

# THE MAG

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BARCELONATECH

## GUNI, THE GLOBAL UNIVERSITY NETWORK FOR INNOVATION

**WORLD RESEARCH** Computer simulations for safer planes. **INTERVIEW** Prof. Romain Quidant on nano-optics and the detection and treatment of cancer using gold nanoparticles. **DOCTORATES** Tanzania: water for all. **SUCCESS STORY** Francesc Belil, Siemens CEO of South West Europe. **OUR PARTNERS** Applus+.

<http://barcelonatech.upc.edu>

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# GUNI: a global network to transform university education

An international network designed to address current challenges: innovation, sustainability, and cooperation between different regions of the planet. This is the profile that defines the Global University Network for Innovation (GUNI), an initiative of UNESCO, the United Nations University (UNU), and UPC-Barcelona Tech aimed at strengthening the role of higher education in society. As it looks ahead to the future, GUNI is pursuing a range of projects.



Over 350 participants from 70 countries took part in the 5th International Barcelona Conference on Higher Education.

The Global University Network for Innovation (GUNI), set up in 1999 by UNESCO, UNU, and UPC-Barcelona Tech (which hosts the GUNI Secretariat), is more active than ever, as a number of new projects demonstrate. The network was established to strengthen the role of higher education in society and contribute to a renewal of higher education visions, missions and policies based on the principles of public service, relevance, and social responsibility. Over 200 members in 75 countries are working to fulfill this mission.

According to Cristina Escrigas, GUNI's executive director, "the vision and mission for the future role of higher education must be reoriented to focus on the challenges facing society. We need to move beyond paradigms like the 'ivory tower' or the 'market-oriented university.' Higher education must be reinvented to provide an innovative and socially committed response that anticipates social transformation and delivers value. Challenges such as the need to create and distribute socially relevant knowledge should be reflected in the core activities of universities and strengthen their commitment to social responsibility."

One of the new projects recently launched is the GUNI Knowledge Community—a virtual meeting point for anyone engaged in tackling emerging issues in higher education—that aims to support the creation, transfer, application and exchange of knowledge.

## FROM CONFERENCE TO REPORT

The International Barcelona Conference on Higher Education is one of GUNI's flagship activities. The fifth edition of the conference, which took place from 23 to 25 November at UPC-Barcelona Tech, was regarded by UNESCO as a follow-up event to the 2009 World

Conference on Higher Education held in Paris. At the conference, 350 participants from over 70 countries—including university rectors, academics, education professionals, researchers, and world-class speakers—discussed how higher education is being transformed to contribute to the sustainability paradigm. Participants proposed strategies to facilitate progress at the regional level and identified barriers that can prevent higher education institutions from contributing to sustainability, as well as formulating proposals to overcome these roadblocks. For example, in response to the lack of a shared understanding and to a culture and organizational structure that encourage compartmentalization, it was proposed that multidisciplinary best practices be given greater visibility, and that

spaces be created to facilitate interpersonal communication and encourage collaboration between institutions.

Another of GUNI's most high-profile activities is the publication of the *Higher Education in the World* report, which is brought out in English and Spanish and has also been translated into Chinese, Arabic and Portuguese. Up to now, GUNI has distributed the report to higher education institutions in over 130 countries.

**"Higher education must be reinvented to provide an innovative response that anticipates social transformation"**

The fourth edition, currently being prepared, will address the same theme as the conference, and for the first time the report will be based on the discussions held and the conclusions drawn at the event. "We've compiled the results of the conference and included them in the report. We want to offer the academic community a toolbox to help to take practical steps that contribute to transforming higher education in a way that facilitates social change. We hope to present the report at the end of next year," says GUNI project officer Yazmín Cruz.

## THE "GLOCAL" FUTURE

Now more than ever, the principle of thinking globally and acting locally is central to GUNI's plans for the future. "To address local knowledge needs, universities should be open to cooperating with other higher education institutions within the framework of global networks. However, global solutions can also emerge from local experience," says Escrigas. Based on this philosophy, GUNI is seeking to change higher education so that it can contribute to the betterment of society. In short, to work out what kind of education we need, we first need to decide what kind of society we want.

[www.guninetwork.org](http://www.guninetwork.org)



Discussion at the conference focused on how universities can contribute to sustainability.

# Computer simulations for safer planes

A UPC-Barcelona Tech research group is working on a project aimed at developing computer simulations to test electronic aircraft devices instead of the current tests that use real components. The ultimate goal is to improve safety on planes and reduce the cost of building them.

UPC-Barcelona Tech's Electromagnetic Compatibility Group is participating in a European project known as High Intensity Radiated Field Synthetic Environment (HIRF-SE). The project focuses on electromagnetic compatibility measures in passenger aircraft, cargo planes, unmanned planes, and helicopters.

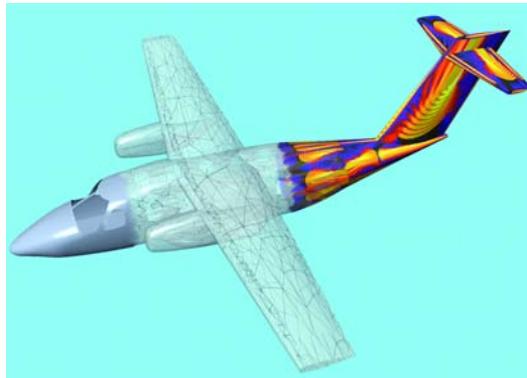
The goal is to reduce the interference that affects electronic equipment and improve the design of aircraft through the use of computer simulations. Electronic compatibility is currently tested using real planes. According to Ferran Silva, a professor in the Department of Electronic Engineering and the head of the group, "these tests are costly in terms of space, time, and money, repetitive, and in some cases even destructive." The research underway is aimed at replacing some of these tests with computer simulations.

## INTERFERENCE, A GROWING PROBLEM

The project, which involves 44 partners in 11 European countries, is a response to the growing number and complexity of electronic devices installed in aircraft. Another factor driving the research is the fact that "conducting elements are increasingly being replaced by fiberglass and carbon composites in fuselage construction. These materials are lighter but make electronic systems more vulnerable to interference," says Silva.

Aircraft flight control and communication systems, radar equipment, alarms, and control devices in general are exposed to interference from external radar systems, electronic devices used by passengers, lightning strikes, and in the case of helicopters, high-voltage electric lines.

At the mid-point of the project, the group's work focuses on verifying the replacement of conventional electromagnetic compatibility tests with



Computer model of a plane by electromagnetic simulation, showing the physical model of the plane, the mesh, and the result of simulation.

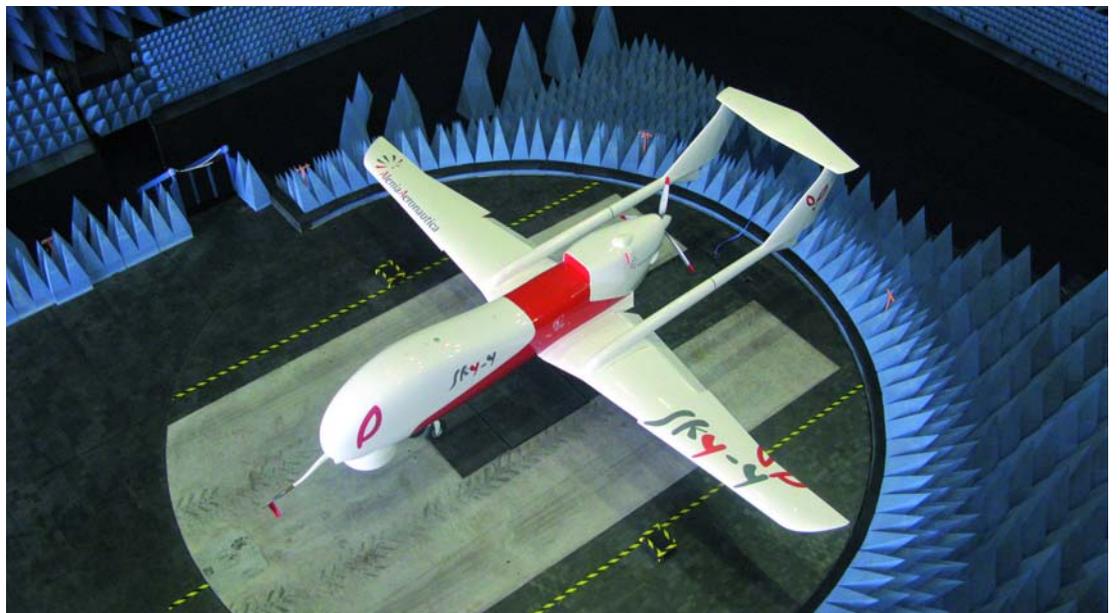
simulations. This involves measuring aircraft parts to eventually create a numerical simulation of a complete helicopter. This work is being carried out at a laboratory on the North

Campus and is expected to be completed early in 2012. The group is also developing part of the simulation software in collaboration with UPC-Barcelona Tech's International Center for Numerical Methods in Engineering (CIMNE).

## The project involves 44 partners in 11 European countries

According to Silva, "the project will reduce costs and improve the design of aircraft before they're built. It will also increase the efficiency of testing by making it possible to test different scenarios for all aircraft parts, for example, by looking at the effects of a lightning strike."

[www.upc.edu/web/gcm](http://www.upc.edu/web/gcm)



Unmanned aircraft in a large electromagnetic chamber to evaluate immunity to external electromagnetic fields.

## NEWS IN BRIEF

### Three European Research Council grants

Eugenio Oñate, director of UPC-Barcelona Tech's International Center for Numerical Methods in Engineering (CIMNE) has received an Advanced Grant, a prestigious form of funding awarded by the European Research Council (ERC) to support pioneering projects led by outstanding scientists. The grant will provide €2.5 million in funding over a 5-year period to carry out a project entitled New Computational Methods for Predicting the Safety of Constructions to Water Hazards Accounting for Fluid-Soil-Structure Interactions.

The ERC also awards Starting Grants of up to €2 million to young investigators. Santiago Badia, a researcher with CIMNE, and Romain Quidant, a researcher with UPC-Barcelona Tech's Institute of Photonic Sciences have both received Starting Grants for their projects (see page 4).

<http://erc.europa.eu>

### Europe-Asia cooperation on satellite navigation

UPC-Barcelona Tech's Astronomy and Geomatics Research Group has been the driving force behind the setting-up in Vietnam of the Europe-Asia Collaboration Center on Satellite Navigation, with the aim of developing satnav services and improving their quality.

The center, which opened in October, is based at the Hanoi University of Science and Technology. The other institutions involved in the project are the Polytechnic Institute of Turin, the University of Franche-Comté, and Thailand's Asian Institute of Technology. One focal point of the center's scientific activity is the new Galileo global navigation satellite system, which falls under the umbrella of the European SEAGAL project (South-East Asia Center on European GNSS for International Cooperation and Local Development).

<http://gage1.upc.es>

### More tools for better climate observation

The Remote Sensing Lab of UPC-Barcelona Tech, the Space Studies Institute of Catalonia (IEEC), and the Spanish National Research Council have developed new tools that significantly improve the quality of altimetric measurements used in climate observation. Measurements made using the new tools are ten times more accurate than those provided by current systems.

The tools offer new perspectives for observation of changing terrestrial elements such as sea elevation, waves, the state of polar ice, and soil moisture.

The innovation was presented at the GNSS-R 2010 International Symposium, which focused on techniques based on reflected signals from global navigation satellite systems. The symposium was held at UPC-Barcelona Tech on 21-22 October.

[www.tsc.upc.edu/rs](http://www.tsc.upc.edu/rs)



## ROMAIN QUIDANT

# “A small chip could replace a large laboratory”

Romain Quidant, an ICREA professor with the Institute of Photonic Sciences (ICFO) and a Cellex Fellow, is leading an ambitious project to detect and treat different types of cancer using gold nanoparticles. In less than 10 years, the team headed by this French physicist could bring about a sea change in the field of oncology.

### How does someone as young as you end up heading their own team?

It doesn't happen overnight. I had to get tenure, just like in the American system. Over a certain period of time you have to demonstrate, on a practical level, that you're capable of coordinating a team. A committee evaluates your work and aptitudes.

### Do personal skills take priority over having a CV built on many years of experience?

Yes. In Europe you generally need to have white hair before you can head up your own team. At the ICFO (where the average age is no higher than 35) young scientists are given an opportunity to express themselves, to contribute ideas and see them implemented. This inevitably creates a refreshing atmosphere that's conducive to innovation. I'm sure this is one of the reasons why this young institution, set up just eight years ago, has been recognized.

### The Fresnel Prize 2009 and a 2010 Starting Grant—what's the best thing about receiving awards like these?

Apart from the fact that they're a recognition of the work you've done, the Starting Grant in par-

ticular provides a significant amount of money for research. This means I can pursue riskier lines of research and maintain my team of researchers and collaborators.

### In your day-to-day work you collaborate with physicists, oncologists, chemists, and other specialists. Is it hard for them to understand each other?

A priori it's complicated: we're all scientists but the way we work and the vocabulary we use differ quite a bit depending on the field. To perform well as a team, we all have to adapt to our colleagues from other fields. In fact this kind of collaboration is starting to be quite common. In medicine, for example, work is now being done at the nanoscale, and they need the knowledge physicists and chemists can offer to find solutions to their problems.

### Do you think the future of research lies in the convergence of different professional profiles?

Yes, I do. Science is advancing at an ever-faster pace and the boundaries between fields are breaking down. It's clear that no progress can be made without the magic that's generated

when you combine different branches of science. For example, in the case of the Surface Plasmon Early Detection of Circulation Heat Shock Proteins (SPEDOC) project, we've created a European consortium in which five groups work together and combine very different profiles.

### What does the project involve?

We're bringing together the latest research on oncology and nano-optics to create a device that could be used to diagnose cancer earlier. And this would be done using just a single drop of blood. The device is a very small chip, just a few centimeters across, that's made of gold nanoparticles. The presence of cancer markers in the blood changes the environment of these nanoparticles and alters the light they emit. When we monitor these changes in the light, we can see whether cancer markers are present and determine their concentration.

### Can you tell us about these cancer markers?

The oncologists on our team have discovered that the concentration of a certain protein (HSP70) is related to the development of can-

cer. The concentration of this protein increases in the blood and on the surface of cancer cells. What's most interesting is that it's not a marker for a specific cancer: it indicates the presence of different types of cancer. Our goal is to have the chip detect the exact concentration of this protein, however low it may be.

**Early detection increases the likelihood of successful treatment.**

Yes, it does. And the chip will be used to detect markers in the walls of circulating cancer cells as well as those present in the blood. These cells are very difficult to detect and they're the most dangerous ones because they can spread the cancer to other parts of the body through metastasis.

**So this chip will be a kind of portable laboratory?**

Yes. It could replace an entire laboratory because all the analyses would be concentrated on a single chip. This would drastically reduce the cost of detection, and the device could be exported to developing countries, which unfortunately lack the infrastructure needed for cancer detection.

**Why do you work with gold?**

Because gold nanoparticles have very special optical properties. Simply put, when they're exposed to the right kind of light, these nanoparticles can behave in two ways: as a nano light source or a nano heat source. When light is emitted we can use it for detection, as I've explained. When the nanoparticle becomes a source of heat, on the other hand, we can apply this principle to design a cancer treatment.

**How would that work?**

We cover the gold nanoparticles with molecules that recognize cancer cells and attach to them. A laser excites the plasmonic resonance of the gold nanoparticles, which heat up and kill the cancer cells. The main advantage of this

approach over techniques like chemotherapy and radiation therapy is that it wouldn't damage healthy tissue, because heating would occur only in the cancer cells.

**It's a project that could have a revolutionary impact. When do you expect to obtain reliable results?**

At the moment we're working at the *in vitro* level, with cultivated cells. There are still many steps that need to be taken before this method comes into clinical use, but I think that if we don't run into any major obstacles we could get there in 10 years. Our chemists are now tackling the challenge of getting the particle to attach only to cancer cells. In theory it's possible, but when you're working in a real body there are more factors that come into play and can interfere with the process.

**Can the gold you put into the body have any side effects?**

Gold is biocompatible. At high concentrations there could be some risks, but we work with concentrations that are 10 times lower than the toxicity threshold, so the gold nanoparticles don't have any harmful effect. Also, they're eliminated naturally from the body.

**Do you always focus on medical research?**

No. I'm working on a broad range of biomedical applications, thanks in part to the generous funding provided by Cellex Foundation Barcelona. But this technology has many other applications. I'm researching how to make the nanoparticles act as sensors for food control and detection of hazardous substances such as drugs. All these applications are based on the color change that occurs when these nanoparticles attach to specific molecules.

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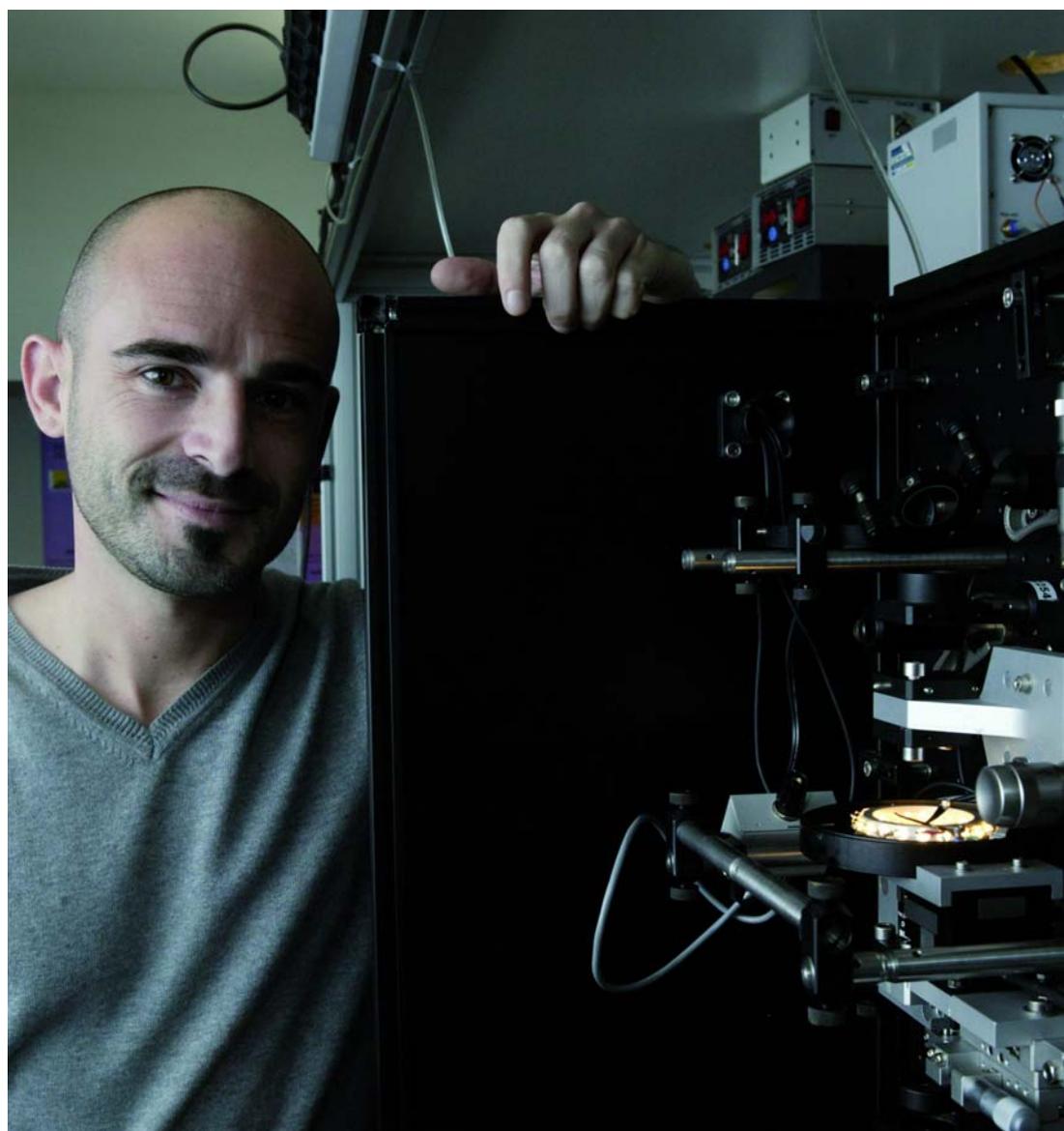
**"I LIKE CATALAN CULTURE EVEN MORE THAN FRENCH CULTURE"**

Eight years ago Romain Quidant received his PhD from the University of Burgundy in France. He moved to Catalonia for his postdoctoral stay. When he got the chance to set up his own team he jumped at it, and he's lived in the region since then. In less than a year he managed to learn Catalan to adapt to the local culture. He also speaks Spanish, his native French, and English, the language he uses to communicate with colleagues.

Quidant is an ICREA (Catalan Institution for Research and Advanced Studies) professor and the leader of a research group on plasmon nano-optics at the Institute of Photonic Sciences (ICFO), a research center set up by the Catalan government and UPC-Barcelona Tech, with 250 optical science and technology researchers. He says the ICFO has no equivalent in Europe because it "follows a model that takes the best aspects of the American system and adapts them to its context." The physicist is proud of the fact that the center he works for has a "strong commitment to quality."

Quidant's research has been internationally recognized. Last year the European Physical Society awarded him the Fresnel Prize for his contribution to the field of applied optics. This year he also received a Starting Grant from the European Research Council (ERC), which will provide him with nearly €2 million in funding to pursue his project.

Quidant feels very fortunate to be doing a job he likes. He's pleased that his work is going well and that it allows him to live in a place where he feels completely at home. "I like Catalan culture even more than French culture," he says. He doesn't want to plan too far ahead but intends to spend a good part of his life here.



The physicist works on nano-optics applied to cancer detection and treatment.

# Improving rural water supply governance in Tanzania

Some rural communities in sub-Saharan Africa have seen a shift in water-access policies thanks to the application of proposals set out in a doctoral thesis completed by Alejandro Jiménez at UPC-Barcelona Tech. The project is the end result of collaboration with NGOs and local authorities in Tanzania, and is supported by the University's Center for Development Cooperation (CCD).



A girl uses a hand pump to collect water in a rural area of Tanzania.

Over 900 million people in the world do not have access to basic drinking water services and 2.6 billion lack adequate water sanitation (to separate sewage from the water for human use). Improving water supply management is therefore essential to achieving the Millennium Development Goals, particularly those related to improving health and combating major diseases.

Social and political factors underlie these shortcomings, which are especially pronounced in sub-Saharan Africa, a region that is dependent on international aid and characterized by low levels of water coverage, high poverty rates, and a gradual process of political decentralization.

In this context, the doctoral thesis developed by Alejandro Jiménez between 2005 and 2009 focuses precisely on identifying and analyzing key aspects of rural water governance, a process that encompasses actors, mechanisms, and the rules governing access. In Tanzania, the country the study is concerned with, nearly 50% of the population lacks access to treated water and the level of coverage is one of the lowest in East Africa.

## In Tanzania nearly 50% of the population does not have access to treated water

After analyzing water governance in the Tanzanian district of Same, Jiménez (a doctoral student with the UPC's Research Group on Cooperation and Human Development) concluded that "government support was determined by local authorities and policies that reflect vested interests rather than on the basis of appropriate identification of the real needs of dispersed rural communities, which at that time were receiving little or no support."

It was therefore important to gather objective information so decisions could be made in a way that would allocate resources and investment based on identified priorities. Decision-making needed to be more aligned with needs and more transparent. Water points in two of

the country's districts were mapped to gather the information needed. Apart from looking at the number of water points, the fieldwork covered several other indicators: the distribution of water points in the territory, water quality, seasonality (variations based on the season and time of day), functionality, the technology used, charging of rates, and management of the service.

The method used provided a more complete picture of the state of the water supply, one more adapted to the reality of the country than that given by the water poverty index. Used internationally, this index "is very complete and demanding but runs up against the limited management capacity of government authorities in less developed countries," says Jiménez, a graduate of the Technical University of Madrid's civil engineering program and a member of the development NGO Engineering Without Borders (ISF-ApD).

The research-action process (the result of collaboration between UPC-Barcelona Tech, NGOs, and local authorities in Tanzania, with the support of the University's Center for Development Cooperation) has contributed to the adoption of the information systems used by Jiménez at the local level. This has facilitated the design of a water access plan that includes the communities where the need is greatest. Control mechanisms are also starting to be applied in the decision-making process, which is now more transparent and participatory.



With one water point for every 250 people, less than 55% of the population in Tanzania has water coverage.

## THESIS



**Author**  
Alejandro Jiménez

**Supervisor**  
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### Title

Key challenges in the governance of rural water supply: lessons learned from Tanzania

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

Because it allowed me to study one of the most significant everyday problems in sub-Saharan Africa: the lack of access to water.

### Areas of application

Improving rural water supply governance in sub-Saharan countries. Development of appropriate information systems in the water sector for least developed countries.

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## New Campus of International Excellence in energy field

The Spanish government has once again recognized UPC-Barcelona Tech with the Campus of International Excellence distinction, awarded to projects of outstanding quality in the Spanish university system. This time the project recognized was the UPC Energy Campus, which is aimed at contributing to the transition to a more sustainable energy model. The project focuses on four strategic areas—energy efficiency, nuclear fission and fusion, smart grids, and renewable energy sources—and involves research groups at five campuses. The UPC Energy Campus builds on a long tradition of leadership by the University in this area of education and research.



UPC-Barcelona Tech's strategic partners in the initiative are the Catalonia Institute for Energy Research (IREC), the Energy, Environment and Technology Research Center (CIEMAT), and 45 other participants, including the Government of Catalonia and companies like Alstom, Abengoa Solar, Seat, Gas Natural Fenosa, Abertis, and Vestas. The project is also supported by the Massachusetts Institute of Technology (MIT), Aachen University, the University of Sydney, and Aalborg University.

In 2009, the Barcelona Knowledge Campus, a joint initiative of UPC-Barcelona Tech and the University of Barcelona, was also recognized as a Campus of International Excellence.

## Pioneering double degree program with Chinese university



UPC-Barcelona Tech is the first Spanish university to conclude a double degree agreement with a Chinese university. On November 17, Antoni Giró, the rector of UPC-Barcelona Tech, and Pei Gang, the rector of Tongji University, signed an agreement to establish a shared curricular pathway in civil engineering that will allow students to earn a double master's degree recognized by both institutions. The pathway is one of excellent quality that will be open to students of both universities who have been through a rigorous selection process. Five selected students from UPC-Barcelona Tech's Barcelona School of Civil Engineering

will complete a two-year master's degree at Tongji University, one of China's most prestigious technical universities.

### A wind tunnel model

Moreover, a vertical wind tunnel designed by researchers at UPC-Barcelona Tech's Castelldefels School of Telecommunications and Aerospace Engineering will be sited in the Chinese city of Jiaxing. A delegation from the Chinese city visited a model of the facility, which will be used to simulate freefall parachuting. The Jiaxing wind tunnel is now under construction, and when completed will be one of the largest in the world.

## International Day promotes student mobility

Twenty-two universities based in Europe, Asia, and the Americas presented their course offerings to UPC-Barcelona Tech students at the 2nd International Day organized by the University's International Relations Service.

At the fair, held on 18 November, students had an opportunity to find out about mobility programs that help participants complete part of their education abroad. They could also get to know universities in countries like France, Germany, Italy, Mexico, the United States, Russia, and China by visiting their stands or attending presentations made by the participating schools.

[www.upc.edu/sri/international-day](http://www.upc.edu/sri/international-day)



## Young Malaysians begin undergraduate studies

In September a group of twelve students from the University of Kuala Lumpur (Malaysia) began undergraduate studies in mechanical engineering at UPC-Barcelona Tech.

The University is the first in Spain to receive Malaysian students within the framework of a project launched to internationalize higher education. The aim of the Malaysian program is to have some of the country's students complete their entire post-secondary education abroad. Grant recipients will also pursue studies in Germany, France, and the United Kingdom.

Seven of the students at UPC-Barcelona Tech are studying at the Vilanova i la Geltrú School of Engineering, and five at the Terrassa School of Engineering. All the participants have the support of a tutor and a special monitoring plan.

[www.upc.edu/pressroom](http://www.upc.edu/pressroom)



## International cooperation with Palestinian universities

The 7th International Conference and 8th Session of the General Assembly of PEACE (Programme for Palestinian European Academic Cooperation in Education) were held on 22-23 November at UPC-Barcelona Tech. The event was attended by some hundred participants, including the rectors of European and Palestinian universities, who focused on priority needs of Palestinian universities that could be met through international academic cooperation.

<http://peaceconference.upc.edu/>

## Best practices in European research projects

The European CLUSTER network (Consortium Linking Universities of Science and Technology for Education and Research) and UPC-Barcelona Tech organized a meeting to share best practices for the submission of European research projects. The event, held at the University on 4 and 5 October, was aimed at encouraging the submission of joint project proposals in response to calls issued by the European Commission under the Marie Curie Initial Training Networks and Marie Curie Industry-Academia Partnerships and Pathways programs.

# “Investment in research and development is the way forward”

Francesc Belil is managing director of Siemens Spain and CEO of South West Europe



## What did you learn at UPC-Barcelona Tech that you now apply in your work?

I learned to think and work methodically, systematically, to go to the heart of a problem, but I also got a broad overview of the situations I'd later come across in real life and the way one thing affects another. In the long term, over the course of your career, this kind of perspective is essential.

## In a knowledge economy where human capital is a competitive advantage, what role should our university play?

Education is crucial. We need to let young people know that lifelong learning is essential because life moves very quickly and global changes are very fast-paced. The technologies I learned to use when I was studying are now obsolete. I didn't have access to the internet or PCs: I learned with a couple of slide rules of calculation. So it's important that we challenge ourselves and not get too comfortable.

## Was leaving Bayer to join Siemens a challenge for you?

For me it was a professional challenge to leave the chemical industry and start working in a field that was new to me, though it was one I felt I had the right background for. It's been an extremely enriching experience for me—an opportunity to work with technologies I hadn't been involved with before and take charge of a much larger area of responsibility comprising 15 countries.

## What challenges is Siemens facing?

Siemens has been around for 162 years, and during that time we've never taken our foot off the gas pedal when it comes to pursuing something we believe is essential to our future: research and development. Technology is the best tool we have to fulfill our goal of helping others, because in the history of humanity we've never taken a step forward that wasn't linked to a change in technology.

## Are you talking about technological development for a sustainable future?

When I use the word “sustainable,” what I have in mind is making the most of the advantages of technology while being very aware that we have a responsibility to reduce its negative impacts. If we don't focus on sustainability, many advances can harm the environment, which matters to us and is particularly significant for coming generations.

## So technological universities like UPC-Barcelona Tech and companies like yours need to work closely together...

We need to have a very close relationship and talk to each other very often so we don't end up with two separate poles: one that creates knowledge and educates people, and another that takes whatever it gets and does whatever it sees fit. We have to sit together at the same table and come up with a set of shared objectives. And ultimately this always involves working out how to use society's resources as efficiently as possible to return benefits to society.

## PROFILE

Belil graduated from UPC-Barcelona Tech's Barcelona School of Industrial Engineering (ETSEIB) and completed further studies at the University of Pittsburgh in the United States and INSEAD Business School in France. In 1972 he joined Bayer, where he held various senior positions in countries including Germany, Mexico, and Spain. He has been managing director of Siemens Spain since 2006 and CEO of South West Europe—the company's third most important cluster—since 2008.

# Applus+ Chair for safer automobiles

For 10 years Applus+ and UPC-Barcelona Tech have worked together to make vehicles safer by carrying out specific studies

UPC-Barcelona Tech and Applus+, a leading Spanish multinational in testing, certification, inspection, and technology services, are working together to improve automobile safety. The project was initiated in 2000 and eventually led to the creation of the Applus+ Automobile Safety Chair.

The Chair seeks to bring together the automotive industry and the academic world to focus on safety. Two types of action are carried out: teaching, within the framework of UPC-Barcelona Tech's Barcelona School of Industrial Engineering, and research and development, including projects launched by the Chair and work done in collaboration with companies.

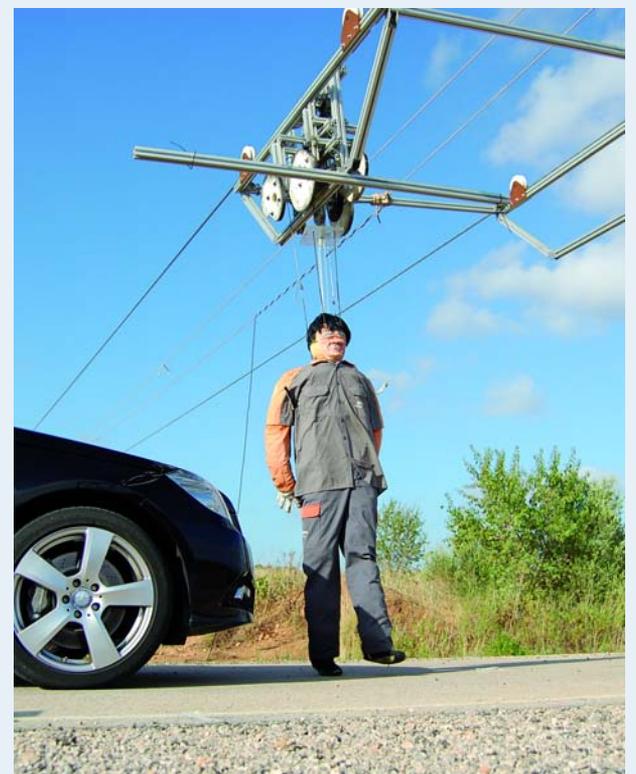
The areas of knowledge the Chair is concerned with are active and passive safety, the same classifications that apply to safety systems used in vehicles, whether for the transport of passengers or goods.

## DIVERSE LINES OF RESEARCH

The Chair has worked on a range of road safety factors related to drivers and pedestrians, and has looked at vehicles of all types. For example, in the case of vehicles for transporting goods and long vehicles, drivers cannot clearly perceive the distance that separates them from another vehicle when they are passing. A project known as Avoidance Possibility Change of Lane Device (ACOL) is aimed at eliminating any uncertainty during these maneuvers.

Specific research projects have also been carried out, including one that led to the development of an energy-absorption system for child car seats. The system incorporates a load limiter that reduces the pressure put on a child's chest area when a frontal impact occurs. Another project, Barcelona Accident Research, looks at how injuries are related to characteristics of the vehicle, the road, and the person involved.

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