

A close-up photograph showing a person's hands peeling an orange. The orange is being held over another person's hand, which is covered in intricate brown henna designs. The person peeling the orange is wearing a ring. The background is dark, and the lighting is focused on the hands and the orange. The overall scene suggests a traditional or cultural activity, possibly related to a wedding or a festival.

# THE MAG

OCTOBER-DECEMBER 2010



UNIVERSITAT POLITÈCNICA  
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## TECHNOLOGY LEND A HAND

**WORLD RESEARCH** Seeking a solution for imminent collapse of mobile telephony.  
**INTERVIEW** Prof. Ulises Cortés on artificial intelligence. **DOCTORATES** Lighting that turns on our emotions. **SUCCESS STORY** Lluís Bertran, director of Liberalized Business Europe for Gas Natural Fenosa. **OUR PARTNERS** Endesa.

<http://barcelonatech.upc.edu>

04

# UPC-Barcelona Tech, a pioneer in international cooperation

Each year some 500 members of the UPC-Barcelona Tech community take part in international cooperation projects. Students, faculty and administrative staff find time in their busy schedules to work on projects that are then implemented in countries around the world, particularly in the South.



Professor Lorenzo Alvarez participated in a project to improve poultry production in communities in the Amazon region of Peru.



The photo taken by Daniel García shows the first generations of female doctors from Gambia to use a computing room, in the framework of a cooperation project.

Many members of the UPC-Barcelona Tech community are acutely aware of the social and economic problems facing developing countries. They contribute their effort and knowledge, and the university's technology, to support projects that often take them far afield. Students, faculty and administrative staff work together on these initiatives. The number of projects has grown from some twenty in the first years of the program to over a hundred. In 1992 UPC-Barcelona Tech set up the Center for Cooperation and Development (CCD) to support and steer these initiatives. The unit was the first of its kind at a Spanish university. Each year the CCD provides grants for development projects. Following the most recent call last May, 102 projects were given full or partial funding to help them achieve their goals.

#### WORKING ON THE SOUTH

Of a total of nearly 500 program participants, 266 will travel to target countries to work on the ground with their local counterparts. As in previous calls, the majority of the projects approved focus on countries in Latin America (56) and sub-Saharan Africa (24), though they also include actions in Palestine, Algeria, India, Morocco, Nepal and Thailand.

There are many young volunteers with stories to tell. Alba Colell, an architecture student, has already been involved in three cooperation projects through the CCD, one in Argentina and two in Morocco. This summer she spent three weeks working on a "Study and Technical Audit of Ksar El Khorbat," aimed at improving the

architectural structure of dwellings in the Atlas Mountains of Morocco. Her participation in these actions provides her with an opportunity to apply the knowledge gained in her university studies and work with countries in the South. Colell has no doubt that if she continues her studies at UPC-Barcelona Tech she will remain involved in these cooperation projects.

And it is not only students who are getting involved. Lorenzo Álvarez, a professor in the Master in Agriculture for Development program, has participated in a project to improve poultry production in communities in the Amazon region of Peru. Álvarez, who has worked closely with people in the region, feels his involvement in the project has been a personally enriching experience and is convinced "there's no better classroom than the Amazon because it's very rich in biodiversity."

#### Following the most recent call, 102 development projects were given funding

In 2010 the CCD will provide almost \$470,000 to fund approved projects. Funding comes from contributions made by the Technology Transfer Center, which provides 0.7% of revenue earned under educational cooperation agreements and from services, courses and other programs. The Fundació UPC also supports the program. Apart from this institutional backing, the 0.7% Campaign encourages students, professors and administrative staff to voluntarily contribute 0.7% of their tuition fees or salaries to fund projects.

The global economic situation is making it more difficult to get people to commit, but it also means their support is more necessary than ever. According to CCD coordinator Xavi Ortega, "the economic crisis is affecting the entire volunteer sector, and it's also having a dramatic impact on the half of the world's population who are already living in extreme poverty. In this situation we need to make an extra effort to maintain or even increase our support and active commitment so that existing imbalances can be reduced."

The CCD's work does not focus only on the South: part of its annual budget is allocated to actions aimed at raising awareness at UPC-Barcelona Tech. The coordinator of the CCD says that "learning about other realities and understanding their causes and effects is an essential first step if we are going to integrate them in our attitudes and the way we see things." Ortega underscores the importance of these programs, which he sees as "the path we need to follow to ensure that the university does more to contribute to social transformation through teaching, research and technology transfer."

<http://www.upc.edu/ccd>

#### ON THE COVER

The photograph *Union ritual* by Laia Mercadé received an Images from the South award from the CCD in 2008.

# Seeking a solution for imminent collapse of mobile telephony

According to the latest calculations, the smartphone boom will lead to a collapse of wireless telecommunications networks in three years. The European Freedom project is aimed at designing solutions to prevent this feared consequence of technological progress.



New smartphones could spell the beginning of the end for wireless telecommunications networks.

In recent years, growth in the use of smartphones has led to an exponential increase in data consumption over wireless telecommunications networks. If this trend continues, networks are expected to collapse in just three years.

To avoid this, a team of researchers with UPC-Barcelona Tech's Signal Processing and Communications Group, headed by Professor Josep Vidal, is coordinating the European Freedom project. The goal is to design technological solutions that make it possible to extend mobile telephony coverage inside buildings, while at the same time boosting the capacity of telecommunications networks. It is also essential to develop a profitable business model to ensure the viability of the new technology.

## FEMTOCELLS

The research focuses on femtocells—telecommunication cells that serve as economical, short-range cellular base stations. Femtocells use an ADSL or fiber optic network to increase the transmission rate of wireless systems by acting as mini base stations.

Right now the main stumbling block is protocols and interference between elements that all share the licensed wireless spectrum used for conventional mobile telephony services. The

biggest challenge for the Freedom project, part of the European Union's 7th Framework Program, is therefore to organize the transmission of data from indoor mini base stations to outdoor cell sites.

Once these hurdles have been cleared, the massive deployment of mini base stations (expected to take place around 2012-2013) will deliver improved coverage inside buildings with very low transmission power. This will extend the life of existing telephone batteries without the need to introduce additional WiFi devices.

## BUSINESS-ORIENTED APPROACH

The team of researchers is also studying the business model that can be built around these new devices. One option is to charge special rates for cell phone calls within femtocell coverage areas and services based on the proximity of cell phones to mini base stations, such as SMS notification services or activation of home automation devices. Alternatively, telephone operators could reduce the congestion that

occurs when there are peaks in demand by offloading some traffic to a conventional cell site via the ADSL connection.

The Freedom project involves a consortium of eight university and business partners, includ-

## Mini base stations could be deployed between 2012 and 2013

ing UPC-Barcelona Tech, which plays a coordinating role. The other participants are Università di Roma La Sapienza, the Czech Technical University, the French Atomic Energy Commission, and the companies Dune S.L.R. (Italy), Telkom Indonesia, Sequans (France), and Siradel (France). The project has a total budget of \$3.45 million.

<http://gps-tsc4.upc.es/>



Professor Josep Vidal is coordinating the European Freedom project.

## From nothing to everything: the origin of matter

The EuroGENESIS research program, coordinated by Jordi José of UPC-Barcelona Tech's Department of Physics and Nuclear Engineering, is aimed at explaining how matter evolved to become complex from the moment of the Big Bang, when hydrogen, helium and lithium were produced in the first few minutes, until 180 million years later, when the first stars formed and the rest of the elements gradually appeared.

This is the first time a program of this kind has engaged the research efforts of a cross-disciplinary team of theoretical astrophysicists, observational astronomers, cosmologists, and nuclear physicists. Four hundred researchers are involved in the EuroGENESIS project, which links 29 research centers in 16 European countries, Canada and the United States.

## Storm elves and sprites recorded on video

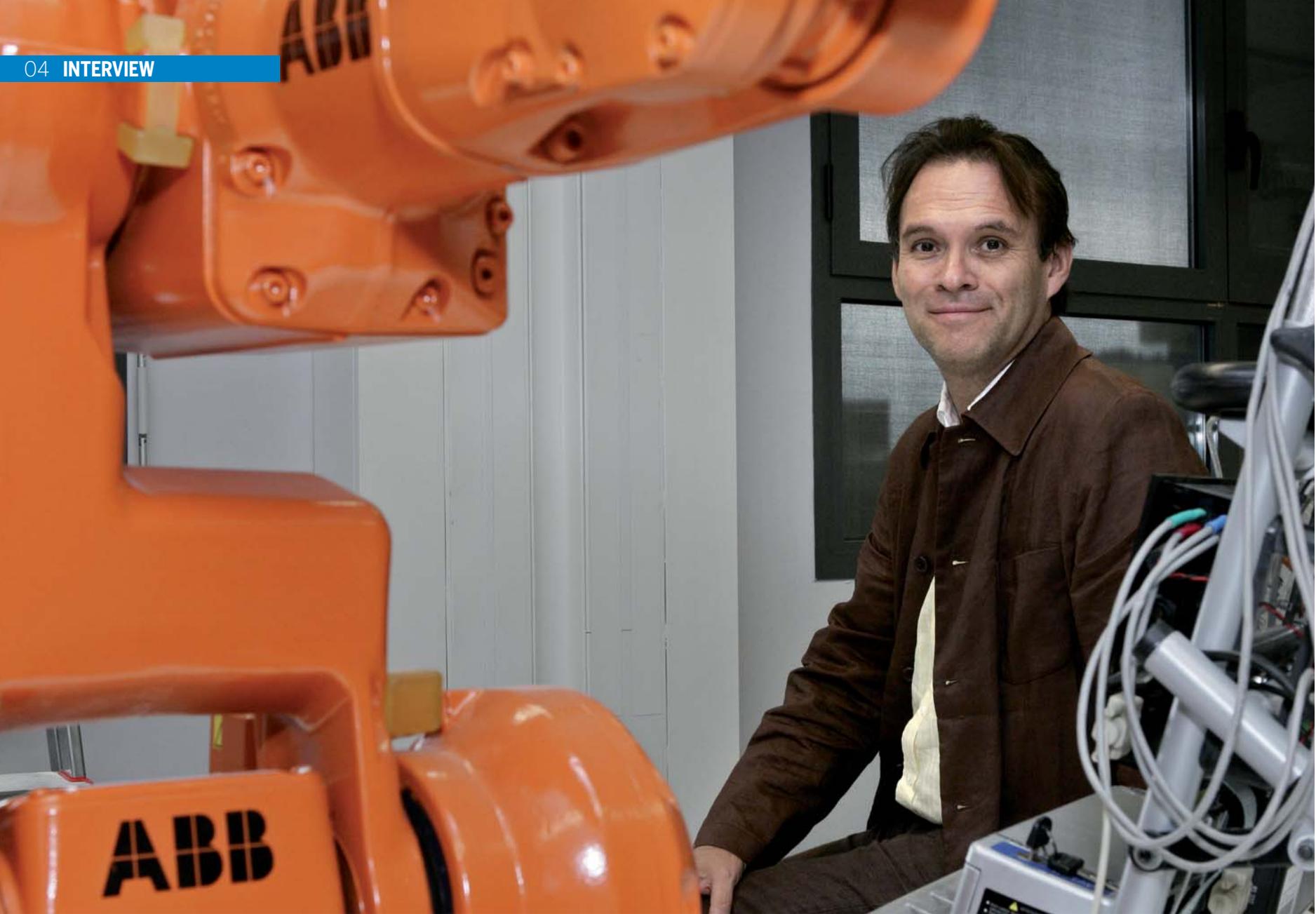
For the first time in Europe, a team of scientists has recorded images of elves and sprites in storms, transient luminous electrical phenomena generated in the upper layers of the atmosphere. Joan Montanyà, a researcher with UPC-Barcelona Tech's Department of Electrical Engineering, is a co-author of the study.

The results show that fewer elves are produced during storms over land than during those at sea, despite the fact that the electrical currents generated by the latter are thought to be stronger. The researchers also observed the interaction between two sprites, which allowed them to gain insight into the electrical structure and dynamics of these discharges.

The images were recorded using a high-speed video camera fitted with an image intensifier.

## Reducing the risk of flooding

The IMPRINTS project, led by Daniel Sempere of UPC-Barcelona Tech's Center for Applied Research on Hydrometeorology and partially funded by the European Union's 7th Framework Program, is in the process of fine-tuning the latest technological tools aimed at improving flood-risk management. The tools will also form the basis for new forecasting and alert systems. A better understanding of the phenomena that lead to flooding and sudden ground movements will make it possible to predict these events and gain time, resulting in a higher level of safety for the population. IMPRINTS is a consortium of 19 public and private entities based in Spain, Switzerland, the United Kingdom, France, Italy and the Netherlands, with the collaboration of universities in South Africa and Canada.



## ULISES CORTÉS

“The SHARE-it project proposes a social contract between machines and individuals”

Ulises Cortés, a professor and researcher in the area of artificial intelligence in the Software Department at UPC-Barcelona Tech, spearheaded the European SHARE-it project. In August 2010, he presented the i-Walker, one of the assistive device prototypes developed under the project, at the World Expo in Shanghai.

### What is artificial intelligence?

Artificial intelligence is a scientific discipline that studies the mechanisms that give rise to human reason, which is the easiest part to explore. It then seeks to determine how these mechanisms can be replicated on a computer in order to allow us to solve complex problems.

### I see.

It's a form of mimesis. We say, “This is how something works in nature. How would it work in the artificial world?” The artificial world thus requires abstract thinking, as well as the use of increasingly powerful reasoning mechanisms: deductive reasoning, inductive reasoning, case-based reasoning, etc. There are hundreds of forms of reason, which are joined to simulate the mechanisms used when people think about the world and to try to reproduce so-called common sense. That's artificial intelligence.

### Which areas of artificial intelligence do you focus on?

We began by exploring knowledge representation. We later evolved toward machine learning, that is, designing algorithms that allow machines to learn. Our specialty for years now has been, when presented with a set of skills, to try to discover whether any of them is new and, if so, to learn it. That's the easy part. The more complicated part is to see whether what we've learned modifies what we already knew in any way and whether we are willing to accept such modifications.

### What applications do the results of your work have?

Our group conducts basic research. Of course, once we develop a tool, we hope to apply it. We mainly work in the environmental and health sectors, as well as in e-commerce. The company SISLTECH is a group spin-off in the latter field.

### Can you name a project that exemplifies what you are talking about?

For instance, one issue that interests us quite a bit, and on which we have been working for more than 15 years, is wastewater treatment. DAI-DEPUR is a very long-term project. First, we designed an expert system to control a treatment plant in Manresa. Today, a plant in Granollers uses our system to treat wastewater every day. Next, we tried to implement intelligent management of the Besòs watershed. Our work in this sphere led to the launch of the company 3Scale.

### And in the health sector?

For eight years, we collaborated with Hospital de la Santa Creu i Sant Pau in Barcelona on the CARREL project. The idea was to develop a system that would allow hospitals to share information about human organ and tissue donors and recipients in order to generate

more efficient mechanisms for assigning transplants. The goal was to minimize the loss of viable organs for transplant.

**You also coordinated the EU-funded SHARE-it project in this sector. What technologies does a project like that yield?**

Such broad-based projects tend to involve a wide range of technology; however, more than technology, projects are driven by the questions they seek to answer. In this case, the questions were twofold: first, could we determine the amount of help that a disabled person requires in order to live autonomously in his or her own environment; second, could we detect changes in a user's needs in order to increase or decrease the necessary assistance accordingly, so that he or she would never receive too little or too much. That is the crux of the problem, to provide exactly the right amount of help.

**Can the answer to these questions be found in prototypes like the *i*-Walker?**

People have different needs and require different assistive devices. By answering the questions "what type of help is required" and "how much help is needed," we can determine whether a person needs an intelligent walker [*i*-Walker], a semi-autonomous wheelchair [Rolland], or a semi-automated platform [Spherik]. The *i*-Walker, Rolland, and Spherik are some of the assistive devices that we have developed. While the *i*-Walker is no doubt the most innovative, what matters most is what lies behind each of these platforms for assisted mobility.

SHARE-it is an assistive philosophy that goes beyond mere mechanics. Indeed, we saw it as a social contract between machines and individuals. Although that might seem a bit far-fetched, the idea is that you cede some of your autonomy to a machine so that it can act in your name on the understanding that you will then be responsible for any actions it might carry out.

**You've taken things one step further, presenting the *i*-Walker at the 2010 World Expo in Shanghai.**

That's right. We entered an Italian call for innovation a while back, because the *i*-Walker was developed with the help of Italian medical teams. We were chosen, and, as a result, the walker has been exhibited in the Italian pavilion "Italy of Innovators" with a view to finding an investor. We develop things, but once we have, we need a company to come along and say, "I'll take 10,000 of those."

**Which field of application of artificial intelligence do you find most gratifying?**

Personally, I'm most interested in the research, regardless of its applicability. Beyond that, I'd say that the applications related to medicine have the greatest social impact, and when these applications affect specific individuals, there is always the satisfaction of hearing personal stories. Not to mention the impact in the media.

**Is that something that you have to take into account when proposing a research project?**

No, but when asked what I find gratifying, I can only reiterate, for me, it's the research. This is mainly because people don't generally wonder about things anymore. The only thing they care about is whether, when they press a button, everything will work. They don't ask whether or not something is complicated from a technical standpoint; they simply want it to do whatever it is it's supposed to do. Ultimately, I think there is also a certain need to raise the profile of the research being conducted at our universities. To this end, we have realized that emphasizing the social aspect of any type of research at the very least has the advantage of getting people to begin to think about the technology behind the tool you have given them.

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**"ONCE YOU'VE BEEN BITTEN BY THE RESEARCH BUG, YOU'LL RESEARCH ANYWHERE."**

Ulises Cortés was born in Mexico City. He earned his degree in industrial and systems engineering from the Instituto Tecnológico y de Estudios Superiores de Monterrey (Monterrey Tech, Mexico State Campus) and came to Barcelona in 1982 to pursue a PhD in computer science at UPC-Barcelona Tech. Since then, he has maintained his ties with the university, where he conducts research and teaches (associate professor from 1985, tenured professor since 1988, full-time professor since 2006).

"Barcelona," he explains, "is an epiphenomenon in our specialty. For years, the members of the Catalan Association for Artificial Intelligence (ACIA) were responsible for a significant number of the scientific papers written in Spain in our field. Today, that has changed. The number of larger groups in Spain is growing by the day. However, the productivity level here remains high."

In 1989, he founded the Knowledge Engineering and Machine Learning Group (KEMLg), where he applies the results of his research in artificial intelligence to useful products for society. "Once you've been bitten by the research bug, you'll research anywhere," he explains. "The main problem with research here is not the quality, which is very high, but the fact that society attaches so little importance to it. Universities are not seen as a strategic asset for society at large."

In addition to teaching and research, Cortés has devoted many years to international affairs. Over the years he has served as vice-dean of international affairs for the Barcelona School of Computer Science (FIB), secretary general of the CLUSTER university network, and representative of the president of UPC-Barcelona Tech for institutional relations with Mexico.

"I have always been involved in small-scale research projects, which I've combined with international affairs. That has opened the doors to a vast range of opportunities for me to collaborate with other universities, travel throughout Europe and observe other ways of working." When asked how people elsewhere work, he explains, "There are places where everything runs like clockwork. Funding is more stable, salaries are very high, you only teach a few classes, and you don't have tenure. Everything is more competitive, and if you don't do a good job, you're out the door. That said, the quality of life in Catalonia makes up for the shortcomings." Since 2007, he has been the academic coordinator at the Barcelona Supercomputing Center.



An elderly person uses the *i*-Walker in the Barcelona North Campus of UPC-Barcelona Tech.

# Lighting that turns on our emotions

Urban lighting affects the way people feel. This is the conclusion of a doctoral thesis conducted at UPC-Barcelona Tech which proposes that emotional factors be taken into consideration when designing light spaces in cities in order to enhance the environment for urban life and contribute to the well-being of city dwellers.



In the lighting of spaces, the effect on people's emotions is increasingly being treated as a significant factor.

Emotions play a central role in our everyday lives: they help us gain knowledge, influence our decisions, stimulate creativity and memory, and are vital to our well-being. Everything we do and perceive has an emotional component, and this needs to be taken into account if spaces are to be designed in a way that is in accord with people's expectations. Amparo Berenice Calvillo, a graduate in architecture from the University of Guadalajara (Mexico), decided to explore this idea in her doctoral thesis, completed at the School of Architecture of

Barcelona. Her study on the way urban lighting influences our emotions is based on the concept of emotional design.

We all know design can create different moods, but in the case of public lighting the emotional factor has been largely overlooked. Generally the approach taken is quite uniform and fails to consider how lighting can affect the way visitors respond to a space, our feeling of attachment, or the sense of esteem felt by city dwellers. To prove her point, Calvillo needed to find out what emotions people experience in specific urban light environments.

After reviewing the most recent literature on the psychology of emotions, visual perception,

lighting design, and emotional design, Calvillo conducted an experimental study involving participants from the University of Guadalajara (Mexico), UPC-Barcelona Tech (Spain), and the University of Perpignan Via Domitia (France). A number of psychological questionnaires were used to collect subjective data on the emotions participants experienced in response to images showing a series of light spaces in Guadalajara, Barcelona, and Perpignan.

## LEARNED VALUES

The conclusion was that urban lighting influences emotions in all cases, and that certain emotional responses (such as pleasant or unpleasant surprise, inspiration, and disappointment) are cultural in origin, while others (esteem or affinity, fascination, enjoyment, fear, and uncertainty) are common across cultures. The reason for this, according to Calvillo, is that "cultural emotions imply expectations that may differ from one culture to another because they're related to everyday life and learned values."

Calvillo was also able to identify a number of relationships between light parameters and emotions. For example, light that is more intense and distributed appears to provoke states of action and excitement, such as enjoyment and fascination. In contrast, spaces with diffuse, low-intensity lighting arouse both positive and negative emotions, such as fear and affinity.

Based on her research, Calvillo concludes that: "In addition to factors like energy and functional efficiency, a sustainable approach to design needs to reflect emotional considerations. Interest in the affective dimension of human experience is increasing, so we may soon see urban, industrial and technological designs that take more account of human factors, including emotions."

## THESIS



### Author

Amparo Berenice Calvillo

### Supervisors

Ramon San Martín,  
Department of  
Engineering Design

### Title

Light and emotions: a study on the influence of urban lighting on emotions, based on emotional design

### Why did you choose this line of research?

I have a personal interest in the subject and I've been involved in other projects related to lighting that led me to conduct research on the relationship between light and emotions.

### Areas of application

Design of urban lighting and luminaires, home automation, computer programs for designing and evaluating lighting, industry.

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Emotional responses to images of light spaces in Barcelona were included in the thesis.

## Orientation Week for international students

What do I have to do to register? Can I do a work placement with a Spanish company? What time does the library close? What documents do I need to open a bank account? These and many other questions posed by UPC-Barcelona Tech's new international students were answered during Orientation Week. The event, held in Barcelona and Terrassa, was organized by the International Relations Service with the cooperation of university services and schools.

Newcomers were offered information and advice to help them deal with the practical matters they need to take care of when they arrive to take up their studies. Orientation Week also provided them with a broad overview of UPC-Barcelona Tech and the language and culture of their host country. Over 200 students signed up for the Barcelona edition of the event, which ran from 6 to 10 September and included visits to the city's Gothic Quarter and the Museum of the History of Catalonia. The majority of participants were from countries in Europe and Latin America, but students from China, India, Pakistan and Iran also took part. At the Terrassa Campus, where 80 international students are enrolled, Orientation Week was held from 4 to 8 October.



## Two UPC-Barcelona Tech vehicles take part in Formula Student



Two teams from UPC-Barcelona Tech have participated in this year's edition of Formula Student, an international competition that challenges the world's most prestigious universities to design, build and compete with single-seat racing cars. In August, the ETSEIB Motorsport team, made up of 23 students from the School of Industrial Engineering of Barcelona, competed on the Formula One track in Hockenheim (Germany), and in September the team raced in Varano (Italy) with the single-seat CAT03, powered by a 4-cylinder, 4-stroke motorcycle engine.

The UPC ecoRacing team, made up of eight students from the School of

Industrial and Aeronautical Engineering of Terrassa (ETSEIAT), also participated in the competition with the ecoR2, the first hybrid car built by university students. The vehicle, which is equipped with a hybrid power train that develops a maximum power of 34 kW, raced at the Silverstone circuit (UK) in the alternative car category, and in October it will compete again in Turin (Italy).

From 23 to 26 September, the two UPC-Barcelona Tech teams raced at the Circuit de Catalunya track in Montmeló.

[www.ecoracing.es/](http://www.ecoracing.es/)  
[www.etseib-motorsport.upc.edu/](http://www.etseib-motorsport.upc.edu/)

## Students drive ICT for development

On 9-10 September, UPC-Barcelona Tech hosted the 5th Annual Conference of the International Network for Postgraduate Students in the Area of Information and Communication Technologies for Development (IPID-ICT4D). The conference was organized by UPC-Barcelona Tech and the Open University of Catalonia. Participants presented master's and doctoral research projects that focus on areas related to ICT for development: gender, rural development, online communities, e-government, technology, education, e-health and entrepreneurship.

The conference was attended by some 50 students who brought along their master's and doctoral thesis projects. Some of their theses are supported by UPC-Barcelona Tech's Center for Development Cooperation. Most attendees were from European countries, but there were also participants from New Zealand, India and Tibet.

[www.humanit.org/PID](http://www.humanit.org/PID)



## UPC-Barcelona Tech: European capital for aeronautical engineering students

From 20 to 24 September, the Annual Meeting of the EUROAVIA Congress (AMEAC 2010) was held in Spain for the first time. The event was organized by the EUROAVIA Terrassa student association. The congress for aeronautical engineering students took place at the School of Industrial and Aeronautical



Engineering of Terrassa (ETSEIAT) of UPC-Barcelona Tech. Lectures were given by professionals working in the sector, including Joan de Dalmau, director of the Aerospace Research & Technology Center (CTAE), and Albert Ramírez, an engineer with Eurocopter, a helicopter design and manufacturing firm and member of the European EADS consortium. Participants visited the Barcelona Airport's T1 terminal, ranked as one of the best in the world. The EUROAVIA Terrassa student association represents UPC-Barcelona Tech and Catalonia in EUROAVIA International, a network of universities and European cities that offers future aeronautical sector professionals an opportunity to make contacts, interact, and organize activities throughout the year. Activities are aimed at complementing formal education and giving students a chance to pursue projects that bring them into closer contact with the aerospace industry.

<http://www.euroavia-terrassa.eu/>

## Ubuntu Forum calls for Tobin Tax

A group of experts from academia and the financial sector have confirmed the feasibility of the Tobin Tax, a proposed tax on financial transactions that would be used to raise revenue for investment in developing countries. The report was commissioned by the governments of 12 countries in Europe, the Americas and Africa. According to the report, entitled *Globalizing Solidarity: The Case for Financial Levies*, the tax would be easy to apply and a micro-tax of just 0.005% on transactions between banks would be enough to raise \$33 billion per year. The countries that commissioned the report—Germany, the UK, Japan, France, Belgium, Norway, Senegal, Brazil, Spain, Korea, Austria and Chile—belong to the Leading Group on Innovative Financing for Development, which also includes organizations like the Ubuntu Forum. This global forum of civil society networks, which is linked to UPC-Barcelona Tech, has called on world leaders to implement a tax on financial transactions as soon as possible.

<http://www.ubuntu.upc.edu/>



# “I felt capable of transforming everything”

Lluís Bertran, director of Liberalized Business Europe for Gas Natural Fenosa



## What did you learn at UPC-Barcelona Tech that you've been able to apply in your profession?

With the knowledge I'd gained, I felt capable of transforming everything and contributing to the progress of society in many areas. I've applied a lot of what I learned at UPC-Barcelona Tech to my work in the energy world.

## Have your hybrid qualifications played an important role in your international success?

Definitely. In addition to the master's programs, which were long in duration and highly intensive, I've taken a lot of other courses. But what's made my professional profile more complete is my commitment to teamwork, to an approach that's based on communicating with people and managing them effectively to coordinate tasks.

## What are your main objectives for Gas Natural Fenosa?

Our project is an ambitious one. We plan to grow in developed markets by delivering advantages to our customers and broadening the range of services we offer in relation to gas, electricity, energy management, diagnosis of needs, energy conservation and efficiency, managing CO2 emissions, and financial management of these instruments.

## Are you convinced that liberalization of the energy sector is a good idea?

Yes, I am. Liberalization is fundamental to

our activity, and it has three key consequences: it means customers can choose and become key decision-makers; it generates competition, which drives us to pursue continuous improvement and excellence; and it creates opportunities in EU markets. These three factors explain why we're now expanding in Europe.

## How does the situation in the French gas sector compare to that in Spain?

In France, the gas market is a mature one. Liberalization started later and opened up a marketing opportunity. The market there is still bigger than in Spain, and there are plans for major installations to deliver more gas to markets, including a gas pipeline that will run through the Pyrenees to link France and Spain (due to come online in 2013) and liquid natural gas terminals.

## Is the Spanish market seen as an attractive one in Europe? Would you work here again?

The Spanish market is very attractive because of strong growth in recent years and the progress on liberalization. All the major European players have now started to operate in our country. And of course I'd return to Spain.

## Is the company you represent collaborating with UPC-Barcelona Tech?

Gas Natural Fenosa has sponsored the Duran Farell Award for Technological Research, given by UPC-Barcelona Tech, since the prize was established in 2000. It's one of the most important awards in the field and a tribute to Pere Duran Farell, a former chairman of the company and the first chairman of UPC-Barcelona Tech's Board of Trustees.

## What do you need to make it in business these days?

You need to be customer-oriented and know how to work with a team to systematically capitalize on improvements. At a personal level, it's essential to be a good communicator so you can effectively coordinate and manage teams. Internationalization can contribute to success, but it's not always a decisive factor.

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# Endesa Red Chairs: a commitment on two fronts

Chairs simulate electric power and renewable energy generation systems and address the importance of human values in engineering

The electric utility company Endesa has demonstrated its commitment to the advancement of knowledge by establishing two chairs at UPC-Barcelona Tech. The Endesa Red Chair on Energy Innovation, directed by Professor Antoni Sudrià, encourages two-way knowledge transfer between the university and the company. One of its objectives is to achieve maximum energy efficiency. The activity of the Chair includes simulation of electric power systems, study and simulation of renewable energy generation systems, and the analysis and execution of energy studies. The Chair has supported the production of doctoral theses and over 30 final theses and established a prize for the best final thesis. One of the tangible products developed is software for assessing the feasibility of connecting photovoltaic panels to Endesa's distribution system. An enertronics group set up in the Department of Electrical Engineering has won two Novare awards (given by Endesa). In October the Chair will bring together international experts for the 5th Endesa Chair Conference on Energy Innovation.

The second chair supported by the company, the Endesa Red Chair on Human Values in Engineering – Victoriano Muñoz Oms (named in recognition of an eminent Spanish engineer), offers courses on the relationship between engineering and society, pursues research and publishes papers on the human side of technology, and engages engineers from many countries in a dialogue on values and attitudes. According to its director, Jaume Fabregat, the Chair supports projects related to science, engineering and values through the Ibero-American “Science in Action” program, sponsored by the Spanish National Research Council. The Chair is also the only Spanish associate member of the World Federation of Engineering Organizations, which represents 20 million professionals and acts on behalf of the global engineering community in dealings with the OECD and the United Nations. Since 2008, the Chair and the Federation have jointly organized the International Conference on Ethics and Human Values in Engineering, a meeting that promotes debate and reflection on the social impact of engineering and the ethics of the profession.

[www.cerien.upc.edu/](http://www.cerien.upc.edu/)  
[www.catedravmo.com](http://www.catedravmo.com)



## PROFILE

Lluís Bertran graduated from UPC-Barcelona Tech in 1983 with a degree in chemical engineering at the School of Industrial Engineering of Barcelona and remains linked to the University as a member of the Association of Friends of UPC-Barcelona Tech. He holds master's degrees in distribution and use of gas, and in business administration and management, and is currently Gas Natural Europe's country manager for France and head of Liberalized Business Europe for Gas Natural Fenosa. The group is the main supplier of natural gas in the Iberian Peninsula, a global leader in the liquid natural gas market, and an operator on the European wholesale market.



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