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ADVERTISING FEATURE

## Spotlight on Catalonia

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### Keeping Catalonia's research revolution on track

#### CATALONIA, SPAIN

*Catalonia has fostered a successful research hub in a relatively short time, but how is it coping with Spain's financial crisis?*



**ALONGSIDE ITS** cultural, artistic and gastronomic merits, Spain's famous Catalonia region is much envied for the stratospheric success of FC Barcelona, the local football club that has become a global brand. Inspired by the club's achievements, Catalonia's scientific leaders want the region to be as synonymous with cutting-edge research as Barcelona has become with world-class football. From his office opposite FC Barcelona's Camp Nou stadium, Joan Guinovart, director of the city's Institute for Research in Biomedicine (IRB), reels off statistics about the region's scientific prowess. "If you measure the number of grants per head of population,

Catalonia is up there next to Switzerland or Israel," he says, referring to the European Research Council (ERC) starting grants won by young researchers in the region. In 2009, Catalan researchers received 11 of the awards. In contrast, Spain's 16 other autonomous communities collectively received just nine. Catalonia also generated more than a quarter of the scientific papers published in Spain between 2003 and 2008, according to research group SCImago, second only to Madrid for volume of work produced. But when the publications are analyzed for the impact of their findings, Catalonia trumps her inland counterpart.

Furthermore, Barcelona jumped 11 places between 2000 and 2008 in an international ranking of the best cities in which to do science (see <http://go.nature.com/vhNBTZ>), leapfrogging Washington DC to take 54th place. Guinovart is confident that IRB can capitalize on Catalonia's success, and he aims to make the institute one of the best in the world. "We are making it to the qualifiers, and in a few years we may be in the finals," he says. "Our model is 100m from here."

**"The main priorities of this government are going to be health, higher education and research."**

*Antoni Castellà, secretary of universities and research, Government of Catalonia*

#### Strategy for success

The Catalan research community credits one man and two strategies for the region's rise in eminence. The man is Andreu Mas-Colell, an economist and former professor at Harvard University — and a native Catalan — who returned to Barcelona from the United States in the mid-1990s. He became minister for universities, research and the information society in the Catalan government soon after, and set his two strategies in motion: building dozens of publicly funded research centres such as the IRB and creating an agency called

ICREA (the Catalan Institute of Research and Advanced Studies) to recruit world-class academics.

ICREA was established in 2001 and is run by a small but dedicated team. The institute is funded directly by the Catalan government to find and pay the salaries of leading researchers from all over the world who are willing to move to Catalonia. Applications are submitted online and evaluated within weeks by experts who have all worked outside Catalonia during their careers. Salaries are negotiable to ensure they remain competitive with other countries, and because the scheme does not rely on vacancies opening, there are steady opportunities. The terms are good for international researchers. “Contracts are permanent from the very first day,” says ICREA director Jaume Bertranpetit. “[There are no] teaching responsibilities, so there is no need for them to speak Spanish or Catalan. The only official language is English.”



JOSEP MARIA SALA

Jaume Bertranpetit, director of Barcelona-based science recruitment agency ICREA, says his organization offers good terms for international researchers.

Mas-Colell left the Catalan government in 2003 when the ruling Convergence and Unity (CiU) party lost its majority and a coalition government took over. Despite political changes, investment in the new research centres — of which there are now 39 — continued to grow, as did the output of Catalan scientists. The CiU returned to power in 2010 and Mas-Colell left his position as secretary general of the ERC to rejoin the government — this time as minister of economy and knowledge. He is also a professor of economics at Pompeu Fabra University in Barcelona. “The good news is that the guy who is responsible for universities and research is also the guy who has the money,” says Guinovart. “The bad news is that there isn't much money.”

### Balancing the books

Major budget cuts are needed across Spain, particularly in Catalonia, which is the country's most indebted region. Spain's prime minister, José Luis Rodríguez Zapatero, has pledged to reduce the country's total public sector deficit from 9.3% of GDP in 2010 to 6% by the end of 2011. And with the central government discouraging the autonomous regions raising funds by selling bonds, Catalonia must reduce its spending for 2011 by 10% on the previous year.

The new Catalan government is still working on its 2011 budget, but there are some promising indications for science. “The main priorities of this government are going to be health, higher education and research,” says Antoni Castellà, the new secretary of universities and research. Although scientific funding will inevitably be affected in the new budget, Castellà says other policy areas will bear the brunt of the cuts.



Antoni Castellà: “Twenty percent of economic activity has to do with transfer of technology, innovation or

Castellà's first priority is ICREA, which now employs 231 contracted researchers. He intends to preserve its budget in order to insulate Catalonia's main scientific talent from the financial crisis. This will also protect the additional benefits that the researchers provide — attracting new talent to Catalonia's labs, and drawing science funding from outside the region that is typically of greater value than ICREA's annual budget. ICREA aside, Castellà is also meeting the directors of the region's publicly funded research centres. He will consider each centre's funding based on its achievements since opening.

IRB's Joan Guinovart does not dismiss the scale of the financial challenge, but points to several partnerships he believes will see his institute weather the storm. “We have a joint programme with the Barcelona Supercomputing Center (BSC) and our structural biology [researchers] will

research.”

soon get their programme boosted by the ALBA synchrotron,” he says.

The BSC is home to one of the world's most powerful computers, the MareMostrum, and in February this year the centre began working with the European Space Agency on a project to analyze how multicore processors handle space environments. ALBA, under construction near Barcelona, will be the first synchrotron in Spain and will be used by 1,000 researchers a year when it becomes operational later in 2011.

#### Top employers in bioscience sector in Catalonia

Employer	Approx. number of employees
Public universities:	24,000
Research Centres of Catalonia (CERCA):	4,300
Grifols (medical product manufacturer):	2,200
Esteve (pharmaceutical company):	2,000
Almirall (pharmaceutical company):	1,800
Boehringer Ingelheim (pharmaceutical company):	1,700
Spanish National Research Council (CSIC):	1,500
Bayer (healthcare, agriculture and material science company):	1,300
Menarini (pharmaceutical company):	600
Uriach (pharmaceutical company):	500

Source: *Blocat*, 2010

IBEC (the Institute for Bioengineering of Catalonia) also maintains partnerships with other organisations. Internationally, it collaborates with institutes in Korea, Japan, Switzerland and England. Locally, it shares projects with Barcelona's universities and other Catalan research centres such as ICFO (the Institute of Photonic Sciences), and also reaches out to researchers in the healthcare sector. “We believe in having strong links with clinicians,” says IBEC head Josep Planell.

An organisation called ACER (the Catalan Association for Research Entities) is a conduit for IBEC's researchers to stay abreast of projects in Catalonia that might one day lead to other collaborations. Another agency, Talencia, also provides support and advice to regional scientists. Planell had hoped to grow the number of research groups within IBEC from 15 to 22 by 2013, but the need for budget cuts has delayed his plans for the time being. Instead IBEC will focus on developing the institute's existing projects.

#### Making light work

Of all Catalonia's publicly funded research centres, ICFO is perhaps the most celebrated. Opened in 2003 in the coastal town of Castelldefels, just west of Barcelona, nine of ICFO's group leaders are employed through ICREA and its researchers publish regularly in *Physical Review Letters* and in various *Nature* journals. Among its more esoteric projects, some of its scientists have fine-tuned a two-photon absorption fluorescence technique to detect the presence of paint on archaeological samples. With a team from the Catalan Institute for Classical Archaeology, they used the technique to determine the names of two senior Roman politicians written on an amphora — a type of ceramic container — found in a nearby village.

A spin-off company from ICFO, Radiantis, which manufactures laser-tuning instruments, cofounded the Southern European Cluster in Photonics and Optics (SECPHO) in 2009 to help increase the competitiveness of the Spanish optics and photonics industry.



One of the newest research centres is IC3 (Catalan Institute of Climate Sciences), Spain's first research centre devoted to climate change. Since its opening in 2008, the centre has looked at both global and local climate

ICFO (the Institute of Photonic Sciences) is based at the Mediterranean Technology Park in Barcelona.

ICFO

questions. Its director, Xavier Rodo, sees financial opportunity for Catalonia in the challenges posed by

climate change. “In North Africa, for example, there is a great need for climate information and technological solutions,” says Rodo. Spain itself is also particularly vulnerable to the effects of climate change. “That means a lot of stress for our society, but it's also an opportunity,” he says. “We need to turn that opportunity into revenues for our people.”

### Local challenges and opportunities

Insiders in the Catalan research community say it will need to overcome organisational as well as financial challenges if its success is to continue. Harvey Evans from the Institute for Predictive and Personalized Medicine for Cancer says that while the overall culture of institutes is comparable to those in the United States, their general administration can be held back by a culture of nepotism. “It's something the politicians are struggling against,” she says. To help improve the training of managerial staff, Pompeu Fabra University launched a master's in leadership and management in science and innovation in 2007. “Graduates work as managers in biotech parks, research groups, public research institutes and private firms,” says Josep-E Baños, a professor of pharmacology at the university and academic director of the course.

The region also needs venture capital injection to help develop additional spin-off companies. Jordi Pascual, director of the Catalan Institute of Nanotechnology, thinks that opportunities will improve over the next decade if better links can be forged between industry and academia. “We have a very good relationship with some companies, but industries in Spain are not always prepared to use the added value we can give to them,” he says.

In recent years Catalonia's politicians have made insightful policy decisions that have helped put science at the heart of the region's economy. “Twenty percent of economic activity has to do with transfer of technology, innovation or research — that's much more than 15 years ago,” says Castellà. If the Catalan government holds true to its vision of keeping science at the centre of the region's future, this augurs well for economic recovery and long-term prosperity.

### Science jobs in Spain: Advertorial PDFs

iCrea

The Institute of Photonic Sciences

VHIO

Institut Catala de Nanotecnologia

ALBA

Universitat Rovira i Virgili

Institut D'Investigacions Biomediques August Pi i Sunyer

Heuristica de Catalunya

Centro de Medicina Regenerativa de Barcelona

Institute for Research in Biomedicine (IRB)

### Related external links

IBEC (Institute for Bioengineering of Catalonia)

ICFO (Institute of Photonic Sciences)

ICN (Catalan Institute of Nanotechnology)

ICREA (Catalan Institute of Research and Advanced Studies)

IC3 (Catalan Institute of Climate Sciences)

IMPCC (Institute for Predictive and Personalized Medicine for Cancer)

IRB (Institute for Research in Biomedicine)  
Government of Catalonia  
Pompeu Fabra University  
Radiantis  
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