



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

Three Nobel Laureates at CREOL@25

CREOL, The College of Optics and Photonics at the University of Central Florida, celebrated its 25th anniversary with CREOL@25, a two-day symposium held 15–16 March.



The front of the CREOL building that was completed early 1996.



Nobel Laureate Charles H Townes at plaque commemorating the creation of the Townes Laser Institute.

The anniversary symposium programme featured Nobel laureates Jan Hall and Nicolaas Bloembergen as plenary speakers, along with technical presentation sessions on high-power lasers, ultrafast optics, nonlinear optics, fibre optics, semiconductor photonics, and imaging and display. CREOL researchers and invited speakers from other research institutions gave presentations directed at a technical audience from the optics/photonics community but accessible to non-specialists as well. The celebration included a graduate student research poster session, an awards banquet dinner, and tours of the college's extensive labs. The programme concluded with a hosted reception. CREOL's industrial affiliate members were invited to join the celebration with tabletop displays.

Following a long established tradition, Dr M J Soileau, founding director of CREOL and now UCF's vice-president for research and commercialization, hosted the CREOL Spring Thing on 17 March at his home, on the shore of alligator-infested Lake Jessup (the number of alligators in the lake is estimated to be over 10,000). Speakers and participants were invited to attend the event festivities, which included great fellowship and Cajun cuisine – including alligator steaks.

CREOL's history dates back to the mid-1980s, when Florida's government took the initiative to grow the state's economy beyond its dependence on tourism and agriculture by fostering the development of high-technology industry. The Florida High Technology and Industry Council (FHTIC), made up of business, industry and university leaders, was in charge of identifying seven technology areas that had high promise and were critical to Florida's economic future. One such area was "Lightwave Technology".

Ron Phillips, then professor in the UCF Electrical Engineering Department, wrote the portion of the report that recommended that the State University System take action to "form the Center for Research in Electro-Optics and Lasers (CREOL) to provide Florida's high-tech industries with access to research, students and faculty in advanced areas of optical and laser sciences." UCF, then only 20 or so years old, was provided by the state of Florida with \$1.5 m of



Apurva Jain, courtesy of CREOL

From left to right, Eric Van Stryland (first Dean), Martin Richardson (director of the Townes Laser Institute), the Nobel Laureates Charles H Townes, Nicolaas Bloembergen, and Jan Hall, Bahaa Saleh (current Dean), M J Soileau (founding director).

permanent, recurring funds to support CREOL, which attracted to University of Central Florida (UCF) what the founding director, Soileau, calls "The Texans" – Soileau, Eric Van Stryland (first dean of the college), David Hagan (associate dean for academic studies for the college), and seven graduate students. Soileau arrived on 2 January 1987 with the mission to build an internationally competitive academic unit in optics. In his own words, "I took the job because of the opportunity to build an academic unit devoted to optics, to staff it with top scholars in the field of optics, and to attract excellent students. The simple idea was to build an academic unit that would be much better than I could ever be hired into, and then to become a member of it by the historical accident of being present at its birth".

In the spring of 1996, an external review panel (consisting of Art Guenther, University of New Mexico; Bob Shannon, University of Arizona; and Brian Thompson, University of Rochester) was convened to review CREOL's progress, structure, plans and programmes. One of the recommendations of this panel was that CREOL should be made into an academic unit with its own degree programmes, tenure of faculty, etc. The rationale for this recommendation was straightforward: optics had become a discipline unto itself. Following the panel's recommendation, the State of Florida approved the School of Optics in 1998. To celebrate this significant



Eric van Stryland and M J Soileau commend the late Art Guenther (ICO President 1999/2002) on his contributions to CREOL as an Industrial Affiliate.

milestone, the School of Optics Inaugural Conference was held 11-12 January 1999, and was attended by many leaders from the optics community, including three Nobel laureates – Nicolaas Bloembergen (who also chaired the conference), Charles Townes and Steven Chu.

Soileau handed over the directorship in July 1999 to Van Stryland and became vice-president for the Office of Research and Commercialization of UCF, where he continues his efforts to move research from the labs into industry. In the same year the school awarded the first optics degrees, and continued thereon an accelerated growth that led to the establishment in 2003 of the Florida Photonics Center of Excellence (FPCE) within the School of Optics with a \$10 m grant from the State of Florida. The focus of the FPCE research and education work is on the technologies of nanophotonics, biophotonics, advanced imaging and 3D displays, and ultra-high bandwidth communications.

In early 2004, CREOL & FPCE became the College of Optics and Photonics. This event marked the first time that an optics programme in the US had achieved the status of a full college in its host institution, a milestone for CREOL, and also an indication that optics and photonics was at last being recognized as a distinct, independent discipline. Nine months later the University of Arizona promoted the Optical Sciences Center to the College of Optical Science. CREOL thus retains the distinction of being the first college in the field, and is glad to see other institutions following its lead.

On 4 May 2007, UCF dedicated its new Townes Laser Institute in honour of Charles Townes, best known for the invention of the principles underlying the laser, for which he was awarded the Nobel prize in 1964. The mis-

sion of the institute is to make UCF the premier institution in advanced laser technology in the US, emphasizing the use of laser technologies in medical and advanced manufacturing industries, and in defence.

In 2009, Bahaa Saleh (ICO vice-president, 2000/02) arrived at UCF from Boston University, where he had chaired that university's department of electrical and computer engineering, to become dean of the College of Optics and Photonics. He has continued a philosophy that has been central to the college's operation, that of partnership with industry and of attracting the best and brightest faculty and students. The growth and development of UCF research capabilities is providing CREOL with many opportunities to team with colleagues in such diverse disciplines as human-factor psychology, augmented reality for simulation and training, materials science and engineering, biomolecular and medical sciences, information technology, digital media, and many others.

There are currently more than 150 optics and photonics-related companies in Florida. CREOL provides the well trained workforce that keeps this industry growing. UCF has spun off over 21 successful photonics-based companies involving a wide variety of technologies, and the faculty has been granted a total of more than 120 patents in optics and photonics since 2000.

Today, CREOL is an internationally recognized centre of excellence for research in a wide range of optics and photonics technologies. Its founding values of excellence in research and education and unwavering commitment to effective partnerships continue to guide its future. The ICO secretariat congratulates CREOL on its 25th anniversary and thanks it for hosting the US ICO secretariat at its headquarters.

Nano-optics and plasmonics at ICTP

The ICO/ICTP Gallieno Denardo Award goes to Selçuk Akturk from Turkey.



Selçuk Akturk winner of the ICO/ICTP Gallieno Denardo Award 2012.

The 2012 ICTP Winter College on Optics: Advances in Nano-Optics and Plasmonics was held 6-17 February. The directors of the college, M Bertolotti, N Zheludev, and Z Ben Lakhdar gathered a select group of 12 lecturers to present the new advances in nano-optics and nanophotonics with emphasis on plasmon physics and plasmonic devices.

Surface plasmon polaritons (SPPs) are electromagnetic excitations on the surface of a good metal whose electromagnetic field is confined to the vicinity of the dielectric-metal interface. This confinement leads to an enhancement of the electromagnetic field at the interface, and the resulting increase in sensitivity is extensively used in chemo- and bio-sensors. The field enhancement is also responsible for surface enhancement of optical phenomena such as Raman scattering, second harmonic generation, fluorescence, etc.



Participants in the 2012 Winter College on Optics: Advances in Nano-Optics and Plasmonics. In the front row (left to right) are J Niemela (local organizer), M Bertolotti and Z Ben Lakhdar, directors of the school.

Light manipulation using SPPs can be effectively reduced from three to two dimensions, and SPPs also allow scaling down optical and electronic devices to nanometric dimensions as well as



Left to right: C Bernardoni (widow of Gallieno Denardo), A Wagué, S Akturk (awardee), JJ Niemela, M L Calvo (ICO past-president), M Danailov and A Consortini.

providing a great deal of flexibility in photonic integration in all-optical circuits. Innovative integrated components combining photonics and electronics can therefore be devised and the manipulation of optical signals on a sub-wavelength scale is made possible. They play a role in an increasing number of applications, including in the field of energy, new lasers and nonlinear devices. Plasmons are also needed to explain the behaviour of nanoscale systems and devices. Applications of plasmonics to bio-sensors, energy, and communications were discussed. The Winter College was attended by 99 participants.

During the Winter College, the ICO held the award ceremony for the ICO/ICTP Gallieno Denardo Award, and a reception for all participants. The award is dedicated to the memory of Gallieno Denardo, who passed away in the summer of 2007 (*ICO Newsletter* 73 October 2007), professor at the University of Trieste and head of the optics programmes at the Abdus Salam International Centre for Theoretical Physics for 20 years. The first ICTP Winter College on Optics was organized by Denardo and held in 1988. Thousands of scientists from developing countries have since benefited by participating in this activity that brings every year a distinguished group of lecturers from all over the world to instruct young minds on the most recent advances in different

areas of optics and photonics.

This year J Niemela, head of the optics programme at ICTP, invited Chiara Bernardoni, widow of the late Denardo to participate in the award ceremony, where a tribute to his memory and work in favour of education and research in optics in developing countries was presented. The 2012 ICO/ICTP Gallieno Denardo Award was awarded by the committee, consisting of A Wagué (chair), A Consortini, JJ Niemela, and M Danailov, to Selçuk Akturk from Istanbul Technical University, Istanbul, Turkey, "for his valuable work in the field of ultrashort optical pulses and in particular for his contributions to the development of ultrashort pulse characterization techniques and their applications to ultrafast nonlinear optics".

Akturk obtained his bachelor degree in 2001 from Bilkent University (Ankara, Turkey) and his PhD in 2005 at Georgia Institute of Technology (Atlanta, USA), both in physics. From 2006 to 2009, he worked at Laboratoire d'optique Appliquée of Ecole Polytechnique at Palaiseau, France. Since 2009, he has been a faculty member at Istanbul Technical University (Istanbul, Turkey), Department of Physics Engineering, currently at associate professor level. His research is mainly on ultrafast optics, including fundamental and applied aspects of femtosecond-pulsed lasers. Recently, he engaged space-time beam and pulse-shaping methods in applications of ultrafast lasers. In these areas, he has authored 34 peer-reviewed articles with more than 550 citations and performed over 80 presentations in international conferences. He has two patents pending. His works were awarded by several institutions including the Turkish Academy of Sciences, SPIE and Berthold Leibinger Foundation. He is a member of the Optical Society, SPIE and Turkish Physical Society, and has joined now the ICO Golden Book of young ICO awardees, whose work is expected to contribute to further development of science and technology in their native countries.

Obituary: H John Caulfield

A tribute to H John Caulfield, a regular ICO collaborator.



Last February, while attending the annual Winter College in Optics at the Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy, I received the sad news of the passing away on 31 January of H John Caulfield.

Caulfield, born March 1936 in Hallettsville, Texas, received his PhD degree in physics from Iowa State University. In an illustrious career, he worked for industry, served as founder and director of the Center for Applied Optics at the University of Alabama, and continued his academic work at the Alabama A&M University Research Institute as chief scientist. In his long and fruitful professional career he contributed greatly in both academic and industry arenas.

Caulfield was a highly respected scientist, known worldwide for his technical and organizational achievements in optical computing, speckle, holography, correlation optics, visual processing of information, optoelectronics and other related areas. He was the editor-in-chief of the *Journal of Holography and Speckle* and editor or co-editor of numerous books. His most recent book, *New Directions in Holography and Speckle*, was co-edited in 2006 with Chandra S Vikram. In the area of optical computing, he worked to solve a 40-year-old problem of making practical optical circuits that consume no energy and can work at any bandwidth that the optical beam carries. During his almost 50 years of research

work he reignited interest in optical Fourier pattern recognition by showing how to maintain its ability to recognize and locate objects while doing much more powerful discrimination than was ever thought possible. In the area of metrology, he applied his invention of fuzzy metrology to wavelength meters, non-imaging location of points, and spectral discrimination. In a field closely related to optics, he and Andrew Parker of Oxford University recently solved a fundamental problem in the evolution of visual systems. His theory on the evolution of consciousness seemed to be gathering supporters. Caulfield received many awards and medals, including The Gabor Award and the Gold Medal from SPIE, the highest award of that society. Working with the Gordon Research Conferences, he organized and chaired the first of many meetings on holography and optical computing that benefited the optics community greatly for a generation of scientists and engineers.

Caulfield was a great collaborator with ICO. He was co-chair of the special session dedicated to Holography in the 2006 ICO Topical Meeting on Optoinformatics/Information Photonics held in St Petersburg (Russia). He organized sessions dedicated to the late Emmet Leith and the late Yuri Denisyuk, both pioneers of holography. In both conference organization and as an invited speaker he served as a great inspiration for many young researchers.

In this short tribute to Caulfield it is difficult to summarize his enormous contributions, to convey an idea of his original mind, and to describe the great richness of the ideas that he liked to share with colleagues and friends. It is certain that those attributes of his will be greatly appreciated through the loss of his presence.

ICO would like to contribute to honouring his memory with this tribute and to extend its condolences to family and collaborators.

Maria L Calvo, ICO past-president

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Forthcoming events with ICO participation

Below is a list of 2012 events with ICO participation. For further information, visit the new ICO webpage at <http://e-ico.org/node/103>.

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

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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
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21–25 October

4th International Symposium on Transparent Conductive Materials (TCM 2012)

Crete, Greece

Contact: George Kiriakidis, tel +30 2810391271, fax +30 2810391295
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Responsibility for the accuracy of this information rests with ICO. President: D T Moore, Vice Provost for Entrepreneurship, Rudolf and Hilda Kingslake Professor of Optical Engineering, University of Rochester, USA. Associate secretary: Gert von Bally, Centrum für Biomedizinische Optik und Photonik, Universitätsklinikum Münster, Robert-Koch-Straße 45, 48149 Münster, Germany; Ce.BOP@uni-muenster.de.

