

ICFOnians

Community News from the Institut de Ciències Fotòniques



EDITOR'S CORNER

Food for thought



BROOK HARDWICK
Coordinating Editor



What puts into motion the creative process? What inspires scientists, chefs, students, and artists as they push the frontiers to do something that has never been done before? Could it be that there is some boundary condition that inspires “the” question that sparks the invention? In this edition, creativity and the “food for thought” that puts in motion the creation of fresh new ideas and perspectives are in the limelight.

World renown chef, Ferran Adrià drove home the idea to a packed auditorium of ICFOians in his 22nd July Colloquium that simple, everyday ingredients can be transformed through myriad techniques and combinations, resulting in unique and before unthought-of culinary inventions. Adrià's creativity as well as innate ability to think outside the box about food and culinary processes in order to innovate, is his hallmark. Presuming to join the ranks of a genius like Ferran Adrià is a bit bold, but if you change the high-tech kitchen to a high-tech lab, make ICFO's GLs the “master chefs”, and replace the culinary ingredients with gold nanoparticles, atomic gas clouds, or even quantum dots, the creative forces within ICFO have more in common with Adrià's than may be immediately obvious to the outside observer.

And the similarities continue. In his ICFO colloquium, Ferran Adrià talked about the new project for elBulli Foundation, mapping and documenting the creative process and helping a wide range of people to access their own creative potential. This is something that ICFOians can relate to on many levels. We have different programs that aim to stimulate curiosity and creativity, providing the “food for thought” for original ideas and theories. In this edition, you will read about the new and exciting outreach venture called “Illuminating Curiosity” in which ICFO collaborates with celebrities to inspire the general public to think about the “why and how” of light. Hundreds of people, many of them children, searched for answers and explained their results using a creative video format.

Likewise, throughout the year and especially in the summer months, ICFO welcomes students who accomplish internships or stays within ICFO's different research groups. These extended visits to ICFO allow students to learn and experience, as well as to make real contributions to their groups' research, adding to the formative base of their academic and budding scientific careers.

The diversity of contributors to this edition of ICFOians reminds us of all that we are able to accomplish when we are open to new ideas brought to the table by inspirational colleagues, both beginners and experienced. It is the motivation to collaborate and to work hard on questions that are both extremely complex and novel, digesting and incorporating original inputs often from outside our area of expertise and making possible surprising and amazing discoveries.

Bon Profit.

COVER



This issue focuses on young talent, including the future generation of scientists who visited ICFO this summer and participated in this artistic representation of a diffraction pattern, a common physical phenomena that occurs when working with gratings, apertures and light. Irene Alda, Jordi Feliu, Marcos López, Nicolás Mateo, María Auxiliadora Padrón, Patricia Riego, Alba Santmartí, María Sanz, Jordi Sastre, Sandra de Vega (Summer Fellows) and Pol Llopart (Outreach Summer Student), all seated on bean bags, represent the light regions. Moving away from the central peak, the bright regions become smaller in diameter (lower intensity) and progressively more spread-out. Missing from image are Summer Fellows Josep María Fargas and Adrià Escobet.

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ICFO NEWS



DIRECTORATE GENERAL FOR RESEARCH VISITS ICFO

ICFO welcomed the staff of the DGR (Directorate General for Research) of the Government of Catalonia to the institute, proudly opening its doors to the dedicated colleagues who have supported the work and mission of the center since its founding in 2002. The visit began with a welcome offered by Lluís Torner, followed by an overview of the science conducted at the institute and finally a tour of ICFO's facilities, visiting labs, the clean room, and the prototype room.

UPC PhD THESIS AWARD

The Extraordinary PhD Awards, given annually by the Universitat Politècnica de Catalunya · BarcelonaTech (UPC), this year recognized 30 PhD students, including Dr. Chaitanya Kumar Suddapalli. His thesis was among the extraordinary doctoral works defended during the 2011-2012 academic year to receive this award. Dr. Kumar Suddapalli joined the Optical Parametric Oscillators group at ICFO led by ICREA Professor at ICFO Majid Ebrahim-Zadeh, to work on a project related to optical frequency conversion systems. His thesis was entitled "High-Power, Fiber-Laser-Pumped Optical Parametric Oscillators from Visible to Mid-Infrared". This UPC distinction was announced in July 2014 and presented in a ceremony in September.

NEW JOINT APPOINTMENT WITH ACS PHOTONICS

As of September 1st, ICREA Professor at ICFO Romain Quidant has been appointed as the associate editor for the journal ACS Photonics, a peer-reviewed journal published by the American Chemical Society. Before his appointment, Prof. Quidant carried out tasks as a member of the Editorial Advisory Board, together with fifteen other renowned scientists from all over the world.

MAX PLANCK-PRINCE OF ASTURIAS AWARD MOBILITY GRANTS

ICFO PhD students Jordi Tura, Senaida Hernández and Pau Farrera have recently been granted the "Max Planck Prince of Asturias Award Mobility Grant", an award given by the Max Planck Society that will provide funding to ICFO in order to support Ms. Hernandez, Mr. Tura and Mr. Farrera's research and scientific accomplishments, their cooperation with the Max Planck Institute of Quantum Optics as well as help them establish close research ties to the German and international scientific communities.

NIH GRANT FOR BREAST CANCER RESEARCH

Head of the SLN Laboratory at ICFO, Dr. Pablo Loza-Alvarez, and Dr. Mónica Marro, in collaboration with the University of Kansas Medical Center (UKMC), have recently received a grant from the National Institutes of Health (NIH, USA) aimed at characterizing and eradicating aggressive breast cancer stem cells. The research team has implemented a new technique called Raman Tweezer Spectroscopy (RTS) that, combined with advanced mathematical tools, can quantify characteristic IMPs of TICs non-invasively with high specificity. RTS permits sorting cells according to their IMPs. The combination of this new technology with previous methods of cell separation is expected to enable an in-depth knowledge of the most aggressive tumor cells and facilitate the design of anti-cancer therapies for their eradication.

ICFO NEWCOMERS



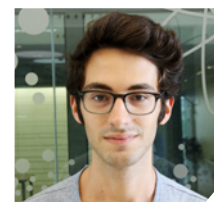
Soledad Royo
KTT Project Manager



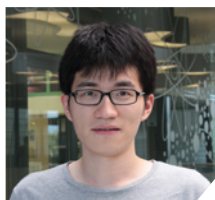
David Raventós
PhD Student



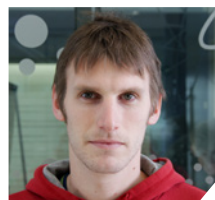
Alessandro Seri
PhD Student



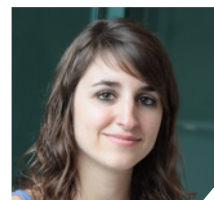
Boris Bourdoncle
PhD Student



Renwen Yu
PhD Student



Nicolas Morell
PhD Student



Luciana Vidas
PhD Student



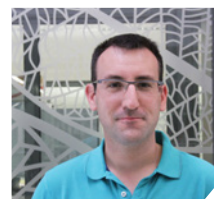
Junxiang Wei
PhD Student



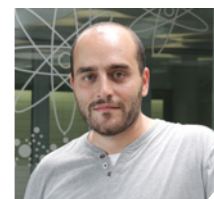
Markus Johansson
Postdoc Researcher



Fabien Vialla
Postdoc Researcher



Claude Renaut
Postdoc Researcher



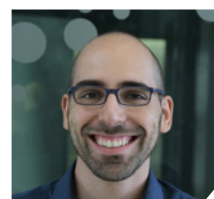
Andrea Marini
Postdoc Researcher



Christian Gogolin
Postdoc Researcher



Erik Garbacik
Postdoc Researcher



David Paredes
Postdoc Researcher



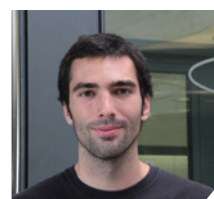
Nitin Mohan
Postdoc Researcher



Lisa Christin
Undergraduate Student



Paulina Dobosz
Research Engineer



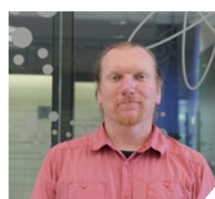
Joaquim Sol Culleré
Undergraduate Student



Maryse Bouwens
Undergraduate Student



Stefano Pironio
Visiting Scientist



Arnan Mitchell
Visiting Scientist

Many of us joined ICFO or took a new position at the Institute between July and September 2014. Welcome to ICFO!



LATEST ADVANCES



THE ADVANTAGES OF ORDER IN BIOLOGY

PNAS published a study by Juan Torreño Piña, Bruno Castro and Carlo Manzo, from the research group led by ICREA Prof. at ICFO María García-Parajo, which establishes the crucial role for the organization of the cell membrane in the recognition and binding of pathogens. The study reveals that pathogen recognition receptors organize in a highly hierarchical fashion on the membrane of immune cells (from the nano- to the meso-scale) exploring regions that are enriched with sites for endocytosis. This preferred organization increases the probability of internalizing virus pathogens for subsequent processing and degradation by dendritic cells. The paper has been recommended by *The Faculty of 1000* as an important paper that provides new findings in biology by means of technically advanced imaging instrumentation.

A NOVEL ANTI-GLARE ANTI-REFLECTION SURFACE

In a recent study published by the journal *ACS Applied Materials & Interfaces*, the research group led by ICREA Prof. at ICFO Valerio Pruneri, in collaboration with Corning Incorporated (USA), developed a novel glass surface that reduces both glare and reflection. They obtained a nano-structured anti-glare, anti-reflective, and even superhydrophobic surface, by roughening a glass surface so it could scatter light and ward off glare, all without hurting the glass's transparency. Then they etched nano-size teeth into the surface to make it anti-reflective. In addition to achieving both of these visual traits, the team showed that the textured surface repelled water, mimicking a lotus leaf.

SPECKLE CONTRAST OPTICAL SPECTROSCOPY

ICFO Researchers Claudia Valdés and Hari Varma from the research group led by Prof. Turgut Durduran, in collaboration with Washington University in St. Louis (USA), have introduced a new, non-invasive, diffuse optical technique, speckle contrast optical spectroscopy (SCOS), for probing deep tissue blood flow using the statistical properties of laser speckle contrast and the photon diffusion model for a point source. The method promises to be a cost-effective, practical alternative to other similar methods and will allow a tomographic 3D imaging of blood flow in tissues. This study was published in *Biomedical Optics Express* and highlighted in *Optics.org*.

A NEW STATE OF MATTER

In a recent experiment published in *Physical Review Letters*, researchers Naeimeh Behbood, Robert Sewell and co-workers of the group led by ICREA Professor at ICFO Morgan Mitchell, have produced a new quantum state of matter known as "macroscopic spin singlet", thought to be responsible for high-temperature superconductivity and other exotic phenomena. Up to now, no one had ever seen a macroscopic spin singlet. The ICFO team was able to cool down the atom cloud to almost 20 millionths of a degree above absolute zero with pulses of laser light, and measure the atoms' spin, to see that the total spin was so close to zero as to be nearly undetectable.

FRACTAL ANTENNAS FOR LIGHT COLLECTION

A team formed by Alberto Curto, of the research group led by ICREA Professor at ICFO Niek van Hulst, in collaboration with scientists from Stanford, have fabricated Si-photo-detectors with transparent metallic fractal electrodes. The work was published in *NanoLetters*. The researchers have been able to merge photonic and electronic functionalities of fractal patterns in one fractal nanostructure. They fabricated transparent nanostructured aluminium electrodes with optimized space-filling fractal geometries displaying a broadband spectral transmission and flat polarization response. These nanofractals might be interesting for several optoelectronic applications, such as solar cells, light emitting diodes, electronic displays, for which combined electronic and optical access is required.

BUSINESS NEWS



New advances for ICFO spin-off companies

Radiantis launches new compact and rugged IR spectrometer

Barcelona-based Radiantis, a specialist manufacturer of advanced frequency conversion systems for laser tuning, and a long-term ICFO industry partner, recently launched the SeaWave, an impressively compact and rugged IR spectrometer. The product, which was the company's star performer at CLEO 2014 in California earlier this year, was specifically developed to deliver both speed and convenience in the measurement of spectra across the 900-1700nm range, without compromising on performance and reliability.

The SeaWave caused more than a few ripples of interest, if you'll excuse the tenuous pun, when it was unveiled at the conference in San Jose. Particularly from representatives of the scientific, industrial, medical and food sectors who commented not only on its unique compactness, but also on its compatibility with CW, pulsed and ultrafast laser systems.

Radiantis was established in 2005 as an ICFO spin off with the goal of enriching the laser market with state-of-the-art, robust and easy-to-use nonlinear systems to expand the wavelength tunability of available lasers. Today, the company is well integrated in the academic and research community and has a broad worldwide network of satisfied customers utilising its advanced products across the US, Europe and Asia.



Signadyne collaborates with Keysight on new PXI Reference Solution

Keysight Technologies (previously Agilent) has recently announced a new PXI Reference Solution for RF power amplifier (PA) characterization and test. The Reference Solution, which performs S-parameter, harmonic distortion, power and demodulation measurements, enables rapid, full characterization of next-generation power amplifier modules, such as a power amplifier-duplexer (PAD). The Reference Solution is optimized for high throughput and highly accurate measurement quality. It is the only small footprint, full characterization solution for design validation and product test of the RF power amplifier, as well as all of the passive devices surrounding the power amplifier, such as filters and duplexers.

The robust digital pre-distortion (DPD) algorithms in the Reference Solution are built on years of close cooperation with wireless manufacturing customers and insights gained from Keysight's SystemVue simulation and N7614B Signal Studio for Power Amplifier Test software applications. This makes it the only solution capable of providing consistent measurements, from simulation to manufacturing, for next-generation power amplifier modules.

"The combination of Keysight's excellence in RF solutions and Signadyne's know-how in high-speed generators has led to development of a comprehensive test solution that provides outstanding value to the RF power amplifier industry," said Marc Almendros, chief executive officer of Signadyne.



OUTREACH



ILLUMINATING CURIOSITY

Lights! Camera! Action!

THE CONTEST

October 22nd, 2013 -ICFO announced the launch of a unique outreach initiative- *Illuminating Curiosity*. The idea was to create a fun and creative encounter between society and photonic sciences. It all began with 14 celebrity collaborators who posed 11 questions related to light, sending out a challenge to submit a creative, engaging, original video responding to these curiosities. The contest welcomed the participation of anyone with an inquisitive and creative spirit and ran through 23 April 2014.



THE PARTICIPANTS

More than 1100 people got to work recording over 170 videos that responded to the questions posed by ICFO's famous collaborators. Their answers were original, creative, inquisitive and informative, demonstrating the ubiquitous role that light has in our daily lives.

THE CELEBRITIES



MÒNICA TERRIBAS | journalist



JORDI RIOS | actor

THE JURY

Jaume Vilalta (journalist, director and host of TV3 Outreach program *Quèquicom*; Professor of Communication at the UPF); **Mireia Vilapuig** (high school student and Celebrity Collaborator in the contest asking the question "Is the light we see from the stars light from the past?"); **Jordi Domènech** (secondary school science teacher at the Institute of Vilanova, Vilanova del Vallès; member of ICFO's "Educators Advisory Team"); **Enrique Sánchez** (ICFO researcher and member of the ICFO student association ICONS); **Helena Izquierdo** (4th year student of Maristes Valldemia School in Mataró, Barcelona; winner of ICFO's *Llum a les Ones 2013* outreach contest); **Miriam Martí** (ICFO KTT **event organizer; specialist in audio-visuals for scientific communication; acting coach). April 23, 2014- the verdicts were in, thanks to this group of "ICFO friends" who served as the distinguished jury. All the videos were evaluated based on age specific criteria.

THE WINNERS

In recognition for the hard work and great videos, the winners received an invitation to visit the studios of TV3 including the set of *Quèquicom*, were awarded a check for €200 and were invited to the gala awards ceremony where they were given the opportunity to meet some of the celebrity collaborators.

WINNER < 12 YEARS OF AGE Escola Pia d'Olot	WINNER 13-17 YEARS OF AGE Institut-Escola Les Vinyes	WINNER MOST POPULAR Escola Ciutat d'Alba
WINNER BEST ACTOR/ACTRESS Escola Pia d'Olot	WINNER > 18 YEARS OF AGE Manuel de Salvador Ignasi Aballí Maria Bea	WINNER SPECIAL MENTION Eight videos received a special mention for their creativity and content.



THE GALA

September 29th- the Poliorama Theatre was alive with young stars- the winners of the first edition of *Illuminating Curiosity*. The award ceremony was the long awaited apex of the year-long outreach experience. The event brought together celebrity collaborators **Pere Renom** (reporter for *Quèquicom*), **Txarango**, **Natxo Tarrés**, and **Mireia Vilapuig** to present awards and interact with the winners as well as proud parents, teachers, friends, ICFOnians and interested members of the local community, all more convinced than ever of the value for all of society that comes from the communication of science. The organizers of *Illuminating Curiosity* wish to thank and congratulate all of the participants who inspired us with their creative, original, witty and funny, but also informative work.



YOUNG TALENT

Summer Opportunities for Students at ICFO

Undergraduate and high school students take advantage of the summer break to have a truly unique research experience.

Throughout the year, ICFO welcomes a steady stream of high school and undergraduate students as part of the center's mission to have a formative influence on the next generation of scientists. Thanks to a wide range of outreach activities as well as an active internship program, young minds gain exposure to the work carried out at ICFO.

In July, August and September, these special visitors have a much more visible presence in our corridors and labs. Undergraduate student participants in the ICFO Summer

Fellows program and Outreach Summer Fellows program, as well as high schoolers in the CiMs+Cellex program and the Fundació Catalunya-la Pedrera's *E²C³-Centre Recerca* program, take advantage of the summer break to have a truly unique research experience. ICFO puts into motion a full series of Summer Lectures, designed to introduce newcomers to the many different research lines at ICFO. A series of lab tours as well as special projects conducted within ICFO's research groups provide the framework for these young scientists (and scientists-to-be) to experience ICFO as a researcher, not just a visitor.

SUMMER FELLOWS
ICFO[®] 2014

Now in its 8th edition, the Summer Fellows Program welcomed twelve undergraduate and Master's students to ICFO to carry out challenging research projects under the supervision of a Group Leader. This program is part of ICFO's efforts to attract

top talent at an early academic career stage. It represents a unique opportunity for the Fellows to collaborate in frontier research projects, to learn how these projects are conducted and to gain real research experience.



IRENE ALDA

•Aged 22, Madrid
•Physics student, Universidad Autónoma de Madrid
•ICFO GROUP: Plasmon nano-optics

"I plan to complete my master studies in Madrid and hopefully come back to ICFO for my master's thesis and a PhD. I've enjoyed the working environment very much."



ADRIÀ ESCOBET

•Aged 20, Berga
•Engineering Physics student, Universitat Politècnica de Catalunya
•ICFO GROUP: SLN Facility

"I have developed the ability to look for solutions to the problems that continually pop up in the day to day work of a researcher."



JOSEP MARIA FARGAS

•Aged 20, Barcelona
•Industrial Engineering and Eng. Physics student, UPC-CFIS
•ICFO GROUP: Quantum information with cold atoms and non-classical light

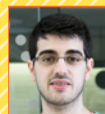
"It was an opportunity that I could not pass up- an experience that I knew would mark a 'before' and 'after' in my vision of science"



JORDI FELIU

•Aged 22, Lleida
•Civil Engineering and Industrial Engineering student, Universitat Politècnica de Catalunya-CFIS
•ICFO GROUP: Optoelectronics

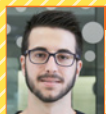
"This summer's experience has reinforced my idea of doing a PhD, even if I am not planning to do it in photonics but in civil engineering."



MARCOS LÓPEZ

•Aged 22, Vila-Real
•Physics student, Universitat de València
•ICFO GROUP: Quantum information theory

"I learned that it is not just about finding good answers, but also about asking good questions."



NICOLÁS MATEO

•Aged 21, Girona
•Engineering Physics student, Universitat Politècnica de Catalunya
•ICFO GROUP: Medical optics

I have known about ICFO for many years and doing research here was an important academic goal for me."



MARÍA AUXILIADORA PADRÓN

•Aged 24, Las Palmas
•Masters in Astrophysics student, Universidad de La Laguna
•ICFO GROUP: Quantum photonics with solids and atoms

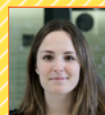
"I wanted to experience working in a research group to see how this world functions and to see if this is what I really want to do with my future (and it is!)."



PATRICIA RIEGO

•Aged 22, Vizcaya
•Physics student, Universidad del País Vasco
•ICFO GROUP: Nano-optoelectronics

"The lab experience has been most important to me- learning that things do not always work, and finding the way to solve the problems and make them work."



ALBA SANTMARTÍ

•Aged 22, Barcelona
•Chemical Engineering student, Universitat Autònoma de Barcelona
•ICFO GROUP: Solution-processed nanophotonic devices

"I'm interested in the field of renewable energy and thought that spending the summer with a research group that worked with photovoltaics would be a great experience."



MARÍA SANZ

•Aged 24, La Coruña
•Masters in Photonics student, Friedrich-Schiller-Universität Jena, Germany
•ICFO GROUP: Single molecule biophotonics

"I know that experience is really important in the field of research and want to gain as much as possible before finishing my studies."



JORDI SASTRE

•Aged 21, Alicante
•Physics Engineering and Telecommunications Engineering student, Universitat Politècnica de Catalunya-CFIS
•ICFO GROUP: Ultracold quantum gases

"As a result of my stay here I have decided to come back to ICFO for my bachelor thesis. After that, who knows!"



SANDRA DE VEGA

•Aged 21, Madrid
•Physics student, Universidad Complutense de Madrid
•ICFO GROUP: Nanophotonics theory

"Here at ICFO it is never monotonous- there is always something to do, some great scientist who has come to give us a talk or some event organized by ICFO."

OUTREACH SUMMER STUDENTS 2014

This was the third year of ICFO's Outreach Summer Fellow program which runs in the framework of the LifeLongLearning program. Undergraduate students spend the summer months collaborating with ICFO researchers in a project which is supported and coordinated by ICFO's KTT team. This year, Pol Llopart, a student at the Universitat Politècnica de Catalunya carried out a project called "Holograms".



E2C3 @ ICFO

ICFO hosted 5 high school students for a 2 to 5 week stay within the *E²C³-Centre Recerca* program, supported by Fundació Catalunya-la Pedrera. Students worked on the following projects: "Image Compression" within the Theoretical quantum-nano photonics group, "Study of the interaction between light and the nano world" within the Nanophotonics theory group, and "Quantum information applied to secured communications" within the Quantum information theory group.

Participating students: Ulisses Martí, Joana Navarro, Guillem Olivella, Martí Gimeno and Marc Homs.



PROGRAMA JOVES I CIÈNCIA

CIMS-CELLEX @ ICFO

Last year ICFO participated in the successful pilot of the CiMs+Cellex program. This year we welcomed our second CiMs+Cellex student, Marta Florido, who is an International Baccalaureate student at Aula Escola Europea. Marta spent the month of July collaborating with the project "Laser light" within the Quantum optics theory group.



BEYOND ICFO



Carles Domingo

Catalonia recently discovered Carles when he made headlines with his perfect “10” on the national university entrance exam. ICFO discovered Carles in 2012 through Fundació Catalunya-La Pedrera’s *Joves i Ciència* program. When we heard the exciting news about his “10”, we invited him back to ICFO to catch up...

I went to primary and secondary school in Vilanova, first at l’escola El Cim and then continuing to Escola Pia for high school. I learned a lot in both and think that they gave me a good education but there is also a lot that I learned outside school. On one hand, I participated in a very helpful mathematics program called ESTALMAT during two years in high school, and also in the Math and Physics Olympics, both in Catalonia and on the national level. This was a real challenge!

On the other hand, I took part in the *Joves i Ciència-E²C³* (Youth and Science) program organized by Fundació Catalunya-la Pedrera which gave me the chance in these last years to do three summer programs. The first of these was in the Pyrenees (2012), where I worked with researchers from ICFO (“Lasers-Fascinating Science and Technology!”). The *E²C³* program has really helped to bring me closer to science.

One of the highlights of that summer in the Pyrenees was Roy Glauber’s visit. You don’t meet a Nobel Laureate every day! It was a big surprise because on that day, he gave us a talk and then came to visit the class where the ten of us were working on the project with lasers. Another thing that has stuck with me from that summer was getting to know ICFO researchers- what their lives are like, what they do. In two weeks, you can only see so much, but we got to see how a research group works and now I consider research as a possibility for my professional future.

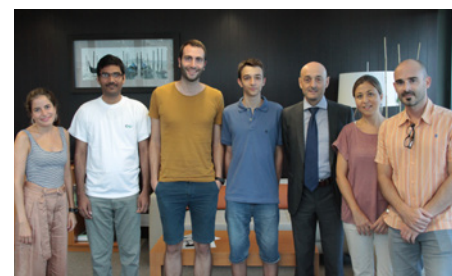
For me, studying to learn and studying to pass an exam are two different things. I like learning so studying with the goal of learning something new I don’t find hard at all. The

trick is finding a way to make studying always about learning, without the final goal being to pass some test. In the end, exams come and go, so the goal is not just to pass, but rather to receive an education.

This year I start the double degree of Mathematics and Engineering at the Universitat Politècnica de Catalunya, CFIS. Up to now in school my favorite subjects have been math and physics as well as the engineering aspects of developing new things. This could be because of influences at home - my father works in IT and he studied mathematics, so these things have been a recurring theme in our house. It could have been that all of the activities I have been involved with over the years have led me to choose these studies. I am not exactly sure what I want to do later in life and the double degree will give me more options to choose from further down the road. I think they will help to open doors.

Outside of school, the track season has just begun and we will see how I manage to balance this with my studies. I run three days a week and one day I swim. I have not participated in lots of competitions; I see sports mostly as a hobby but they give me energy and make me feel good. When I am physically tired, I see things in a different light. Some days when I have a lot on my mind, I go out for a run and that helps me to get a different perspective and to clear my head.

You ask how I imagine myself in 10 years’ time. I really do not know but I hope not terribly aged! I would like to go abroad once I finish my studies to do something that I enjoy. That might be research or it may be working in industry. Who knows, maybe in 10 years I will still be working on my PhD!



“Another thing that has stuck with me from that summer was getting to know ICFO researchers- what their lives are like, what they do.”

GO & FLY



80 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. 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.



77 | DR. CÉSAR VALADÉS

“Polarized super-resolution fluorescence microscopy”

TD: Dr Pablo Loza-Alvarez and Dr Sophie Brasselet, Institut Fresnel-Université d’Aix Marseille (Erasmus Mundus Joint Doctorate Program Europhotonics) | **July 12, 2014**



78 | DR. LUIS DOMÍNGUEZ

“Whispering Gallery Microresonator for Second Harmonic Light Generation”

TD: UPC Professor at ICFO Jordi Martorell
July 22, 2014



79 | DR. ROBERTO LEÓN

“Quantum-based spectroscopy and efficient energy transport with biomolecules”

TD: UPC Professor at ICFO Juan P. Torres
September 30, 2014



80 | DR. ANA ASEÑO

“Plasmon, light and electron beam interactions at the nanoscale”

TD: ICREA Professor at ICFO Javier Garcia de Abajo | **September 30, 2014** (Universidad Complutense de Madrid)

HIGH PROFILE



Ferran Adrià:

“I have no doubt that if there is passion, if there is excitement, if there is a predisposition and a suitable environment, creativity can be contagious.”



As chef and co-owner of the world-famous restaurant El Bulli (Girona), FERRAN ADRIÀ came to be considered by many the best chef in the world.

El Bulli- the restaurant- was successful, fantastic and unique. Why did you decide to close it to do something different?

There are several reasons why we thought we needed to transform El Bulli, not close it. First, we wanted to keep creating. At the level the restaurant was functioning, we could have kept working for several more years, but we probably would not have continued to achieve the levels of excellence we pursued. Moreover, we were getting into a monotonous routine and wanted to explore new scenarios. In terms of cuisine, we had spent 25 years trying to create a language. It was time to ask if there was another possible language. You must also realize that after many years of hard work, the team wanted a change of life, both for ourselves and for our families.

What motivated you to transform El Bulli into a center for innovation?

As I said, we were entering into a routine and were becoming a “bureaucratic” company with daily paperwork that mortgaged much of the team’s time. We needed a new scenario. We wanted to ask ourselves

again “what is a kitchen?” and “what is a restaurant?”. To do this, we needed a new framework. On the other hand, we felt that the spirit of El Bulli could not die, so we talked about transformation. We wanted El Bulli to remain active.

ICFOnians share with you the itch to “push the limit”, to “see what would happen if...” What was your initial motivation to do so?

Our main motivation has always lain in the search for the limits in our discipline, cuisine. Cooking was the language we used to investigate these limits, to push and take them further.

Did you feel that you were changing the history of cuisine at El Bulli?

The major changes that we made to cuisine took place between 1994 and 1997, and at that time we were not aware of anything! After the fact you can analyze these things from the inside and also from the outside, but the truth is that at that time we did not feel we were changing the history of cooking.

How did you learn about the scientific techniques that you used in your culinary experiments?

In El Bulli, we did not use scientific techniques. Starting in 2001 we started a dialogue with science, and from that we learned different approaches and ways of working, but our techniques were always culinary.

Can you teach creativity?

Without a doubt you can educate and train for creativity. Creativity can also be optimized. We are currently carrying out extensive work on the creative process, to see what elements are involved. By comprehending these elements, we believe it is possible to influence them in order to promote or encourage creativity.

Is creativity contagious?

I have no doubt that if there is passion, if there is excitement, if there is a predisposition and a suitable environment, creativity can be contagious. People are like fertile soil; we just need the time, the place, and the precise conditions for creativity to bloom.

SUDOKU by www.sudoku-puzzles.com

EASY

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

MEDIUM

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

DIFFICULT

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

VERY DIFFICULT

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

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