

# ICFOnians

Community News from the Institut de Ciències Fotòniques





## EDITOR'S CORNER

### Progress



**BROOK HARDWICK**  
*Coordinating Editor*



We all agree that everyone wins when fundamental research can take off and grow into solutions for human challenges. At the outset, however, you never know what amazing things will sprout from these seeds of new knowledge. In the same way that fundamental research sets in motion a series of events and developments that are impossible to foresee yet paradigm shifting when they take root, empowering people by offering opportunities to develop, obtain training, and work towards challenging goals can produce similar results. This issue of ICFOnians is full of examples of progress- the kind that comes from dedication to scientific discovery and that empowered people can achieve.

Over the course of the last century, major shifts in gender roles have taken place throughout society. As the cover of this edition shows, this quarter we have had the chance to celebrate the contributions of women in science on two separate occasions. On 11 February 2016, a United Nations Member States resolution recognizing the critical role that women and girls play in science and technology communities gave way to the first *International Day of Women and Girls in Science*. Furthermore, on 8 March, the world celebrated the 41<sup>st</sup> edition of International Women's Day. While today it is not uncommon to see successful women in all professions, including science, there is still disparity in the numbers between women and men in the scientific communities. These international days may help to assuage these disparities, both drawing the public's attention to the progress made to date and the challenges that remain. For our part, at ICFO we are actively encouraging new generations of women with inquisitive minds to join us on our fascinating journey of scientific discovery! (Please see page 6 to learn about a wide range of training opportunities launched this quarter.)

Progress that comes from scientific discovery is also in the headlines this edition. Since graphene's isolation in 2004 by Geim and Novoselov, frontier research has been racing to uncover the seemingly limitless potential of 2D materials. In February, Graphene and 2D materials stepped into the limelight at the 2016 GSMA Mobile World Congress (MWC) in Barcelona making an unprecedented connection with the mobile ecosystem. In a new *Graphene Pavilion*, coordinated by ICFO and the European Graphene Flagship with the support of the GSMA and the European Commission, research centers, along with start-ups and enterprises working on graphene-related topics showcased graphene empowered prototypes to an industry hungry for innovation and progress. You can read more on the progress achieved at this event on page 5, and also get the GSMA perspective on graphene's progress in the *High Profile* interview with John Hoffman, CEO of the GSMA on page 8.

It is difficult not to feel excitement for all the progress being made when you see all the talented new ICFOnians that have joined us just since the start of this year (55 new faces on page 3!) and also when you review the high impact scientific advances taking place at ICFO and in the labs of our collaborators. We hope you will enjoy reading more in the pages that follow.

## COVER



February 11<sup>th</sup> is the new *International Day of Women and Girls in Science*, recognizing the critical role women and girls play in science and technology. ICFO salutes women in all areas of science and technology, and encourages girls and young women with inquisitive minds to join us on this fascinating journey of scientific discovery!

## INDEX

### EDITOR'S CORNER

*Progress*

2

### HAPPENINGS

#### ICFO NEWS

*Royal Spanish Society of Physics Awards*  
*PoC for Graphene Wearable Technology*  
*1st Generation Euro-Bioimaging Node*  
*ICFO Leads LUCA project*  
*From Science To Business*

3

#### ICFO NEWCOMERS

#### LATEST ADVANCES

*Directing Energy Flow With Graphene*  
*Entanglement Becomes Easier To Measure*  
*Nano-Photonics Meets Nano-Mechanics*  
*Single Molecules Show Their Colours*  
*Cancer Immunotherapy From The Nanoscale*  
*Thyroid Cancer Screening*

3

4

*Bell Tests and the ICFO Quantum Random Number Generator*

#### BUSINESS NEWS

*Graphene at the Mobile World Congress*

5

### COLLABORATION

#### TRAINING

*Research needs young talent*

6

### PEOPLE

#### BEYOND ICFO

*Prof. Silvia Soria*

#### MYSTERY ICFONIANS

#### GO & FLY

*Francisco José Maia Da Silva*

7

7

7

### THE LAST WORD

#### HIGH PROFILE

*John Hoffman*

8

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ICFO NEWS



ROYAL SPANISH SOCIETY OF PHYSICS AWARDS

ICFO Prof. Leticia Tarruell is the 2015 recipient of the RSEF (Royal Spanish Society of Physics) Physics Awards for Young Experimental Physics in recognition of her achievements and creativity in conducting quantum simulation experiments. Every year the RSEF, together with the BBVA Foundation, select the most important achievements in Physics within the Spanish community.

PoC FOR GRAPHENE WEARABLE TECHNOLOGY

ICREA Group leaders at ICFO, Professors Frank Koppens, Gerasimos Konstantatos and Turgut Durduran, have been awarded ICFO's fifth Proof of Concept (PoC) grant for the GRAPHEALTH project. This project focuses on exploiting the inherent properties of hybrid graphene-quantum dot detectors in order to facilitate constant non-invasive health monitoring through vital parameters. This device enables a flexible, compact and wearable health monitoring system for consumer health applications as well as for athletes' muscle health during exercise or after injury.

1ST GENERATION EURO-BIOIMAGING NODE

The SLN facility at ICFO has been selected to become one of the single technology flagship nodes of Euro-BioImaging (EuBI). As a large-scale pan-European research infrastructure project, the EuBI consists of a network of specialised imaging facilities which will provide open physical user access to a broad range of state-of-the-art biological and medical imaging technologies for life scientists in Europe and beyond. ICFO's SLN facility will lead the *Barcelona Super Resolution Light Nanoscopy at Barcelona* node, in collaboration with CRG. In addition, under CRG's leadership, ICFO's SLN facility and IRB Barcelona will partner in the *Barcelona Mesoscopic Imaging* node.

ICFO LEADS LUCA PROJECT

With approximately 300,000 new cases diagnosed worldwide each year, thyroid cancer is a major and growing health concern. To address this challenge the EU has recently funded the project Laser and Ultrasound Co-analyzer for Thyroid Nodules (LUCA), a project coordinated by ICFO in collaboration with IDIBAPS. The project aims to develop a new, low-cost device that will offer doctors enhanced information and increased precision in thyroid nodule screening for improved diagnosis. By using ultrasound and near-infrared diffuse optical technologies, the device is expected to significantly reduce the number of unnecessary surgeries saving millions of euros and improving the lives of millions of people.

FROM SCIENCE TO BUSINESS

This year, the Barcelona Institute of Science and Technology and ESADE Business School will offer the "From Science to Business" course to researchers at all six BIST centres. The course, conceived and developed by ICFO where it has already been offered in five previous editions with excellent results, is in line with BIST's strategic objectives of promoting opportunities for tech transfer, fostering collaboration among researchers in the different knowledge areas, and offering high level training for PhD students, postdocs and group leaders.



ICFO NEWCOMERS



Victor Fernández  
Research Engineer



Juan I. Bascuas  
Human Resources



Alexandra Chaves  
Project Management



María José Benítez  
Research Engineer



Ona Bombí Aymerich  
Research Engineer



Enric Viñas Balada  
Research Engineer



Marina Cuñquero  
Research Engineer



Cristina García  
Research Engineer



Hanyu Ye  
PhD student



Vincenzo D'Ambrosio  
PostDoc Researcher



María J. Moreno  
Purchasing



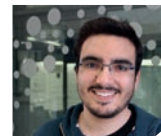
Anuja Padhye  
PhD Student



Maria Maffei  
Visiting PhD student



Daniel Pérez  
Student



David Moreno  
Student



Guillermo Martínez  
PhD student



Zhaozhe Li  
PostDoc Researcher



Gianluca Cotta  
Research Engineer



Paula Canet Riera  
Student



Nils - Eric Guenther  
PhD student



Lorenzo Cortese  
PostDoc Researcher



Jordi Puig Ribas  
Student



Julien Guilbert  
Student



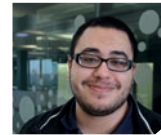
María García Sanz  
Student



Jordi Roca Solà  
Academic Events



Daniel Schick  
Visiting Scientist



Anise Laadjal  
Student



Ameeruddin Ghouse  
Research Engineer



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Student



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Student



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Student



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Student



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Student



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Student



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Student



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Student



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PhD student



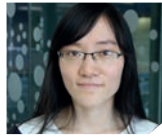
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PostDoc Researcher



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PostDoc Researcher



Edoardo Martinenghi  
Visiting PhD student



Bernardo A. Casabone  
PostDoc Researcher



Aurelien Sanchez  
PhD student



Nina Fleischmann  
Research Engineer



Mehmet Zafer Akgül  
PhD student



Vindhya Prakash  
PhD student



Carlos Lobo  
Visiting Scientist



Jonas Fischer  
PhD student



Jan Tuziemski  
Visiting PhD student



Vincent Brunaud  
Student



Laura Maddalena  
Student



Júlia Marcó Navarro  
Student



Rafael Perpiñán  
Student



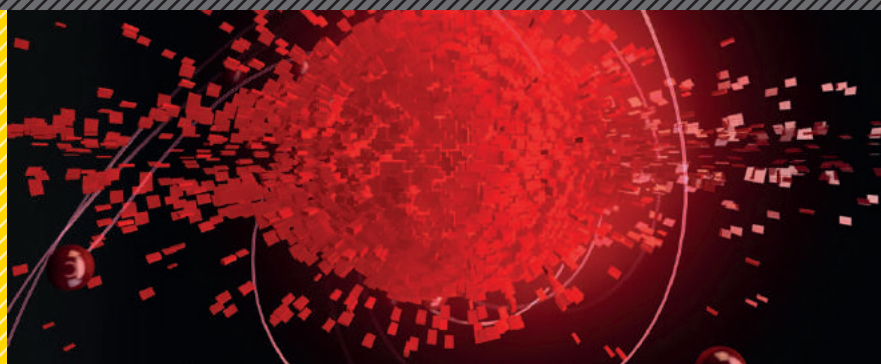
María Aurelia Ricci  
PostDoc Researcher

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





## LATEST ADVANCES

**DIRECTING ENERGY FLOW WITH GRAPHENE**

■ Detecting and controlling the electron thermalization process in graphene and in nanoscale devices in general remains challenging even with the most advanced ultrafast laser techniques. In a recent study published by *Nature Physics*, researchers from MIT, the National Institute of Material Sciences (NIMS), and ICFO researchers Mathieu Massicotte and ICFO Prof. at ICFO Frank Koppens, have used graphene to overcome this challenge, controlling, manipulating and modulating electron energy transport in nanoscale materials.

**ENTANGLEMENT BECOMES EASIER TO MEASURE**

■ ICFO alumni Dr. Philipp Hauke and Dr. Luca Tagliacozzo together with Prof. Dr. Peter Zoller (University of Innsbruck in collaboration with Technische Universität München), have proposed a new protocol for detecting entanglement. The findings, published in *Nature Physics*, demonstrate that with this protocol one can easily extract information about entanglement in many-particle systems, regardless of the size of the system. At ICFO, both Hauke and Tagliacozzo were members of the research group led by ICREA Prof at ICFO Maciej Lewenstein.

**NANO-PHOTONICS MEETS NANO-MECHANICS**

■ ICFO researchers Dr. Antoine Reserbat-Plantey, Kevin G. Schädler, and Dr. Louis Gaudreau, led by ICREA Professors at ICFO Frank Koppens and Adrian Bachtold, and ICFO Professor Darrick Chang, have created the first original hybrid device consisting of an on-chip graphene NEMS suspended a few tens of nanometres above nitrogen-vacancy centres (NVCs). The study, appearing in *Nature Communications*, explains how the graphene NEMS can be actuated and deflected electrostatically over a few tens of nanometres with modest voltages applied to a gate electrode. The graphene motion can thus be used to modulate the light emission by the NVC, while the emitted field can be used as a universal probe of the graphene position.

**SINGLE MOLECULES SHOW THEIR COLOURS**

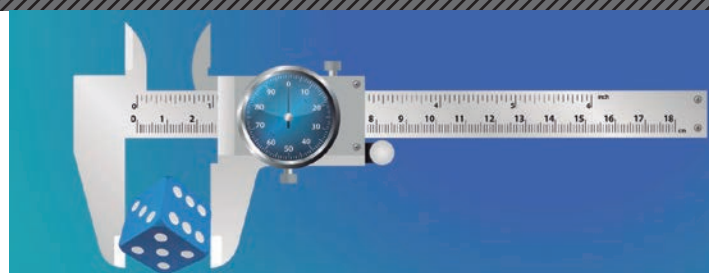
■ In a recent study published in *Nature Communications*, Lukasz Piatkowski and Esther Gellings led by ICREA Prof at ICFO Niek van Hulst, introduce a novel approach based on interferometric broadband excitation combined with confocal fluorescence detection of individual molecules under ambient conditions, bringing single molecule excitation spectroscopy side-by-side to single molecule emission spectroscopy. Excited state dynamics gives way to a variety of decay channels, showing its sensitivity to interactions with the local environment.

**CANCER IMMUNOTHERAPY FROM THE NANOSCALE**

■ ICFO Researchers Juan Torreño-Pina and Carlo Manzo in the group led by ICREA Prof. at ICFO María García-Parajo, have recently discovered a novel mechanism that leads to the activation of Natural Killer T (iNKT) cells, providing crucial insights towards the development of immunotherapies against cancer and autoimmune diseases. Published in *PNAS Plus*, the study was a collaborative effort with the group led by ICFO Prof. Melike Lakadamyali and Prof. Enzo Cerundolo, Director of the Human Immunology Unit of The Weatherall Institute of Molecular Medicine at the University of Oxford (UK).

**THYROID CANCER SCREENING**

■ ICFO researchers Claus Lindner and Dr. Parisa Farzam led by ICREA Prof. at ICFO Turgut Durduran, in collaboration with researchers at Hospital Clínic Barcelona and IDIBAPS, have published a study in *PLOS ONE* about their pioneering research using a combination of time-resolved and diffuse correlation spectroscopy to carry out non-invasive characterization of optical and hemodynamic properties in healthy and pathological human thyroid tissue. With this technique, they were able to distinguish between healthy and nodule tissue (as well as between thyroid and surrounding muscle tissue).



## Bell Tests and the ICFO Quantum Random Number Generator

ICFO researchers and alumni play vital roles in three loophole-free Bell tests conducted in TU Delft, IQOQI Vienna and NIST.

■ The final months of 2015 saw the culmination of a fifty-year effort to test the foundations of quantum mechanics via “Bell tests” - experiments designed to check for violations of the principle of “local realism”. In October and December, the results of three loophole-free Bell tests conducted in TU Delft, IQOQI Vienna and NIST were published in *Nature* and in a dedicated issue of *Physical Review Letters*.

As Einstein famously pointed out in 1935, quantum mechanics is inconsistent with the principle of local realism: the idea that distant objects should have objective properties that are pre-existent and independently measurable. Thirty years later, John Bell proposed a concrete experimental test to look for violations of this principle by measuring the quantum state of two distant entangled particles, and ever since then, physicists have developed a series of increasingly sophisticated experiments both to observe such violations and close so-called “loopholes” due to the use of imperfect detectors and insufficiently separated particles.

ICFO researchers and alumni played a vital role in the success of the most recent of these experiments. A key technology enabling the loophole-free Bell tests to be successfully carried out - a new random number generator (RNG) - was developed at ICFO by the groups led by ICREA Professors Morgan Mitchell and Valerio Pruneri. ICFO alumni Tim Taminiau (TU Delft) and Fabian Steinlechner (IQOQI Vienna) were core members of the research teams that carried out the experiments.

In an ideal Bell test, the quantum state of two distant entangled particles must be measured with very high efficiency. Crucially, the choice of what measurement to make on each particle must be independent, random and made before there is any possible communication between the two particles by sending a signal between them at the speed of light. ICFO’s RNG made this possible. As Prof. Mitchell observes, “A Bell test is the toughest possible environment for a RNG. The device has to work very fast, nearly perfectly, and you have to prove how well it is working. For us, this was like landing a spacecraft on a comet: absurdly difficult, and incredibly fun.”

“Bell tests require random numbers that are produced in very short time windows and with extraordinary guarantees of purity,” explains Prof. Mitchell. “ICFO developed a special RNG, based on our patented technology to generate random numbers for supercomputers and other ‘classical’ applications. This RNG was used by all the experiments of 2015, because we were the only ones who could meet the requirements.”

The development of the ICFO random number generator is the result of a remarkable interdisciplinary research effort involving scientists and engineers expert in diverse fields. A by product of Prof. Pruneri’s research on developing a quantum transceiver for the European Space Agency, the initial design was conceived together with Marcos Curtis from the University of Vigo. In collaboration with Prof. Mitchell, PhD students Marc Jofre and Carlos Abellan, postdoctoral researcher Waldimar Amaya and engineer Daniel Mitrani, worked to develop the initial prototype, perfect the device, and develop new methods for certifying its randomness.

Along the way, the team set a world record for the speed of generating random numbers, and tested prototypes for use in supercomputing centers. They are now developing the RNG into small form factor versions that can be integrated in computer boards and even mobile phones.



**BUSINESS NEWS**

**GRAPHENE AT MOBILE WORLD CONGRESS 2016**

**ICFO coordinates first successful Graphene Pavilion**

Graphene has been making important strides over the last decade towards application in several industries. Now, in the first-ever Graphene Pavilion at this year's Mobile World Congress (MWC) in Barcelona, this wonder material won the attention of one of the most innovation hungry industries on the planet.

With ICFO and the European Graphene Flagship coordinating its debut at the congress, and GSMA and the European Commission lending their essential support, the Pavilion was an opportunity to shine a light on graphene's potential across the entire mobile ecosystem. The goal of the Pavilion was to show how graphene and 2D materials can overcome certain limitations existing in the mobile ecosystem, providing solutions for device flexibility, energy storage, smart sensors and faster data communications, to name a few.

In parallel to the coordination of a 135m<sup>2</sup> space showcasing several interactive demos and working prototypes coming from more than 20 European-level entities, ICFO and the Graphene Flagship organized a session within the MWC Conference program called

"The Graphene Revolution", which included visionary talks by key industry and research leaders working on graphene-related technologies. Moreover, Nobel Laureate Prof. Novoselov was invited to offer a Keynote session.

The Graphene Pavilion has proven that graphene will have a say in the future of mobile. As John Hoffman, CEO of GSMA Ltd., stated, "The Graphene Pavilion was a first for Mobile World Congress and attendees embraced the innovation it showcased. We look forward to a continued collaboration with the graphene community, the graphene flagship and ICFO, and thank them for their efforts in coordinating the pavilion and opening a new vision for the future of the mobile ecosystem."

**Highlights of this amazing four-day event included:**

- Graphene powered innovations gained exposure with the MWC's 100.000+ visitors.
- Twelve companies and twelve research centres took part in the Graphene Pavilion.
- The Pavilion showcased graphene-based interactive prototypes, demos and applications in the fields of: Flexible Display Technologies, Wearables, Internet of Things, Energy Transmission & Storage, and Data Communications.
- GSMA organized VIP tours and visits from government representatives and celebrities.
- Each exhibiting institution made an average of 250 business contacts.
- The Pavilion received more than 150 national and international media hits.

ICFO's leadership in this event is a reflection of the emphasis the center places on Knowledge and Technology Transfer (KTT). Dr. Silvia Carrasco, Director of the KTT unit at ICFO, explains, "It is exciting to witness and facilitate such high potential connections between research

**The research centers and companies involved in the pavilion included:** Aixtron, AMO-GmbH, Avanzare, BeDimensional, BGTmaterials, Catalan Institute of NanoScience and Nanotechnology - ICN2, Centre Nacional de Microelectrónica-CNM, Chalmers University of Technology, Consiglio Nazionale delle Ricerche, FlexEnable, Fraunhofer Gesellschaft, Gnext, Graphenea, Haydale, ICFO - The Institute of Photonic Sciences, Institut d'Investigacions Biomèdiques August Pi i Sunyer- IDIBAPS, Institute of Electronic Materials Technology - ITME, Italian Institute of Technology - IIT, Novalia, Nvision, Pi and Bi, The University of Manchester, University of Cambridge and Zap&Go.

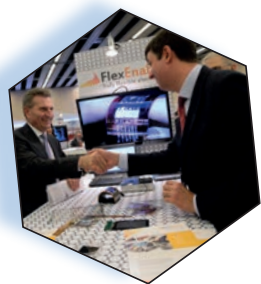
and the mobile industry. This week we have seen firsthand opportunities for innovation for everyone involved."

ICFO is grateful to the sponsors and supporters of the Pavilion for their confidence in the management and research output of the institute. Thanks also go to co-exhibitors for the endless efforts and enthusiasm invested during the week,

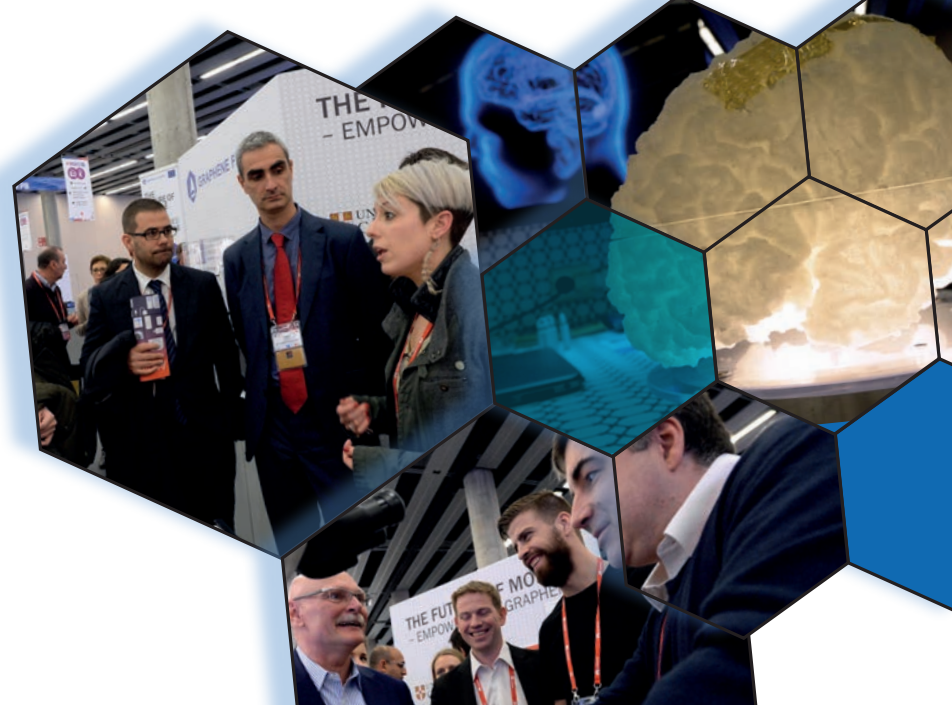
and all who visited the Pavilion, openly embracing the potential of graphene. The global support for the Graphene Pavilion far exceeded all expectations.

**Stay tuned as the Graphene Pavilion opens next at Mobile World Congress Shanghai. (June 29 - July 1, 2016).**

+ INFO ▶ #GrapheneMWC #MWC16.



*"This week we have seen firsthand opportunities for innovation for everyone involved."*  
**Dr. Silvia Carrasco**  
 KTT Director at ICFO.





## TRAINING

# RESEARCH NEEDS YOUNG TALENT



New perspectives and a constant injection of inspiration are vital for the future of research. Through its strong offering of training programs like the International PhD program, the Summer Fellows program, and participation in the new Barcelona International Youth Science Challenge program, ICFO hopes to inspire the next gen-

eration of scientists. ICFO also counts on young professionals within its management units who will offer the institutional support necessary for research to take place at the highest level. In this edition, we review research calls and initiatives that will help to ensure that ICFO stays on the cutting edge of science.

## DOCTORAL FELLOWSHIPS

■ The European Commission's Marie Skłodowska-Curie COFUND action has recently awarded ICFO highly competitive funding for two doctoral fellowship programs. Overall these two new projects, entitled ICFOstepstone, will provide up to 45 fellowships between 2016 and 2022, allowing the institute to attract excellent doctoral candidates from around the globe to participate in our research initiatives. The European Commission's COFUND action offers funding aimed at promoting the international and intersectional dimensions

of research training and career development. The ICFOstepstone projects will enable ICFO to significantly enhance its PhD training program, provide outstanding research and educational opportunities to top students from around the world, and foster the next generation of industrial and academic leaders in photonic sciences and technologies. The award of these fellowships is the result of the dedicated efforts of the Human Resource and Education team together with Projects and Academic Affairs, and builds upon the institutes outstanding record of

attracting European funding for training initiatives. ICFO currently runs the ICFOstepstone+COFUND-action, an equivalent program for post-doctoral researchers which attracts fellows from institutes including Stanford University (USA), Harvard University (USA), Griffith University (Australia), ENS Paris (France), FOM-Institute AMOLF Amsterdam (NL), among others.

The first call for new PhD Fellows under

the ICFOstepstone scheme, which opened in January of this year, closed at the end of March. Almost 400 candidates from around the world have applied for the 18 available PhD Fellowships, which include fellowships from ICFOstepstone, and from the International Fellowship Program "la Caixa" – Severo Ochoa. A short list of candidates will be invited to come to ICFO in May for interviews.



## PROMOTING YOUNG EMPLOYMENT

■ Young adults have been especially hard hit by the financial crisis of the past decade, with far fewer employment opportunities on hand as they entered the workforce. Thanks to a special initiative of the Spanish Ministry of Economy and Competitiveness, seven new ICFOians joined ICFO this January. The program "Aid scheme to promote young employment and implement a guarantee for youth in R&D+i" (*Ayudas*

*para la promoción de empleo joven e implantación de la garantía juvenil en I+D+i*) targets young people under the age of thirty, facilitating the creation of jobs in research centers. These positions will give them the opportunity to enhance their professional experience, thus making their CVs more attractive in the labor market. At the same time, these new positions will strengthen the research centers' activities. Thanks to these

grants, Juan Ignacio Bascuas, Alexandra Chaves, Cristina García Domene, Marina Cunquero Enric Viñas, Ona Bombí and María José Benítez joined different ICFO units, namely Human Resources and Education, Projects, NanoFabrication Lab, Super-resolution Light Microscopy & Nanoscopy Lab, and the KTT Unit.



## SUMMER FELLOWS 2016

■ For a period of three months, between June and September 2016, ICFO will host its summer research fellowship program.

The program aims to give students an early exposure to frontier science and research, and offer outstanding undergraduate students the chance to experience first-hand the excitement and challenges posed by research projects within the variety of the ICFO research fields.

The ICFO Summer Fellows Program is supported by the Fundació Cellex Barcelona, the Catedra Fundació Catalunya-La Pedrera Ignacio Cirac at ICFO, as well as the Severo Ochoa Centres

of Excellence Program of Spain's Ministry of Economy and Competitiveness.

+ INFO ► [jobs.icfo.eu](http://jobs.icfo.eu)

Fundació  
Catalunya  
La Pedrera



Fundació Privada  
CELLEX



## BARCELONA INTERNATIONAL YOUTH SCIENCE PROGRAM

■ Ten international undergraduate students are to visit ICFO this summer as part of the Barcelona International Youth Science Challenge (BIYSC), organized by Fundació Catalunya La Pedrera. The students will be challenged to experience research life at the very frontier of science and to discover the crucial role of nanophotonics in health, communications and environmental sciences. The program will run in up to ten research centers in the Barcelona area, including ICN2, CRG, IBEC, IRB, IBE, ICIQ, SPECS-UPF, La Salle-University Ramon Lull, Faculty of Biology at UB, and ICFO.

+ INFO ► [biy-sc.org](http://biy-sc.org)





## BEYOND ICFO



# Prof. Silvia Soria

PHOTO: Microdevices for Photonics Lab after an exhausting day of filming for JoVE. From left to right: **Daniele Farnesi** (PhD student, now at Creol for six months), **Simone Berneschi** (post-doc), **Franco Cosi** (optical technician), **Silvia Soria** (nonlinear optics responsible) and **Gualtiero Nunzi Conti** (optoelectronics responsible).

Prof. Dr. Silvia Soria was one of the ICFO pioneers, conducting research as a Postdoctoral researcher at the institute from 2002 through 2006. She is now a tenured professor at IFAC-CNR, Institute of Applied Physics in Florence.

I'm staring at a blank page, wondering what I could tell you about my life beyond ICFO, without being either hyper-realistic or over-dramatic. Positive or negative, these are two traits of my character. As an introduction, let me tell you that I'm a veteran ICFOnian. In my four years here, I saw ICFO grow from micro (five people in 2002) to macro (over 200 in 2006). At ICFO, I built my career, as many of you have, and then I decided to be on the road once again, trying to broaden my horizon beyond 2020.

My scientific background is non-linear dynamics, transitions from order to chaos. I also really like to undergo the same transition in my private life: I married, got pregnant with fraternal twins, moved country and started a new job, all at the same time. For three years, I was descending, slowly

but steadily, into a hell of madness. The good thing is that there is always light at the end of the tunnel and, suddenly, you find yourself again in the sunny side of the world, publishing and not perishing.

In 2010, I got a permanent position through public examination at the Italian National Research Council (CNR) in Florence. Also, I became a habilitated professor researching non-linear optics in whispering gallery mode resonators. Unfortunately, the tenure positions are not awarded with start up funds, so I'm struggling to obtain research funds every day. (See the letter sent to *Nature* on 4<sup>th</sup> of February 2016 by several Italian scientists. The situation is not ideal, but being a natural born survivor, I manage to go on. And Florence is a wonderful city to live in, do not forget!

CNR is a research body made of several institutes distributed nation-wide. The main advantage/disadvantage is that we do not teach. By not teaching, we are not in direct contact with students. That makes it quite difficult, but not impossible, to attract them to pursue their PhD at CNR. However the research network is very large and collaborating with other colleagues is very easy; we always reach enough people-power to carry out our research interests. For instance, I'm working at the Institute of Applied Physics (IFAC) in a kind of distributed, non-hierarchical group together with Gualtiero Nunzi Conti (responsible for optoelectronics). At the other side of the corridor you can find the Institute of Complex Systems (ISC) and at the campus entrance we have the European Laboratory of Nonlinear Spectroscopy (LENS) and the National Insti-

tute of Optics (INO). All these institutes do research in the field of optics and photonics, with small overlaps and good complementary skills and labs.

As you see, not all institutions will pamper you as much as ICFO. Sometimes you will feel like jumping into the void, but it is worth it! And now through the ICFO Alumni we can always be in touch!

*"At ICFO, I built my career, as many of you have, and then I decided to be on the road once again, trying to broaden my horizon beyond 2020."*

## GO &amp; FLY

# 110

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. This ICFOnian has recently succeeded in defending his PhD Thesis. 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.



**110**  
February 29  
2016

**FRANCISCO JOSÉ MAIA DA SILVA**

*"Generation of intense few-cycle phase-stable electric fields: from the mid-IR to soft X-rays"*

TD: ICREA Prof. Dr. Jens Biegert

## MYSTERY ICFONIANS

**How much do you know about the people you work with?** ICFOnians are a fascinating group, with hobbies, interests and abilities you may never have guessed. You may share a lab, a bus ride home or even lunch with other ICFOnians, but there is undoubtedly more to the picture than meets the eye. In this new section we want to help you get to know each other better. In this first edition, we bring you two Mystery ICFOnians. Have a look around and see if you can guess who they are! Look for the answers in next edition's Challenge section!



1. She was a famous child actress from age 3-16 and did lots of adverts and TV shows.
2. She has a strong artistic background and plays several instruments.
3. She is and isn't Italian.
4. She has freckles and a great smile.
5. She hates cockroaches.
6. She came to ICFO to do her PhD studies.



1. She studied in Finland, USA, and Austria before returning to Spain.
2. She works on the 3rd floor.
3. She is passionate about reading and especially writing.
4. She loves green and Inspector Maigret.
5. When she was little, she wanted to be an astronaut.
6. She hates fava beans, pineapple, and anyone who plots against Inspector Maigret.

## HIGH PROFILE



### John Hoffman:

*“It’s critical for organisations such as ICFO to be engaging with a broad cross-section of the mobile ecosystem, because graphene will touch so many different players in and elements of the mobile value chain.”*

As CEO and Director for GSMA Ltd., John Hoffman oversees various lines of business, including the GSMA’s portfolio of award-winning trade shows and conferences, its online, print and broadcast media properties, industry research services and a range of network managed services.



**The GSMA’s members are quite sophisticated and discerning companies. What is it that they expect from Mobile World Congress (MWC)?**

As the organisation that represents the interests of mobile operators on a worldwide basis, the GSMA undertakes a number of initiatives on behalf of our members. We drive industry programmes, focusing on areas such as mobile identity, connected living and the Internet of Things, digital commerce and next-generation networks. We also advocate for our industry and our members, engaging constructively with regulators, governments and multinational institutions to help shape regulation and secure sufficient spectrum to enable the mobile industry to fulfill its vast potential. Supporting all of this, we focus on convening the industry; our events, such as our flagship Mobile World Congress in Barcelona, provide a platform for players across the industry and adjacent industry sectors, along with governments, to gather to explore the issues, technologies, trends that are shaping the future of mobile. Mobile World Congress is widely recognised as our industry’s “must-attend” event, the place where people come to do business. In addition to the conference, exhibition, seminars, partner events and meetings, companies value the business meetings and network-

ing – there’s nowhere else that they can come and do four months of business meetings in four days.

**The MWC exhibition includes a number of pavilions and zones focusing on specific technology areas, with graphene featuring in a standalone pavilion. What are your expectations for graphene within the mobile ecosystem?**

This year’s show floor included number of exhibits focusing on specific technology areas, such as the Internet of Things, Wearables, Green Technology and, for the first time, the Graphene Pavilion. Graphene is a particularly exciting area - its impact on many of the building block components of the mobile industry will be profound. Graphene will revolutionise display technology, sensor technology, energy transmission and storage technology and chip technology, and there will be many more applications. I think we are really just starting to see what’s possible with this technology and I’m excited to see how it will develop.

**And how do you think the pavilion was perceived by the congress goers/your membership?**

Judging from the level of traffic on the pavilion and the interactions, I’d say that it was very well received.

Attendees come to Mobile World Congress to learn about the future of technology and the impact that this will have for their business, whether they are a mobile operator, device maker, infrastructure provider or a company in an adjacent industry sector, and graphene is something that will have a far-reaching impact. And the presence of graphene was not contained to the pavilion. In the Mobile World Congress conference, the “Mobile Is Innovation” keynote included a presentation by Professor Sir Konstantin Novoselov FRS, highlighting graphene, and also featured the session “The Graphene Revolution” led by ICFO Group Leader Frank Koppens, showcasing companies currently working with graphene.

**What should research institutes like ICFO be doing to best partner with innovators within the mobile sector?**

It’s critical for organisations such as ICFO to be engaging with a broad cross-section of the mobile ecosystem, because graphene will touch so many different players in and elements of the mobile value chain. Mobile World Congress offers a great opportunity to do this in one place, to start those ongoing dialogues and establish long-lasting relationships.

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

EASY

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SAVE THE DATE:  
FRIDAY SEPTEMBER 23, 2016

ICFO Alumni Network  
ICFO's 1st Alumni Reunion Event

We encourage all Alumni to come back to ICFO for the first Alumni Reunion Event, where we will discuss new advances in science and industry, and look for new ways to work together.

- Focused contributed talks
- Discussions about scientific and industrial trends
- Resources to strengthen where you are today while inspiring current ICFOnians as they advance in their careers.
- There will be something for everyone!

Contact us at [contact@alumni.icfo.eu](mailto:contact@alumni.icfo.eu) with questions and suggestions or to let us know you plan to attend.

SEE YOU IN SEPTEMBER!

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