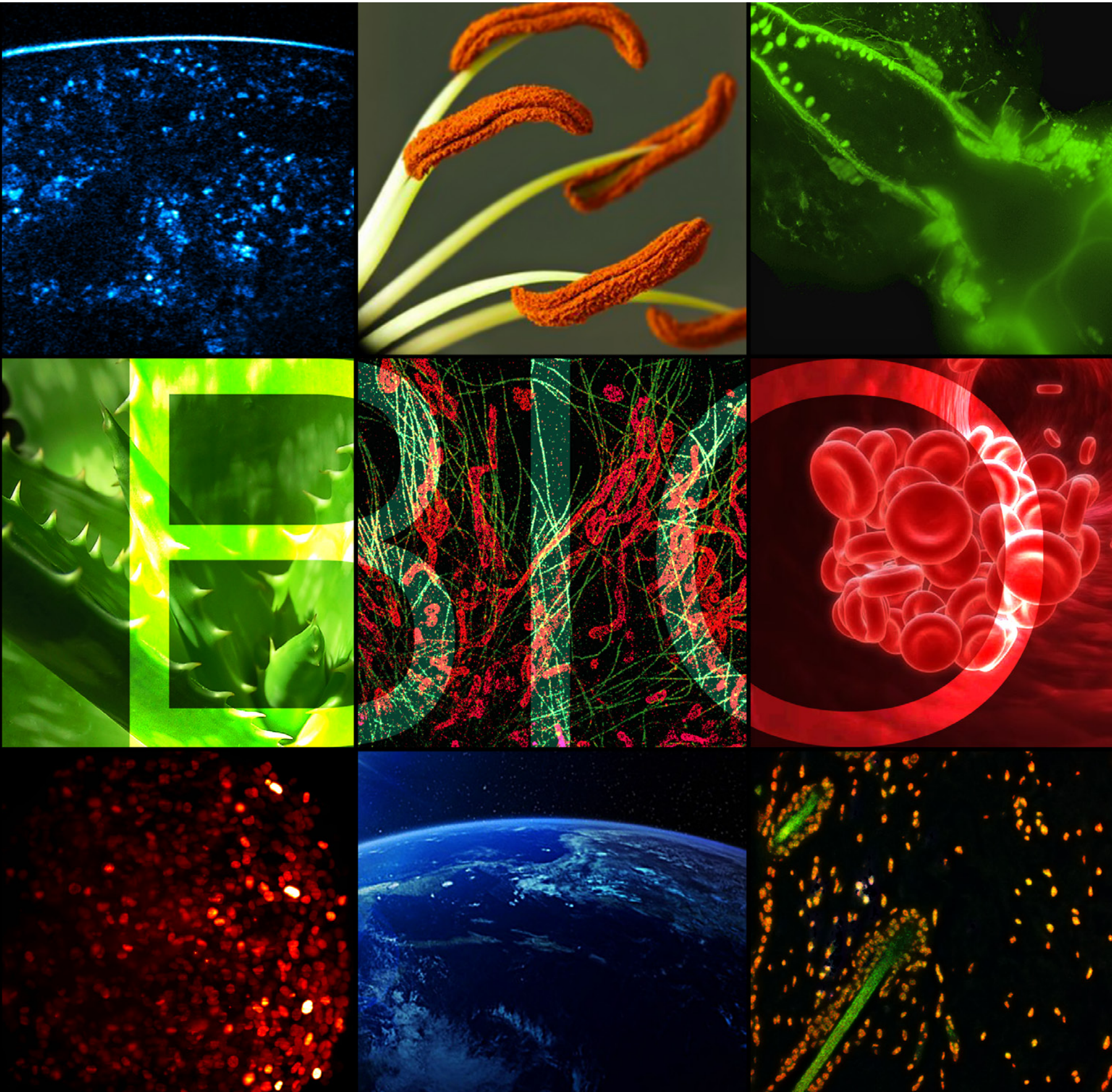


ICFOnians

Community News from the Institut de Ciències Fotòniques



EDITOR'S CORNER

Where everybody knows your name



BROOK HARDWICK
Coordinating Editor



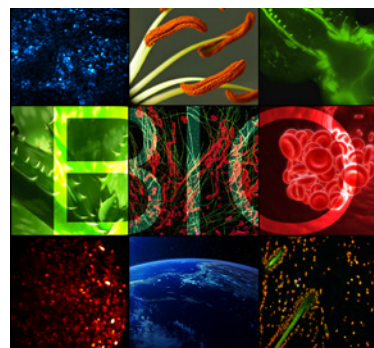
I often hear comments from ICFOnians who have been here for some time about the changes in ICFO since “the early days”. While all agree that the facilities are not only bigger now, they are better and that with the growth has come amazing discoveries, collaborations, and results, there is still a bit of nostalgia for the days when everyone knew your name.

Here is my “two cent’s worth” on this subject. I believe that a closely knit ICFO community is not something of the past, but rather our present and our future. Moreover, I believe it is in all of our interest to nurture and maintain this network and this affinity. At ICFO, this network is absolutely within reach of all those who believe that science is about collaborations and sharing ideas. It is also there for the taking for all of those who make the very most of every experience, be it discovering a beautiful city and culture, connecting with a diverse group of intelligent people from around the world, or uncovering something truly exciting in research. Once an ICFOnian, always an ICFOnian, but the more you put into your time at ICFO, the more you will receive even after it is time to move on to your next project and adventure as an ICFO alum.

There is a long list of reasons why I think it is worth investing in the ICFO experience: On Sant Jordi, ICFOnians who I have only seen in official roles as researchers and Safety and Security Management, were found putting crazy limericks about light written by other ICFOnians to music. Who knew that they could play the guitar and drums or sing like that and what other hidden talents are out there! During the Light for Health event and ICREA Conference, ICFOnians spent hours sharing laboratories with other conference participants. These same conference participants were openly envious about the city and setting they had come to visit. We have submitted 5 (and counting) proposals for journal covers where we have papers pending publication, helping to gain further recognition for ICFO research. After *La Vanguardia* ran an article in the Sunday paper about the awards which Maciej, Gerasimos, Romain and Rafa were given in April, friends with absolutely no previous knowledge of ICFO congratulated me for being part of something important- something that they perceived as worthy of societies respect, both here at home and also abroad. This list could go on and on...

Perhaps we do not see each other every day as we go up and down ICFO’s long corridors. Perhaps we see new faces for whom we have not yet learned the name... but if we take advantage of the upcoming opportunities (coming soon-Summer Party!) and the agreeable space around the Cafè de la Llum or the ICFO Library, the conferences, seminars and colloquiums already on the agenda for the upcoming months, we will discover that it is not so hard to find a niche here at ICFO. It is up to YOU to make sure that everybody knows your name.

COVER



Biology is defined as ‘the science of life or living matter in all its forms and phenomena’. Befitting this edition of ICFOnians which focuses on Light for Health, the cover collage is taken from the world around us, with some special up close images “made at ICFO”. (Upper left) THG microscopy/ SLN Facility (Upper right) Light Sheet Fluorescence Microscopy / SLN Facility (Center) STORM / Lakadamyali’s Lab (Lower left) Light Sheet Fluorescence Microscopy / SLN Facility (Lower right) Confocal / SLN Facility.

INDEX

EDITOR’S CORNER	2
<i>Where everybody knows your name</i>	
HAPPENINGS	
ICFO NEWS	3
<i>Double Hat-trick for ICFO Research</i>	
<i>Joint Workshop MPQ - ICFO</i>	
<i>Light on the Waves at CCCB</i>	
<i>Graphene at ICFO</i>	
ICFO NEWCOMERS	3
LATEST ADVANCES	4
<i>Non-destructive technique for measuring at the atomic scale</i>	
<i>A photon pair source for quantum repeaters</i>	
<i>Laser dissection of neurons</i>	
<i>Imaging new topological insulators with cold-atom systems</i>	
BUSINESS NEWS	4
<i>Corning Lab at ICFO</i>	
COLLABORATION	
LIFE SCIENCES AT ICFO	5
<i>ICREA Conference</i>	
<i>LAH 2013</i>	
PEOPLE	
IN FOCUS	6
<i>Susana Santos- Manager of Light for Health Program</i>	
IN THE FRAME	6
<i>New ICFO Group Leaders:</i>	
<i>Javier Garcia de Abajo & Leticia Tarruell</i>	
BEYOND ICFO	7
<i>Maurizio Righini</i>	
GO & FLY	7
<i>Rodrigo Gallego, Olivier Tieleman, Rodrigo Avilés</i>	
<i>Philipp Hauke, Marc Jofre, Tobias Grass and Chirag Dhara</i>	
THE LAST WORD	
HIGH PROFILE	8
<i>Xiaozei Zhuang</i>	

Coordinating Editor
Brook Hardwick, Head of Communications Unit

Editorial Committee
Brook Hardwick, Head of Communications Unit
Lluís Torner, ICFO Director
Dolors Mateu, ICFO Manager
Silvia Carrasco, ICFO Knowledge & Technology Transfer Director
Laia Miralles i Puig, ICFO Head of Human Resources & Education
Albert Mundet, ICFO Communications
Valerio Pruneri, ICFO Group Leader, Optoelectronics

Reporting & Picture Research
Brook Hardwick, Head of Communications Unit
Albert Mundet, ICFO Communications
Tomás Charles, Visual Communication
Mariona Díez, Visual Communication

Additional Contributors
Susana Santos, Light for Health Program Manager, KTT
María García-Parajo, ICFO Group Leader, Single molecule biophotonics
Javier García de Abajo, ICFO Group Leader, Nanophotonics Theory
Leticia Tarruell, ICFO Group Leader, Ultracold quantum gases
Dr. Maurizio Righini, Postdoctoral researcher, University of California, Berkeley.
Dr. Xiaowei Zhang, Harvard University and Howard Hughes Medical Institute

Pictures by
© ICFO, E. Blanco, Photonics21, Digivisión.

Design & Layout
Mineral Gràfics

ICFO
Institut de Ciències Fotoniques


European Regional Development Fund
European Social Fund

ICFO-The Institute of Photonic Sciences
Mediterranean Technology Park
Av. Carl Friedrich Gauss, 3
08860 Castelldefels | Barcelona | Spain
Phone: 93 553 4001
Email: icfonians-newsletter@icfo.eu
Web: www.icfo.eu



This newsletter is printed on 100% post-consumer-waste recycled, chlorine-free, and EU eco-labeled paper.



This content is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License. Except pictures that are copyrighted by ICFO.

D.L.: B-54464-2008
Icfonians® is a registered trademark

ICFO NEWS

ICFO NEWCOMERS



DOUBLE HAT-TRICK FOR ICFO RESEARCH

In the past months, ICFO researchers have been recognized internationally and at home with SIX prestigious awards. Prof. Maciej Lewenstein was awarded the *Gutenberg Research Award* and the *European Physics Society Prize for Fundamental Aspects of Quantum Electronics and Optics*, Prof. Gerasimos Konstantatos has been recognized with the *European Physics Society 2013 Fresnel Prize*, Prof. Romain Quidant received the *International Commission for Optics Award (ICO Award)*, PhD student Rafael Betancur has been honored with the *2012 Photonics21 Student Innovation Award* and Dr. Silvia Carrasco was awarded with the *Fem Talent Award* in the category of "Emerging Talent". The news however is not just that ICFO has a strong and growing reputation. The cumulative message of these awards is that ICFO is capturing and cultivating top global talent. The recognized effects of this positive recruitment can be seen in research excellence that permeates ICFO's output at all levels and paves the way for important advances for society.

JOINT WORKSHOP MPQ-ICFO

Within the framework of the Fundació Catalunya-La Pedrera-Ignacio Cirac Chair, ICFO and the Max-Planck Institut für Quantenoptik (MPQ) celebrated a joint workshop entitled 'From fundamental questions to applications', bringing together members of the research groups led by ICREA Professors at ICFO Antonio Acín and Maciej Lewenstein with the MPQ group led by Prof. Ignacio Cirac. This three day workshop (22-24 May) provided researchers from both institutes the opportunity to present and debate work in the area of quantum physics. The agenda of the workshop included a series of 45 minute talks by researchers from MPQ, ICFO, Autonomous University of Barcelona, and the Autonomous University of Madrid/CSIC. There were also discussion sessions and tours of ICFO laboratories.

LIGHT ON THE WAVES AT CCCB

ICFO's Outreach team took part in Kosmopolis, a prestigious bi-annual literature festival organized by CCCB (Centre de Cultura Contemporània de Barcelona). Participating musicians did a repeat performance of selections from the 2012 "Llum a les Ones" concert to get the 2nd edition of this contest off to a strong start. In addition, some first edition participants including musicians, teachers and members of the jury, participated in a round table discussion about their collaboration, explaining the work process and giving insights into how science can be a subject for musical or literary creation.

GRAPHENE @ ICFO

In an effort to provide a dynamic summary of graphene activity at ICFO, we have launched a dedicated website: www.graphene.icfo.es. Eight research groups at the Institute are currently involved in graphene related projects, setting a rapid pace in the advancement of graphene research. In this type of emerging translational nanotechnology, discoveries in academic laboratories are rapidly transferred to applications and commercial products. Graphene and related materials have the potential to make a profound impact on society as a whole in the short and long term.



Javier García de Abajo
Group Leader



Mariona Díez
Undergraduate Student



Haimabati Dey
PhD Student



Tatiana Statsenko
Postgraduate student



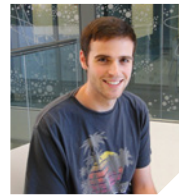
Paul Skrzypczyk
Postdoctoral Researcher



Miriam Marchena
PhD Student



César Valadés
PhD Student



Christoph Polzer
Undergraduate Student



Marco Manzoni
PhD Student



Yiming Cao
Postdoctoral Researcher



Joe Boberly
Research Engineer



Ravindra Chhajlany
Postdoctoral Researcher



Antonio Ortiz
Visiting PhD Student



Beatriz Baselga
PhD Student



Mrityunjaya Nebhwani
Postgraduate student



Xavier Palou
Postgraduate student



Marietta Batzer
Postgraduate student



Kevin Schädler
PhD Student



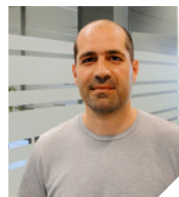
Tomás Charles
Graphic Design



Dimitrios Karanikolopoulos
Postgraduate student



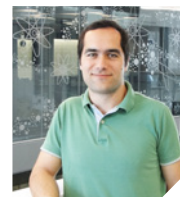
Nikos Fayard
Postgraduate student



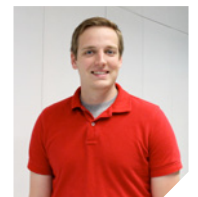
Pedro Silva
Postdoctoral Researcher



Joachim Cohen
Postgraduate student



Adrià Ollé
Research Funding Management



Timothy Miller
Postdoctoral Researcher



Nichole Miller
Postdoctoral Researcher



Leticia Tarruell
Group Leader



Núria Gómez
KTT



Alessio Inchingolo
PhD Student



Aitor Villar
Undergraduate Student

Many of us joined ICFO or took a new position at the Institute between February 2013 and mid June.



LATEST ADVANCES



NON-DESTRUCTIVE TECHNIQUE FOR MEASURING AT THE ATOMIC SCALE

In an article published in *Nature Photonics*, researchers from the group led by Prof. Morgan Mitchell report the observation of a highly fragile and volatile body through a new quantum-mechanical measurement technique. Researchers applied the so-called “quantum non-demolition measurement” to a tiny cloud of atoms. They were able to observe the spinning of the electrons in the atoms, and more importantly, the atom cloud was not disturbed in the process. It is the first time quantum non-demolition measurement has been demonstrated with any material object. The information obtained exceeds the “standard quantum limit”, which quantifies the maximum amount of information obtainable with any traditional probing. Overcoming this limit provides rigorous proof of the effectiveness of quantum physics for measuring delicate objects. This new technique may improve the performance of measurements like gravitational wave detection, brain magnetic imaging, and other ultra-sensitive measurements.

A PHOTON PAIR SOURCE FOR QUANTUM REPEATERS

In a paper published in *Physical Review Letters* and selected as viewpoint in *Physics*, the group led by Prof. Hugues de Riedmatten demonstrates a novel quantum light source capable of connecting solid state quantum memories emitting in the visible to the optical fiber network. The source is ideally suited for long distance quantum information networks. Praseodymium doped crystals are currently one of the most promising solid state quantum memories, potentially enabling efficient and long lived quantum light storage. However, they have two major drawbacks: they absorb light at a wavelength of 606 nm where the loss in optical fibers is very high and they feature a narrow spectral bandwidth limited to a few MHz which has prevented to date the realization of a suitable quantum light source. To overcome these limitations, the authors used a novel type of quantum light source. The source creates ultra-narrowband photon pairs with one photon compatible with the solid state quantum memory and the other one at a telecommunication wavelength, thus allowing the connection between the quantum memory and the optical fiber network.

LASER DISSECTION OF NEURONS

In their paper appearing in *PLOS ONE journal*, researchers in the SLN facility led by Dr. Pablo Loza-Alvarez presented a new methodology for the assessment of the collateral damage induced by laser dissection of neurons in living soil worms. Their studies centered on the examination of the tissues surrounding the targeted neuron region using a combination of high resolution microscopy modalities. This work focused on the observation of any possible collateral damage attributed to the axon surgery and the minimization of said damage. Researchers used a multimodal microscopy approach that is based on the simultaneous use of several advanced imaging techniques. This allows high resolution observation of many of the processes occurring around the targeted axon, providing a complete damage assessment tool that can be used during and after the neuron surgery.

IMAGING NEW TOPOLOGICAL INSULATORS WITH COLD-ATOM SYSTEMS

Topological insulators are interesting novel materials that conduct robust current at their edges. Their properties are particularly strong due to intrinsic topological order encoded globally in them. Synthetic topological insulators can be realized with ultra-cold atoms which offer novel ways of detection of topological properties and edge current. They offer fascinating applications in quantum information, spintronics and spintomics. In a paper published in *PNAS*, Prof. Maciej Lewenstein collaborated to show that optical-lattice-based experiments can be tailored to directly visualize the propagation of edge current in topological insulators. The method described is rooted in the unique capability for initially shaping a cold atomic gas with optical-lattices and imaging its evolution after suddenly removing induced shaping.

BUSINESS NEWS by Silvia Carrasco

Corning Incorporated & ICFO Announce Corning Professorship and Laboratory

The Corning Surfaces Laboratory is designed to host cutting-edge fabrication and characterization equipment. The official opening was celebrated on June 17, 2013.

Corning Incorporated (NYSE: GLW), ICFO CLP Member and the world leader in specialty glass and ceramics, and ICFO have established a Corning Professorship and Laboratory. Cindy B. Giroux, division vice president and research director and Nick Borrelli, a corporate fellow, both of Corning Incorporated, have been collaborating with ICFO Professor at ICFO Valerio Pruneri for more than two years. This collaboration has borne a successful relationship between ICFO and Corning and has subsequently provided the opportunity for Corning to increase its presence in Spain.

The Corning-ICFO partnership includes multi-year sponsorship of a Chaired Faculty Professorship, a Corning Surfaces Laboratory, and sponsored research projects of mutual interest. The Chaired Faculty Professorship will be occupied by Professor Valerio Pruneri, whose knowledge of materials, physical principles, optics and nano-structures as well as his vast and unique experiences in photonic devices make him uniquely qualified to lead the collaboration. Upon graduation, Dr. Pruneri's early work experience at Corning OTI near Milan, Italy, brought him into Corning's industrial research sphere where he met Nick Borrelli.

Corning looks forward to extending its collaboration with the ICFO and Professor Valerio Pruneri. “ICFO offers a unique opportunity to learn from leading edge professors who work on relevant topics in photonics and materials properties,” said Cindy Giroux. “In addition, Professor Pruneri brings a unique perspective, exciting technical data and a solid experimental approach. This collaboration enables us to drive to new fundamental knowledge.”

“Our partnership with a global company like Corning, with such high-quality and innovative spirit, is truly fortunate for us. With the new lab and chair we bring our cooperation to a new level that I am convinced will greatly benefit both partners” said Professor Lluís Torner, ICFO Director.

“The collaboration was triggered by personal contacts between Corning Corporate Fellow Nick Borrelli and me. We started with a small collaborative project on a very specific subject and it has now evolved into a longer term effort to create surface technologies for several applications. My group is thrilled by these new opportunities to work with highly qualified research scientists and leaders from Corning. We are committed to continue working on projects relevant to the industry.” Explained Professor Valerio Pruneri.



Left: Silvia Carrasco, Lluís Torner, Cindy Giroux, Nick Borrelli, and Valerio Pruneri.

Bottom: Minister Andreu Mas-Colell, officially opened the laboratory on June 17th.



LIFE SCIENCES AT ICFO

*ICREA International Symposium:
“Visualizing signaling nanoplateforms
at a higher spatiotemporal resolution”*

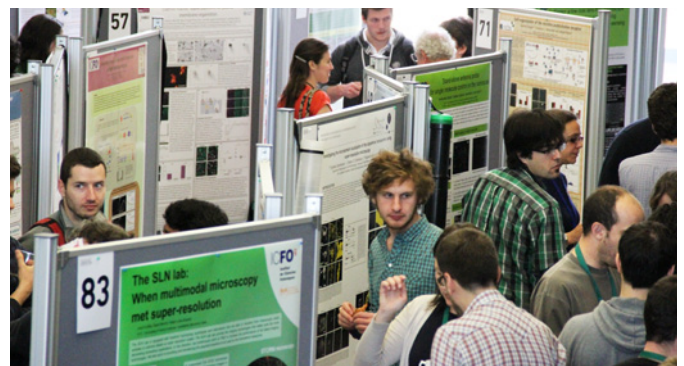
Placing ICFO on the map of the top places in the world performing supresolutoiu nanoscopy.

Each year, ICREA researchers are eligible to participate in a highly competitive call for proposals for the ICREA Conference Awards which fund international conferences and workshops in Catalonia where participants are world leaders in their fields. The awarded events may be devoted to any area of knowledge that is relevant to the research carried out by the applicants, although priority is given to cutting-edge fields and interdisciplinary subjects.

In July 2012, ICREA awarded this honor to ICREA Professor at ICFO, Maria Garcia-Parajo, putting in motion the organization of the International Symposium “Visualizing signaling nanoplateforms at a higher spatiotemporal resolution”, which finally took place at ICFO on 29-31 May. Prof. Garcia-Parajo explained, “we feel very proud of having hosted this event at ICFO, placing our Institute also on the map of the top places in the world performing super-resolution nanoscopy and applying these novel techniques to further our understanding of the mysteries that govern cell membrane compartmentalization and function.”

The symposium covered topics related to the organization of the plasma membrane at the nanoscale, the role of proteins and lipids in signal transduction, and the cortical actin cytoskeleton in organizing and stabilizing membrane domains as well as influencing membrane architecture and signal transduction. There was a very special emphasis on the technologies that are enabling the visualization of membrane nanodomains at unprecedented spatiotemporal resolution with presentations from the inventors of STED, FPALM and STORM techniques sharing their research primarily on the first day of the conference.

In addition to the intense three day line-up of speakers, there was a very lively poster session, with over 80 participants exhibiting, as well as Lab visits and opportunities for informal discussions and networking. This field is booming and the proof of this was the lively atmosphere that ran throughout the entire event, with excellent contributions not only from senior researchers but also a strong representation of shorter presentations by younger contributing researchers. The auditorium was filled to maximum capacity throughout the symposium.



FEEDBACK FROM THE PARTICIPANTS

“Congratulations on running such a fantastic meeting this past week. I truly enjoyed myself and learned some really interesting new aspects of PM nanoscale organization. The speakers and venue were terrific. Thanks for inviting me.”

JENNIFER LIPPINCOTT-SCHWARTZ
Distinguished NIH Investigator and member of the National Academy of Sciences, USA.

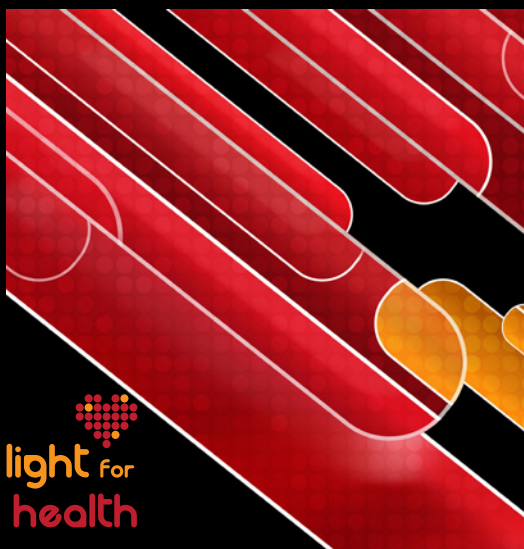
“I can say without any hesitation that it is the most exciting meeting I have been to in a LONG time! The science was terrific, the food was fabulous and the people were so nice and friendly that I had almost forgotten how scientists can and should be!”

SERGIO GRINSTEIN
The Hospital for Sick Children Research Institute & University of Toronto.

“I should let you know that your meeting was simply superb! It has been a tour de force of technology and science. Thanks for all your warm hospitality and the excellent and elegant organization”

SATYAJIT MAYOR
Director of the National Center for Biological Sciences, Bangalore.

**L4H 2013
SUPERRESOLUTION TECHNIQUES:
FROM METHODS TO DATA ANALYSIS**



The Light for Health Focus Program aims to draw attention to the numerous applications of photonics in Life Sciences. Light for Health 2013, the 4th edition of this event, was part of the ICREA International Symposium at ICFO. The focus was on state-of-the-art technologies at unprecedented spatiotemporal resolution.

The invited speakers within the L4H program included:

- **STEFAN HELL** (Max-Planck-Institute for Biophysical Chemistry, Germany) – Inventor of STED nanoscopy
- **XIAOWEI ZHUANG** (Harvard University, USA) – Inventor of STORM nanoscopy
- **SAMUEL HESS** (University of Maine, USA) – Inventor of FPALM nanoscopy
- **MARKUS SAUER** (Julius Maximilians University Würzburg, Germany) – Inventor of dSTORM nanoscopy
- **KEITH LIDKE** (University of New Mexico, USA) – Inventor of hyperspectral single molecule imaging



Stefan Hell



Xiaowei Zhuang



Samuel Hess



Markus Sauer



Keith Lidke

IN FOCUS



Susana Santos:

“ICFO caught my eye, starting with the fact that a Photonics Institute responded so quickly and enthusiastically to my Life Sciences CV.”



Before I completed my degree in Zootechnical Engineering I did a short course in the lovely city of Delft where I realized that The Netherlands was a great place to gain personal and professional experience. Soon after, I moved to Utrecht University for an internship in Avian and Exotic Animal Medicine. Here I conducted research developing a technique to differentiate gender in rare bird species which are monomorphic to the human eye. It didn't take long to realize that feather color origin and physical characteristics of the plumage were far too complex to be addressed with the current state-of-the-art colorimetric method. The initial 6 months project led to a PhD in Veterinary Sciences suggesting a method for plumage color characterization. This is when I started to study light-matter interactions, working closely with physicists and ornithologists to discover the amazing world of bird coloration and bird behavior. This helps to explain why in spring, when new migrating exotic species arrive to the PMT, you may find me staring out over the canals!

After completing my PhD, my Oporto origins resurfaced, calling me back to the sun and sea and

Barcelona seemed like a good place to continue my career. ICFO caught my eye, starting with the fact that a Photonics Institute responded so quickly and enthusiastically to my Life Sciences CV. I joined the group led by Prof. Pablo Loza-Álvarez as a postdoc developing a Nanosurgery tool. I launched the basic biology lab at ICFO in order to start culturing the *C. elegans* model organism that was, and still is today, the “target model” of many advanced imaging techniques developed at ICFO.

Working with incredibly impressive imaging techniques developed at ICFO, I realized that these microscopes were far too valuable to be disassembled after the proof-of-principle: they needed to be made available to “end-users” as tools for answering biological questions and be part of user-friendly commercial set-ups. This is when I assembled a Multimodal imaging and manipulation microscope, which is now part of the SLN facility. I contacted biologists that work with *C. elegans*, organized a 100% biology meeting at ICFO and started transferring ICFO's knowledge to other fields of research. When my postdoc finished, ICFO challenged me to continue my work within

the KTT unit, managing the *Light for Health Program (L4H Program)*. Having experienced firsthand the communication gap between the worlds of physics and life sciences, this felt like a great challenge.

For me the L4H program is the bridge that allows the researchers at ICFO to bring their know-how to the outside world, be that to other research fields, the market, or new products. In addition, the L4H Program provides pillars of support, allowing research to be done at the highest level. These pillars are *Facilities*, like the new Biology lab; *Know-how*, through the organization of courses, workshops, tutorials and seminars in complementary fields; *Services* such as protocol and paperwork organization for the approval of biosamples, animals and human protocols to fulfill the highest levels of ethics, safety and regulations; and *Contacts* with partners in different fields of research and industry. I find it tremendously rewarding helping to bring Photonics closer to Life Sciences.

**Susana Santos is the Manager for the Light for Health Program in the ICFO Knowledge and Technology Transfer team.*

IN THE FRAME

NEW RESEARCH GROUPS AT ICFO: June 1st marked the long awaited arrival of two new group leaders.



JAVIER GARCIA DE ABAJO
Nanophotonics Theory

Javier, originally from Bilbao in the Basque region of Spain, has led the Nanophotonics Theory group for many years at CSIC in Madrid, specializing in explaining and predicting new phenomena involving the interaction of light with nanostructures. For the past 18 months prior to joining ICFO, he was in the UK as a visiting Professor at the Optoelectronics Research Centre, Southampton. Javier has had several productive collaborations with ICFO research groups led by Professors Quidant, Koppens and van Hulst, resulting in high impact publications.

Studies particles and waves, light and electrons, usually at the nanoscale, always with an eye on potential applications to sensing and signal processing.

- ICREA@ICFO Professor
- Moved to ICFO from Instituto de Química-Física “Rocasolano” – CSIC, Spain
- Fellow OSA
- Fellow APS

OUTSIDE ICFO:

I have to admit that I keep practicing in karaokes. Apparently I have no future in singing -so people tell me-, but that doesn't count when you are on stage in front of a microphone, right?



LETICIA TARRUELL
Ultracold quantum gases

Leticia is both Spanish and French by birth. She grew up in Madrid where she began her Physics studies, completing them in Paris. She completed her PhD at École Normale Supérieure in Paris in Christophe Salomon's group, carried out post-doctoral work at ETH Zurich in the group led by Tilman Esslinger and worked more recently as Junior CNRS Researcher in Philippe Bouyer's team at Institut d'Optique in Bordeaux.

Studies ultracold quantum gases as model systems for understanding strongly correlated systems and engineering novel materials.

- ICFO Professor
- Nest Fellow
- Joined ICFO from CNRS, Institut d'Optique, France

OUTSIDE ICFO:

If I weren't a physicist, I would have loved to be a musician. For a while, playing the violin absorbed most of my time and I considered physics more like a hobby.

BEYOND ICFO By Maurizio Righini



Maurizio Righini:
"I always had the feeling that I joined ICFO by pure chance. For me it has been like winning a lottery."

Dear ICFOnians,
 I always had the feeling that I joined ICFO by pure chance. For me it has been like winning a lottery. Seven years have passed since that sunny day of May and now I am writing you from California, where I live (and it's still sunny!), I am married to a former ICFOnian and I work in a renowned lab at a world's top ranked University.

At ICFO I had the privilege to work in Prof. Romain Quidant's group where I contributed to develop the so-called plasmonic trapping for lab-on-a-chip applications. After earning my PhD, I was appointed to a postdoctoral position in the laboratory of Prof. Carlos Bustamante at the University of California, Berkeley. I was subsequently awarded a fellowship from the Damon Runyon Cancer Research Foundation to study protein translation. Currently, I am developing a new instrument combining optical tweezers and single molecule fluorescence detection to study in real time how the ribosome synthesizes proteins.

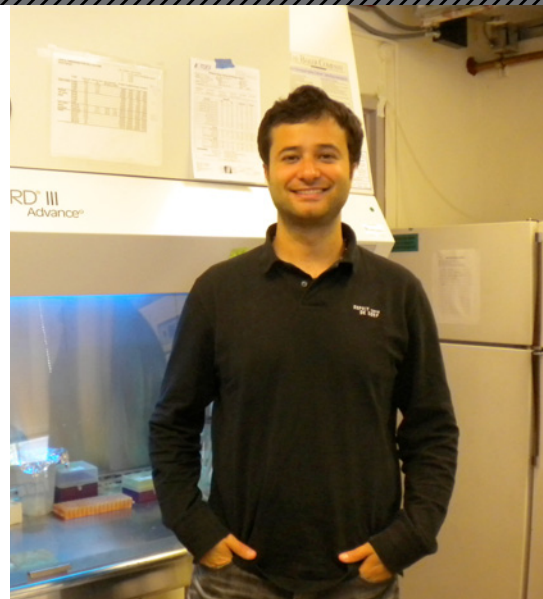
The Berkeley campus is beautiful and lies on a hill with great views on the bay area and San Francisco. It is very common to encounter deer and squirrels. Very rarely (and hopefully it will not change) mountain lions have also been spotted (!). Although I very much enjoy the feeling of a large campus, I also miss the smaller dimension of an institute such as ICFO where relations are tighter among all the employees.

In terms of group resources, lab facilities, quality of science and internationality, I see no differences.

My working life has not changed too much. I spend most of the day in the pleasant darkness of the optical lab and in the spare time I win any possible foosball competition (sorry Jonas).

San Francisco is a beautiful and vibrant city, similar to Barcelona in certain aspects. There are only two main drawbacks. First, you need to get used to the earth shaking every now and then. Second, if you came with the Beach Boys' songs in your mind, you will soon realize that this is not Castelldefels. "The coldest winter I have ever spent was the summer in San Francisco" is a famous quote attributed to Mark Twain.

Another positive aspect of the Bay Area is that it is a very popular conference destination. This grants us the opportunity to receive visits from many scientists and friends. So far our house has been visited by 13 ICFOnians of whom 4 have been our guests for several nights (see picture). The only exception is Prof. Morgan Mitchell who instead hosted us in his charming house in the country side over the weekend. I really like that our house can be considered as a hub by our former colleagues and friends. So, now you know, if you ever pass by drop us an email. The sofa bed might not be that comfortable, but the reception is very warm! I wish you the very best!



1. Maurizio Righini in his lab at Berkeley.
 2. ICFOnians at the Golden Gate Bridge: (right to left) Jon Donner, Laura Grau, Maurizio Righini and Michael Geiselmann.

GO & FLY

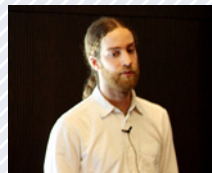


57 women and men have successfully defended their thesis at ICFO since its founding in 2002 and have helped us to measure what we have learned, how far we have come, and how much we have yet to learn.

These ICFOnians have recently succeeded in defending their PhD Thesis. Honouring 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.



51 | RODRIGO GALLEGO
'Device-independent information protocols: Measuring dimensionality, randomness and nonlocality'
TD: ICREA Professor at ICFO Antonio Acín
February 22, 2013



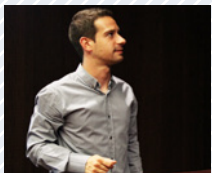
52 | OLIVIER TIELEMAN
'Ultracold atoms in optical lattices with long-range interactions and periodic driving'
TD: ICREA Professor at ICFO Maciej Lewenstein and co-supervised by Dr. André Eckardt.
March 8, 2013



53 | RODRIGO AVILÉS
'Strategies for pushing nonlinear microscopy towards its performance limits'
TD: Dr. Pablo Loza-Álvarez
March 27, 2013



54 | PHILIPP HAUKE
'Quantum simulations with ultracold atoms: beyond standard optical lattices'
TD: ICREA Professor at ICFO Maciej Lewenstein and co-supervised by Dr. Fernando Cucchietti (current at Barcelona Supercomputing Center (BSC)).
April 5, 2013



55 | MARC JOFRE
'Integrated photonic transmitters for secure space quantum communication'
TD: ICREA Professor at ICFO Valerio Pruneri
April 15, 2013



56 | TOBIAS GRASS
'Ultracold atoms in artificial gauge fields'
TD: ICREA Professor at ICFO Maciej Lewenstein and co-supervised by Dr. Bruno Julia Diaz
April 23, 2013



57 | CHIRAG DHARA
'Intrinsic randomness in non-local theories: quantification and amplification'
TD: ICREA Professor at ICFO Antonio Acín
June 13, 2013

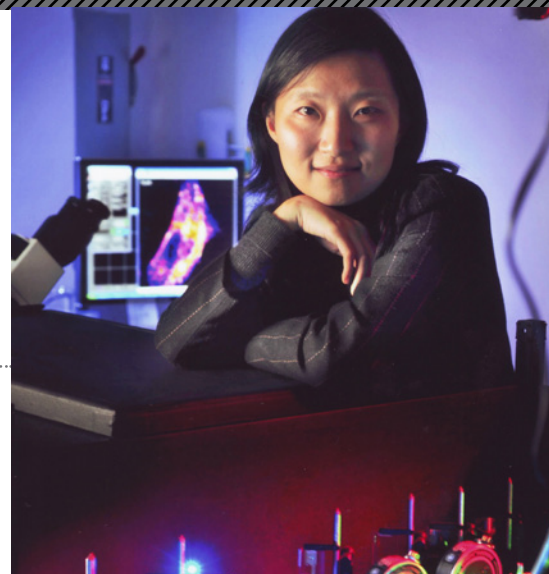
HIGH PROFILE



Xiaowei Zhuang:

“Don’t be afraid to take the big risks and work on high impact stuff, even though they have higher chance of failure”.

Xiaowei Zhuang is Harvard Professor of Chemistry and Chemical Biology, and Physics, and investigator of the Howard Hughes Medical Institute. Her lab invented the Super-resolution Light Microscopy STORM technique and continues to develop new techniques which they apply to answering questions in cell and neurobiology.



As a rigorously trained physicist, what drew you outside the world of pure physics?

I have always found Physics very beautiful and coherent, but during my PhD thesis, I began to realize that the field of physics is relatively mature and research in this field is increasingly about working on incrementally improving things, rather than making ground breaking discoveries. Although I did not think of transitioning during my graduate school training because I love the beauty of physics, the seed was planted. During my postdoc at Stanford, I was inspired by Nobel Laureate Steven Chu and joined his lab. I told him that although I really loved his work I didn’t want to work on the existing research directions in his lab but wanted to try something new. He told me about his new love, Biology. It was not my fascination about Biology that got me started, but I was looking for something new and Steven Chu is highly effective at inspiring people.

Your time with Steven Chu marks a turning point in your career.

When I started my postdoc, I knew very little about Biology, but later I stayed in Biology and used my

physics tools to investigate biological problems. Even though I did not like biology as a student, I really loved the biological research once I started that. I actually enjoyed it even more than the research about physics because there are a lot more fundamental things about biology that are still unknown. From my time with Steven Chu, I learned to focus on things that had a big impact or could really make a big change for the world- and biology has a lot of things like that.

What advice would you give to young researchers at the beginning of their careers.

I remember when I got my tenure at Harvard, a visiting friend asked me “how are you going to do things differently now that you have tenure and don’t have to do the safety-net things”. I was surprised because I never knew I was supposed to do those safety-net things! It is true that when you aim high, there is a higher probability to fail, but if you are intelligent, persistent, and work hard, you will achieve some of the things that you aim at. And sometimes you will have serendipitous discoveries. As long as you don’t bury yourself in the small, mundane, in-

cremental things, you may not achieve exactly what you planned to achieve, but some other big things will work out instead.

What would you say has been your most serendipitous discovery?

That would be the work that I presented at the ICREA Conference. I had asked two post-doc fellows in my lab to look at how actin is organized inside synapses using STORM, a super-resolution fluorescence microscopy technology that we invented. Instead they found this really curious thing – actin appears to form a regular, periodic structure in axons. Acutely observant, they did not let any possibilities pass their eyes and followed up with this accidental discovery. They discovered a novel sub-membrane cytoskeleton structure in axon that is made of actin, spectrin and other associated proteins. This highly periodic structure with an incredibly long-range order, which people never knew existed before, is bound to have important functional implications! It is very important to keep an open mind, and when you see something interesting, run with it even if it is not what you originally intended to aim at.

SUDOKU by www.sudoku-puzzles.com

EASY

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

MEDIUM

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

DIFFICULT

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

VERY DIFFICULT

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

*Want to subscribe?
Have you got news to share?*

Whether you'd like to subscribe to **ICFOnians**, change your email address, or have some comments and ideas for future content, we'd love to hear from you!

To subscribe or to read back issues of **ICFOnians**, please visit the ICFO Website www.icfo.eu

To get in touch, please send us an email to: icfonians-newsletter@icfo.eu indicating your name, email address, and institution.

Follow us on:



www.twitter.com/ICFOnians
www.facebook.com/ICFOnians