

# ICFOnians

Community News from the Institut de Ciències Fotòniques



## EDITOR'S CORNER

### The Forest and the Trees

**BROOK HARDWICK**  
Coordinating Editor



Between deadlines, new projects, and basic housekeeping items that affect us all, it is easy to lose sight of the big picture- focusing only on the trees and not seeing the forest. At a place like ICFO where there is so much going on in so many different fields, getting boxed-in can mean missing out on amazing opportunities for collaboration or who knows- maybe even a golden idea! This edition of ICFOnians, which gathers highlights of the last quarter of 2015, reflects opportunities that we have taken to step back and contemplate the forest for a change- what a great way to bring closure to 2015 and prepare for the new year!

The first opportunity we had this quarter was in honour of the landmark birthdays of Roy Glauber and Maciej Lewenstein (30 x 3 & 30 x 2). For two full days in October, friends and colleagues swarmed to ICFO for the *Frontiers in Quantum Physics Symposium* where they shared science, memories, amusing anecdotes, and even some unforgettable music. All attended because they had in some way been part of the lives and careers of these two great scientists. Taking a moment at an important juncture in life to review successes and relive eureka moments helps to put things into perspective and even helps to inspire new initiatives, more collaborations and hopefully more eureka moments. A wide variety of inputs from world renowned leaders in physics created an eye-opening landscape of perspectives and I would venture to say, opened the door to entirely new "forests", especially for some of the younger attendees.

Just over a month after the big birthday celebration, ICFO launched with great success a new event, *ICFO DAY*, with the explicit goal of giving all of ICFO, researchers and staff, the chance to get the big picture of what is going on at the institute. The event was the brain-child of Prof. Niek van Hulst, Head of Academic Programs who had long dreamed of an Open Day for ICFOnians- a pause in the regular operation of the institute and a chance to turn everything inside out to investigate and discuss what is going on behind closed doors. Rob Sewell, Coordinator of Academic programs and Silvia Vilaprinyo coordinated ICFO volunteers and produced an amazing day made by ICFOnians for ICFOnians like nothing that had been seen here ever before. I believe I speak for everyone when I say that the event far exceeded expectations in terms of cross-fertilization of ideas, general institutional awareness and "buen rollo". Check out the insert in this edition which we had to create in order to give proper coverage to this new hopefully annual event.

All this is not to say that we should only look at the forest! ICFO is great at detail work and we know that the fine points of every picture- the trees that make up the forest- give the forest its rich details. We are patient, curious, and always look inside to find out what makes something work at the most fundamental level. Keep reading to learn about all of these important details as well.

HAPPY NEW YEAR AND HAPPY READING!

## COVER



Over the past months, we have been snapping a lot of pictures with special occasions taking place throughout the institute. There was an opportunity for everyone to get involved.

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\*SPECIAL INSERT

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Brook Hardwick, Corporate Communications Head

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ICFO NEWS



**EXCELENCIA SEVERO OCHOA**  
2016 - 2019

**SEVERO OCHOA INSTITUTE OF EXCELLENCE 2016-2019**

Launched in 2011 by the Spanish Ministry of Science and Innovation, the Severo Ochoa Excellence Program aims at identifying the top world-class research institutions in the country and allocating dedicated funding for them to conduct a cutting-edge research project for a period of four years. Four years after its first grant, ICFO consolidates its reputation as an institute for research excellence with its 2nd Severo Ochoa distinction. The evaluation process was based on an analysis of the strategic research plans for 2016-2019, with ICFO scoring 99.85 points out of a total of 100. The award carries with it financing for a million euros annually for the next four years.

**ARA IGNASI PUJOL AWARD**

In celebration of its fifth anniversary, the newspaper *ARA* and “La Caixa” Foundation have organized the *ARA Awards*, hosted on November 2<sup>nd</sup> at the Palau de la Música Catalana. In recognition of ICFO’s work in research, training and technology transfer to the industrial sector, the institute was presented with the Ignasi Pujol Award for promoting Entrepreneurship. The award is given in remembrance of the late head of the Economy section of the newspaper.

**NATIONAL RESEARCH AWARD FOR YOUNG TALENT**

This year the Catalan Foundation for Research and Innovation’s (FCRI) National Research Award in the Young Talent category has been granted to ICREA Professor at ICFO, Frank Koppens, leader of the nano-optoelectronics group at ICFO, for his outstanding achievements in the fields of graphene and 2D materials. This award is given each year to encourage and recognize the efforts of young researchers who stand out for the quality and excellence of their scientific work and research.

**PROF. JENS BIEGERT NEW OSA FELLOW AND APL ASSOCIATE EDITOR**

ICFO proudly announces that Prof. Jens Biegert has been selected to join the 2016 class of Fellows of the Optical Society of America (OSA). He is being recognized “for pioneering work in the development of ultrashort and intense few cycle pulses in the mid-infrared, and their use in analysing the structure of molecules”. In addition, he has also been invited to become one of the associate editors for *APL Photonics*, a peer-reviewed and open access journal that was launched in November 2015 by the American Institute of Physics (AIP).

**ERNST-REUTER-PRIZE 2015**

Every year since its first edition in 1985, the outstanding Ernst-Reuter-Prize has been awarded by the Freie Universität. This year Dr. Christian Gogolin, ICFO postdoctoral researcher and MPQ-ICFO Fellow in the Quantum Optics Theory and Quantum Information Theory research groups, has been honoured with this award for his outstanding achievements presented in his final thesis dissertation “Equilibration, thermalization, and the emergence of statistical mechanics in closed quantum systems“, defended in 2014.

ICFO NEWCOMERS



**Alba Rosado**  
Project Manager



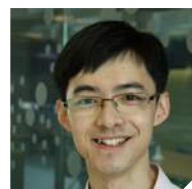
**Marcos López**  
PhD Student



**Jorge Vergara**  
PhD Student



**Jacob Swain**  
PhD Student



**Lijun Meng**  
PhD Student



**Pablo Gómez**  
PhD Student



**Julio Sanz**  
PhD Student



**Ugaitz Elu**  
PhD Student



**Albert Aloy**  
PhD Student



**María Sanz**  
PhD Student



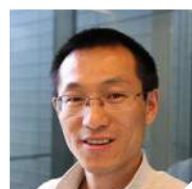
**Natalia Bruno**  
Postdoctoral Researcher



**Alexandre Dauphin**  
Postdoctoral Researcher



**Yu Bi**  
Postdoctoral Researcher



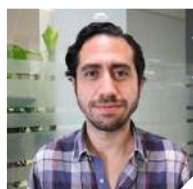
**Jianjun Wang**  
Postdoctoral Researcher



**Mariona Moreno**  
Postdoctoral Researcher



**Nengjie Huo**  
Postdoctoral Researcher



**Cuauhtemoc Araujo**  
Postdoctoral Researcher



**Johann Toudert**  
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**Guillermo Arregui**  
Postgraduate Student



**Irfan Ansari**  
Postgraduate Student



**Maria Martí**  
Project Manager



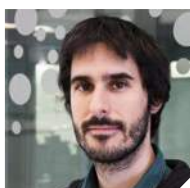
**Diana Davydovskaya**  
Research Engineer



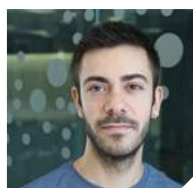
**Tomeu Coll**  
Research Engineer



**Teresa Galán**  
Research Engineer



**Carles Monasterio**  
Research Engineer



**Roger Guiu**  
Undergraduate Student



**Edyta Osika**  
Visiting PhD-student



**Fernando Sols**  
Visiting Scientist



**Mangaka Matoetoe**  
Visiting Scientist

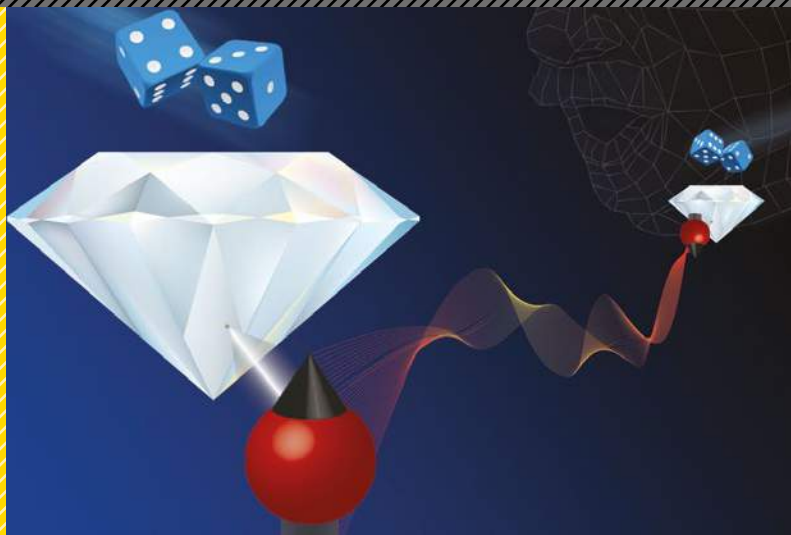


**Malgorzata Mochol-Grzelak**  
Visiting Scientist

Many of us joined ICFO or took a new position at the Institute between October and December.



## LATEST ADVANCES



## EXPERIMENT TESTS EINSTEIN'S "GOD DOES NOT PLAY DICE"

■ The Random number generator developed at ICFO by Carlos Abellan, Waldimar Amaya, and Daniel Mitrani, led by ICREA Professors Morgan Mitchell and Valerio Pruneri, played a critical role in the historic experiment published in *Nature* by the TU Delft group led by Ronald Hanson. With the help of ICFO's quantum random number generator, the Delft experiment has given the strongest refutation to date of Albert Einstein's principle of "local realism," which says that the universe obeys laws, not chance, and that there is no communication faster than light.

This quantum random number generator technology has also played an important role in loophole-free Bell tests in two other high profile experiments at IQOQI Vienna and NIST. The accomplishments achieved in these studies have been of such importance that *Physics Review Letters* dedicated the December issue of the journal to Bell tests.

## GRAPHENE ENABLES FASTER COMMUNICATIONS

■ *Nature Nanotechnology* published a study in which the research group led by ICREA Prof at ICFO Frank Koppens showed that a two-dimensional crystal, combined with graphene, has the capability of detecting optical pulses with a response faster than ten picoseconds, while maintaining a high efficiency. By using ultra-fast laser pulses, they have shown a record-high photo-response speed for a heterostructure made of two-dimensional materials.

## BROWNIAN CARNOT ENGINE

■ A study by ICFO researchers Ignacio Martínez, Édgar Roldán, Raúl Rica and the late Dmitri Petrov, which validates one of the milestones of Thermodynamics, was published in *Nature Physics*. In this study, ICFO Researchers developed a microscopic motor, a micro Carnot engine, which operates between two thermal baths. This microscopic heat engine functions by trapping a microparticle with a laser trap, tuning the effective temperature of the particle via noisy electric fields which increase the Brownian fluctuations of the trapped particle. This advance will help to pave the road for the design of artificial nanomotors and their application in state-of-the-art fields such as intelligent materials, artificial muscles, or even nanorobots.

## QUANTUM PHOTONIC CERTIFICATION PROTOCOLS

■ In a recent work published in *Nature Communications*, ICFO researcher Christian Gogolin, in collaboration with scientists from the Dahlem Center for Complex Quantum Systems, the Universidade Federal do Rio de Janeiro, and MPQ - Max-Planck-Institut für Quantenoptik, have reported on an experimentally friendly and reliable certification tool for photonic quantum technologies. They presented a certification test applicable to multi-mode pure Gaussian states, pure non-Gaussian states generated by linear-optical circuits with Fock-basis states of constant boson number as inputs, and pure states generated from the latter class by post-selecting with Fock-basis measurements. This protocol is efficient in the former case, as well as for a constant number of photons in the latter two. The results obtained constitute a step forward in attaining reliable certification of large-scale photonic networks such as those used for quantum-information processing, quantum simulations, BosonSampling, and quantum metrology.

## BUSINESS NEWS

KTT  
Launch  
Pad

## New ERC Proof of Concept Project

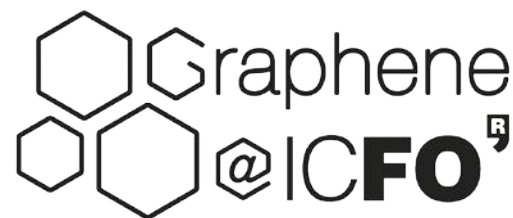
GRAPHEALTH: graphene wearable technology

The European Research Council, in its efforts to help ERC grant-holders to bridge the gap between their research and the earliest stage of a marketable innovation, created the Proof of Concept (PoC) funding scheme for researchers who have already been awarded an ERC grant. Not only does this program help ERC grantees to explore the innovation potential of their research and/or commercialize the results of their ERC-funded research, the program complements the efforts of ICFO's Knowledge and Technology Transfer Unit (KTT) which proactively searches for ways to translate newly generated knowledge into new technologies.

ICFO group leaders Professors Frank Koppens, Gerasimos Konstantatos and Turgut Durduran have been awarded ICFO's fifth PoC for the *GRAPHEALTH* project. This is the second PoC for both Frank Koppens and Gerasimos Konstantatos.

The main goal of *GRAPHEALTH* is to exploit the inherent properties of hybrid graphene-quantum dot detectors in order to enable constant non-invasive health monitoring through vital parameters. Unlike current bulky systems, this new approach enables a flexible, compact and wearable health monitoring system for constant monitoring for consumer health applications as well as muscle health of athletes during exercise or after injury. ICFO's hybrid quantum dot and graphene technology exhibits very high sensitivity and the technology is compatible with flexible electronic manufacturing processes. The detector is also more compact than current commercial devices.

The project is currently incubating in the ICFO Launchpad, ICFO's space and support structure which allows innovative ideas to develop into new technology spin-offs.



## Photonics for early diagnosis of IBD



■ The Optoelectronics research group led by ICREA Prof at ICFO Valerio Pruneri has recently teamed up with the Department of Molecular Microbiology of Hospital Sant Joan de Deu (HSJD), led by Dr. Carmen Muñoz-Almagro, to exploit a new photonic device that could help expedite the diagnosis of Invasive Bacterial Diseases (IBD). IBD are responsible for illnesses such as pleuropneumonia, meningitis or bacteremia among others which are a serious threat to global health, especially to children and the elderly. The Cellex Foundation, a fervent supporter of ICFO's research as well as a generous patron for the HSJD, was instrumental in putting this collaboration in motion.

RESEARCH EXCELLENCE

# AXA Research Fund Chair at ICFO

First Chair holder Prof Antonio Acín will develop and implement encryption systems based on quantum devices

The AXA Research Fund has awarded to ICFO a Chair, which is both permanent and pioneering on a global scale, for a quantum information technology project that will focus on risks associated with data privacy. The Chair has a budget of EUR 1.7 million, bringing AXA's support to science in Spain to approximately EUR 10 million.

Data security has become an issue of the utmost importance in the global arena. The Snowden case, for example, not only revealed weaknesses in security protocols used to transmit data over networks but also in the trust we place in our service providers.

ICFO is the most recent recipient of a permanent AXA chair in Spain. The chair holder, who will lead this project for the first 5 years, is ICREA Prof at ICFO Antonio Acín. A pioneer in the field of quantum cryptography, leader of the Quantum Information Theory group at ICFO and winner of three prestigious European Research Council grants, Prof Acín studies quantum cryptography protocols that ensure the non-violability of data communications.

Through the AXA Chair, ICFO will conduct research focused on developing and implementing encryption systems based on quantum devices, with the aim of 100% secure data communications. Based on the use of quantum particles, these devices are able to code information in a way that is impossible to hack. As Professor Acín states, "To break these protocols would be to go against the laws of quantum physics, which is something that has never been achieved."

According to Ulrike Decoene, head of the AXA Research Fund, "Quantum encryption is the great hope for total data privacy, as it would allow users to certify the security of their communications without relying on a third party supplier. This contrasts with current methods of encryption, which are vulnerable to hacking and whose security intrinsically requires some level of trust in the supplier of the encryption system." Jean-Paul Rignault, CEO of AXA Spain and the AXA Research Fund's representative in Spain, adds: "We are convinced that better knowledge and understanding of the risks facing societies is essential for their development; hence our commitment to providing the academic world with the

means and freedom they need to conduct research in these areas. Supporting them is our responsibility and a unique opportunity to enhance general knowledge and contribute to better protecting the general public."

ICFO's director, Lluís Torner considers this a great opportunity "which will allow us to provide new and important training opportunities for young scientists in a research area with great



potential. It will also allow us to communicate the results of this research throughout society."

Chair holder Antonio Acín is convinced that "security in today's age

of reliance on information is of vital importance to everyone.". He adds, "This chair will allow us to delve into our research with the aim of obtaining high-impact, innovative results for the future of society."

*"Data security has become an issue of the utmost importance in the global arena. The Snowden case, for example, not only revealed weaknesses in security protocols used to transmit data over networks but also in the trust we place in our service providers."*

## Phd Poster Session & Award

ICONS sponsors Best Poster Prize for the PhD Student Poster Session



From left to right: Nolsen Suárez, Barbara BuaDES, and César Cabrera.

The Student Poster Session is held each year to encourage the exchange of ideas and knowledge between research groups at ICFO. This year's Poster Session took place coinciding with the first "ICFO Day" event, underscoring the importance of PhD students sharing their research with the rest of the ICFO community. In total, thirty eight posters were exhibited in the hall of the Nest Building, starting a week before the ICFO Day event and continuing through December to ensure that all have the opportunity to browse and learn about the many different research lines at the institute.

- The Best Poster Award was sponsored by **ICONS** with the support received from **OSA-SPIE**
- **1st Place: CÉSAR CABRERA** in the Ultracold Quantum Gases group  
Poster: "A new experiment for the observation of the bosonic polaron"
- **2nd Place: BARBARA BUADES** in the Attoscience and Ultrafast Optics group  
Poster: "Spatio-temporal Isolation of Attosecond Pulses at 300 eV: Attosecond Lighthouse at the Water Window"
- **3rd Place: NOLSEN SUÁREZ** in the Attoscience and Ultrafast Optics group.  
Poster: "Above-threshold ionization and photoelectron spectra in atomic systems driven by strong laser fields"

## 2014 ICFO PhD Thesis Award for Dr Jan Gieseler



Prof Niek van Hulst, Prof Lukas Novotny, Jan Gieseler and Prof Romain Quidant

Now in its 6th edition, the ICFO PhD Thesis Award was created in order to distinguish particularly brilliant PhD Theses presented at ICFO. With this award ICFO wishes to highlight and reward extraordinary PhD students whose research progress at the Institute has proven to be highly creative and ambitious.

In recognition of the exceptional doctoral thesis: "Dynamics of Optically Levitated Nanoparticles in High Vacuum", co-supervised by ICREA Prof at ICFO Romain Quidant and ICFO Distinguished Invited Prof Lukas Novotny (ETH Zürich), Dr. Jan Gieseler was awarded the 2014 ICFO PhD award during the first ICFO Day celebration on November 27.

*By devising novel concepts to optically levitate nanoparticles in high vacuum, Jan Gieseler managed during his doctoral years at ICFO to pioneer an original route in optomechanics and thus trigger a new research line.*

## TRAINING



## PhD Open Days @ ICFO 2015



Have you ever thought about doing a PhD? Do ICFO research topics fit your interests?

Accomplishing a PhD can certainly be a rewarding experience but it is really worth thinking it through before making the decision to start. ICFO aims to play an important role in training the next generation of scientists and technologists: bright, ambitious young women and men, with a talent for discovery and strong moral values, who aim to achieve difficult but important goals in research.

The 4<sup>th</sup> edition of the PhD Open Day was organized at ICFO on November 6, 2015 in order to give talented and outstanding graduate students the chance to learn more about our research and training programs. The event had a special

focus on the doctoral degree studies and the several PhD positions available at ICFO each year.

Around sixty students joined this 2015 event, coming from universities in the Barcelona area, universities in Spain, and also from other EU countries and beyond. In order to assure that highly competitive candidates for ICFO positions would be able to attend, an internal committee awarded travel grants to 15 students coming from outside Catalonia, covering travel and accommodation costs.

The event was inaugurated by Prof. Niek van Hulst, Head of Academic

Programs, who presented the institute and its research activities in general, highlighting our four broad thematic research areas, namely nonlinear photonics, quantum photonics, nanophotonics, and biophotonics. ICFO's academic program, which offers accurate supervision, mentoring and support along with training through research and in transferable skills as well as career development opportunities for a future in academia and industry, was also addressed.

During the event, participants had the opportunity to interact with our research community, above all ICFO Group Leaders and current PhD-stu-

dents, to learn the reality of the ICFO PhD experience. They were able to listen to the testimonials of recent ICFO PhD recipients and to participate in lectures given by Group Leaders who talked about the wide range of research areas present at ICFO. In addition, attendees visited our state-of-the-art research laboratories.

Our hope is that those who attended the ICFO PhD Open Day will be better equipped to make well informed decisions when embarking on the path to a PhD. And of course we hope that many were encouraged to submit their candidatures for starting their PhD Projects with us.

## OUTREACH



### Time, Einstein and the Coolest stuff in the universe

■ William Phillips, Nobel Laureate in Physics 1997 for the development of methods to cool and trap atoms with laser light, offered a very special presentation at La Pedrera as part of the Fundació Catalunya- La Pedrera- Ignació Cirac Chair. This masterclass for the general public was a lively, multimedia show, including experimental demonstrations and down-to-earth explanations about some of today's most exciting science.



### Young Photonic Congress

■ More than 120 students from all over Catalonia, who during the 2014-2015 school year conducted research projects, class projects or took part in research stays with a direct or indirect focus on light, were invited to ICFO to take part in what was for most their first scientific congress. This congress was organized in the framework of GoPhoton!, a European project by the European Centres for Outreach in Photonics (ECOP) which was funded through the 7<sup>th</sup> framework programme of the European Commission.



### La Llum a les Ones (Light on the Waves)

■ Now in its 4<sup>th</sup> edition, La Llum a les Ones is a scientific contest aimed at bringing photonic sciences closer to society by motivating high school students to write poems or short stories about light. The winning texts are put to music by groups from the Catalan music scene. The winners, ICFOians, friends, family, teachers and supporters of science all come together in a grand finale concert, generously hosted by CCCB Educació and MC'ed by Daniel Arbós and Màrius Belles from the Scientific outreach radio show "Pa ciència, la nostra". This year, the contest encouraged participants to write a text based on the evocative science fiction images created by Frank R. Paul, illustrator of the first pulp magazines in the science fiction field that appeared in the twenties and thirties.

► The Entangled ICFO Band joined Carlos Cros, Gulliem Roma, Les Sueques, La Mecànica Sonora, Sittar Green, and El Punto in putting the winner's texts to music.

IN FOCUS



# Frontiers of Quantum Physics 2015

Celebrating the landmark birthdays of Roy Glauber (30x3) and Maciej Lewenstein (30x2)

2015 marked important birthdays for ICREA Professor at ICFO Maciej Lewenstein (30x2) and Nobel Laureate and ICFO Distinguished Invited Professor Roy Glauber (30x3). In order to celebrate these landmark events, ICFO organized a special symposium entitled "Frontiers of Quantum Physics 2015" which took place at ICFO on October 22<sup>nd</sup> and 23<sup>rd</sup>, 2015. The list of invited speakers included prominent scientists working in the field of Quantum Physics, all mingling as part of Roy's and Maciej's network of friends, students, and collaborators.

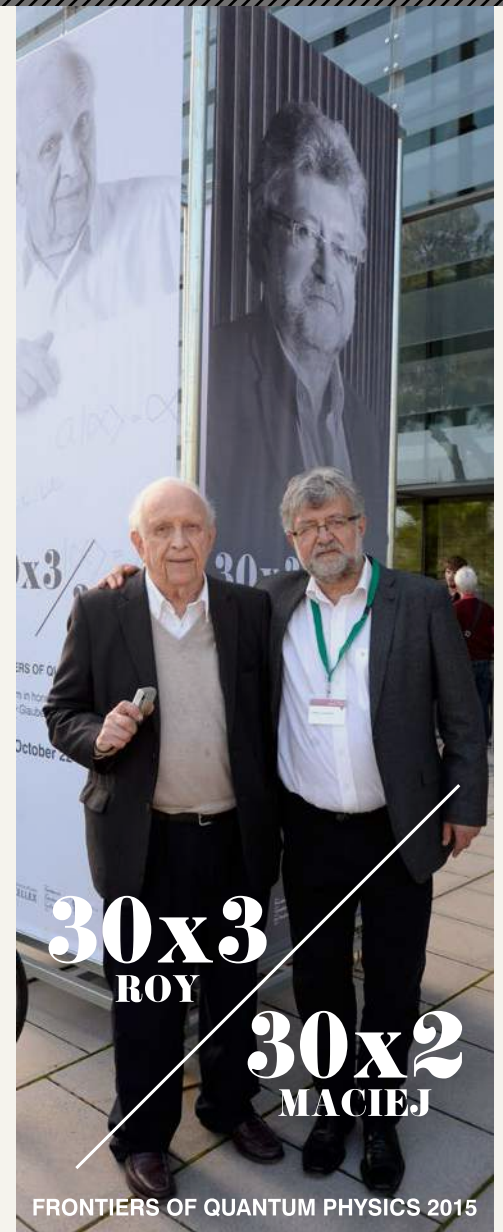
In total, over 120 friends and colleagues gathered to celebrate friendship and a passion for physics. In addition to talks which included reflections on some of the most important scientific findings of our time, many shared memories and anecdotes from decades of personal and professional collaborations.

The event drew to a close with the screening of "That's the Story", a documentary based on Roy Glauber's first person accounts of the Manhattan Project. Taking advantage of the special occasion and audience, the documentary

was followed by a live impromptu Q&A session with Roy Glauber.

As a unique grand finale and in honour of Maciej's passion for music, world renowned jazz pianist Agustí Fernández gave a memorable concert for all ICFO and the symposium guests in the Nest Hall.

*"Over 120 friends and colleagues gathered to celebrate friendship and a passion for physics"*



GO & FLY



**109** women and men have successfully defended their theses at ICFO since its founding in 2002 and have helped us to measure what we have learned, how far we have come, and how much we have yet to learn. These ICFOnians have recently succeeded in defending their PhD Theses. Honoring ICFO's tradition, ICFOnians gather together to celebrate your accomplishments and encourage you to Go & Fly! Remember that wherever you go, you will always be a part of the ICFO community.



**102**

October 2  
2015

**JUAN ANDRÉS TORREÑO**

*'Membrane Protein Nanoclustering as a Functional Unit of Immune Cells'*

TD: ICREA Prof. Dr. María García Parajo and Dr. Carlo Manzo



**103**

October 22  
2015

**MUSTAFA GÜNDOĞAN**

*'Solid-State Quantum Memory for Photonic Qubits'*

TDs: ICREA Prof. Dr. Hugues de Riedmatten



**104**

November 3  
2015

**FEDERICA BEDUINI**

*'Entanglement and State Characterisation from Two-Photon Interference'*

TDs: ICREA Prof. Dr. Morgan Mitchell



**105**

November 11  
2015

**MARÍA ALEJANDRA ORTEGA**

*'Desarrollo y Validación de una Plataforma Optofluídica Ultrasensible para la Detección de Marcadores Tumorales Relevantes en Oncología'*

TD: ICREA Prof. Dr. Romain Quidant and Dr. Vanesa Sanz



**106**

November 26  
2015

**ENRIQUE SÁNCHEZ**

*'High-Power, fiber-laser-pumped frequency conversion sources for the ultraviolet'*

TD: ICREA Prof. Dr. Majid Ebrahim-Zadeh and Dr. Chaitanya Kumar Suddapalli



**107**

December 1  
2015

**BORIS ALBRECHT**

*'Quantum control of single spin excitations in cold atomic quantum memories'*

TD: ICREA Prof. Dr. Hugues de Riedmatten



**108**

December 4  
2015

**MICHELA BADIOLI**

*'Graphene Optoelectronics from the Visible to the Mid-Infrared'*

TD: ICREA Prof. Dr. Frank Koppens



**109**

December 14  
2015

**FABIAN STEINLECHNER**

*'Sources of Photonic Entanglement for Applications in Space'*

TD: ICREA Prof. Dr. Valerio Pruneri

## HIGH PROFILE



**Barcelona Institute of Science and Technology**

### Montserrat Vendrell

*Director of The Barcelona Institute of Science and Technology (BIST)*

After over 10 years dedicated to research in biomedical science, DR MONSTERRAT VENDRELL shifted to leading research initiatives, including the Barcelona Science Park (Parc Científic de Barcelona), Biocat and the Council of European Bioregions (CEBR). She now accepts the challenge of launching The Barcelona Institute of Science and Technology into the ranks of internationally recognized research entities.



**What motivated you to join the BIST initiative?**

I have always been involved in organizations from the very beginning. I like projects where I can create, learn a lot, and have an impact in my immediate surrounding. I am convinced BIST has all these ingredients. BIST englobes 6 of the most outstanding research centres that we have in Catalonia, crosses different disciplines, and aims to build an environment to develop the scientists that the world needs.

**The institutes that make up BIST (ICFO, CRG, ICIQ, ICN2, IFAE and IRB) have vastly different research focuses and strong individual identities. What do they have in common?**

All 6 institutes belong to the CERCA network of research institutes in Catalonia, and at the moment of BIST's creation, they had the Severo Ochoa accreditation (granted by the Spanish Government). They all have a high percentage of ICREA scientists, and governance based on accountability. Although their research focus is obviously diverse, putting them around the same table not only provides outstanding critical mass (more than 49 ERC grants for example, 1,500 researchers) but offers a common ground for sci-

entific planning and execution. As Karl Popper said, "We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline".

**What skills from your days as a researcher do you rely on most heavily to lead this new institute?**

My days as a researcher have provided me with deep knowledge of what science is about, but most importantly, have helped me to deal with scientists as peers, understand what they need to carry out the most competitive research. Scientific method can be applied to any challenge we want to face: identify a need or a problem, test potential ways forward, and implement your final option all the way through. It requires the capacity to invent, but also the methodology to turn ideas into real outputs.

**Turn the clock forward. Where do you expect to see The Barcelona Institute of Science and Technology in the future?**

I would like to see BIST as a strong, internationally recognised organization, which is a priority for

any smart, curious PhD student from anywhere in the world. I envision a flexible and agile organization that provides the right ingredients for scientists to thrive and achieve their goals as professionals, whether they follow the academic path or they contribute with their knowledge and expertise to other initiatives. I would like BIST to contribute to putting Barcelona in the top priority list of cities where any scientist would like to go, not because of the weather or the food, but because you can be happy doing great science.

*"My days as a researcher have provided me with deep knowledge of what science is about, but most importantly, have helped me to deal with scientists as peers, understand what they need to carry out the most competitive research."*

## SUDOKU by [www.sudoku-puzzles.com](http://www.sudoku-puzzles.com)

EASY

9				3			4	1
1	3		2				6	
		8	4		1	7		
		9		5		8	7	
3			1		7			9
	8	2		4		1		
		3	6		4	9		
	9				5		1	7
2	5			9				6

MEDIUM

2					6			
5				8		7	6	
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8								4
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DIFFICULT

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VERY DIFFICULT

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1			9		8			4
2				6	7			1
	3	6				7		
				7				8
8			2			5		

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# ICFO

## Day

On the **27th November**, all ICFO paused to share the activities that are taking place throughout the institute. This full day activity was planned so that all could have a better idea of the wide range of amazing, curious and sometimes surprising things that ICFOians cook up every day in the groups, labs and various divisions and departments of ICFO.

**27th November | 2016**

### MORNING PROGRAM

*Dedicated to exploration and discussions*

- Open Labs- free entrance at leisure to see what is going on behind the closed doors of ICFO's laboratories
- Guided tours- small groups were organized for 30 minute tours of the back-office areas of the building, the light painting activity, made @ ICFO prototypes, and labs with clean-room requirements.
- Demos- the Medical Optics group led by Prof. Turgut Durduran demonstrated the BabyLux mock-up device and a clinical neuro-monitor... and even found new volunteers for their studies measuring blood flow and oxygenation.
- Challenges- the Mechanical workshop designed activities conceived to challenge our "out-of-box thinking". Volunteers from a variety of ICFO groups and units designed the "BIG ICFO GAME"- an obstacle course of sorts which challenged our intimate knowledge of the institute.

### AFTERNOON PROGRAM

*Gathering to celebrate ICFOians' accomplishments and roll out new initiatives of interest to us all*

- Overview from Director Lluís Torner
- Presentation of awards for the best thesis of 2014 and awards for best poster in the PhD Poster Session
- Presentation from Montserrat Vendrell, director of The Barcelona Institute of Science and Technology
- Presentation of the Alumni network
- Presentation of and congratulations to the ICFO PhD Thesis Defenders of 2015

