopy'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6355

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Think consumption varies between petrol grades? Think again...

Researchers in Finland have discovered that no difference exists between the commercial petrol grades 95E10 and 98E5 with respect to consumption of fuel during normal driving conditions. The study was funded in part by the EU-funded Transeco (1) initiative.

Scientists at the VTT Technical Research Centre of Finland conducted driving tests at the Otaniemi Neste Oil service station in Espoo using six used cars of various makes under laboratory conditions. The model years of the cars were between 1999 and 2010 and, based on their manufacturers' recommendations, compatible with E10-fuel. The Finnish Customs Laboratory set the ethanol contents of the fuel batches to make sure that ethanol contents complied with the specifications outlined in the study. The findings showed 4.7% for the E5-grade and 9.4% for the E10-grade.

The VTT team says the majority of people think that fuel consumption is much higher with 95E10 petrol compared to its forerunner 95E or the 98E5 petrol that is currently available to consumers.

'The point of this study was to highlight how fuel consumption should actually be measured to give comparable results,' says VTT principle scientist Juhani Laurikko. 'Measuring fuel consumption very accurately is not as simple as it seems, because other factors affect consumption besides the fuel itself. In laboratory conditions, we can eliminate these other factors.'

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Based on their calculations, the VTT has found that the cars tested used an average of 10.30 litres of 95E10 per 100 kilometres (km), against 10.23 litres of 98E5 per 100 km. The team says the 0.07 difference favours the 98E5 on average. So using 95E10 petrol actually boosts consumption by 0.7% because it has higher ethanol content.

After normalising measurement results of each single test run with observed slight scatter in actual work done over the driving cycle, the researchers found a 1.0% higher overall difference.

They also found that the calorific values based on approximate fuel composition were 1.1% in favour of E5, being consistent with the 1.0% difference in consumption. The researchers contend that the calorific value of the fuel — the energy content per unit of volume or mass — plays a key role for fuel consumption.

The Transeco research programme targets increasing road traffic energy use, developing technologies that reduce emissions, and bringing the results of the development work to market. The project received EUR 3 million under the ERA-NET Transport II Scheme of the EU's Seventh Framework Programme (FP7).

(1) 'Transeco-tutkimusohjelman.'

Promoted through the Research Information Centre.
http://ec.europa.eu/research/infocentre > search > 21893

Car fuel cells to enjoy longer life

The lifetime of automotive fuel cells will be extended thanks to research on the role that liquid water plays in the degradation processes of fuel cells.

It is well known that liquid water plays a crucial role in the degradation processes of fuel cells; however, scientists want to better understand this action in order to find ways of improving fuel cell performance and durability.

The EU-funded Decode (1) project examined degradation mechanisms in 'Polymer electrolyte membrane fuel cells' (PEFCs) under steady-state, cycling and start-up and shut-down conditions.

Certain information can only be derived from a specific model configuration and so the researchers created the necessary scenario. But, in general, components were tested as they age naturally, i.e. over a long-term period of operation under realistic and technical conditions.

Using these methods, the researchers examined a variety of components in the fuel cells including the electrodes, membranes, diffusion media and bipolar stacks.

According to Decode researchers, 'a special strength of the project is the large modelling activity.' They believe that this will considerably further our understanding of the processes leading to degradation, as well as 'deliver the tools to describe ageing and performance degradation' of PEFCs.

Decode was based at Germany's Space Agency, DLR.

(1) 'Understanding of degradation mechanisms to improve components and design of PEFC'.

Funded under the FP7 specific programme Capacities under the theme Energy.
http://cordis.europa.eu/marketplace > search > offers > 6395

Robust energy scenarios to guide EU policies

Quantitative and analytical tools are being used to devise robust scenarios for the evolution of energy technologies over the next 50 years.

Climate change, declining stocks of fossil fuels and political instability all threaten energy security in the EU. Scientists are therefore attempting to draw up clear energy scenarios for the next 50 years to help policy-makers develop the best environmental and energy policies, through the EU-funded Planets ([1]) project.

Researchers will use quantitative and analytical tools to predict the best technological hedging policy in response to future environmental and energy policies, while technological assessments will provide the necessary guidance on technology availability and competitiveness. Given the long-term nature of the analysis and the many uncertainties surrounding the natural, technological and socioeconomic determinants, the scenarios were accompanied by probabilistic modelling analysis.

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The Planets project examined how all environmental and energy factors at a European and global level can influence the deployment of new technologies with respect to a business-as-usual scenario. This project also analysed the links between European and world perspectives of energy technology futures and forecasts, in particular in terms of issues like economic competitiveness and the capacity to export clean technology, including carbon capture and storage.

Planets was based at the Fondazione Eni Enrico Mattei in Milan, Italy.

(1) 'Probabilistic long-term assessment of new energy technology scenarios.'

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

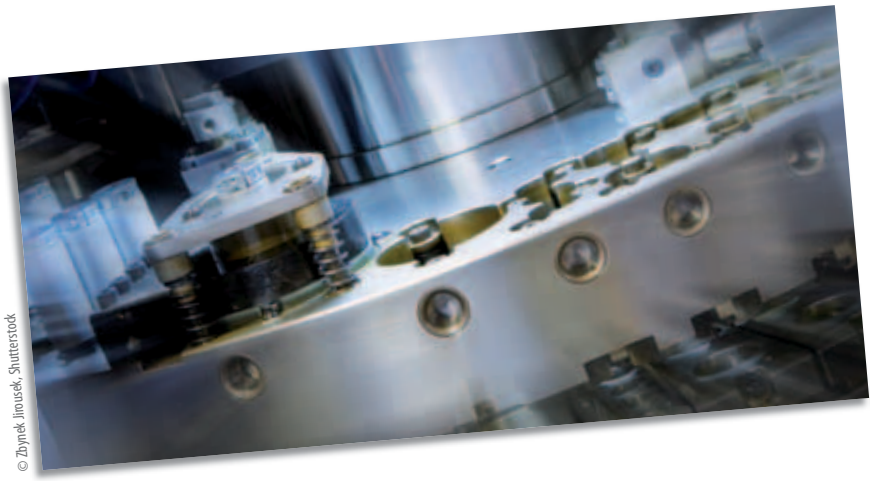
http://cordis.europa.eu/marketplace > search > offers > 6423

Thermoacoustic energy to become affordable

Researchers in the Netherlands are investigating how advances in science and technology can make thermoacoustic energy economically attractive.

Thermoacoustics is concerned with the thermodynamic conversion between heat and intense sound in the presence of a solid boundary. While its working principles are complex, the technology offers huge advantages over other systems as it lacks moving parts, uses environmentally-friendly working media and only ordinary materials. Researchers believe therefore that the development of thermoacoustic systems will lead to energy and cost savings and economically attractive renewable energy options.

The EU-funded Thatea ([1]) project is exploring different conversion processes involved in thermoacoustic systems and the potential they have for energy applications. It is, for example, assessing the feasibility of thermoacoustic applications to achieve various conversion efficiencies.



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The scientists are also investigating the integrated systems that couple the separate components, resulting in high overall system efficiency. Research is being carried out on thermoacoustic engines, on heat pumps, on resonators, on thermoacoustic heat exchangers, on regenerator material, and on non-linear phenomena occurring in these systems.

In addition to making the technology more efficient and subsequently more affordable, the research team hopes the project, once complete, will place the EU in a stronger competitive position in this field vis-à-vis the US, China and Japan.

(1) 'Thermoacoustic technology for energy applications.'

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

http://cordis.europa.eu/marketplace > search > offers > 6348

New low-cost photovoltaic technology

Dye-sensitised solar cells are to be granted a longer lifetime and made more efficient thanks to improved materials and manufacturing procedures.

The future of photovoltaic technology looks bright as EU-funded researchers develop new materials and manufacturing procedures for dye-sensitised solar cells with longer lifetimes and modules that are more efficient than current models.

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They believe that these improvements will result in the demonstration of a new scalable low-cost photovoltaic technology. 'It will therefore form the basis of a potentially substantial business opportunity aiming at developing a new solar cell product with cost and payback characteristics strongly advantaged over existing technologies,' claim the scientists. They hope to 'benefit the entire European community in creating economically accessible solar energy technology and significant industrial activity.'

The EU-funded Robust DSC ([1]) project focused on the development of large-area, robust, 7 %-efficient DSC modules using scalable, reproducible and commercially viable fabrication procedures. In parallel, the project scientists, based at the Energy Research Centre of the Netherlands, also used more fundamental research and new materials and device configurations to try to increase the efficiency of lab-scale DSCs to 14 %.

(1) 'Efficient and robust dye sensitised solar cells and modules'.

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

http://cordis.europa.eu/marketplace > search > offers > 6308

Small-molecule solar cell boosts power efficiency

Researchers in Germany are aiming to create a solar cell device based on small molecules to improve the efficiency of organic microelectronic devices.

Scientists have made the first steps towards improving the efficiency of organic microelectronic devices by gaining a better understanding of the role of structure in solar cell efficiency, and of how to control that structure to produce a device with improved efficiency.

Under the aegis of the EU-funded LIFORGANICPV ([1]) project, the researchers set out to produce a solar cell device based on small molecules for which the impact of the interfacial ordering can be understood and the efficiency modified by changes to that ordering. They wanted to achieve this by establishing the structure of lithium fluoride (LiF) on the surface of an ordered organic thin film and by exploring the impact LiF deposition on the order of the underlying organic molecule, before relating any changes in structure near the interface to the performance of the device.

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The scientists said that over the course of the project, they managed to 'produce a workhorse device structure, modify the interfacial structure and control the device performance gaining insights into how engineering of those interfaces can be used in the next generation photovoltaic devices.'

(1) 'Investigation of interfacial structure of buried inorganic-organic interfaces in organic photovoltaics — LiF at organic-cathode interface'.

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

http://cordis.europa.eu/marketplace > search > offers > 6361

SMEs check composites used for transport

Testing and repairing advanced composite materials provides significant opportunities for Europe's small and medium-sized enterprises. The EU-funded Compair (1) project has provided valuable support to companies that monitor surface transport made from these new products.

Use of advanced composite materials in the transport sector has increased over the last two decades, including a growing number of critical safety parts. Advanced composites have the advantage of being both strong and light, resulting in a weight saving of nearly 20 %. They also have the potential to replace an even greater proportion of traditional materials.

Composites include advanced carbon-fibre reinforced polymers, which can experience certain defects that differ from those suffered by more conventional materials such as aluminium and steel. Therefore the normal non-destructive testing (NDT) inspection techniques used for finding defects in traditional materials are not suitable for use with advanced composites.

Compair project supports small and medium-sized enterprises (SMEs) that provide monitoring services of composite materials for manufacturers of high speed surface transport. This is a field that enjoys enormous potential for growth and includes research organisations that can supply research and development services to SMEs on a sub-contract basis.

Compair has developed new approaches for the continuous monitoring and NDT of composites used in surface transport. The project has divided the composites into road, rail, and marine categories. The initiative has identified the composite structures to be examined and drawn up inspection requirements. Samples have been produced with built-in defects to represent potential defects.

Researchers have also applied computer models to investigate the use of a range of cutting-edge technologies for studying composite structures. A system is being developed for sending and receiving electrical signals to and from transducers connected to components. This transfer of data will be controlled by an operator employing user friendly software.

Increased use of advanced composite materials in surface transport will provide considerable weight reductions resulting in corresponding savings in fuel. This will help keep down transport costs and increase sustainability. Success of the Compair project will also enable European SMEs to compete more effectively in the field of composite material testing and repair.

Compair is based at TWI Limited in Cambridge, United Kingdom.

(1) 'Continuous health monitoring and non-destructive assessment of composites and composite repairs on surface transport applications'.

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

http://cordis.europa.eu/marketplace > search > offers > 6438

Have a safe trip!

New sensor technologies, tailor-made software and advanced safety simulations are yielding much more robust and comprehensive solutions for vehicle safety.

When dealing with safety and security design, there is no such thing as too much information: it adds up to offer a better built, safety-enhancing system overall. This especially applies to safety in land transport, where novel technologies and innovative concepts can play an important role. The EU-funded Asset-road (1) project is developing a highly advanced road-safety system that supports the driver or operator of a vehicle. It is testing and implementing a holistic approach to improve safety and efficiency by considering driver, vehicle, traffic, infrastructure, environment and regulation.

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The project is focusing on accident prevention through improved driver awareness and early warning procedures in case of incidents and hazards. It is also enabling cleaner and more fluent traffic in parallel. Asset-road's aims are being achieved through enhanced integration and cooperation between relevant parties in traffic safety, as well as implementation of a system based on machine-to-machine communication. Emphasis is being placed on new sensor combinations that perform vehicle tracking by video and monitor vehicle weight during movement, vehicle position on lane and vehicle/wheel condition.

The project has worked on sensor data synthesis from all these sources, as well as advanced communication and monitoring technology. The first system prototypes of combined 'Weigh in motion' (WIM), road condition monitoring, satellite navigation, driver behaviour analysis, tracking system and regulation knowledge base technology have emerged. Seat belt compliance detection, a more versatile WIM sensor with integrated radio technology and an improved driver behaviour system are also under development.

Asset-road also analysed driver compliance with road regulations and safe driving practices in different EU countries. It then designed and tested a smart in-vehicle information system (LISA). Integration of prototype software is in progress. In the meantime, work on load flow and road impact analyses has been undertaken, and major progress was achieved in considering both infrastructure durability, and road and safety conditions.

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Software for intelligent interactive services, including geographical data, was then developed and tested. In-vehicle software for vehicle-to-infrastructure and vehicle-to-vehicle (V2I/V2V) communication has also been implemented and tested. This allows vehicles to communicate with others automatically in dangerous situations (e.g. assessing proximity) as well as with road infrastructure (e.g. road works and hazardous spots).

Special test sites for all these simulations and prototypes have been established. The analysis of different processes and interdependencies identifies critical parameters that influence safety. These developed technical solutions for sensor system hardware, software and wireless communication encourage the European industry to further develop competence in these fields. The project is therefore beneficial not only the safety of citizens but also to European industry and the environment.

Asset-road is based at PTV in Karlsruhe, Germany.

(1) 'Asset advanced safety and driver support in essential road transport'.

Funded under the FP7 specific programme Cooperation under the theme Transport.
http://cordis.europa.eu/marketplace > search > offers > 6322

Public participation in greener urban transport

Citizen involvement in sustainable transport issues lies at the heart of a European project which has raised awareness of research and policies for improving mobility in urban areas.

The initiative has enabled transport to become more sustainable through public participation, allowing the views of people in the street to be heard by decision makers. The EU-funded Move Together ([1]) project has predicted the impact of EU research programmes on daily life by consulting a panel of European citizens. It has also shown how individual choices can positively influence urban mobility and quality of life. In addition the initiative has encouraged greater public support and participation in planning measures and the implementation of EU research and sustainable transport policies in Europe's cities.

Project partners from Belgium, Germany, France, Italy and Austria have worked with two groups of citizens. The first comprised an international focus group of 27 individuals randomly chosen from each EU country, who participated in two workshops and the Move Together conference launch. The second group involved 24 citizens randomly selected from each area of the Rome metropolitan area who took part in two workshops and a local Move Together conference.

Involvement with the two groups has resulted in two Move Together citizens declarations at the EU and the local level. The declarations include a series of messages highlighting citizens' understanding of EU research on urban transport and its impact on their day-to-day lives. These experiences have been communicated to the wider public through a travelling exhibition that has visited Brussels, Budapest, Nice, Roma and Vienna.

A final conference has been organised and a poster exhibition that has appeared across Europe. The conference

has included EU policy-makers and stakeholders, representatives of the cities hosting Move Together exhibitions and members of the citizens' panels.

The project has successfully facilitated public participation in the planning and implementation of urban sustainable transport research. The result has been a positive impact on the quality of life of EU citizens.

(1) 'Raising citizen awareness and appreciation of EU research on sustainable transport in the urban environment.'

Funded under the FP7 specific programme Cooperation under the theme Transport.
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All systems go for EU aviation project

A sophisticated European initiative has launched what could be the world's largest consortium for developing and testing multiple aircraft systems.

An aircraft is a complex system involving hundreds of independent and co-dependent subsystems that must run seamlessly every time to ensure a safe and secure ride. It could take years to build and test, especially if a new prototype is involved.

Strong competition, market demands, more advanced products with shorter lead times and increasing cost constraints mean that time and money in manufacturing aircraft are of the essence. Testing and simulation are particularly important research and development activities, as they make certain that comfort, reliability and safety have been rigorously tested before an aircraft is released.

In tackling this challenge on a grand scale, the EU-funded Crescendo ([1]) project is bringing together 59 partners under one large consortium to undertake all the modelling and simulation capabilities and services related to aircraft. This will allow for improved functional, behavioural and operational aspects of an aircraft and its subsystems.

The Crescendo partners are developing an operational concept known as 'Mastered behavioural digital aircraft' (MBDA). The work plan involves proof of concept in the first year of the project, building a prototype in the second year and validating the results in the third year.

Progress has been very promising with much of the project's mandate having already been achieved. For example, the technical scope of all test cases under Crescendo has been defined and agreed upon. Detailed simulation processes have also been outlined, as have the lifecycle phases of most other processes. All the gathered information is being linked to expected benefits and high-level objectives.

Specific model developments to support the test cases are also currently in progress. In the meantime, the first requirements and functional analyses have been completed for vital facilities and services such as the model store, simulation factory, quality lab and enterprise collaboration.

The project is strongly focusing on the development of the 'Behavioural digital aircraft' (BDA) system for total examination of the function and operation of aircraft and related systems. It moves beyond modelling and simulating parts to simulating the complete aircraft and its behaviour. The BDA system is already in the implementation phase and should be realised shortly.

This aircraft consortium is linking Europe to important partners in Asia and the US. The resulting BDA system and emerging results will testify to this success.

(1) 'Collaborative and robust engineering using simulation capability enabling next design optimisation'.

Funded under the FP7 specific programme Cooperation under the theme Transport.
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Safe transport on both sides of the Mediterranean

Enhancing safety and security in transport systems and infrastructure in the Mediterranean region has been the focus of the EU-funded Esteem ([1]) project.

Links between North African Mediterranean partner countries (MPCs) and southern Europe have been strengthened through the identification of common research themes at the regional level. The coordination of different Mediterranean organisations has been achieved thanks to an ad-hoc network that will ensure the project's lasting impact in the region.

Esteem has successfully identified the sub-areas to be investigated, including road safety management, human factors in road safety, use of information systems and infrastructure design. Researchers compared the situation of the four sub-areas in European countries with the MPCs in order to understand what security measures should be adopted for the transport field.

Stakeholder consultation has enabled better understanding of how current challenges can be overcome and which aspects of European best practice should be applied to the MPCs. Findings by project partners have been used to draw up road maps for future research. Project events have been supported by networking and dissemination activities to ensure the initiative has a lasting impact in the region.

A secretariat for the Esteem project has also been created and together with its website can be used to disseminate results from surveys and workshops. Other dissemination tools have been developed such as a project leaflet, logo, newsletters and calls for papers.

The Esteem project has contributed to future research road maps for both the FP7 'Transport programme' and MPC governments, and will help coordinate high-quality research and transport policies. The initiative will therefore provide major benefits for citizens of countries on either side of the Mediterranean.

Esteem project partners were based in Algeria, France, Morocco, Spain and Tunisia.

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(1) 'Enhancing safety and security aspects in transport research in the EuroMediterranean region'.

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

http://cordis.europa.eu/marketplace > search > offers > 6354

On the road to highway recycling

Road building materials and road-related waste can be reused to construct new, more sustainable highways. This is the vision of an EU-funded initiative aiming to share, at the European level, national experience on dismantling roads and recycling materials.

The EU-funded Direct_mat ([1]) project objectives have been achieved thanks to the development of a European database for compiling and displaying existing research and data and the drawing up of best practice guides. The guides include advice for the dismantling, recycling and safe disposal of asphalt road materials taken from the benchmarking of national practices.

Information is also available for other materials related to road use, including tyre shreds, industrial by-products and reinforcement materials. Project partners have created guidelines for ensuring that the information stored on the database is updated. The database can provide quick and easy online access to validated guidelines, national document references, literature reviews and practical case studies.

Particular care has been taken by the Direct_mat consortium to reach end users at the national level. Theory and practice have been closely connected through cooperation with stakeholders, the publication of articles in national journals and presentations at national seminars. A European workshop has also been planned for the near future.

Direct_mat will benefit end users such as road authorities, regulators and standardisation authorities as well as those involved in the design and building of roads and developing and supplying materials. The database will enable better identification of outstanding research needs in the area of recycling road waste, resulting in more sustainable highways.

(1) 'Dismantling and recycling techniques for road materials — sharing knowledge and practices'.

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

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Study finds creatures not adapting to environmental changes in Antarctic

Organisms found in the Antarctic region are not quick to adapt to changes in the environment, new international research shows. The study, carried out by 200 scientists from 15 countries, is the culmination of a seven month expedition on board the Polarstern vessel of the Alfred Wegener Institute (AWI) for Polar and Marine Research in the German-based Helmholtz Association.

The Polarstern research vessels returned to the Bremerhaven port in late May 2011. During their journey, the researchers measured the temperature of the Weddell Sea, discovering that while the warming of the deep water continues, the organisms found undersea are not adapting quickly to these changes.

Polar researchers from Germany favour in particular the Weddell Sea as locations for their studies. Oceanographers, for example, use sophisticated sensors, along with a network of moorings and floats, to measure temperature, sea ice thickness and salt concentration. They use floats and satellites to transmit their information. Extending their network of measurement was one of the objectives of this latest expedition, led by Dr Eberhard Fahrbach from AWI's Climate Sciences/Observational Oceanography Division.

'An initial evaluation of the measurement data shows that the temperature down to great depths of the Weddell Sea continues to rise,' explains Dr Fahrbach, who was in Antarctica on the Polarstern from November 2010 to February 2011.

Both measurements made on the ship and information generated by the moorings were collected within the framework of international observation programmes. The data help bolster our understanding of the role of the Atlantic sector of the Southern Ocean in large-scale events of importance to the climate, according to the researchers.

Temperature and salt concentration distribution in the deep area of the Weddell Sea are influenced by cold, saline water sinks (thermohaline circulation). So changes in the properties of these cold water masses in the Antarctic will have global impacts, the researchers say.

They point out that the rise in bottom water temperature can be detected over large sections of the ocean north of the Atlantic. The temperature in the Weddell Sea, says Dr Fahrbach, has increased by six hundredths of a degree on average across the entire water column in just a little over a quarter of a century.

'This temperature rise seems small,' says Dr Fahrbach, 'but because it extends down to great depths, it entails a considerable heat volume that is stored in the ocean. This contributes to the fact that the atmosphere heats up less than expected as a result of the increase in the greenhouse effect. According to the World Climate Report (IPCC), more than 80 % of the heat that Earth has additionally absorbed thus far due to the altered greenhouse effect is stored in the upper ocean layers down to a depth of 1 500 metres. Now we have been able to show that the deep ocean with its enormous volume is also involved in this process.'

Scientists from the Change in Antarctic Marine Biota study investigated which species can adjust to climate change quickly. AWI's Dr Rainer Knust and colleagues probed sites near the coast in the western and eastern Weddell Sea. They discovered that some organisms cope better with altered conditions than others because of their physiological features. The researchers say these species adapted to their environmental conditions in the course of evolution, and species from the high Antarctic adapted 'optimally to very low.'

Promoted through the Research Information Centre.
http://ec.europa.eu/research/infocentre > search > 21733

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Transgenesis can help plants protect against stress

In times of changing climate and water shortages worldwide, it is important to find ways of helping crops survive. This can be done by altering growth and behavioural processes in the plants themselves.

Arabidopsis UGT74E2 is an indole-3-butyric acid (IBA)-glycosyltransferase found in the plant's root expansion zone and the margins of leaf base and petioles. IBA is a plant hormone or auxin, which has a crucial role in coordinating many growth and behavioural processes in the plant lifecycle.

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UGT74E2 can be easily transcripted by introducing various biotic and abiotic stress conditions. Being able to do this and so increasing the production of UGT74E2 can achieve changes in IBA homeostasis and the plant structure. This opens the way for adapting to adverse environmental conditions such as water stress.

The EU-funded Redoxhormone ([1]) project investigated ways in which plant growth processes can be manipulated to improve their tolerance to drought or water stress. Work was done to demonstrate various processes that succeed in modifying plant make-up and reactions to environmental stressors.

In the process, it was revealed that IBA and IBA-glucose are important regulators of morphological and physiological stress adaptation mechanisms. Main results show that UGT74E2 over-expression can alter auxin homeostasis and enable transgenic plants to survive extended periods of drought and high salt content. Just as important, the project was able to show that auxins may be able to help safeguard the photosynthesis process when plants are subject to water stress.

These and other Redoxhormone project results are positive markers in the search for new means of protecting crops, dealing with water stress and improving the yields of cultivated crops. This is a definite plus on the road towards a more sustainable society and the use of food and non-food applications for renewable resources and increased biomass production.

(1) 'Linking redox and hormonal signalling in *Arabidopsis* plants with altered levels of a stress-inducible glycosyltransferase'.

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

http://cordis.europa.eu/marketplace > search > offers > 6342

Putting a price on wetland ecosystem services

Research covering three continents aspires to improve the management of wetlands with a focus on sustainability. Guidance on how to apply the decision-support framework developed during the EU-funded Wetwin ([1]) project will be made available.

Wetlands are complex ecosystems that provide a number of valuable services such as water purification, flood protection and biodiversity preservation. A wide range of stakeholders, often with conflicting demands, makes sustainable management of these resources a difficult task.

Wetwin aimed to find a way to resolve this challenge. The primary deliverable of the project was a decision-support tool.

Stakeholders from the African, European and South American test sites were given the opportunity to make their desires known at dedicated workshops. The 'Driver, pressure, state, impact, response' (DPSIR) methodology was then applied to rank the demands related to livelihood and environment in order of importance.

The next step involved evaluating the effectiveness of different management solutions in achieving the stakeholders' objectives. This was accomplished by

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examining the response of several scientific, economic and social indicators to changes in land use and other types of intervention.

An assessment of the vulnerability of these sites has also been performed during Wetwin. Future scenarios incorporate elements of global forecasts of changes in climate, population and other key parameters. Models are also expected to play an important role in identifying the management strategies that achieve the optimal compromise between the often conflicting demands on the wetlands.

To facilitate sustainable management not only of the study sites, but of wetlands worldwide, comprehensive guidelines are to be written up at the conclusion of Wetwin and accompanied by training sessions.

(1) 'Enhancing the role of wetlands in integrated water resources management for twinned river basins in EU, Africa and South-America in support of EU Water Initiatives.'

Funded under the FP7 specific programme Cooperation under the theme Environment.
http://cordis.europa.eu/marketplace > search > offers > 6296

Clusters provide economic benefits for wood sector

Economic potential in Romania can be boosted with the help of the EU-funded Pro-wood ([1]) project for developing cluster initiatives in the local wood industry.

A fact-finding analysis was conducted at the beginning of Pro-wood to determine the needs of the wood sector in the Brasov-Covasna area in Romania. Findings revealed insufficient cooperation between research and business, and a minimal company presence online.

Additional problems included a need for qualified marketing staff, poor collaboration between education institutions and business, and no suitable vocational training. There was also a lack of awareness of the benefits to be gained from research activities.

The Pro-wood project addressed these challenges by involving experts and local stakeholders. Partners visited schools to talk about their work and a competition was organised to raise pupils' awareness of employment opportunities within the wood industry.

Training seminars on e-commerce and marketing have been conducted for consortium members and the sharing of machinery know-how has been organised in the region. A workshop on 'Increasing the efficiency and performance of woodworking companies' has also been held.

Furthermore, project partners have developed a vision for acknowledged wood clusters that includes objectives and measurable results. A framework for improving online services has also been created.

Pro-wood has brought together existing elements to strengthen stakeholder collaboration in the wood sector. It has successfully raised awareness of the concept of cooperation and the benefits it can bring. The initiative can be regarded as a model project for Romania's national cluster policy.

Pro-wood involved organisations based in France, Romania and Finland.

(1) 'Promoting and linking wood industry and research in Romanian regions using good practice from acknowledged wood clusters in the EU'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.
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Research gets a bigger, better 'playground'

Enhancing research facilities and resources, as well as linking with important non-EU countries, is strengthening the network of European research infrastructures.

Europe is always keen on encouraging research in academic and industrial environments, a stance that gives the continent a competitive edge over many parts of the world. One way of accomplishing this is to enhance European research infrastructures (RIs). This includes the facilities and resources that provide the scientific community essential services needed for quality research in an academic and/or industrial environment.

Funded by the EU, the Euroris-net ([1]) project is implementing a research infrastructures programme and promoting RIs to enhance European research, competitiveness and growth. It is improving the effectiveness of National Contact Points (NCPs), a network of specialists in different countries who assist with RIs. This is being achieved by upgrading cross-border cooperation, resulting in more consistent services for customers across Europe.

The project wants to ensure that RIs are open to researchers, the scientific community and industry, covering all scientific and technological fields. This is why its 35 partners hail from both within and beyond the EU, including Canada, Russia, and South Africa.

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Substantial progress has been made in implementing an operational NCP network for research infrastructures, which is now fully operational. The project has already developed an advanced interactive human network of NCPs for the research infrastructures programme that fulfils the project's objectives, supported by new tools and good practices. At the same time it is continuously promoting the visibility and efficacy of the RI programme. In addition, joint visits, training sessions and the extensive usage of the project's virtual help desk contribute to its progress. All RI stakeholders have been receiving accurate, reliable support, as well as up-to-date information on the RI programme.

In summary, research infrastructures are important for strengthening the knowledge base of scientific communities and the technological know-how of the industrial sector across Europe.

(1) 'European research infrastructures network of National Contact Points'.

Funded under the FP7 specific programme Capacities under the theme Infrastructures.
http://cordis.europa.eu/marketplace > search > offers > 6327

Enriching European humanities

Two new humanities-related themes under the European Research Area will probe cultural dynamics and creativity through a myriad of projects in a cross-European context.

The humanities are a complex set of academic disciplines that include language, literature, philosophy, religion and history. Critical and/or speculative approaches are used in humanities research.

While the EU is keen on scientific research and technology, it is also interested in advancing the humanities in different ways. The EU's Joint Research Programme on Humanities in the European Research Area (HERA JRP) recently established two themes that help further humanities across Europe. One of these is 'cultural dynamics: inheritance and identity,' and the other is 'humanities as a source of creativity and innovation.'

The two themes are set to address major social, cultural, and political challenges facing the continent. HERA JRP is bringing together 13 national funding organisations to create collaborative research opportunities across the EU. Partners from different EU nations developed common research priorities, created a national funding mechanism and pooled much of their funding together.

Projects under these themes were then opened to scholars in Austria, Croatia, Denmark, Estonia, Finland, Iceland, Ireland, Luxembourg, Netherlands, Norway, Slovenia, Sweden and the UK, regardless of their nationality. To apply for project funding (a total of EUR 16.5 million) under these grants, interested scholars and researchers formed consortia with members from three different HERA JRP countries.

These project proposals were evaluated by two international, independent HERA JRP review panels. A high number of proposals was submitted

for the two humanities fields, and the budget was eventually awarded to the 19 most successful proposals. The two theme-specific launch conferences took place in Vienna in June 2010.

In parallel, the HERA JRP formulated a knowledge-transfer strategy which aims at increasing awareness of the impact of funded research beyond academia. Already, knowledge transfer and networking are bringing together academic and non-academic partners from more than one HERA JRP project, extending the study of humanities to different sectors. Thought-provoking results as well as different approaches to subjects like philosophy, history, sociology, law and politics will enrich Europe.

Funded under the FP7 programme Coordination under the theme 'Support for the coordination of research activities'.
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EU gets creative to attract science and tech students

National science contests across Europe aim to attract young students to explore related career and training prospects. A single EU contest brings them all together.

The European Union Contest for Young Scientists (EUCYS) was part of the 'Science in society' programme initiated by the European Commission's Directorate-General for Research. With the goal of promoting cooperation and interchange among promising young scientists, this contest gave EU students the chance to mix with others sharing similar interests and to meet some of Europe's leading scientists. The overall aim was to strengthen efforts being made by participating countries to attract its youth to careers in science and technology.


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The EU-funded EUCYS2009 (1) project was coordinated by the Commissariat à l'Energie Atomique (CEA) and co-organised by the French National Education Ministry via Sciences à l'École, and by Centre National de la Recherche Scientifique, Palais de la découverte, and the C. Génial Foundation.

Activities concentrated on developing and enhancing a strong interest in natural and social sciences among young students across Europe. Efforts aimed to stimulate creative projects and encourage young European students to follow their interest in science and related career prospects. EUCYS2009 offered scientific prizes to send prize winners on week-long visits to some of Europe's leading scientific facilities. This was designed to pique the interest of young scientists in research at top institutes.

Ranging in age from 14 to 20, 129 graduates from 32 European and 6 guest countries took part in the contest. A total of 85 projects, ranked first in 2009 national contests in participating countries, covered biology, chemistry, computer sciences, earth sciences, engineering, environmental sciences, mathematics, physics, medical sciences and social sciences. After oral and written presentations of their work and interviews held during the 2009 Paris Exhibition, excellent scientific content and originality were celebrated with 30 prizes and special awards given to 25 projects, presented by 37 contestants from 19 countries.

(1) 'European Union contest for young scientists 2009'.

Funded under the FP7 specific programme Capacities under the theme Science in society.
http://cordis.europa.eu/marketplace > search > offers > 6273

Global networking to tackle global challenges

Through the EU-funded Bio Circle ([1]) project, European countries teamed together with other nations to overcome challenges in fields such as food, agriculture and biotechnology.

Europe has conceived its formidable research framework programmes in a way to further research and innovation across the continent. It has also validated the need to collaborate beyond its borders with countries that are not members of the EU on issues of global importance.

The project increased participation of researchers abroad in projects under the 'Food, agriculture, fisheries and biotechnology' (FAFB) theme of the EU's Seventh Framework Programme. Research under FAFB addresses complex global issues such as livestock diseases, pests in agriculture, and non-food challenges that can be tackled with biotechnology. These issues require collaboration of researchers from Africa, Australia, China and South America.

Bio Circle represents a network of National Contact Points (NCPs) for FAFB distributed in 18 third countries and six European countries. The NCPs facilitate the successful roll-out of the framework programme. They support the submission of projects with high potential impact, bring research closer to industry and SMEs, and promote initiatives locally with stakeholders. Through these NCPs, in this case referred to as BIO-NCPs, Bio Circle strengthened the participation of researchers from outside Europe for research projects under the FAFB theme.

Bio Circle oversaw extensive training for the 18 third country BIO-NCPs in Brussels. In addition, 12 BIO-NCPs abroad visited institutions of the European BIO-NCPs to learn more about their practices.

Subsequently, third country BIO-NCPs have prepared an overview of the most important research institutions in their country. The profiles of these institutions have been published on the Bio Circle website, facilitating partner searches. BIO-NCPs abroad have also outlined plans for training sessions, infodays and national roundtables to pinpoint joint research themes with the EU.

In October 2009, a large brokerage event and a European Infoday on FAFB were organised, attracting 176 participants from over 40 countries. Roundtables have taken place in several countries, including Egypt, Morocco and Tunisia.

In addition, project activities were promoted through the Bio Circle website, leaflets, newsletters, training events and links to other websites. An intranet system based on the project's site is helping to coordinate Bio Circle activities and advance its cause.

(1) 'Creating a circle by extending the BIO NCP network to third country NIPs'.

Funded under the FP7 programme Cooperation under the theme 'Knowledge based bio-economy.'
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Mirroring society's knowledge effectively

A better understanding of the relationship between science and society and how this affects different European research settings is vital for Europe to achieve its goal of becoming a more competitive knowledge-based society and economy. A European study investigated this matter further.

A group of researchers set out to help Europe achieve this ambitious undertaking, first discussed at the 2000 Lisbon meeting of European leaders. The EU-funded Mirrors ([1]) project coordinated and analysed the relationship between science, politics and society as seen in recent decades by philosophers, historians and sociologists.

The project brought together scholars and researchers from different countries to study the relationship between science and society in different national and international contexts. The team formulated recommendations for science policy based on their findings. It is also examined how the Lisbon Strategy encouraged a knowledge-based society as well as efforts at democratising decision processes concerning research and development.

The project identified an imbalance between science policy means and ends. The imbalance was found in promoting policy strategies that met the needs of the private industry sector more than those of society. The project found that the needs of private industry and general society were artificially balanced, as the system equates economic well-being with social well-being. This implies that economic well-being would be sufficient to achieve social well-being, which is not necessarily the case. Thus, the researchers stressed the need to adjust policy strategy so it addresses the needs of both private industry and civil society.

In other words, the project found that economic growth and competition can go hand in hand with promoting the interests of general society and the environment. This would help elaborate an epistemological approach that connects the needs of society with economic growth. The project's aim was achieved by devising a multicultural approach to support a policy of scientific innovation based on democratic choices, creativity and exploitation of talents.

Through this approach, the project helped promote trust in science, reinterpreting topics such as techno-scientific innovation, expertise, creativity, education reform and specialisation. It then formulated recommendations for regulating these areas by setting environmental sustainability as a strategic goal.

The project, based in Italy, took on more members from the general public and benefitted from their feedback as well. Mirrors project emerged with valuable recommendations embracing industrial, environmental, and social solutions based on sustainability.

(1) 'Monitoring ideas regarding research organisations and reasons in science'.

Funded under the FP7 specific programme Capacities under the theme Science in society.
http://cordis.europa.eu/marketplace > search > offers > 6353

Science for everyone, every day

Mixing science, culture and entertainment in a series of events is doing wonders to demystify a challenging subject and bring the public much closer to the intricacies of science.

It is important for society to attain an understanding of science in a practical way that can be applied to daily life. The Italian Emilia-Romagna region has been bridging the gap between science and citizen. The region was home to the EU-funded Edscience 09 ([1]) project and the researchers' night initiative in September 2009.

Several local universities, research centres and municipalities contributed to the initiative, which organised public events across the region over three days. It showed how researchers and their work are relevant to the everyday world we live in, and how this contributes to the improvement of citizens' daily life.

The researchers' night in Emilia-Romagna was held in Bologna and seven other towns in the area. The initiative featured experiments, demonstrations, exhibitions, guided visits, open laboratories, museums, science cafes, conferences, shows and even lives music events. Around 400 researchers participated in these public events, exchanging information with attendees in a setting that included testimonials, actors, dancers and musicians. Over 10 000 visitors attended.

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The initiative aimed to attract as many people as possible and was promoted through an elaborate awareness campaign that included, among others, a website and the social and traditional media (press events, article publications, researcher interviews, a radio campaign and TV ads). Schools, teachers and graduates were also targeted through different channels.

A questionnaire was made available before, during and after the multiple events, as well as through the project website, to collect feedback. Over 550 questionnaires were completed and processed. Results revealed that the three-day event was highly appreciated and that similar events would be welcomed. It improved researchers' public image through an understanding of their work and stimulated young people to consider embarking on scientific careers.

Similar events in other regions and beyond may increase the general public's appreciation of science and help the younger generation discover new horizons, ultimately having a positive socio-economic impact.

(1) 'Everyday science 2009. Researchers and research in everyday life'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6331

The green movement gets its own clothing line

Who would have thought that choosing which clothes to wear could help fight climate change? Yet new fibres being developed in Europe do just that and the outlook for the continent's historic textile industry is looking brighter and greener.

Many environmental problems arise from the excavation and consumption of fossil fuels. People associate factories, vehicles and other machinery with greenhouse gas emissions and climate change, but they not their clothes. Yet the way clothes are manufactured today places a significant burden on the environment.

The EU recently funded an effort to replace petroleum-based raw materials in the textile industry with environmentally friendly alternatives. The Italian-based project was called Bioagrotex ([1]).

The Bioagrotex team combined natural fibres with bio-based polymers and resins. The natural fibres were sourced from renewable agricultural products and derivatives such as jute, linseed, hemp and hop nettle. They discovered that the fibres' mechanical properties could be improved by treatment with a furan (an organic compound) bioresin. Dilution of the resin in water significantly reduced its toxicity and also helped decrease fabric stiffness.

When it came time to add a biopolymer, polylactic acid (PLA) delivered the best processability. This ensured that

the resulting agrotextile could easily be extruded into many different material formats.

Finally, with an eye to the product's entire lifecycle, the Bioagrotex scientists measured the biodegradability of the green fibres. They examined how the fibres decomposed after being buried in soil as well as how they responded to ultraviolet light. The prototypes, especially those that had been treated with the furan bioresin, exhibited excellent durability. These encouraging results warrant further effort to proceed to the manufacturing stage.

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(1) 'Development of new agrotextiles from renewable resources and with a tailored biodegradability'.

Funded under the FP7 specific programme Cooperation under the theme 'Nanoscience, nanotechnologies, materials and new production technologies.'
http://cordis.europa.eu/marketplace > search > offers > 6326

Science on air

Are European media and television making enough of an effort to educate society about science? One EU project examines the issue and makes recommendations on how best to achieve this.

As scientific research and innovation flourish in Europe, authorities are concerned that the gap between science and the general public is not being addressed. It is important for citizens to appreciate science and its contribution to society so that Europe's competitiveness and scientific literacy remain high.

The EU-funded AVSA project (1) looked into how science was being communicated through radio and television in Europe. The project was conducted under the wing of the communication of knowledge/science journalism division at Freie Universität Berlin.

It researched the factors that influence the dissemination of science programmes, examined segmentation of media markets, market forces and the tradition of science reporting. Special emphasis was placed on television, particularly public service television and broadcasting. The project found that broadcasting in Germany, Finland and Sweden are characterised by highly segmented markets, low market pressure on public service broadcasting and a strong tradition in science reporting. These countries' media encouraged a multicoloured picture of science.

Ireland and the United Kingdom aired less science content in the media though they are still doing comparatively well. More significantly, media in Bulgaria, Greece, Spain and Romania showed characteristics that decrease the probability of vibrant science programming considerably.

Overall, the project noted a lack of mechanisms for broadcasting innovative programmes on new scientific findings and attracting large audiences. In several countries (Bulgaria, Estonia, Greece, Spain and France), there is also an absence of programmes that render science more interesting and popular. There is a general lack of edutainment programmes, particularly in Bulgaria,

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Estonia and Greece, as well as of environmental advocacy programmes almost everywhere, except Spain.

Interestingly, there was not much difference in how people perceived science in different European countries, a fact which helps formulate a common platform to enhance science exposure. In light of these findings, AVSA has developed an action plan to facilitate public engagement in science. It recommends that authorities concerned with science broadcasting encourage public engagement by shifting their perspective from a largely science-centric view to more media-centric and audience-centric views.

This involves investigating constraints of media production more closely. It also requires a re-examination of the established expertise of broadcasting organisations and individual programme makers. The aim is to attract and sustain audience interest and consider audience needs. If these recommendations are adopted, a more scientifically educated general public will result, promoting an improved knowledge society in Europe.

AVSA included partners in Ireland, Greece, Romania and Finland.

(1) 'Audio visual science audiences. A comparative study'.

Funded under the FP7 specific programme Capacities under the theme Science in society.
http://cordis.europa.eu/marketplace > search > offers > 6328

Dynamics of quantum gravity theories examined

Scientists have in recent years gained a solid understanding of the kinematical structures provided by candidate theories of quantum gravity. Researchers are now striving to understand the dynamics of these theories.

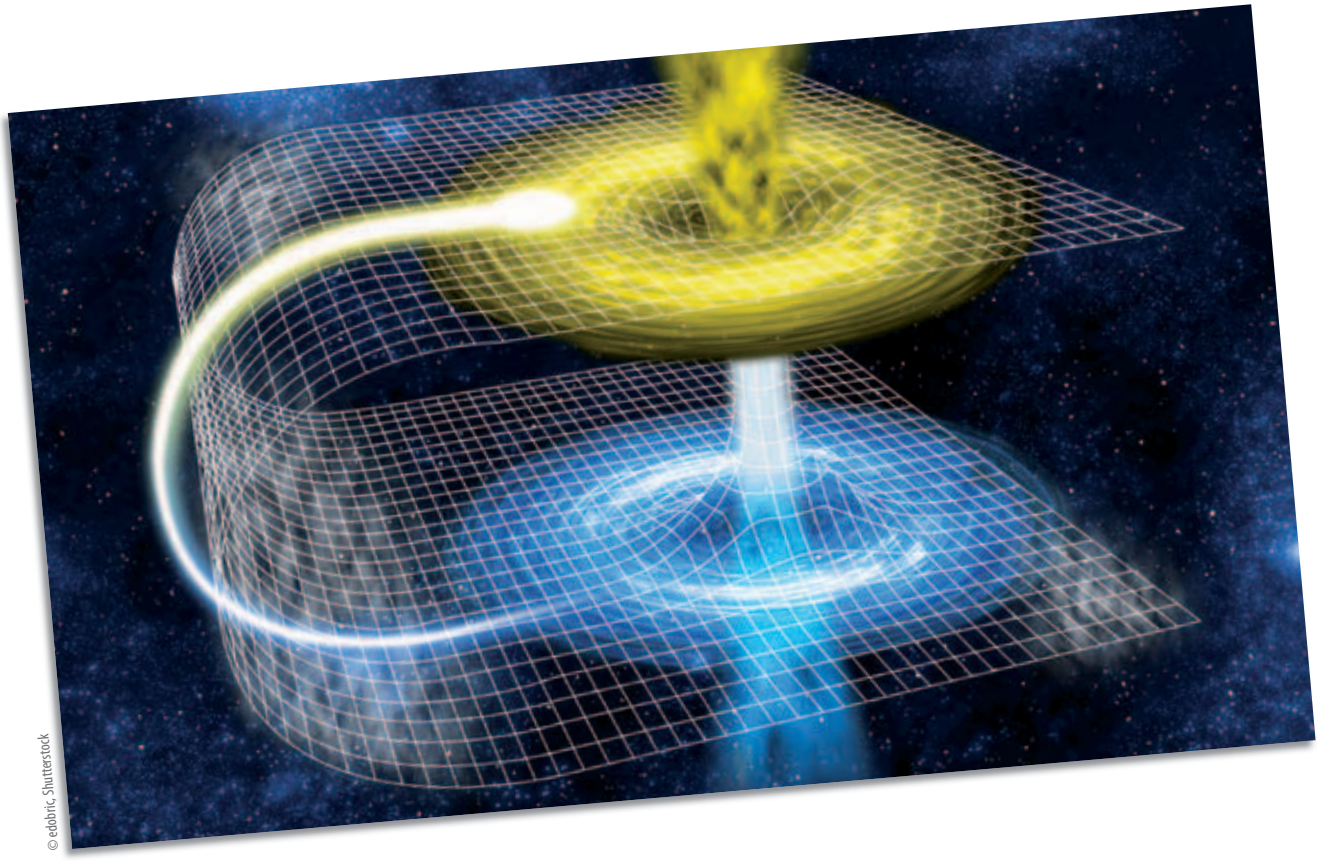
After increasing their knowledge of quantum gravity (QG) theories such as loop QG, spin foam models and causal dynamical triangulations, scientists want to investigate the dynamics of these theories by developing computational and perturbative techniques. This research is aimed, in particular, at analysing the implications of their properties for cosmology.

The EU-funded Observables in QG ([1]) project team, based in the Netherlands, notes that all these theories use some kind of discreteness either as an auxiliary structure or as a derived property. They add that this opens the question of how this discreteness interacts with the symmetry at the heart of general relativity, namely the so-called diffeomorphism symmetry.

Researchers undertook the first steps to discuss representations of the diffeomorphism group in discretised theories of QG. After providing a clear definition of diffeomorphisms in discretised theories, they succeeded in showing that in general diffeomorphism symmetry is broken on the discretised level. The scientists then examined possible approaches to obtain consistent dynamics for quantum theories of gravity.

(1) 'Physical observables in quantum gravity'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6330



One tool to raise the bar on nursing home health care

Effectively improving the quality of services and health for the elderly in nursing homes requires a common tool for assessing the current state of affairs.

The EU-funded Shelter ([1]) project is developing an assessment tool that can be used in nursing homes throughout Europe. Such an instrument will allow standardised methods to be used to record and evaluate the health care needs of the elderly in long-term care facilities, so that these can be improved. The project members have started revising and adapting the minimum data set (MDS), an assessment instrument, for just this purpose.

Shelter is working to validate this tool for long-term care facilities (MDS-LTCF) in European nursing homes. The study is assessing how valid the instrument is in its newly translated forms, the validity of items in the translated versions, and the inter-rater and test-retest reliability of each item. The MDS-LTCF form has been translated from English into seven languages.

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Various objectives have already been achieved 18 months into the project. Team members have developed a nursing home services (EU-NHS) assessment form to describe the features of nursing homes taking part in the Shelter project. An intranet network system has been developed where partners can look for information on the study as well as upload their own information to the database. Here, nursing homes can also register to participate in the study. A standardised training process has been developed and researchers have been trained in both theory and practical administration of the MDS-LCTF.

Three study meetings have been held since the project started in 2009, with the latest, the mid-term meeting, held in Treviso, Italy to evaluate progress and plan dissemination activities. The Shelter study aims to apply the MDS-LTCF on a large scale with the creation of a database that will facilitate measuring resident outcomes, identifying predictors of outcomes, development of eligibility criteria, monitoring of services delivered, and analysis of quality of care indicators.

Shelter project partners are based in the Czech Republic, Finland, France, Germany, Israel and the Netherlands.

(1) 'Services and health for elderly in long term care'.

Funded under the FP7 specific programme Cooperation under the theme Health.
http://cordis.europa.eu/marketplace > search > offers > 6390

Which internet for which future?

At over 40, the internet is ageing. Not initially designed to cope with today's overwhelming number of users and applications, the internet faces ever more limitations and yet must evolve to support society's development.

The 'Future Internet' or the internet for the next several decades will need to be developed today. It is a core issue in today's ICT research — not only in Europe but also in all developed and emerging countries. Research related to the Future Internet is generally based on incremental objectives and is technology-driven. But this leads to a paradox because the Future Internet is being developed without thoroughly exploring possible future scenarios of society.

This is why Sigma Orionis and the Italian chapter of the Club of Rome (PECCEI Foundation) launched the EU-funded Paradiso ([1]) project in 2007. The project partners adopted a forward-looking approach that explores the foreseeable interactions between the internet and societal developments in the next several decades. The objective is to distil recommendations on how to develop today, particularly through EU-funded research programmes, the Future Internet to its full societal potential.

A future in the making

Paradiso's core activity is the analytical review of future societal trends and evolution scenarios in ICT. Results are reported through successive public releases of the *Paradiso reference document*, each of which is submitted to an open consultation. Many events, including high-level conferences and seminars have been organised over the period 2008-11. This has given the project the opportunity to interact with hundreds of key stakeholders in the ICT area and in many other disciplines. Moreover, a Paradiso multidisciplinary expert panel composed of around 40 representatives from leading institutions, companies, research institutes and NGOs in Europe and the rest of the world, has been closely associated to core project activities.

The project is set to end in 2011. But the project's recommendations are already

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nearly finalised. These recommendations include:

- holistic and multidisciplinary approaches of internet research should be encouraged;
- forward-looking approaches and foresight exercises should be supported in this domain;
- the involvement of users, communities, NGOs and other representatives of the civil society should be increased, which includes the concepts of community-based innovation or collective co-production, and one of 'platforms for discussion and collective action';
- international cooperation in internet research should be strengthened considering the specific global dimension of the internet and the perspectives of reverse innovation it can represent;
- value-driven programmes and projects should be promoted, which includes the concepts of socially driven approaches , of responsible innovation, and of improved ethical review mechanisms.


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Moreover, the *Paradiso reference document* recommends the European Commission pay attention to the potential of research 'exploring the limits of the internet'. Limits must be explored to go beyond incremental solutions and increase the innovation potential.

The Paradiso project partners will continue their research after the formal end of the project. They created the not-for-profit Paradiso Foundation that aims to inform people about the Future Internet. The foundation, with support from donors, will help initiatives and network interested people and civil society in Europe and elsewhere.

(1) 'Exploring a Future Internet suited to a probable paradigm shift in global societal developments'.

Promoted through the EU-funded Paradiso project.
www.paradiso-fp7.eu

How to tame waves, numerically speaking

Aircraft noise around airports and earthquakes are both caused by waves propagating through media. New computational models that better describe complex wave behaviour could provide important insight into these troublesome phenomena.

The growth of computing power over recent decades has allowed scientists to implement rigorous computational techniques that had previously been unfeasible. Such was the approach adopted during the EU-funded Wave propagation (1) project.

The focus of the German research was on optimising the application of the 'Scaled boundary finite element method' (SBFEM), which essentially entails cutting the problem into smaller bits. Work to combine the SBFEM with the mixed-variables technique resulted in more accurate simulation of the propagation of elastic and acoustic waves in complex spaces.

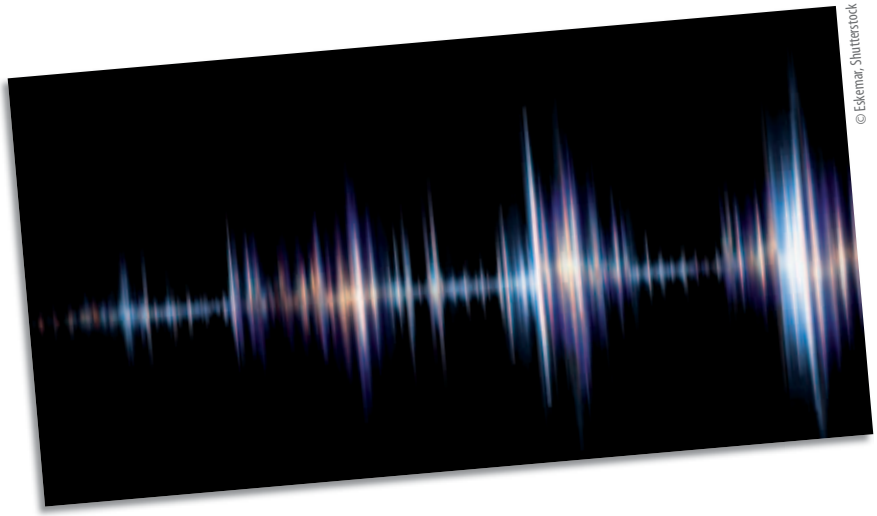
Building on previous research, a doubly asymptotic expansion of the SBFE dynamic stiffness was employed to address the mathematical challenge of accurately modelling radiation damping. Furthermore, a novel non-classical method of solving fractional differential equations was developed. This in turn enabled modelling of transient diffusion in a semi-infinite layered system directly in the time-domain, which had never before been accomplished.

Instability is often responsible for rendering many computational solutions invalid. During the project, considerable progress was made in overcoming this obstacle in cases with a large number of degrees of freedom. The key was to modify the doubly asymptotic expansion based on a detailed analysis of the scalar wave equation formulated in spherical coordinates.

This knowledge has been shared with the research community through several publications in peer-reviewed journals and presentations at relevant conferences.

(1) 'Realistic computational modelling of large-scale wave propagation problems in unbounded domains'.

Funded under the FP7 specific programme People (Marie-Curie actions).
http://cordis.europa.eu/marketplace > search > offers > 6337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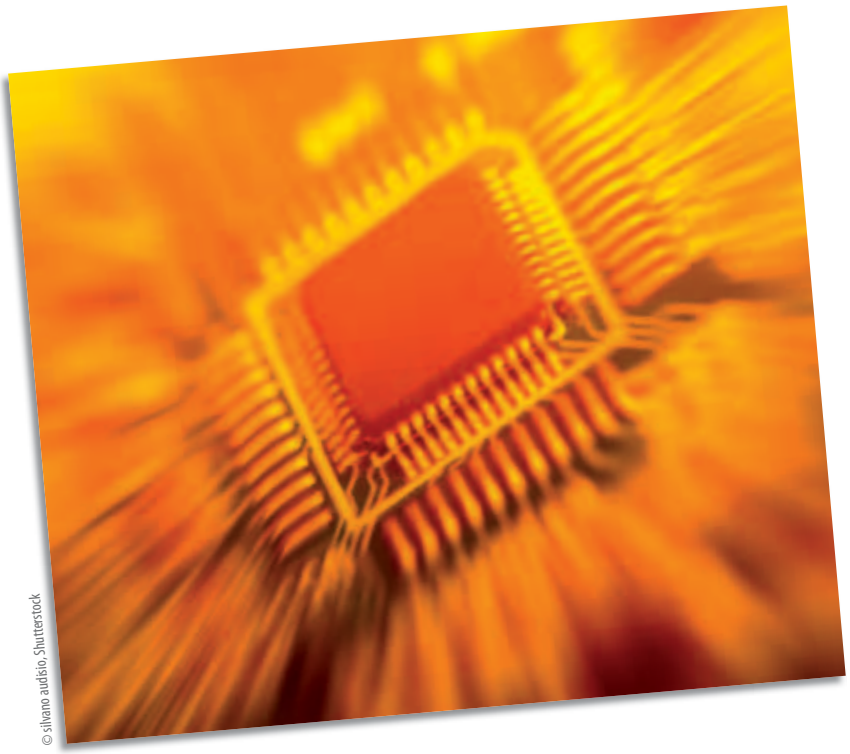
All-weather electronics

New materials are being developed to create electronic devices and sensors that can withstand exposure to extreme conditions.

Electronic devices and sensors often need to be used in high temperatures, high electric fields or in highly corrosive environments. Researchers from the EU-funded Morgan ([1]) project are therefore investigating how diamond and gallium nitride (GaN) heterostructures can be used to produce the best materials for such conditions.

Devices and sensors designed to operate in harsh environments need new semiconductor materials which are stable, especially at high temperatures, and which have substrate and package combinations that enable rapid heat extraction or the capability to withstand high temperatures. Chemical inertness is also an advantage, especially if there is a need to monitor highly corrosive chemical agents.



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Scientists in France believe that diamond and gallium nitride heterostructures fulfil these criteria. Both materials possess durability and robustness to high temperature, radiation and electric fields. They explain that diamond material exhibits the best mechanical robustness and thermal conductivity, while GaN presents high electron mobility, giving high power handling and efficiency.

In addition, the packaging and metallisation of electronic devices or sensors are essential considerations in extreme conditions and environments, as the researchers highlight. The Morgan project scientists will therefore also trial advanced three-dimensional ceramic packaging and new metallisation techniques.

(1) 'Materials for robust gallium nitride'.

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

http://cordis.europa.eu/marketplace > search > offers > 6392

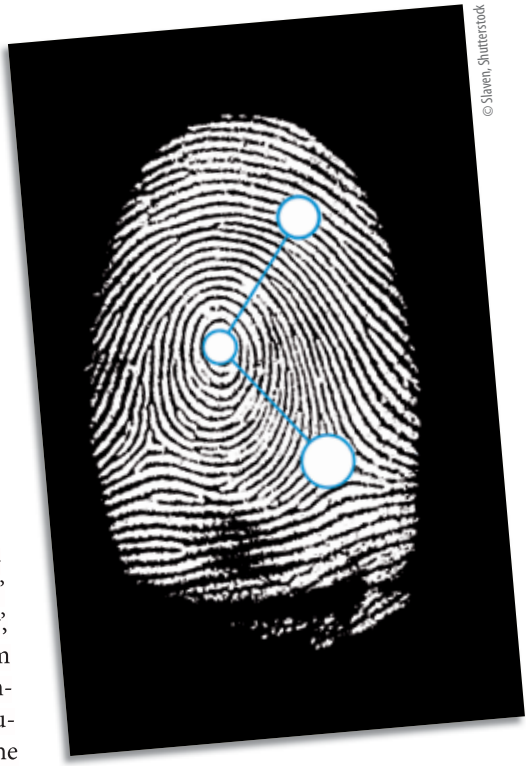
Establishing trust in biometrics use

Security threats are prompting officials and governments to consider stronger biometric measures amid concerns that biometrics could compromise privacy.

Where does security stop and the invasion of privacy start? Much of society insists on its anonymity but the threat of terrorism and crime is driving authorities to consider more high-tech safety mechanisms that could be seen as compromising one's privacy.

The EU-funded RISE ([1]) project wants to increase awareness worldwide on ethical aspects of biometrics and security technologies. Biometrics, technology that recognises unique characteristics in people, such as voices, retinas, faces or even DNA, has great potential for security, but opponents fear that biometric information could be used without their consent.

The RISE project, which was launched in 2009, has made valuable progress in this area. Two successful meetings were convened in Asia, representing strategic occasions to engage international dialogue on ethics of biometrics, privacy and international data sharing, with representatives from China and India. Moreover, two high-level workshops on 'individual identity' and 'global mobility and security', took place in Brussels, Belgium and saw the participation of high-ranking government and institutional speakers. This included the



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EU's Vice-President and Transport Commissioner Siim Kallas.

The project embarked on its second phase which resulted in a European stakeholder conference held in December 2010. That event will be followed by the fourth international conference in December 2011, where the RISE consortium will launch a permanent international platform on ethics of biometrics and security technologies. By establishing this permanent dialogue-platform, RISE will promote discussion and coordination among different and sometimes conflicting actors.

The platform represents a powerful arena that brings together individuals and organisations, as well as national and international institutions. It will give everyone involved a voice and establish trust among all parties within the framework offered by the 'Charter of fundamental rights of the European Union.' Ideally, through this conference, all sides will find common ground where they can balance security needs with privacy issues.

(1) 'Rising pan-European and international awareness of biometrics and security ethics'.

Funded under the FP7 specific programme Capacities under the theme Science in society.

http://cordis.europa.eu/marketplace > search > offers > 6388

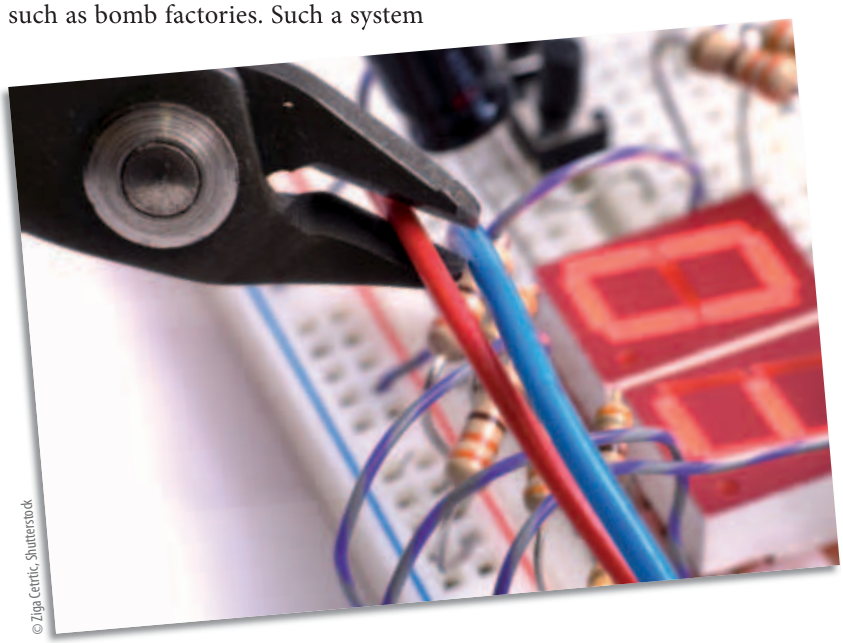
Europe's pre-emptive strike for security

Terrorism in all its forms is a real threat in Europe and requires novel, efficient methods to be addressed. A new system may be able to detect raw bomb-making material and even drugs before they're ready to use.

Terrorist attacks can occur any time and anywhere in Europe, putting citizens in grave danger. This has already happened in London, Madrid and elsewhere in Europe with devastating effects. There is currently no detection system that focuses on the production phase of explosives. Illicit production sites are currently discovered either by chance or by traditional intelligence-gathering methods.

To remedy this dire situation, the EU-funded 'Localisation of threat substances in urban society' (Lotus) project is developing an integrated surveillance system for continuous chemical monitoring. This will be achieved through fixed-site detectors and/or mobile detectors to identify 'chemical hotspots' such as bomb factories. Such a system would represent a very sophisticated anti-terrorist tool for law enforcement agencies, which could then pre-empt major disasters.

System capability is being demonstrated by modifying existing sensors and developing new ones to detect selected bomb-making material. The project proposes integrating sensors into an existing network global infrastructure for positioning and networking using the global positioning system (GPS); and global system for mobile communication (GSM) and general packet radio service (GPRS) respectively. This allows Lotus to be used almost anywhere in the world with relatively small costs for supporting installation and extra personnel.



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Lotus will be instrumental in localising threatening substances and their dispersion. The system can be linked to one operations centre for an immediate assessment of the situation before the damage is done.

Significant progress has been achieved by the project so far. To begin with, an explosives and dangerous materials list has been outlined and preliminary scenario requirements have been established. Sensors have been fine-tuned and system requirements have been outlined. Man-machine interface specifications have also been prepared, and a preliminary simulation tool for testing the system in various conditions has been developed.

Lotus partners believe that this is a viable way forward. It allows law enforcement agencies to be proactive, taking appropriate measures before the threat peaks. The same system could also be used for combating organised crime by detecting drug production. Homemade production of explosives and drugs from readily available precursors is another threat that could be neutralised effectively with Lotus. Such a system is enough to dent the economic viability of illegal weapons manufacturers and discourage would-be terrorists from committing heinous crimes. Once perfected, it will be of inestimable value for ensuring safety and security.

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

http://cordis.europa.eu/marketplace > search > offers > 6393

Privacy and security: a comparative analysis

Security concerns may be pushing the boundaries of privacy and calling on various stakeholders, including the public, to usher in the era of digital monitoring and biometrics.

Europe is finding that crime and terrorist threats constitute cross-border issues. In parallel, safety mechanisms and organised crime prevention have become the concern not only of local governments, but of the European Union as a whole. This development is bound to have effects on the practices related to data protection and privacy, which often clash with the interests of security measures.

The 9/11 attacks in New York as well as the bombings in London and Madrid have stimulated the spread of security technologies and practices. Security needs, however, can interfere with free movement, efficiency of service, and ease of trade, putting economic viability at odds with stricter monitoring.

There is an urgent need to balance these contrasting angles related to security, a challenge that the EU-funded PATS ([1]) project is aiming to tackle. The project is bridging the needs of the public, government agencies and private companies to satisfy social needs, avoid wrongful investments and pre-empt mismatches. It is joining the efforts of all stakeholders to develop new technologies and increase privacy awareness across various sectors, from firms to government agencies. There is a particular focus on the development and use of closed circuit television (CCTV) and biometrics.

For example, companies with strong IT labs, consultants and the military could see to the convergence of biometrics and digitised CCTV creating the ultimate security system. As more stakeholders get involved, decentralisation is set to disperse accountability onto more actors, including those from the private realm.

PATS aims at researching these changing dynamics in Finland, Germany, Israel, Poland, the UK and the US. The analysis focuses on current security regimes and their privacy awareness structures. The project is also initiating constructive dialogue with the actors in the field, raising awareness on the needs of privacy and data protection needs and examining opportunities for new communication strategies.

This helps structure the different security fields in a systematic manner, taking historical and cultural aspects into account. It also allows PATS to assess current degrees of privacy awareness among these actors. In addition, PATS is mapping civil security in the partner countries mentioned above. It is examining security agencies and actors through a general historical reconstruction since 1989. This provides the 'big picture' while at the same time offering a comparative view on the partners' countries.

The analysis of actors in the field, but also of technological developments, has already produced fruitful conclusions that will help shape a new paradigm for advancing security. It will also raise awareness of the need for technology, backed by a multitude of stakeholders, and involve the public in security discourse. Ultimately, privacy may also have to be redefined.

(1) 'Privacy awareness through security branding'.

Funded under the FP7 specific programme Capacities under the theme Science in society.
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Time to revamp security communications

Developing dynamic communication mechanisms for post-terrorist activities will save lives, prevent panic and undermine terrorist aspirations.

Many current EU projects are tackling security and pre-empting terrorism before it happens. Research is needed, however, to organise and fine-tune immediate and comprehensive communication responses to terror attacks.

The EU-funded Safe-Comms ([1]) project is exploring communication strategies for the aftermath of terror attacks. By analysing communication requirements and activities that follow attacks in different countries for effective crisis communications, the project is developing a comprehensive, flexible communication strategy for authorities.

Recovery from a terror attack depends on a carefully planned and effective communications strategy aimed at the media, general public and internal employees of the authorities. Having contingency plans ensures an effective counter-terrorism communication strategy and can save lives. The global terrorist threat also requires that every government office, local authority and organisation is prepared.

The project will provide authorities across Europe at the governmental, regional and local levels with crisis communication plans specifically designed for terror attacks, which are based on analysis of numerous real-world case studies and the unique requirements of recovery from these attacks. By having a ready crisis communication strategy for such crises, authorities can significantly minimise what the terrorists seek to achieve — public panic and the undermining of governments.

The project team has analysed communication challenges caused by terror attacks according to type of attack, duration, targets, victims and repercussions. It examined the components of an attack's effects and the requirements for an effective communications strategy in crisis preparation, prevention and intervention. The team analysed over 25 actual terror attacks which took place in recent years in Europe and the Middle East. Analysis focused on the communication strategy and tactics adopted by public authorities in each case, including the effectiveness of post-attack communication. Detailed findings of the case studies represented the first-ever comparative research on communication reactions to terror attacks and as such are of inestimable value.

The project team also conducted two meetings in Greece and Israel, disseminated the results and generated significant media interest. Team leaders also presented the project at various forums, which included public officials, diplomats and security officials from across Europe.

The next stage of the project will integrate emerging results and develop a comprehensive, flexible communication strategy for terror crises. This strategy will comprise tactical modules, each corresponding to specific stages of post-attack recovery, types and duration of attack, audiences and aftermaths.

Safe-Comms will also develop a training and simulation programme, based on a crisis manual and audiovisual training aids. This will enable public authorities to develop, train and adapt their own terror crisis communication plans. With robust pre-emptive and responsive security plans, Europe can help invalidate the terrorists' aims from their onset by limiting both incidence and repercussions.

Project partners are based in Bulgaria, Germany, Greece, Israel, Spain and the United Kingdom.

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(1) 'Counter-terrorism crisis communications strategies for recovery and continuity'.

Funded under the FP7 specific programme Cooperation under the theme Security.
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EU project tackles engineered nanomaterials risk

EU-funded scientists have developed risk assessment criteria for engineered nanomaterials (ENMs) that will help support experts in making policy decisions. The EU-funded Nanohouse ([1]) project reveals that product design can affect the unintentional release of ENMs.

Making responsible decisions about future product development will be possible by bringing together product life-cycle knowledge with a systematic evaluation of what hazards could emerge. The Nanohouse team suggest that their risk assessment criteria should be used to assess and minimise potential risks. This would benefit those working in the building sector in particular, because it is estimated that nanomaterials will be used to develop 15 % to 30 % of facade coatings within the next four years. The study is presented in the journal *Environment International*.

Experts say the unintentional release of ENMs used in products, including facade coatings for buildings, could play havoc on both the environment and human health. Researchers tweak ENMs to exploit physical, chemical and mechanical properties that exist at significantly small scales. Various sectors such as medical, construction and transport depend on them because of their special properties: ultraviolet (UV)-resistant, flame-retardant, dirt-resistant, scratch-proof and self-cleaning.

Led by the France-based organisation Commissariat à l'énergie atomique et aux énergies alternatives (CEA), the Nanohouse team comprises researchers and industry actors from Belgium, France, Italy, the Netherlands and Switzerland. The assessment criteria they provide can be used to assure that development of products is not only safe but sustainable as well. This is good news as a regulatory review of nanotechnology is scheduled in 2011.

The Nanohouse partners evaluated data from past research studies to shed light on what people know about the potential risks posed by ENMs used in nanotextiles and facade coatings. They also performed novel mathematical modelling of ENM behaviour and human toxicology.

Based on this work, the team singled out a number of assessment criteria for human health and the environment: environmental effects; solubility in water; sedimentation; stability during incineration; human toxicity; DNA (deoxyribonucleic acid) impairment; impact on wastewater facilities; damage of tissue barriers; and translocation effects in skin, the gastrointestinal or respiratory tracts.

Former studies found that it is possible to remove some 90 % of ENMs like nanosilver from wastewater. Removing ENMs from wastewater helps reduce environmental hazards. Most ENM particles could form agglomerates (collections/groups of masses) that drop into the sediment with potential exposure to sediment-dwelling organisms. The Nanohouse team postulates that nanosilver, for instance, can have a negative impact on the environment, but more research must be carried out to find out about nanostructured titanium dioxide.

The direct release of ENMs into the air depends on the design of the product, according to the partners. This fraction of ENMs is most likely embedded in larger-sized particles, they add. Researchers have linked titanium oxide to varying degrees of disruption to cellular functions in the brain, lungs and other important organs. ENMs can also act as carriers for other toxic substances.

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It should be noted that current methods to quantify the precise risk to human health is not a simple task. Researchers say no reliable methods or tools are available on the market.

Nanohouse is backed with EUR 2.4 million under the 'Nanosciences, nanotechnologies, materials and new production technologies' (NMP) theme of the EU's Seventh Framework Programme (FP7).

(1) 'Life cycle of nanoparticle-based products used in house coating'.

Promoted through the Research Information Centre.
http://ec.europa.eu/research/infocentre > search > 22173

Nanotech illuminates bioresearch

The complexities of cell biology call for enhanced imaging techniques to improve patient treatment. Fluorescence imaging for cells has been improved thanks to an EU-funded effort.

The EU-funded FWMIMAGING ([1]) project set out to develop a multiphoton microscopy technique. At the same time, researchers tried to determine if this could be applied in cell biology where some problems call for sensitive three-dimensional imaging.

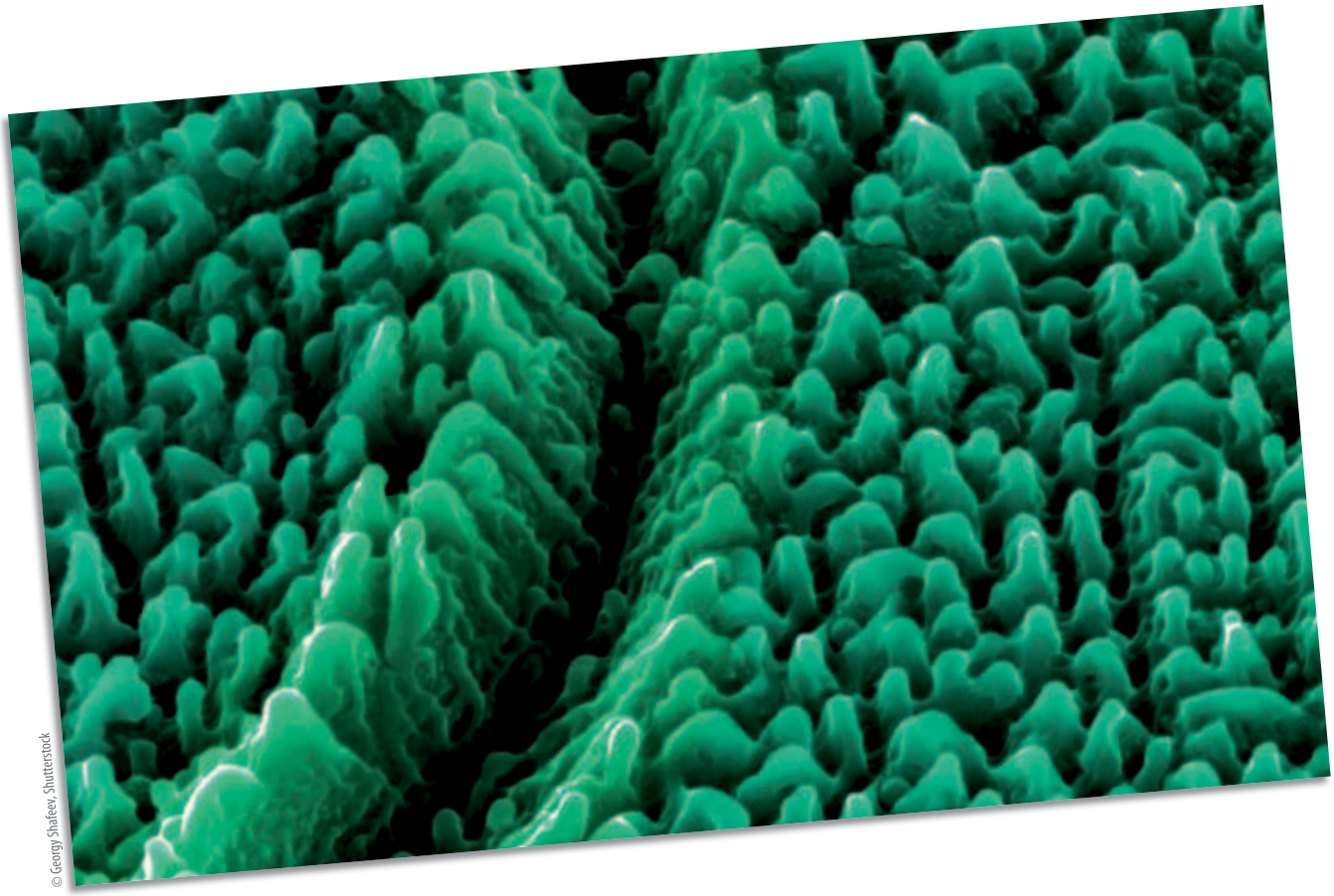
This novel technique is based on detecting a resonant and clear non-linear optical response four-wave mixing (FWM) of colloidal quantum dots for their use as bio-labels. Colloidal semiconductor quantum dots have attracted great interest for their potential use in optoelectronic instruments. This new method retains the advantages of fluorescence imaging but goes one better by offering coherent detection without the interference of a fluorescent background.

FWMIMAGING succeeded in developing the multiphoton microscopy technique for cell imaging, and demonstrated its applicability to cell microscopy. This and other project advances made in imaging techniques will impact both the physics and bioscience communities. The new imaging modality will help address challenging biomedical problems and contribute to medical applications, improving disease diagnosis and treatment.

(1) 'Study of coherent non-linear optical response of nanoparticles and application to multiphoton imaging in cell biology'.

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

http://cordis.europa.eu/marketplace > search > offers > 6333



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Smaller technology than ever

Microscopic carbon tubes are being used to build tiny equipment using new techniques. This opens the door to a different class of equipment and enables applications on a quantum level not seen before.

There is so much more than meets the eye where science is concerned, particularly on the quantum scale. Miniature devices such as sensors are being built for science and technology, thanks to the use of nanomaterials. The EU-funded QDCN ([1]) project, based in Spain, is developing an ultra-sensitive detector that probes the electrical properties of individual molecules. Such a device is being made with tiny elements called carbon nanotubes (CNTs), each approximately 1/50 000th of a human hair.

To operate, these devices also require semiconductors, i.e. materials with specific electrical conductivity. A more recent and more powerful type of semiconductor on a minute scale is known as the quantum dot. It enhances conductivity and can be used to manufacture much better devices than those currently available.

In order to measure electrical properties of an individual molecule, quantum dots are attached to only one electrode represented by a single CNT. The advantage of employing a CNT as an electrode causes localised screening from the electrode, rendering the study of the electronic structure of the semiconducting dots more accessible.

This constitutes a new, more efficient approach developed by the project to create sensors and detectors. The novel nanodevice layout greatly simplifies the fabrication process compared to standard devices which used to use two electrodes separated by a gap of a few nanometres. This is significant, as the fabrication of such devices is quite challenging and time-consuming, and involves numerous processes and intricate equipment.

The project's next step was to characterise these fabricated nanodevices and measure their accuracy. This was achieved using a new technique called 'electron counting spectroscope' that involves measurement at low temperatures. The technique allows researchers to probe the electronic properties of semiconducting quantum dots. Importantly, it also allows them to fill or empty any semiconducting quantum dot with many electrons, a previously onerous task.

In addition to creating the detector device, the project mastered various nanodevice fabrication techniques that involve many processes and much equipment to deal with at the quantum scale. These include suspended nanotube devices, graphene devices, four terminal gold nanotube devices and catalytic nanomotor devices.

Moreover, the project's advances allow manipulation of Fermi energy (i.e. energy at absolute zero temperature) by significant amounts. This holds promise for nanoscale or molecular electronics, since the large energy manipulation and separation in such applications is limited.

Overall, QDCN has shown that single-electron detection with a CNT transistor represents a new strategy to study the separation in energy between the electronic discrete levels of the semiconducting quantum dot. In particular, it has shown that electronic levels of a quantum dot can exhibit chaotic behaviour, a phenomenon which had only been examined in theory in recent decades.

(1) 'Quantum devices based on carbon nanotubes.'

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

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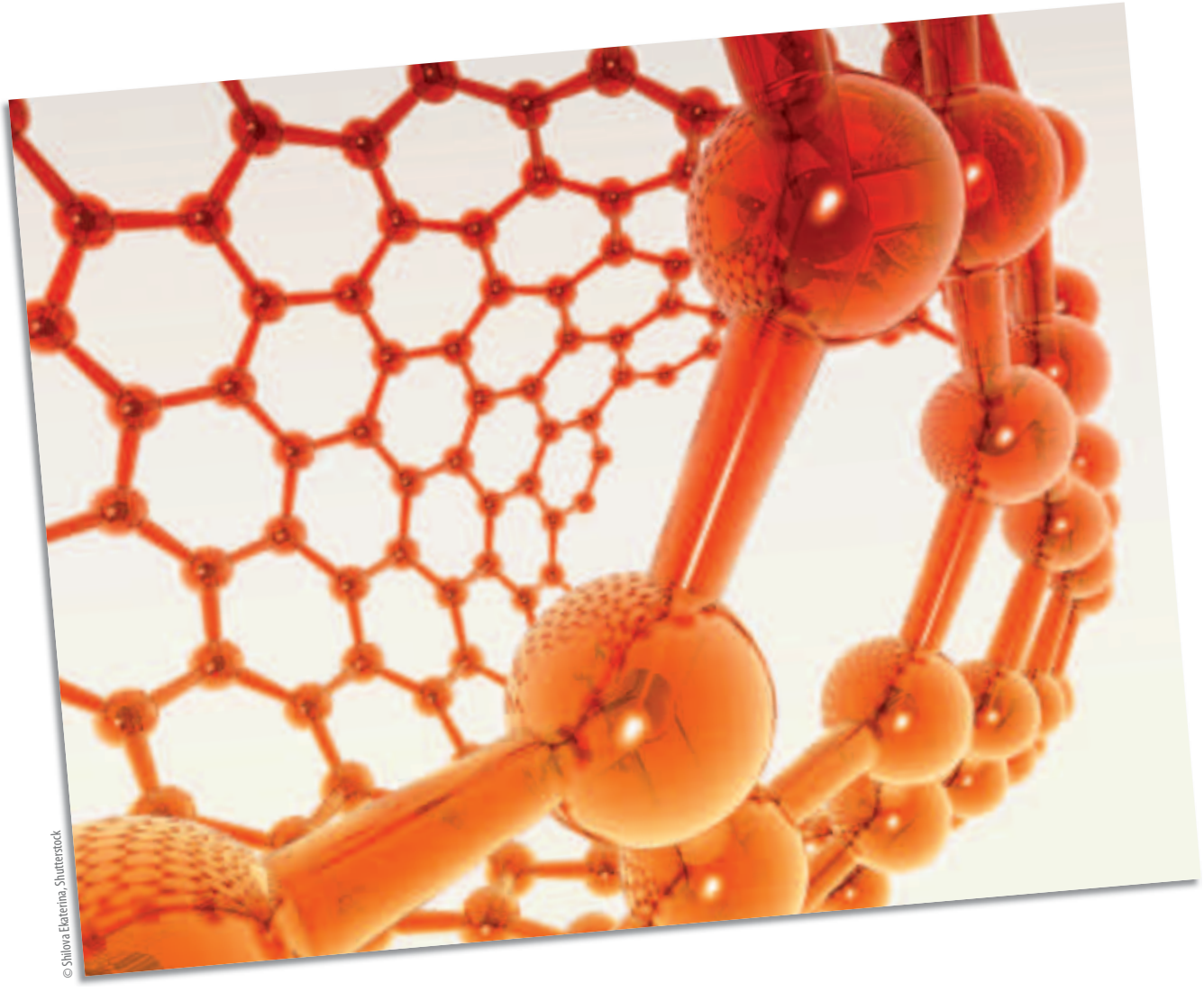

Cleaning robot lights up photovoltaic power plants

A fully autonomous robot for cleaning the glass surfaces of large-scale photovoltaic power stations is being developed by a European consortium.

The EU-funded PV-Servitor (1) project has focused on building a robot that can automatically clean glass surfaces of up to 2 500 square metres. The device will be used for ground-mounted photovoltaic (PV) power plants made up of a number of 100-kilowatt units. Effective cleaning of the glass surfaces will increase efficiency of photovoltaic cells and help reduce maintenance costs.

Researchers have developed a lightweight, fully automated cleaning robot capable of working outside for extended periods of time by replacing the rechargeable batteries with a long-life energy supply system. The device is also capable of unrestricted navigation and possesses cognitive vision systems, enabling the detection of pollution and inspection of PV cells.

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Support for the project has been provided by Europe's largest PV distributor and module manufacturer, together with other leading players in the main PV markets of Germany and Spain. These potential end-users can ensure the project's market success by granting access to their large-scale PV power stations.

Successful development of the cleaning robot by the PV-Servitor consortium will help support the EU's drive for greater sustainability by enabling renewable energy, in the form of photovoltaics, to become even more efficient.

Project partners are based in Denmark, Germany, Austria and Spain.

(1) 'Autonomous cleaning robot for large scale photovoltaic power plants in Europe resulting in 5 % cost reduction of electricity'.

Funded under the FP7 specific programme Capacities under the theme 'Research for the benefit of SMEs'.
http://cordis.europa.eu/marketplace > search > offers > 6404

Better construction is built in clusters

Innovation and regional thinking in construction has the potential to stimulate the industry.

The construction sector in Europe is a dynamic force behind growth and employment, amounting to 7 % of national employment per gross domestic product and 14 % when design and materials are accounted for. However, it is relatively behind in absorbing research and development (R & D) and innovation.

The strategic research agenda prepared by the European construction technology platform has set up ambitious goals to transform this traditional sector into a knowledge-driven and R & D-based one. In response, the EU-funded Reg con (1) project supported innovation-driven areas in Europe or 'clusters' that house research and construction infrastructure. The initiative involved regional approaches, multi-stakeholder engagement and cross-regional cooperation.

Reg con elaborated a framework to define the most important elements for emerging, developing and mature clusters. Thorough analysis of potential stakeholders' opinions on cluster initiatives was undertaken through field surveys in each country, taking into account the specific requirements and needs of the relevant region and cluster.

The project prepared country reports and a database of potential cluster members and stakeholders. In 2008 it mobilised stakeholders during communication workshops organised in the Basque region, Greece and Poland. Meetings with potential stakeholders took place and intense dissemination activities were undertaken. This laid the ground for forming new clusters in these three regions. Novel action plans developed by the project were an important step in further developing the new clusters, covering organisational, operational, and financial aspects.

As a result of all its activities, Reg con also prepared a publication titled *Regional construction clustering in action. Strategic roadmapping & action planning*. This publication acts as a guideline for cluster formation, featuring examples for construction clustering beyond the pilot regions. Another publication titled *Regional construction clustering in action. Case study*

showcase provides insight into the plans and aspirations of several European cluster regions. The case studies highlight innovation in construction and demonstrate the clustering concept in action.

Lastly, by incorporating small and medium-sized enterprises into sector innovation processes, the Reg con project has contributed to a knowledge-based shift in the construction sector. Its actions are still helping to make the European construction industry more competitive.

Project partners were based in Greece, Spain, Poland, Slovenia and Finland.

(1) 'Support action for innovation driven clusters in construction. Regional approaches, multi-stakeholder engagement and cross regional co-operation'.

Funded under the FP7 specific programme Capacities under the theme 'Regions of knowledge'.
http://cordis.europa.eu/marketplace > search > offers > 6436

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Getting a taste for food packaging technology

Food packaging plays an important role in protecting and containing food and maintaining its quality. New packaging materials will increase the shelf life of food and reduce waste.

Although highly effective for storage and protecting against external hazards, problems can result from the interaction between packaging materials and food. This problem has been addressed by the EU-funded Safetechnopack (1) project, which has developed food packaging technology at the Tubitak Marmara Research Centre Food Institute in Turkey. The aim has been to help the institute to become a centre for food science, by researching chemical contamination from materials in contact with food.

Two researchers have been recruited from the fields of chemistry and polymer science to work on new packaging technologies. New materials will be developed using nanotechnology and active antimicrobial packaging.

Events have been organised in Istanbul, Turkey to highlight the work of the project and its contribution to the Turkish food and packaging industry.

The result has been an increase in visibility of the institute and its capabilities, leading to greater demand for its services from abroad. Efforts to increase the institute's professional network have resulted in fact-finding missions to European research centres and scientific events such as conferences and meetings.

The Safetechnopack project has helped researchers make advances in food packaging technology and raised the profile of the Tubitak Marmara Research Centre Food Institute and the Turkish food industry.

(1) 'Improving the scientific and technological research capacity of food institute on safety and technology of food packaging'.

Funded under the FP7 specific programme Capacities under the theme 'Research potential of convergence regions'.
http://cordis.europa.eu/marketplace > search > offers > 6416

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Europe conquers the high seas

Following a long maritime tradition, Europe is promoting shipbuilding and the leisure boat sectors. This will guarantee the continuity and competitiveness of this solid industry.

For centuries, Europe was a formidable player in maritime accomplishments that led to exploration and prosperity. Even today, the maritime industry in the EU, particularly shipbuilding and marine technology, is quite competitive on a global scale. To sustain this competitiveness, ongoing investment research and technological development (RTD) are needed. The European maritime industry can compete successfully in global markets by focusing on critical and dynamic technologies for products and production processes.

The EU-funded Starnetregio (1) project has increased the capacity of regional players in Croatia (Rijeka), Italy (Friuli Venezia Giulia) and Slovenia by investing in marine-industry RTD. The initiative specifically involved RTD in shipbuilding and port equipment, driven by regional research-intensive areas or clusters. These clusters, which the project has successfully established, comprise universities, research centres, enterprises, and public regional authorities.

To achieve its aims during its 30-month mandate, the project established a viable institutional cluster framework, mapping regional development plans and RTD key actors. It conducted a cross-regional analysis of development plans and RTD actors, enabling the emergence of a transnational collaborative research environment in the future. Knowledge transfer through mutual learning processes and mentoring activities among stakeholders was also undertaken, as was the development of a joint action plan for improving integration among stakeholders.

The elaboration of the shared transnational research agenda (TRA) was one of the most important results of the project, integrating collected data from the all areas of research. As a result, the TRA is continuously identifying and setting up concerted research strategies to address the sector's industrial needs. It helps define common RTD policies and programmes and sees them to fruition. The TRA summarises common interests and needs of the three regions, focusing on areas for further development and boosting shipbuilding as well as the leisure boat industry.

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Following the TRA, six of the 11 Starnetregio partners signed a framework agreement to ensure networking and cooperation among the regions and among stakeholders within each region. Along with this, a joint action plan has been outlined and is considered the ultimate project result. It represents a clear roadmap for measures and actions that will be developed and implemented by the Starnetregio partners after the project's end. These measures are set to go a long way in ensuring Europe's competitive edge in the maritime field.

(1) 'Starring a trans-regional network of regional research-driven marine clusters'.

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

http://cordis.europa.eu/marketplace > search > offers > 6419

Affordable CCS technology

Research aims to reduce the energy penalty and costs of a pre-combustion carbon capture and storage technology based on the sorption-enhanced water-gas shift process.

Carbon capture and storage (CCS) technology is being heralded by the EU as a key element in its battle to fight climate change and reduce greenhouse gas emissions. However, for the moment the cost of this technology remains a major obstacle for its large-scale introduction.

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Scientists at the Energy Research Centre of the Netherlands are addressing the problem through the EU-funded Caesar ([1]) project.

Caesar is investigating how to reduce the costs of the pre-combustion carbon dioxide (CO_2) capture technology based on the 'Sorption-enhanced water-gas shift' (SEWGS) process. The SEWGS process produces hot, high-pressure hydrogen in a catalytic carbon shift reactor with simultaneous adsorption of CO_2 on a high-temperature adsorbent. The system operates in a cyclic manner with steam for adsorbent regeneration. Scientists hope via the Caesar project to make this technology more economically attractive through the optimisation of sorbent materials, and reactor and process design.

They believe that an optimised SEWGS process could reduce CO_2 avoidance costs to around EUR 15 per tonne of CO_2. In comparison, current technologies under development aim for between EUR 30 and EUR 40 per tonne of CO_2.

The project will focus on applying the SEWGS process for pre-combustion CO_2 capture from natural gas, but it will ultimately be broadened to also apply to coal gas and industrial processes. The research team plans to design a pilot unit for all these applications.

Project partners are based in Italy, the Netherlands, Norway, and the United Kingdom.

(1) 'Carbon-free electricity by SEWGS: advanced materials, reactor and process design'.

Funded under the FP7 specific programme Cooperation under the theme Energy.
http://cordis.europa.eu/marketplace > search > offers > 6429

Better perlite for added-value products

Researchers are using new technologies to remove problems associated with the use of perlite in the chemical, construction and manufacturing industries. Perlite is a light and porous volcanic rock.

Conventionally expanded perlite is widely used in the construction, manufacturing and chemical industries. However, it has many weaknesses such as low resistance to compression and high porosity, which limit the range of its applications and adversely affect the quality of perlite-based products.

The EU-funded Experl ([1]) project seeks to remove these problems by producing micro-sized closed structure perlite through the development of breakthrough perlite expansion technologies. This substance should lead to the creation of a new generation of high added-value end-products, including preformed insulating products, like panels, boards and bricks, and functional fillers with advanced physical, technical and environmental performance characteristics.


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The researchers expect these products to replace the minerals currently imported, which include titanium dioxide (TiO2), diatomite and wollastonite, and polymeric (polystyrene-based) materials.

The research team has already made huge strides towards making micro-sized closed structure perlite a reality with, for example, the development of two techniques for the mechanical pre-treatment of raw perlite, and the design of an optimum pre-treatment process for the production of different raw perlite grades. They have also designed a pilot-scale perlite expansion system using the indirect heating technology, which is currently under development.

(1) 'Efficient exploitation of EU perlite resources for the development of a new generation of innovative and high added value micro-perlite based materials for chemical, construction and manufacturing'.

Funded under the FP7 specific programme Cooperation under the theme 'Nanoscience, nanotechnologies, materials and new production technologies.'
http://cordis.europa.eu/marketplace > search > offers > 6292

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

First international workshop on ambient gaming

The first international workshop on ambient gaming will take place from 16 to 18 November, 2011 in Amsterdam, the Netherlands.

Ambient games are innovative game designs which incorporate ambient intelligence characteristics, such as context-awareness, personalisation, adaptation and anticipation. These qualities contribute to a whole new player experience, for instance by allowing players to move around freely, without being bound by a computer screen or another device, by using information coming from sensors. Ambient games support casual play, i.e. play and games are seamlessly integrated with daily activities. Ambient gaming implies taking the everyday stuff of life and turning it into a game. Yet gaming is not limited to a single device at a single time, but is intertwined with daily activities.

While ambient gaming offers promising opportunities for creating novel and unique player experiences, there are still many unanswered questions related to this new field of research, such as what are promising scenarios for ambient game design? Which technologies are available that can be used for ambient gaming? How to design and evaluate ambient games?

The event will bring together stakeholders who are active in this field (game designers, researchers, and technologists) in order to examine a variety of issues from different perspectives and uncover the potential of ambient technology for play and games.

For further information, please visit:
http://www.playfitproject.nl/ambientgamingworkshop/

Understanding extreme geohazards: the science of the disaster risk management cycle

An event entitled 'Understanding extreme geohazards: the science of the disaster risk management cycle' will take place from 27 November to 2 December 2011 in Sant Feliu de Guixols, Spain.

Extreme geohazards can cause major disasters. In fact, most of the lives and property lost to disasters caused by geohazards are due to extreme events. Although infrequent and restricted to certain geographical regions, their potential impact is huge and of global scale. At the same time, the potential impact on civilization of any such rare event tends to be ignored in land use and infrastructure planning.

Understanding the full spectrum of extreme geohazards is a prerequisite for disaster risk management and increased global resilience to these events. Reducing the disasters induced by the occurrence of extreme hazards at an acceptable economic cost requires a solid scientific understanding of the hazards. Recent disasters revealed gaps in the knowledge available for policy and decision making.

The conference will identify the most urgent scientific challenges that hinder the application of hazards knowledge to risk management. A main outcome of the conference will be a list of actions that would help to ensure that the scientific challenges are addressed in a timely manner and that the resulting information is communicated to policy- and decision makers.

For further information, please visit:
http://www.cost.esf.org/events/geohazards

Workshop on multimedia techniques for augmented reality: presence and emotion in virtual environment

The 'Workshop on multimedia techniques for augmented reality: presence and emotion in virtual environment' will take place from 28 November to 1 December 2011 in Dijon, France.

There is evidence that future human-computer interfaces will enable more natural and intuitive communication between people and all kinds of devices equipped with sensors. Interaction between humans and computers may one day more closely resemble human-to-human communications.

Progress in human-computer interaction has been made possible by innovative technologies that empower users in increasingly natural and intuitive ways. This progress has a great impact on the field of virtual-augmented reality, improving immersion and making simulations more realistic.

The event is designed to give a chance for researchers working with new technologies, psychologists, designers and human/computer experts who investigate human-centred technology to look at what lies beyond the frontiers of today's virtual environments.

For further information, please visit:
http://www2.u-bourgogne.fr/SITIS/11/INTERPRET.html

Earth observation for ocean-atmosphere interactions science

The 'Earth observation for ocean-atmosphere interactions science' conference will take place from 29 November to 2 December 2011 in Frascati, Italy.

The 'Surface ocean lower atmosphere study' (SOLAS) is a major international initiative meant to achieve quantitative understanding of the key biogeochemical-physical interactions and feedbacks between the ocean and the atmosphere, and how this coupled system affects and is affected by climate and environmental change. The project has a range of stakeholders and sponsors including the European cooperation in science and technology.

SOLAS brings together interdisciplinary research and studies, requiring marine and atmospheric scientists to work together with Earth observation (EO) scientists and modellers.

In fact, recent advances in EO technology have made possible improved global observations of several key parameters governing ocean-atmosphere interaction. An increased number of EO missions in the coming years will add to this capacity. However, the full exploitation of this capacity by scientific and institutional users requires coordinated research efforts to develop robust global geo-information products and

to facilitate their integration into suitable coupled physical/biogeochemical models.

The conference will bring together the EO and SOLAS communities, as well as scientific institutions and space agencies involved in the observation, characterisation and forecasting of ocean-atmosphere interaction and their impacts.

For further information, please visit: http://www.eo4oceanatmosphere.info/

Fifth international conference on complex distributed systems

The fifth international conference on complex distributed systems will take place from 5 to 7 December 2011 in Mannheim, Germany.

Cloud computing is the provision of computational resources on demand via a computer network, such as applications, databases, file services, email, etc. In the traditional model of computing, both data and software are fully contained on the user's computer. In cloud computing the user's computer may contain almost no software or data (perhaps a minimal operating system and web browser only), serving as little more than a display terminal for processes occurring on a network of computers far away.

Cloud computing is a very popular topic in information technology and is seen by some as one of the very pillars of the future internet. The benefits and the risks of the delivery of all types of services via the cloud have relevance for industry, business, academia and governments.

With cloud computing the processing of information will become a pervasively accessible utility and commodity. Despite the distributed locations and heterogeneous control and administration of cloud resources, predict some stakeholders, cloud computing will be easy-to-use and indispensable for everyday life and work.

The event will be a forum for researchers and engineers to present research and development in all areas related to architecture, design, implementation, application and evaluation of cloud computing, services and environments.

For further information, please visit: http://siwn.org.uk/cods11/ccs11.htm

Sixth international conference on bio-inspired models of network, information, and computing systems

The sixth international conference on bio-inspired models of network, information, and computing systems will take place from 5 to 7 December 2011 in York, United Kingdom.

Rapid developments in networking and resource integration domains have resulted in the emergence of distributed computing models such as web services and cloud computing for solving very complex problems. However, biology has developed effective solutions to hard engineering challenges through millions of years of evolution. Several algorithms and techniques widely used in computer science have been adapted from, or inspired by, known biological phenomena. Computer scientists applying biomimetics are sometimes inspired by observing nature and adopting biological approaches, such as in the aforementioned distributed computing models.

The event will feature keynote speeches, technical session, focused special tracks, workshops and demo/poster sessions, along with entertaining social functions. Topics of discussion will include:

- bio-inspired formal models and methods;
- bio-inspired algorithms and mechanisms;
- bio-inspired software and hardware systems;
- properties in bio-inspired systems;
- design and performance issues of bio-inspired systems;
- tools, testbeds and deployment issues of bio-inspired systems;
- real-world applications/implementations and standardisation of bio-inspired systems;
- socially-inspired, game theoretic and other metaphor-driven interdisciplinary approaches to software and hardware systems.

For further information, please visit: http://www.bionetics.org/index.shtml

First international workshop on smart communication protocols and algorithms

The first international workshop on smart communication protocols and algorithms will be held from 5 to 9 December 2011 in Houston, Texas.

Smart communication protocols and algorithms make use of several methods and techniques to communicate the network devices to transfer data. They can be used to perceive the network conditions, or the user behaviour, in order to dynamically plan, adapt, decide, take the appropriate actions, and learn from the consequences.

The algorithms can make use of the information gathered from the protocol in order to sense the environment, plan actions according to the input, be aware of what is happening in the environment, and take the appropriate decisions using a reasoning engine.

The event will look at the design, development, analysis and optimisation of smart communication protocols and algorithms at various communication layers. The event programme is planned to include analytical research, simulations, practical results, position papers and papers addressing key problems and solutions.

For further information, please visit: http://scpa.it.ubi.pt/

Fourth international conference on intelligent robotics and applications

The fourth international conference on intelligent robotics and applications will take place from 6 to 9 December 2011 in Aachen, Germany.

The conference theme is improving robot behaviour. Robotics is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots. It is related to the sciences of electronics, engineering, mechanics and software.

The aim of the conference is to link the disciplines developing and/or using robotics with its applications. In addition, there will be a focus on forming a connection between different perspectives on the field of robotics from fundamental research to the usage of robotics.

Some of the themes that the conference will cover include:

- control and supervision systems;
- human-robots interfaces;
- image processing;
- intelligent control systems;
- optimisation algorithms;
- digital manufacturing;
- human-robot interaction.

For further information, please visit: http://www.icira2011.org/

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