



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

The new ICO president talks optics

Duncan Moore calls for members' input to ICO's strategic plan.

The world has changed in extraordinary ways since a small group of creative, collaborative scientists founded the International Commission for Optics (ICO) 65 years ago – and the world of optics has changed right along with it.

Optical fibers usher our data across the world in a fraction of a second. Satellites chock full of optical components beam our cell phone signals to every corner of the globe. Lasers help produce music of a quality that was once the province of elaborate orchestras. And ICO officials now “meet face to face” several times a year via Skype, a technology that wasn't ever dreamed of when ICO was founded in 1947.

Change is relentless. That's why it's crucial for ICO to embark on a strategic planning process. The bureau will meet in Genoa, Italy, for a retreat on 1–2 July to begin the process of drafting a strategic plan for review at the next general assembly, to be held in Spain in 2014. Current and former officers of ICO are part of the process, and input from all of our members is crucial.

ICO has a rich history. Our organization was founded as an affiliated commission of the International Union of Pure and Applied Physics (IUPAP). IUPAP is one of about two-dozen scientific unions organized in the early part of the last century that are part of the International Council of Scientific Unions. ICO currently includes members from 52 territories.

But who are we, really, and where are we going? We consider ourselves to be the international meeting place for optics and photonics. Yet in recent years many other optical societies have expanded rapidly into the international arena. It's absolutely critical at this juncture that we consider what we uniquely have to offer.

The planning process has several components, including an evaluation of what we have to offer in the world as it is today, and as it may be in 10, 25 or even 50 years. Today, global economies continue to shake off the effects of the biggest economic downturn since the Great Depression. Bluntly, these are among the most challenging economic times that the world has faced since ICO was born. And so boosting economies and creating jobs are among the greatest needs across the globe.

At the same time, we are privileged to be immersed in what may be the most exciting



Duncan Moore is from the University of Rochester, US, and is the 2011–2014 ICO president.

industry on the planet. As we discussed in Sydney in 2008 and again in Puebla last year, we need to consider and expand the role of optics in developing economies worldwide. We all know of incredibly bright, talented young people graduating from fine programmes, ready to push the boundaries of science. They attend scientific meetings, publish in journals and contribute to the world of science in crucial ways. But have we, their mentors, done our part? Have we done all that we can to make sure that these students are equipped with the skills to evaluate their discoveries, new technologies, in terms of business opportunities? Nearly every large company, employing hundreds or thousands of people, once started out as a very small company, a group of like-minded individuals (sometimes just a single individual) confident that their idea could make a difference in the lives of others. We need to do all that we can to nourish this potential. Technology like optics is a driver that can truly ignite an economy.

An important part of the future is ensuring the stability and vitality of our organization's finances. I am pleased to announce that ICO is in the early stages of launching the first fundraising campaign in its history. Already, ICO

has received a most generous pledge of \$20 000 from our former treasurer, Sandy Sawchuk, professor and chair of electrical engineering systems at the University of Southern California. This is a wonderful first step forward, and I hope to have more such examples to share with you during the three years that I will serve as president.

Equally important to ICO's future is increasing our membership in ICO, and the commitment of members to the organization. ICO is an all-volunteer organization, and your input and time are wonderful assets to share with the organization. As part of your involvement,

please consider nominating a colleague for the ICO Prize and the Galileo Galilei Award, whose nominations are due in April.

I'd like to extend my heartfelt thanks to Maria Calvo, immediate past-president of ICO, for the wonderful job that she did for the last three years. I also want to thank Ari Friberg who has served as secretary, president and past-president. Please join the rest of the bureau and me as we begin our strategic planning process; contact any member of the bureau with input or suggestions. This is your organization, and we need your talents as we set our sights on 2014 and beyond.

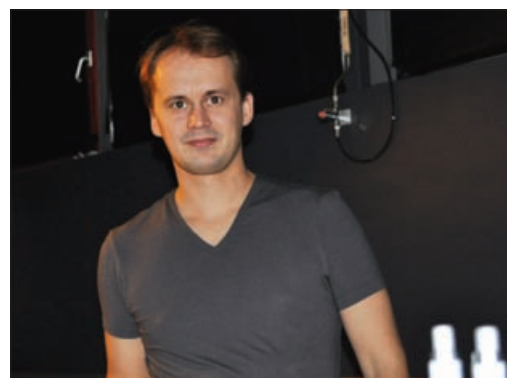
IUPAP Young Scientist Prize in Optics

Goëry Genty is a leader in ultra-fast pulse research at the Tampere University of Technology in Finland.

Goëry Genty was born in Bordeaux, France, in 1975. He received his MSc in optics in 1998 from the Ecole Supérieur d'Optique, at Paris Tech, and his PhD from the Helsinki University of Technology, Finland, in 2004. He joined the Tampere University of Technology as a post-doc in 2007. In 2009 he was appointed as a research fellow of the Academy of Finland and now leads a research group on ultrafast pulse dynamics and applications.

Genty was awarded the IUPAP Young Scientist Award in Optics 2011 "for his outstanding contributions in pulse propagation and ultra-fast dynamics in nonlinear optical fibres, particularly his groundbreaking results on supercontinuum generation and nonlinear instabilities".

Ten years ago he started working on supercontinuum generation in photonic crystal fibres, unravelling novel dynamics and exploring new regimes of ultrafast propagation effects. In particular, he showed that Raman scattering influences soliton fission and the generation of dispersive waves, and demonstrated that coupling between the solitons and dispersive waves can lead to substantial enhancement of the supercontinuum bandwidth (some commercial sources are now based on this effect). He played a major role in the original demonstration and analysis of polarized supercontinuum in highly birefringent fibres that is paramount for many applications such as cavity-enhanced spectroscopy or polarization optical coherence tomography. Genty has also introduced the spectrogram representation in the context of supercontinuum modelling that is now widely used, allowing unique analysis of the dynamics of the physical phenomena involved. In 2006, together with colleagues from France and New-Zealand, he wrote a comprehensive review on the physics of supercontinuum generation in photonic crystal fibres in *Review of Modern Physics*, which is now the reference in the field and has inspired many subsequent studies.



Goëry Genty, IUPAP Young Scientist Prize in Optics 2011.

More recently he has been modelling ultrafast pulse propagation with, for example, the derivation of the generalized envelope equation valid down to the single-cycle regime and allowing the inclusion of carrier-envelope phase evolution dynamics or the development of a general theory of coherence properties of broadband sources.

His current research interest focuses on nonlinear wave localization and optical extreme events that can occur spontaneously as a result of noise-seeded instabilities and which can also be found in many other nonlinear physical systems. Recent highlights include the appreciation of the role of collisions in enhancing nonlinear fibre instabilities, the significance of optical rogue wave statistics, and the demonstration of a new regime of modulation instability. Significantly, in 2010, in a joint effort with an international research team from France, Ireland and Australia he contributed to the first experimental proof of the existence of the Peregrine soliton predicted 25 years ago (and which has been envisaged as a prototype of freak wave on the oceans) using a fibre-optic system.

Genty's achievements have resulted in more than 30 publications on nonlinear pulse propagation that have been cited more than 1400 times as of November 2011.

How an eye for optics created a company

An interview with
Dr Marco Machado,
founder and CEO of
Augen Optics.



Marco Machado, CEO, at Augen Optics headquarters.



Part of the facilities at Augen Optics.

Marco Machado arrived in Baja California 30 years ago to do research at CICESE, the Centro de Investigación Científica y de Educación de Ensenada in Mexico. During the Mexican economic downturn soon to come he took sabbatical leave to build a small company, and with a beautiful seashore view across the highway, he found the location for Augen Optics, and for his own home.

Augen Optics currently has 600 employees, 300 of them working at the central location in Ensenada, where the research and development section is also located. The buildings were designed with the goal of offering an inspiring environment for the employees, with magnificent views greeting employee and visitor alike. The optical labs serve 3000 eyecare professionals. The construction of a large network of consumers of his products has been one of Machado's many achievements. Augen Optics is, for Machado, a company that produces a "low-technology product made with high technology" – indeed, made with sub-micron precision.

Machado's interest in optics began in his fourteenth year, when his older brothers, professional opticians, paid him 25 cents for each lens that he polished. While studying at the university, he and two friends produced high-school optics lab equipment (prisms, mirrors, etc).

His PhD director in England, WT Welford, had advised him not to sit behind a desk after returning to his country, but instead to look for local problems in need of a solution. Upon his return from England, he envisioned the need for an optical laboratory in Mexico and set himself the task of producing in his own laboratory the machinery that would be required. He started by building his own lens polishers and later the more complex optical surface generators.

His company hired brilliant students from the region for research and development of its own products. The company helped these students through their master's degree stud-

ies with a small grants, and then, working together with INAOE (in Puebla) and CIO (in León), he helped them to obtain grants from CONACYT (Consejo Nacional de Ciencia y Tecnología), which allowed them to obtain their PhD degrees in developed countries working on topics related to the interests of Augen Optics. These students returned from their studies to work at Augen, allowing the company to build its own research and development section devoted to optical design, and to the construction of prototypes and the testing of Augen products.

Machado also welcomed academics on sabbatical leave. Among others, Prof. Daniel Malacara, the first PhD in optics in Mexico and highly recognized internationally, spent a period of sabbatical leave at Augen, during which time he developed a lensometer. Unfortunately, the instrument was not needed by the optical market, a fact highlighting the different research perspectives of a company and of a university. As Machado says, a project at a university is allowed to have useless or even negative results, whereas industry needs solutions. Each time that Augen developed a product that was not needed, the product was there but the development was an economical failure.

Machado has strong feelings regarding research and the role that it plays. He notes that the evaluation criteria for research work at universities in developing countries are not consistent with a good model for the country's development. Universities do not evaluate their researchers on the basis of their ability to solve local problems; rather they require that the researchers write proposals on international topics that lack national interest and value. To earn higher salaries, scientists in developing countries are expected to publish in foreign journals. Augen products – lenses – are not topics for publication in foreign journals, Machado says. Rather, they are industrial secrets. Yet he says that it has been very use-

ful to him to have been a researcher and to know the science and technology system of his own country. He knows electronics, but he does not attempt to take all research on his shoulders. Instead, he hires experts, and makes himself an expert on hiring. For him the interview with the prospective candidate is crucial to choosing the appropriate profile.

Developing countries must focus on their own problems and identify their competitive advantages, like the Japanese did. First, they need to identify their own problems, and then a political decision must be made regarding the type of industry that will receive preferential treatment and research support from the government and the financial systems. Support for research should be given for specific purposes. The freedom of choosing a research topic should be only for those who do not, in fact, need money for their research. Otherwise “a poor country is doing research for developed countries, trying to solve their problems instead of its own”.

Once a country has established priorities oriented to solving specific problems, the solution is not to do what the US did 200 years ago. The US is not producing great wealth; Americans are only consuming. Most US companies have moved abroad, and it will take 10–20 years to bring them back to the US. The 100 largest companies have trillion-dollar profits, with only \$150 bn going to the workers. Machado considers that his goal as entrepreneur is not to make money. He does not consider himself to be a shopkeeper. He has the capacity to invest in his own technology, but in order to have a sustainable model for research and development he needs to sell a product of his own for optical laboratories, different from those produced in the US or Europe. The money is earned as a consequence of Augen’s product-oriented research activity, since the company is not a research institute. But his effort is not to maximize the earnings of shareholders. He is instead convinced that the money has to be given back to the economy, and that less developed countries have to change the model and construct one adequate to their specific circumstances.

As an entrepreneur, Machado addresses the need to accommodate changing international conditions. When he started Augen Optics the environment was different. China was not industrialized, and the current “open market” policy had not been established. Now the end of the free market is approaching, and China is an alternative (he recommends reading the book *The End of the Free Market*, by Ian Bremmer). An essential part of his work is therefore to read and learn about the market, not only about optics and physics. There is no model of entrepreneurship that is valid in general. There is the need to keep updated and to use



Top: Marco Machado and his Augen-designed lens mastering machine. Bottom: Augen Optics lenses.

models adequate for the time. That is why he thinks that the teaching of “entrepreneurship” is not a proper job for a university. The university should teach optics and electronics and have research on topics related to national problems. In England for example, the students have to go to a factory, do something for the factory, and learn from that experience.

Machado is critical of the way that Mexico operates on the world market. Brazil’s economy is booming and is protected, not open. Brazil is not importing; rather it is producing what it needs and exporting to China. Their trade balance is \$30 m for 200 million people. Mexico, by way of contrast, imports eight million cars from the US, most second-hand, instead of producing its own cars. Mexico has also changed recently from incandescent to LED illumination and become China’s LED industry consumer, instead of starting its own LED production.

Machado continues planning the future for his company because doing business is currently very hard: “We think of Augen as an island that now has to change. In order to have a future, the company must adapt to the new market conditions.” He has expanded into the US and Brazilian market and is looking forward to increasing sales into China, the UK and Australia.

He also donates the lenses used in the teacher-training UNESCO Workshops on Active Learning in Optics and Photonics (ALOP) in Latin America.

Two decades of correlation optics in Ukraine

The biennial Correlation Optics conference was held in Chernivtsi, Ukraine, 12–16 September 2011.



From left to right: Dr A Dubolazov (awardee); Prof. O Angelsky, chair of the conference; Prof. A Bekshaev; K Pokorski (awarded student); Prof. D Zimnyakov; S Sviridova (awarded student).

The series of international conferences on Correlation Optics has reached its tenth edition. The series started in 1993 during the social crisis and harsh economic conditions in Ukraine that followed the collapse of the former Soviet Union. The series has relied since 1995 on financial support from ICO and its member societies SPIE, OSA and EOS, as well as from the EPS and local sponsors. Over a period of two decades, participants from some 30 countries have attended the conference.

Traditionally, the main topics of the conference have been partial coherence and partial polarization, singular optics, optical correlation devices including digital holography and diffractive optics elements, and optical correlation diagnostics of random light-scattering objects and media. Recently the variety of topics has extended to include biomedical optics, with emphasis on non-invasive optical techniques for preclinical diagnostics of path-

ological and physiological state of biological tissues. These techniques are predominantly based on 2D Stokes polarimetry and statistical-fractal-wavelet data processing.

The organizers of the 2011 conference gave considerable attention to attracting young researchers and organizing a special student session, which included lectures by A Volyar, D Zimnyakov and A Bekshaev on singular optics and applications of laser statistical and polarimetric techniques. PhD students from Russia, Poland and Ukraine were awarded for the best student contributions to the conference.

The proceedings of the conference will be published by SPIE, and selected papers will be published in special issues of the *Applied Optics* journal and the international journal *Optical Memory & Neural Networks – Information Optics*. More information on the 2011 conference is permanently available at www.itf.cv.ua/corrupt11.

Obituary: Anthony E Siegman

The author of the monumental laser textbook *Lasers* passed away on 7 October 2011.



Anthony Siegman was the inventor of the unstable optical laser resonator and the teacher of many students destined to contribute to the development of lasers and quantum electronics. For more than 40 years he was a member of the Electrical Engineering and Applied Physics faculty at Stanford University, California, US. He was appointed the Burton J and Ann M McMurtry Professor in the School of Engineering in 1986.

Siegman was a member of the US National Academy of Engineering and the US National Academy of Sciences and the recipient of the Schawlow Medal of the Laser Institute of America. He received the Frederic Ives Medal of the Optical Society of America, the OSA's highest honour, and was the society's president in 1999. He also was awarded the society's R W Wood Prize. The Institute of Electrical and Electronics Engi-

neers honoured him with the WRG Baker and JJ Ebers awards.

Joseph Goodman, former ICO president (1987–1990), shared the following with ICO: “Tony’s death was a shock to all of us. He had a huge impact on Stanford and on the optics community more generally. When I was an undergraduate at Harvard, at the beginning of my senior year, Tony Siegman showed up on the Harvard campus. This was the same year that he joined the Stanford faculty. Tony was there to convince Harvard undergrads interested in engineering to apply to Stanford for graduate school (he had been an undergrad at Harvard too). He convinced me, and after I had been admitted, he contacted another faculty member and arranged for me to receive a research assistantship. Thus Tony had a big impact on my life, as he did on the lives of many others.”

Contacts

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Forthcoming events with ICO participation

Below is a list of events with ICO participation that are coming up in 2012. For further information, see www.ico-optics.org/events.html.

6–7 February ICTP Winter College 2012

“Winter College on Optics: Advances in Nano-Optics and Plasmonics”

Trieste, Italy

Contact: ICTP secretariat, tel +39 040 2240 9932, fax +39 040 2240 7932, smr2132@ictp.it
http://cdsagenda5.ictp.it/full_display.php?email=0&ida=a11152

29–31 March

Education and Training in Optics and Photonics (ETOP)

Carthage, Tunisia

Chair: Zohra Ben Lakhdar

Contact: Mourad Zghal, tel +216 71856240, fax +216 71856829, mourad.zghal@supcom.rnu.tn
www.esprit-prepa.com/etop/

31 March – 3 April

1st EOS Topical Meeting on Photonics for Sustainable Development – Focus on the Mediterranean (PSDM 2011)

Tunis, Tunisia

Contact: Julia Dalichow, tel +49 511 2788 155, fax +49 511 2788 117, dalichow@myeos.org
www.myeos.org/events/psdm2011

10–13 April

VII International Workshop TecnoLaser, “TECNOLASER 2012”, and III International Meeting Optics, Life & Heritage, under the general lemma “Optics and Laser Technology in Science, Industry and Culture”

La Habana, Cuba

Contact: Justo Ravelo Triana, tel (0537) 209 3920, fax (0537) 202 1518
tecnolaser@ceaden.edu.cu
www.ceaden.cu/tecnolaser/index.asp

14–17 May

3rd International Topical Meeting on Optical Sensing and Artificial Vision (OSAV 2012)

St Petersburg, Russia

Contact: Igor Gurov, tel +7 (812) 571-6532, fax +7 (812) 315-7534, gurov@mail.ifmo.ru
<http://osav.spb.ru>

27–30 May

ICO Topical Meeting: 6th International Conference on Nanophotonics (ICNP 2012)

Beijing, China

Honorary chairs: Bingkun Zhou and Paras Prasad

General chairs: Qihuang Gong and Joseph Haus

Contact and exhibit manager: Yun-Feng Xiao,

tel (86)10 62765512, fax (86)10 62756567

icnp2012@pku.edu.cn

<http://icnp2012.pku.edu.cn/>

2–5 July

8th International Conference on Optics-photonics Design and Fabrication “ODF’12”

St Petersburg, Russia

Contact: M Letunovskaya, tel +7 (812) 457 18 87, fax +7 (812) 457 18 87, odf12@gmail.com

<http://odf2012.ru/>

4–6 July

ICO Topical Meeting: 12th Conference of the International Society on Optics Within Life Sciences “OWLS 12”

Genoa, Italy

Contact: Alberto Diaspro, tel +39 010 71 781 503, fax +39 010 72 03 21, alberto.diaspro@iit.it

www.owls2012.org/

3–6 September

International Conference “Micro- to Nano-Photonics III – ROMOPTO 2012”

Bucharest, Romania

Contact: Valentin Vlad, tel +40 21 457 44 67,

fax 40 21 457 44 79 or +40 21 457 42 43,

v_i_vlad@yahoo.com

<http://romopto.inflpr.ro>

2–5 November

5th International Photonics and Optoelectronics Meetings (POEM 2012)

Wuhan, China

Contact: Xiaochun Xiao, Qingming Luo, tel +86 27 87792227 or +86 27 87792223,

fax +86 27 87792224

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