

## news

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### **Researchers from the University of Valencia propose a minimal genome containing 206 protein-coding genes**

A team from the Cavanilles Institute at the University of Valencia has proposed the core of the protein-coding gene set for a hypothetical minimal bacterial cell. The study was published in *Microbiology and Molecular Biology Reviews* in September 2004 (68:518-537). Rosario Gil, Francisco J. Silva, Juli Peretó (member of the IEC) and Andrés Moya have performed a computational comparative analysis of eight bacterial genomes. Of the analyzed genomes, six were very small and not able to live free, whereas the other two genomes were larger and corresponded to free-living relatives. A reconstruction of a minimal metabolic machinery necessary to sustain life was carried out. The authors have proposed a minimal genome that contains 206 protein-coding genes with all the genetic information necessary for self-maintenance and reproduction. Such hypothetical simplest bacterial cell would consist of (i) a complete DNA replication machinery, (ii) a rudimentary system of DNA repair, (iii) a transcriptional machinery, (iv) a translational system, (v) the necessary proteins for protein-processing, protein-folding, secretion and degradation functions, (vi) only FtZ-driven cell division (considering that, in a protected environment, the cell wall might not be necessary for cellular structure), (vii) a PTS for glucose transport, (viii) energetic metabolism based on ATP synthesis by glycolytic substrate-level phosphorylation, (ix) three enzymes (ribulose-phosphate epimerase, ribose-phosphate epimerase, and transketolase) for the non-oxida-

tive branch of the pentose pathway. The scenario for the live of that cell would be living in a non-inducing stress environment where most essential nutrients and cofactors were present.

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### **The Technical University of Catalonia (UPC) and NANOCEM**

The Technical University of Catalonia (UPC) participates in NANOCEM, a European network whose objective is to generate basic knowledge on the nano- and microscale phenomena that affect the essential characteristics of cement and concrete. NANOCEM comprises 20 European universities and 11 European industrial partners that already do research and technology transfer of nanotechnology applied to cementitious materials.

Macroscopic properties of cement-based materials are strongly influenced not only by environmental service conditions, but also by microstructure. Despite concrete being the most widely used building material in the world, the fundamental mechanisms underlying its behaviour are very poorly understood, because of its chemical and physical complexity. The application of nanometric and microscopic techniques will provide in-depth understanding of both fundamental rheologic properties of cement pastes and the microstructural behaviour of these materials. The world average use of concrete has been estimated to be 2.5 tons per person per year.

The UPC participates in the network with two teams of the School of Civil Engineering of Barcelona: the group led by

Ignasi Casanova (Department of Building Engineering), doing research in nanosciences and nanotechnologies, and the group led by Ignasi Carol (Department of Geotechnical Engineering and Geo-Sciences), whose research focuses on the mechanical behaviour of materials.

The firms participating in the network have contributed a total of 1.2 million euro until 2006. As a result of the research to be carried out on nanoengineering, great changes are expected in the field of cement, the binding material most widely used in construction. These changes include a longer durability of concrete, which would resist better chemical aggression by external agents, and lower environmental impacts in the production of cement-based building materials. In addition, experts work in the introduction of functional nanoparticles in the cement with the ability to absorb CO<sub>2</sub>.

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### **International Malaria Consortium establishes its Secretariat in Barcelona**

The International Preventive Treatment in Infants (IPTi) Consortium, which recently received US\$16 million from the Bill & Melinda Gates Foundation to evaluate new studies on the malaria control in infants, has set up its Secretariat, directed by Pedro Alonso at the International Health Center of the Hospital of the School of Medicine (Hospital Clínic) of the University of Barcelona. Andrea Egan, a British scientist with a great experience on malaria research carried out in the UK, Gambia, the USA and Mali, has been appointed the IPTi Consortium Coordinator.

The IPTi Consortium gathers outstanding centers of research on malaria from Africa, Europe and the United States, as well as the World Health organization (WHO) and the United Nations Children's Fund (UNICEF). On the way towards the discovery of an effective malaria vaccine, intermittent preventive treatment is a novel promising strategy to control malaria. Giving to children antimalarial drugs intermittently during their first year of life has shown to cut more than half both children risk to contract the disease and the incidence of infantile anaemia. As children are usually the group most at risk of disease and death, targeting them may be effective to control a disease that kills every year 1.5 to 2.7 million people worldwide. Of this mortality, 90 per cent are African children under five; in some African regions almost half of all malaria cases occur in infants less than one year old.

Operating as a Consortium provides the opportunity to standardise approaches to the measurement of outcomes. It also allows to conduct trials with the same objective in many sites, which is essential because the pattern of malaria can vary greatly from area to area.

Further information:

<http://ipti-malaria.org>

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## Woman engineer from Alacant among the TR100

Núria Oliver, from Alacant, is among the 2004 top young innovators in technology (TR100) named annually by *Technology Reviews*, the world-oldest technology innovation magazine, founded at the Massachusetts Technology Institute (MIT) in 1899. Oliver (33), a graduated in Electrical Engineering and Computer Science, completed her doctorate studies at the MIT Media Lab with a scholarship from La Caixa Foundation. She is currently a researcher at Microsoft Research in Redmond, WA, USA, where she works on smart environments, context awareness, statistical machine learning, artificial intelligence, health monitoring, and human computer interaction to build computational models of

human behaviour through perceptually intelligent systems. Oliver projects include a smart office that can recognize what its occupants are doing, and a system that lets users interact with computers through hand gestures. She believes that technology can empower and increase the quality of life of people, and hopes to build computers that are able to recognize what they are perceiving and react accordingly. Her techniques would also provide another way for those who cannot use a keyboard—young children or the disabled—to communicate with computer.

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## European LIFE Project to preserving bear's populations in the Pyrenees

Throughout the twentieth century, the brown bear (*Ursus arctos*), which was once common in European forests, has been forced to leave its natural habitats and move to higher altitudes. Deforestation, uncontrolled hunting, water pollution, extending grazing and even policies against human predators, forced bears almost to extinction in some areas. It has been estimated that there were around 180 bears in the Pyrenees in 1937. In 1952, their number had dropped to 100, and in 1971 the bear's population was only 30-40. In 1996-1997 the French Government and the Spanish Autonomous Governments of Navarra, Aragon and Catalonia signed a LIFE Project with the European Union to reintroduce this species, which is considered of priority protection in the EU. (LIFE Project is the European Commission mechanism to fund programmes to protect endangered species.)

In the case of the brown bear, the main goal of the LIFE Project was to know the possibility of establishing a viable population of bears in the Pyrenees and that its long-term preservation were compatible with human activities that develop on the same territory. The pilot program was the first phase of all the

BROWN LIFE/BEAR programme and consisted of the liberation and follow-up of 3 individuals over 1996 and 1997. Genetic studies in different European bear's populations indicated that, among those whose numbers were high enough to allow removing some individuals, Slovenian bears were those genetically most similar to the brown bear of the Pyrenees. So, two females—Ziva and Melba—and one male—Pyros—from Slovenia were taken to the Pyrenees in the hope that they could reproduce—either among themselves or with other bears of the small populations still remnant. They seemed to adapt well to the new habitat and were soon wandering at both sides of the border. Both Ziva and Melba had their first offspring in 1997. Unfortunately, that very year Melba was shot dead. A female of the original remnant population has been also shot dead recently—in 2004—by a group of French hunters. Its 10-months-old baby escaped, but it will be difficult for him alone to survive winter. Teams of scientists at both sides of the border have tracked the bear populations, which could be 13-15 almost ten year after the introduction of the Slovenian bears. The Catalan Government receives between 15-25 annual claims of damages caused by bears to cattle, especially in the Vall d'Aran region, which means compensations to shepherds with a total amount of around 15,000 euro. Although the signs are encouraging, the bear's population is still too small. To ensure its long-term survival, the population should be between 80-100 bears.

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## *Pierolapithecus catalaunicus*, a new Middle Miocene great ape discovered in Catalonia

On November 19, 2004, the journal *Science* published the discovery of a partial skeleton with facial cranium from a new Middle Miocene (12.5 to 13 million years ago) ape that could be close to the last common ancestor of great apes and

humans (*Science* [2004] 306:1339–1344). A team led by Salvador Moyà-Solà, from the Miquel Crusafont Institute of Paleontology, Sabadell, Catalonia made the discovery. They named the new species *Pierolapithecus catalaunicus*. The genus name refers to Hostalets de Pierola, a small village 50 km from Barcelona next to the site where they found the remains, whereas the species epithet refers to Catalonia. The specimen found was given the nickname Pau, which is a Catalan polysemic word meaning both 'Paul' and 'Peace'. The discovery of *P. catalaunicus* provides a new perspective regarding two major aspects of hominoid evolution. In fact, it shows that the known Middle Miocene African taxa are too primitive for them to be considered as stem great apes, as previously suggested. In addition, it provides evidence that early great apes are more primitive than inferred from neontological data, because it associates primitive hominoid and derived great ape features.

cohol cleaner production, and economical and quality aspects were also discussed in the meeting. The Conference, chaired by Joan Mata (University of Barcelona) was co-organized by the University of Barcelona, the Catalan Institute of Wine (Institut Català del Vi, INCAVI), the International Water Association (IWA) and the Office International de la Vigne et du Vin (OIV). Among sponsors were Catalan worldwide known cava producers Codorniu and Freixenet. France, Spain and the United States (in this order) were the countries with the highest numbers of contributions, which reflects the significance that viticulture and winery has in these countries.

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### Conference on Public Communication of Science and Technology

The 8th Conference of the International Network on Public Communication of Science and Technology (PCST-8), held in Barcelona, June 3 through 6, 2004, gathered 650 participants from more than 50 countries. With the motto «Science, Knowledge and Cultural Diversity», the PCST-8 opened up a field to debate on the global discourse of science in a range of local culture and knowledge environments. This huge subject was faced from cross approaches, such as ethics (science and science communication ethics) and innovation in the PCST frame. In addition, a special session was devoted to young generations (future scientists and communicators) and women. In the closing session, Vladimir de Semir, chair of the conference, announced that Barcelona would host the first headquarters of the International Academy «Science & Society» (provisional name). This new organization will be responsible for the creation of the documentary basis of the PCST network and will have as a main task the drawing up of reports on regarding communication and social understanding of science. De Semir, who will chair the Network between 2004-2006, announced also that the Academy

will look for the necessary international resources to guarantee the inclusion of countries with more restraints in the field of communication. The network must grow up, but it must also represent all the different cultures of the world. Thus science communication must respect the different cultural contexts and include the knowledge of all continents.

The executive committee of the PCST network decided also to give support to the content of the Olympia Letter of Culture, document signed in September 2001 at the beginning of the Athens Cultural Olympiad by sixty personalities from all over the world as an initiative of the Hellenic Ministry of Culture. The Letter includes the formal commitment to «make public or private media to assume, aware of their moral responsibility, their role of carriers of peace and dialogue, and guarantee the plurality of the information, as well as their independence regarding all pressures from the political, ideological and economical power.»

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## CONFERENCES

### Sustainable viticulture and winery wastes management

The 3rd International Specialised Conference on Sustainable Viticulture and Winery Wastes Management was held in Barcelona, May 24 through 26, 2004. Two previous conferences, held in France in 1994 and 1998, had focused mainly on the treatment and management of winery effluents. In many countries, legislation regarding wastes has evolved significantly over the last few years and is a fundamental reference for an optimal environment management. Within this scenario, the scope of the 3rd Conference broadened to include all aspects related to sustainable viticulture, which considers the whole life cycle of wine, and thus, all the environmental aspects that should be taken into account. Classical and relevant subjects including winery effluents treatment and disposal, the related field of vinasses and wine-al-

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### Congress on hazelnut

Hazelnut (*Corylus avellana* L.) has been a classical culture in Tarragona district since the thirteenth century. After the nineteenth century, the number of commercial orchards increased dramatically and Catalonia now leads hazelnut industry in Spain. The current hazelnut production in the Tarragona district is around 20,000 tons per year, 85% of total crop in Spain. That was the reason why the city of Tarragona was chosen to host the 6th International Congress on Hazelnut, held in June 14 through 18, 2004. Topics discussed at the meeting included germplasms and genetic improvement, biology and physiology, propagation and rootstocks, orchard management, pest and diseases, postharvest and quality, and industry, marketing and economics. The congress programme included also visits to «Mas Bové», the estate that hosts the Catalan Institute for Food Research and Technology (Institut de Recerca i Tecnologia Agroalimentàries IRTA), where the Hazelnut Germoplasm

Bank is located; to several orchards for demonstrations of harvesting machines; and to a nut industry.

### **Aquaculture Europe 2004 (AE2004)**

The annual conference of the European Aquaculture Society (EAS) was held in Barcelona, October 20 through 23, 2004. Rosa Flos (Technical University of Catalonia) chaired the AE2004 Organizing Committee, and Sandra Adams (University of Stirling, UK) and Jan A. Olafsen (University of Tromsø, Norway and President of the European Society for Marine Biotechnology) chaired the Programme Committee. The motto of the conference was «Biotechnologies for quality», and the sessions focused mainly on the presentation and discussion of recent advances in biotechnology (including new products and methodologies) and their impact in the improvement of aquaculture production and seafood quality. Food quality and safety have become high priorities in Europe and worldwide. Advances in plant and animal sciences and biotechnologies, including the application of genomics, have contributed to the advancement of aquaculture and its role in the production of high-quality, health promoting seafood. The first day of the meeting, the EAS and the Spanish Aquaculture Society (SEA) co-organized a workshop on the «Challenges of the Mediterranean Aquaculture», to promote exchange of information among producers, researchers and others associated with the industry in the Mediterranean region. Rita Colwell, University of Maryland College Park Distinguished Professor, US National Science Foundation past Director, and microbiologist expert in marine biotechnology (she is founding President of the University of Maryland Biotechnology Center) imparted the inaugural lecture, which dealt with the leading role that biotechnology can play in the 21st-century aquaculture, with its modern tools, which include genomics and computational analysis.

### **Engineering Education in Sustainable Development 2004 (EESD2004) and the Declaration of Barcelona**

The 2nd international conference on Engineering Education in Sustainable Development (EESD2004) was held at the Technical University of Barcelona, October 27 through 29, 2004. These conferences are devoted to the embedment of sustainable development in research and education in higher education in engineering. The aim of the work carried out at EESD2004 was summarized in the Barcelona Declaration released the last day of the conference. That document considers (i) the role that engineers must play in the exercise of their profession, which must include social aspects and application of professional knowledge according to universal values and ethics; (ii) the role that engineering education, backed by the university community and the wider engineering and science community, must play to train engineers able to carry out what society expects from them; and (iii) the aspects of the educational process that must be reviewed in relation with the above. The document ends stating that «[u]niversities must redirect the teaching-learning process in order to become real change agents who are capable of making significant contributions by creating a new model for society. Responding to change is a fundamental part of a university's role in society. There is evidence that sustainable development has already been incorporated in engineering education in a number of institutions around the world. The United Nations Decade on Education for Sustainable Development (2005-2014) offers a great opportunity to consolidate and replicate this existing good practice across the international higher education community.

Universities now have the opportunity to re-orient the traditional functions of teaching and research, by generating alternative ideas and new knowledge. They must also be committed to responding creatively and imaginatively to

social problems and in this way educate towards sustainable development.»

### **17th Conference of Physicians and Biologists of Catalan Language**

On October 28 through 30 2004 the 17th Conference of Physicians and Biologists of Catalan Language (Congrés de Metges i Biòlegs de Llengua Catalana, CMBLC) was held in Valencia. This conference has a tradition that goes back to 1913, when the first edition was held in Barcelona, and its spirit goes beyond the professional scope of most scientific meetings. The CMBLCs gather professionals and students from the various fields of the life and health sciences that, in addition of their common interest for science, have a common language and culture. The fact that Catalan language and culture are main links among the participants does not mean that the scientific aspects of the conference are overlooked. On the contrary, the organizers always invite lecturers that are leaders in their specialties, often working in centres of worldwide prestige. Another feature of the CMBLCs is the participation of lecturers from fields other than the life sciences, such as philosophers, linguists and historians. Special invited lecturers of the 17th CMBLCs were Àngel Pellicer, from New York University Medical Center, whose main research interest focuses on oncogenes and tumor suppressor genes, and their role in tumorigenesis; Bernat Soria, from Miguel Hernández University-Eltx, pioneer in the study of stem cells and their potential therapeutical applications; and Eudald Carbonell, from Rovira Virgili University, Tarragona, and co-director of the Sierra de Atapuerca, Burgos paleontological sites, where the discovery of human fossils and stone tools at least 780,000-year old altered radically the fossil hominid record in Europe.



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### **General Assembly of the Union Académique International (IUA) (International Union of Academies) held in Barcelona.**

The 78th General Assembly of the Union Académique International (IUA, International Union of Academies) was held in Barcelona in the frame of the Barcelona Forum of Cultures, May 26 through June 2, 2004. The Institut d'Estudis Catalans has been a IUA member since 1922, and even when its activities were suppressed by Franco's dictatorship its IUA membership was never interrupted. The IUA work sessions ended with the elections for the presidency for the period 2004–2007. Agostino Paravicini Bagliani, IUA member that represents the Swiss Academy of Humanities and Social Sciences, was elected for that post. According to its 1919 bylaws, the IUA aim is «to encourage cooperation in the advancement of studies through collaborative research and publications in those branches of learning promoted by the Academies and institutions represented in the IUA—philology, archeology, history, the moral and social sciences.

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### **Challenges for Geomagnetism, Aeronomy and Seismology in the XXI Century**

Within the framework of the centenary of the Ebro Observatory of Cosmic Physics (it was set up in 1904), located in Roquetes, near the Ebro Delta, the International Conference «Challenges for Geomagnetism, Aeronomy and Seismology in the XXI Century» was held at that center on September 29 through October 1, 2004. The meeting, chaired by Arantza Ugalde, (Ebro Observatory, Spanish Scientific Research Council, and University Rovira Virgili), covered topics dealing with Ebro Observatory's prime lines of research, and addressed basically the following questions: Is the observation of geophysical parameters still necessary? When will we have enough information? From where and how should the new observations be done? To what extent are our models reflecting the reality? In which way can they be improved? Frontier and multidisciplinary topics including Geomagnetism, Aeronomy and Seismology were also discussed.

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## **AWARD**

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### **2004 EUROSOLAR Award to Ecoserveis, Barcelona**

EUROSOLAR, the European Association for Renewable Energies awarded the 2004 Eurosolar award in the category of solar architecture to Ecoserveis, a non-governmental organization based in Barcelona that has worked in the field of renewable energies since the early 1990s. EUROSOLAR, founded in 1988, is a non-profit European association that promotes the total replacement of nuclear and fossil energies with renewable energy sources. It conducts its work independently of political parties, institutions, commercial enterprises and interest groups. The award on solar architecture was given to the Ecoserveis «Fàbrica del Sol» (Sun Factory) project. Such a project consisted of recovering, refurbishing, transforming and managing the last building of former abandoned Barcelona Coal Gas Factory and making it energy self-sufficient. This has been possible using solar thermal and photovoltaic power, biogas from a landfill, and electricity from a local wind farm. It has also a water collection system that allows re-using water. The building, in which aspects of architecture, town planning and sustainability are brought together, serves now as a center for demonstration, information and education on renewable energies in the heart of the city.