

INSIDE IBE C

The newsletter of the Institute for Bioengineering of Catalonia



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2015 'a hat-trick for IBEC'

In June, *La Vanguardia* journalist Josep Corbella hit the nail on the head when he described 2015 as “el año del triplete” for IBEC – known as a hat-trick in English – for the three major milestones of Xavier Trepats Banc Sabadell Award, the most important award in Spain in the health sciences and among the top international awards; Samuel Sánchez’s winning of the Premio Fundación Princesa de Girona Investigación Científica for his advances in the field of nanotechnology; and, above all, the institute’s honour of the Severo Ochoa Excellence Award.

Severo Ochoa awards, which are allocated by an international panel of more than 70 judges, identify and promote research centres and units in Spain that stand out as international references in their specialized

“The Severo Ochoa award is the confirmation of a success story that started only a few years ago”

fields. With this accreditation, IBEC is recognised as one of Spain’s leading research centres alongside just 19 other organisations in the country, of which IBEC is the third-youngest centre.

“The award is a huge milestone in the evolution and consolidation of IBEC, and the confirmation of a success story that started only a few years ago,” IBEC Director Josep Samitier says. “This recognition validates our new IBEC Strategy for 2014-2017, with the panel of evaluators giving the go-ahead for our plans.”

But the hat-trick hasn’t been all. In April IBEC also received the ‘Human Resources Excellence in Research’ stamp from the European Commission in recognition of its commitment to continuously improving its HR policies in line with The European Charter of Researchers and The Code of Conduct for the Recruitment of Researchers. IBEC is one of ten CERCA institutes to have received the award; in the Spanish arena, only 21 institutions have been recognized. The award is the result of IBEC’s development, since June 2014, of its new Human Resources Strategy for Researchers (HRS4R) and associated Action Plan, which compared IBEC’s current HR prac-

The Severo Ochoa award ceremony took place in Madrid on 16th July. This honour marks IBEC as an international reference in its field



tices against the principles of the European Charter and Code.

As far as individual achievements are concerned, as well as Xavier Trepats winning the Banc Sabadell Award for Biomedical Research and new group leader Samuel Sánchez receiving the Premio Fundación Princesa de Girona Investigación Científica, Nanoscale Bioelectrical Characterization group leader Gabriel Gomila received an ICREA Academia Prize 2014 for excellence in research and capacity for leadership, and Biomedical Signal Processing and Interpretation group leader Raimon Jané was

appointed as a member of the new CIBER-BBN Steering Committee. In addition, Elena Martínez, head of the Biomimetic Systems for Cell Engineering group, received an ERC Consolidator Grant, bringing IBEC’s ERC project count up to nine.

“We won’t officially celebrate IBEC’s first decade until the tenth symposium in 2017, but it’s wonderful that in that short time we have been able to build ourselves up as an international reference for bioengineering, as well as celebrating many success stories in healthcare technology, nanomedicine and regenerative medicine,” adds Josep. //

IBEC’s new stars of science



In January **Nuria Montserrat** took up a group leader position at IBEC, where she will study ways to generate cell and molecular resources with clinical potential for the treatment of genetic kidney diseases. While at the Center of Regenerative Medicine in Barcelona, Nuria was part of a team who announced the first-ever creation of 3D “mini-kidneys” from human pluripotent stem cells in 2013. She will use her five-year ERC Starting Grant to build on her studies of induced pluripotent stem cells (iPSCs), cell differentiation, disease modelling, gene editing and organ regeneration.

Also in January, **Samuel Sánchez** took up a joint appointment as ICREA professor and group leader at IBEC with his current affiliation, Germany’s MPI for Intelligent Systems. His research focuses on micro- and nanomotors – machines as small as bacteria that can target specific cells for applications such as localised drug delivery. Samuel entered the Guinness Book of Records in 2012 for inventing a type of micromotor, the world’s smallest ‘jet engine’. In the same year his research was recognised with an ERC Starting Grant. In 2014, he was named “Innovador del Año” by *MIT Technology Review*.



RESEARCH NEWS

Clinical collaborations reap rewards

IBEC's links with hospitals are a focus of the institute's strategy for 2014-2017, and some joint projects are already getting good results

With Eduard Torrents' Bacterial Infections: Antimicrobial Therapy group signing a close collaboration agreement with Vall d'Hebron Institut de Recerca's Infectious Diseases group earlier this year, IBEC is well on the way to being the technological counterpart of the major hospitals.

While Eduard's group is interested in different bioengineering approaches to elucidate ways to diagnose and eradicate multi-drug resistant bacteria, the VHIR group focuses on community-acquired and nosohusial infections, HIV, and tropical or traveller diseases. The collaboration resulted in a publication in *PLoS ONE* earlier this year which elucidated the ability of M-HA to inhibit the growth of undesirable bacterial pathogens.

Other IBEC groups are also seeing their collaborations with clinicians reap benefits.

Raimon Jané's group, which has been working closely with the Hospital Germans Trias i Pujol, celebrated a paper in IEEE's *Journal of Biomedical Health Informatics* on distinguishing normal respiratory sounds from adventitious ones, and one in the *European Respiratory Journal* on a new method of evaluate the efficiency of the mechanical

activation of respiratory muscles. Elisabeth Engel's group continues its collaboration with Hospital de Terrassa on BIOTENDON, a project funded by RecerCaixa, and new IBEC group leader Nuria Montserrat, who works alongside clinicians at Hospital Clínic and the Hospital Sant Joan de Deu, celebrated a paper in *Cell* earlier this year which described the use of genetic 'editing' to remove mitochondrial mutations in mouse eggs. //



IBEC's Eduard Torrents with Joan Gavalrà at VHIR

A step towards personalised medicine

There's nothing very glamorous about cancer, but now a new EU-funded project – GLAM – aims to help make monitoring and diagnosis less intrusive.

Glass Laser Multiplexed Biosensor, which involved organisations from Spain, The Netherlands, Israel, Belgium, Serbia and the UK, will use groundbreaking technology to develop a device that is a step towards truly personalized medicine, as it will help oncologists make better treatment decisions according to the patient's particular needs.

"Differential cancer diagnosis – in other words, the analysis of biomarkers for cancer – and the monitoring of patients who are already undergoing cancer treatment takes place daily in clinical settings," says IBEC's Elena Martínez, one of the partners in the four-year project, which is coordinated by Leitat Technological Center. "But the technology currently used to measure biomarker

levels is expensive and sophisticated, and the results aren't always very accurate."

Most cancer biomarker analysis carried out today uses blood or tissue, which needs to be analyzed in specialized laboratories; this incurs a high cost and specialized personnel and equipment. Large amounts of

The tool will help oncologists make better treatment decisions

biological material are needed, and there's a long wait for the results.

GLAM will tackle all these problems by developing a new device that provides diagnosis, prognosis, and data monitoring faster and with exceptional ultra-sensitivity, and in time to take appropriate decisions to improve personalized diagnosis and therapy.

Focusing on genito-urinary cancers, the tool will detect biomarkers from biofluids such as urine in a non-invasive way, and will help oncologists make better treatment decisions that approach personalized medicine.

"The device makes use of the unprecedented sensitivity that can be achieved using laser micro-ring resonators – devices using the same principle as a whispering gallery, but with light instead of sound," says Elena, who was also awarded an ERC Consolidator Grant this year for a different project. "With their ultra-sensitivity, simplicity of use, portability and low cost, they're ideal for detecting the key biomarkers in tumor development and treatment."

Importantly, GLAM's unique technology will mean the device has the potential to be used with other types of biofluids, opening the way to the diagnosis and monitoring of many more diseases. //

Visit www.ibecbarcelona.eu for more news: How cells cope with stress and strain • New malaria strategy proposes using unaffected red blood cells as drug carriers • IBEC groups join forces to combat chronic bacterial infections • ...and more!

What is EIT Health?

New European-wide healthy ageing network explained in six easy steps

Since the announcement that the consortium involving IBEC was the one chosen to be the EIT's Knowledge and Innovation Community (KIC) on healthy living and active ageing, you may have heard the name EIT Health quite a lot. But what exactly is EIT Health, and why is it important? We summarise using the six best questions to ask to ensure you get the gist of any story – the five Ws and the H.

What?

Integrating all three sides of the 'knowledge triangle', i.e. higher education, research and business, Knowledge and Innovation Communities carry out a whole range of activities, covering the entire innovation chain, including training and education programmes, reinforcing the journey from research to the market, innovation projects and business incubators. EIT Health and the other second-round KIC, EIT Raw Materials, are the fourth and fifth to be created after Climate-KIC, EIT Digital and KIC InnoEnergy in 2008.

Who?

EIT Health is a consortium of more than 50 core partners – including IBEC – and 90 associate partners from leading businesses, research centres and universities from 14 EU countries. IBEC Director Josep

Samitier is a member of the supervisory board alongside 11 other individuals from all over Europe.

Where?

Headquartered in Munich, EIT Health has formed six Co-location Centres across Europe: London (UK/Ireland), Stockholm (Scandinavia), Rotterdam (Belgium-Netherlands), Barcelona (Spain), Paris (France) and Heidelberg (Germany).

When?

EIT Health was designated as an EIT Knowledge and Innovation Community by the EIT Governing Board on 9th December 2014, but the consortium, originally called Innolife, has been working to promote its bid since 2009.

Why?

We already have very efficient health care in a number of European countries, but the potential for improving health is still enormous. People can do a lot to lead a fulfilled life, free of complications in their later years in spite of health conditions, by actively managing their health. To help them do this, EIT Health will develop health solutions that support people in their desire for an active and self-determined life. It will provide a general framework in which ideas and innovations can develop, especially if they require fast access to resources which

are not readily available at the innovation's source. EIT Health will help people turn ideas into new market opportunities, take advantage of an unprecedented spectrum of expertise, leverage entrepreneurial know-how to launch their business, or co-innovate and collaborate in new research projects on a European scale.

How?

Between 2016 and 2018, EIT Health aims to create 165 start-ups, enrol a million students in its educational online programmes per year, and incubate about 140 new business ideas per year.

Check out www.eit-health.eu if you'd like to find out more. //



L-r: Ehud Gazit, CERCA director Lluís Rovira and Josep Samitier

Israeli good!

Israel's former Chief Scientist of the Ministry of Science and Technology, Prof. Ehud Gazit, was one of the visitors who took part in a joint symposium between IBEC and Tel Aviv University (TAU) on 18th-19th May.

Supported by AGAUR, the symposium was a chance for group leaders from both sides to present their work and try to identify synergies and opportunities for collaboration.

With many similarities between Catalonia and Israel – which are almost neck-and-neck when it comes to research output in *Science* and *Nature*, with over 30 publications per million inhabitants and similar levels of funding under FP7 – the IBEC/TAU relationship builds on the fact-finding mission of Artur Mas and Barcelona-based scientists, including IBEC director Josep Samitier, to Israel last year. //



Open day for future talent

Nearly 60 undergraduate and masters students attended IBEC's reSEARCH4TALENT day on Thursday 30th April. We opened our doors to everyone interested in knowing more about a career as a researcher, giving them the chance to talk to real researchers and ask questions about day-to-day work in the lab, career paths, work-life balance, mobility and more, as well as taking a tour of the IBEC labs and enjoying a "snack 'n' chat" networking session in the PCB garden.

Finding a balance

UNESCO's 1996 World Science Report stated that "women's progress along a scientific career is rather like the way water moves along a pipe with holes in it". Is this still valid today? Why do women gradually disappear on the way up to the most senior research or academic levels? Is it actually possible to have a balanced personal life alongside a career in academic research? Why do some PhD students and junior postdocs leave science before they've even started? If we want children, how do we decide when to have them?

To discuss these and other questions that lay at the very heart of what makes a research career successful or not, we invited four IBEC Junior Group Leaders – Elisabeth Engel, Elena Martínez, Pere Roca-Cusachs and Núria Montserrat – to participate as guest speakers in a round table session about work-life balance in research that took place on July 15th. One of the actions of IBEC's Equal Opportunities and Diversity Management Plan, the session aimed to raise awareness about gender bias and the difficulties of managing a good

work-life balance for both sexes, with a special focus on research careers.

Concepts such as vertical segregation, the 'glass ceiling' effect, or feeling guilty for not paying enough attention to family life were discussed, and while the session aimed to give a clearer sense of what it takes to survive, thrive and succeed in research in particular, it was clear that these problems don't only affect researchers, and that we were addressing a problem that involves society as a whole. It really is a global challenge!

The guest speakers shared their own personal experiences as successful role models who have managed to reach a leading position in research while, at the same time, raising their children or taking care of their family. Each story provided a different perspective with different problems and motivations, but all agreed that there comes a time when you have to prioritise what is important to you, and accept that you can't be the best at everything – in other words, you can't have it all.

The session was very interactive, and everyone had the chance to contribute their opinions. The networking brunch afterwards also offered a good opportunity to share thoughts and chat more informally with the speakers.

– Ricard Rius, HR



L-r: Pere Roca-Cusachs, Núria Montserrat, Elena Martínez and Elisabeth Engel at the 'Work-life balance in research' session

Taking the reins at ACER

In February, IBEC Director Josep Samitier was named new president of the Associació Catalana d'Entitats de Recerca (ACER).

Josep took over from IFCO director Lluís Torner, who had held the position since 2009. The other members of the Director's Board are Joan Gómez Pallarès (ICAC) as secretary, and Ramon Gomis (IDIBAPS), Jordi Galí (CREI) and Josep M. Monfort

"It's a great honour to represent all the centres in the Catalan research arena"

(IRTA) as members. "It's a great honour to represent all the centres in the Catalan research arena in front of the government, and to help bring ACER into a new era," says Josep.

Established in 2003 by the Catalan government's department of Universities, Invest-

igation and Information Society, ACER is an independent association of more than 40 institutions in Catalonia – including CRG, IRB, ICFO, IBEC, VHIR and IDIBAPS – which conduct research as their principal mission. The association's goal is to help establish the region as an international benchmark in scientific and technological research by representing its associated centres, encouraging collaboration and the coordinated exchange of information, promoting synergies with similar agencies related to local, national or international research, and contributing to the improvement of scientific understanding in society.

ACER activities which have taken place since the change in leadership have included a conference on "RIS3CAT i els Instruments d'Innovació d'ACCIÓ. Oportunitats pels centres ACER" on 12th June and the 5a Escola de Primavera on science communication on 16th June, which was co-organised by IBEC, the CRG and IMIM. //

Fun in the sun

If your idea of a good time is running around a field in 30°C, you'll surely have been one of the 70 or more participants who enjoyed IBEC's Summer Day on 3rd July. Attendees played team sports such as football or paddle tennis, or took part in fitness activities such as zumba together, before relaxing by the pool for the afternoon with a packed lunch.



IBEC Director Josep Samitier welcomes participants to the IBEC Summer Day event

Kids Day at IBEC

On Friday 26th June IBEC, in collaboration with IRB, celebrated its first edition of Kids' Day, when staff and researchers from the two institutes were invited to bring their children

to the PCB for a morning of science activities. Kids' Day was an opportunity for staff to show their children their workplace, and gave the 47 IBEC visitors – who were aged between 3 and 12 – the chance to be a 'little researcher'

for a day via tours of the labs, games and interactive activities, including a science show by *Ciència Divertida*.

"The kids really loved it," says Events Coordinator Pilar Jiménez, who organised the day. "We'd like to thank all the many IBEC volunteers for looking after the children and helping them enjoy their day."



OUTREACH NEWS

Calling all bloggers!

IBEC's new dedicated outreach blog at divuga.ibecbarcelona.eu is supported by a FECYT grant. As well as being a record of all the outreach activities IBEC organises and takes part in, it is also a forum for articles about various subjects that may be of interest to the general public or students wanting to learn more about science and research. If you'd like to contribute, contact ibeccommunications@ibecbarcelona.eu.

Another milestone for outreach at the institute was the visit on 17th June of a group of students from the University of Texas. It was the first time a student group from the USA had come all the way to visit IBEC, and their particular interest was infectious diseases, so Eduard Torrents and Lucas Pedraz kindly contributed their time.

In March, IBEC took part in the *Saló de l'Ensenyament*, as well as the *Festa de la Ciència i la Tecnologia* (thanks to Arnau Biosca, Sílvia Pittolo, Pilar Rodríguez and Laura Casares) and the *Fira Recerca en Directe* (Vanessa Gil and Ariadna Pérez), both in April. In May, 11 high school teachers took part in workshops on "Bioenginyeria cardíaca: Una opció de futur" as part of the



Professors i Ciència programme, organised by the *Fundació Catalunya-La Pedrera*. Also in May, Xavier Trepant and Laura Casares took part in a global science outreach event taking place simultaneously in 9 countries and 50 cities all over the world. The *Pint of Science* festival aimed to deliver fun pub talks on the latest scientific research by the people who carry it out, and Xavi and Laura gave talks on "The forces that drive cancer cells" and "Cell, the force be with you" at a packed *Café de les Delícies*.

Finally, school visits in the last few months have included groups from *Escola Roig Tesàlia*, *Institut Secretari Coloma*, *Institut Moisès Broggi*, *Institut Francesc Macià*, *IES Pau Claris*, *Institut Sales*, *IES Torrent de les Bruixes*, *Institut Trepant de Lleida*, *Institut Miquel Martí i Pol*, *Centre Escolar Montlau*, and the *Escola Suïssa de Barcelona*. Many thanks to all the IBEC researchers who helped out. //

La Caixa support to continue

IBEC has signed a new agreement with the Obra Social "la Caixa" to carry out a new translational research programme aimed at addressing clinical challenges related to ageing.

The IBEC-La Caixa programme in Healthy Ageing Research, which will last until 2016, is focused on three specific needs related to ageing: Restoring Organ and Tissue Function, Managing Chronicity through Advanced Diagnostics, and Fighting Infectious Diseases. It will use four enabling technological platforms – electrical and optical detection, biomimetics and bio-inspired materials, cell mechanics, and nanorobotics – to tackle these challenges.

This new joint programme follows on from IBEC and the Obra Social "la Caixa"'s successful first collaboration during 2012–2014, when IBEC was one of the five centres to participate in the foundation's pilot scheme allocating €2.5m to funding research evaluation and technology transfer in Catalonia.

IBEC's project under that scheme, 'Sistemes de diagnòstic i teràpia basats en la integració de noves tecnologies nano bio info i cogno' provided the framework within which the institute's three 'flagships' – Nanomedicine, Cell Engineering and Intelligent Healthcare – carried out several interdisciplinary projects. Results so far have

included the identification of a new mechanism in cell communication that promotes cancer metastasis (published in *Nature Cell Biology*); a molecular mechanism of rigidity sensing in breast cancer (*Nature Materials*); and the first ever splenon-on-a-chip (*Lab on a Chip*); a patent for Monolayer Stress Microscopy; and the creation of a joint unit for research and development of point-of-care diagnostic devices with Genòmica S.A.

The IBEC-La Caixa programme in Healthy Ageing Research is strongly related to innovation through EIT Health (page 4), fostering collaboration with clinicians, incorporate new expertise related to ageing and develop closer-to-the market products. //

NEWS from the PhD COMMITTEE



We need more members!

The IBEC PhD Students Committee has been busy as usual, organising events such as regular Bowling Fridays, volleyball on the beach in July, Laser Combat Night in April, a Calçotada in March and beginning the year with a ski trip to Andorra in February.

However, with the departure of several members who have either finished their PhDs or moved on with their groups, the members of the committee are not as numerous as they once were.

"Since the inception of the committee in June 2013, we've seen the students at IBEC really benefit from having a proper structure for arranging social occasions and organising courses, as well as having more of a voice in the running of the institute," says IBEC's managing director, David Badia. "We'd especially like to encourage group leaders to volunteer a member of their groups to join the PhD Committee, as we'd like all the IBEC groups to be represented."

If you'd like to join the PhD Students Committee or nominate one of your students, please get in touch by email: phdcommittee@ibecbarcelona.eu. //

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// **Important message from the Projects Office:** An **ORCID number** is a unique identifier for authors and researchers to ensure that their scientific and technical output is clearly identified. Funding bodies, including MINECO, AGAUR, ERC and H2020, ask for this ORCID number for the evaluation of PIs and proposals. We expect that, in the near future, this ID will be mandatory in some of the calls. IBEC researchers are encouraged to create their ORCID identifier if they don't have one yet. To do so, please go to <https://>

orcid.org/register.

// IBEC's **brand new website** is now up and running in all three languages. It's best viewed in Firefox, Chrome or one of the other new generation browsers. If you spot any broken links or things that don't look quite right, please contact veigh@ibecbarcelona.eu. For details about the **new IBEC logo** including templates for letters, presentations and posters, please visit the Corporate Image section of the new website at www.ibecbarcelona.eu/corporate-image.

// ICREA also has a **new website and logo**. Check it out at www.icrea.cat.

// IBEC Director Josep Samitier contributed his expertise to a **week-long course organised by CSIC** and held at the Universidad Internacional Menéndez Pelayo in Santander in July. "Nanotecnología: la revolución del siglo XXI" was aimed at third and fourth-year undergraduates, and Josep's module addressed the new methods of diagnosis and treatment of diseases which have been made possible by nanomedicine.

IBEC PEOPLE



Ramona Bravo has joined the Core Facilities team as a laboratory technician. Previously, she was a PhD student at IBEC doing research on aggregative proteins involved in Alzheimer's disease under the supervision of Xavier Fernández-Busquets. In 2008, she moved to Aromics (Applied Research Using Omic Sciences S.L.), a biotech company, where she worked as a research technician in cancer and neurodegenerative disease projects.

AWARDS AND HONOURS



Integrative cell and tissue dynamics group leader and ICREA research professor **Xavier Trepat** was this year's winner of the Banc Sabadell Award for Biomedical Research for his work on understanding the fundamental biophysical mechanisms underlying cell interaction and communication. The award is the most important in Spain in the health sciences and among the top international awards. "Despite his youth, Xavier Trepat has become an international leader in his field and enjoys an excellent reputation therein for his research," was the

statement of the ten-strong jury, prestigious researchers from all over Spain.

New IBEC group leader **Samuel Sánchez** (right), this year's winner of the Premio Fundación Princesa de Girona (FPdGi) Investigación Científica for his advances in the field of nanotechnology, was awarded his prize at the 6th awards ceremony/IMPULSA Forum opening event on 25th June, which was presided over by Their Majesties the King and Queen of Spain. The prestigious FPdGi awards recognise the innovative and exemplary careers of young people between the ages of 16 and 35.



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Nanoscale Bioelectrical Characterization group leader **Gabriel Gomila** received an ICREA Academia Prize 2014 for excellence

in research and capacity for leadership. The 30 recipients of the awards, which are bestowed annually by the Catalan Institution for Research and Advanced Studies to encourage university professionals with an outstanding research career to stay in the Catalan university system, received their honours at a ceremony at Sant Pau in July.

UPCOMING EVENTS

Thursday 17th September @ 10:00 am
IBEC Seminar: Richard Reilly, Trinity College Dublin. "A question of Timing: Sensory processing in Dystonia and Parkinson's Disease"

Friday 18th September @ 10:00
IBEC Seminar: Marc Martí-Renom, ICREA Research Professor/CNAG/CRG. "Structure determination of genomes and genomic domains by satisfaction of spatial restraints"

Wednesday 30th September
8th IBEC Symposium: "Bioengineering for Regenerative Therapies". AXA Auditorium, L'illa Diagonal, Av. Diagonal 547

Friday 16th October @ 10:00
IBEC Seminar: Lorenzo Albertazzi, IBEC. "Nanoscopy for Nanomedicine: looking at nanomaterials in action one molecule at a time"

More events at www.ibecbarcelona.eu

Articles or ideas, please!

Is your group starting a new project? Perhaps something interesting has happened in your research area, or you've had an interesting visitor. Is there an important change that people should know about, or a deadline? Maybe you'd just like to find out what the IBEC community thinks about something, or you have a request. If you have an idea for *InsideIBEC* or would like to write an article yourself, contact vleigh@ibecbarcelona.eu.



IBEC in pictures

IBECers enjoyed Sant Jordi (23rd April) together this year at a garden party with a difference. In the spirit of internal networking and getting to know new people, each male attendee of the lunchtime gathering in the towers garden of the PCB was given a woman staff member or researcher's name on a slip of paper. They then had to identify her and present her with her red rose.



InsideIBEC issue 9, summer 2015.
Published at IBEC, Baldri Reixac 10-12,
08028 Barcelona, Spain.
Available online:
<http://www.ibecbarcelona.eu/about-us/documents/>
Editor: Vienna Leigh. Please send
contributions to vleigh@ibecbarcelona.eu