



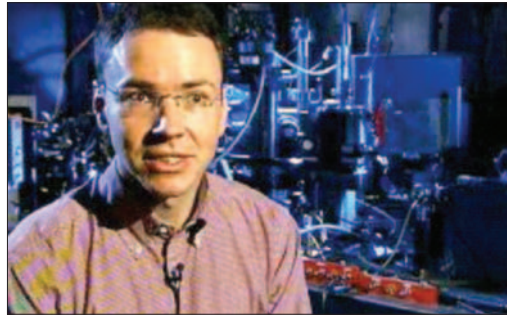
# NEWSLETTER



COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

## ICO Prize 2005 goes to Immanuel Bloch

**Bloch wins award for exploring quantum physics with optical microtraps formed by laser light.**



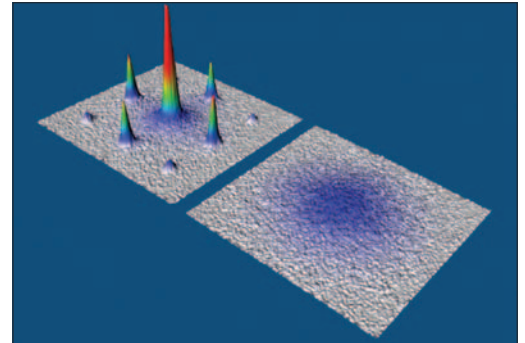
Immanuel Bloch, a professor of physics at the Johannes Gutenberg-University in Mainz, Germany, has won the ICO Prize 2005, celebrating the World Year of Physics.

In 1982 ICO established the ICO Prize, to be given annually to an individual who has made a noteworthy contribution to optics, published or submitted for publication before he or she has reached the age of 40. (Specifically, the prize-winner must not have reached the age of 40 before 31 December of the year for which the prize is awarded.)

The proposal of the ICO Prize Committee for this year, celebrating the World Year of Physics, was to award it to Dr Immanuel Bloch from the Johannes Gutenberg-University of Mainz, Germany. This proposal was unanimously approved by the ICO Bureau held in Changchun (China) last August. The award citation reads: "The ICO Prize for the year 2005 is given to Dr. Immanuel Bloch in recognition of his outstanding contributions in the areas of condensed matter physics, quantum optics, quantum information and atomic and molecular physics. These achievements were done as a researcher younger than 40 years old."

Bloch (aged 33) is full professor of physics at the Johannes Gutenberg-University of Mainz, Germany. His research interests include the investigation of ultra-cold bosonic and fermionic quantum gases, with special attention to applications in the field of condensed-matter physics, quantum optics, quantum information, and atomic and molecular physics.

His recent research has focused on exploring ultra-cold quantum gases in artificial periodic potentials formed by laser light, so-called optical lattices. Such optical lattices create a potential landscape of hundreds of thousands



Based on the first realization of Bose-Einstein condensation, by Nobel prize-winners Wolfgang Ketterle and US physicists Eric Cornell and Carl Wieman, Immanuel Bloch has become the first to crack the Bose-Einstein condensation wave and regularly arrange several hundred of these special atoms into a glowing grid or optical lattice. In the future, this type of optical lattice could make up the basic elements of a new kind of matter state with applications in quantum computing.

of small optical tweezers like microtraps, in which the atomic gases can be trapped. Among Bloch's research highlights are the first experimental observation of a quantum phase transition from a superfluid to a Mott insulating state of matter; the observation of collapse and revivals of the macroscopic quantum field of a Bose-Einstein condensate (BEC); and the realization of collisional quantum gates for large-scale entanglement and quantum-information purposes.

Very recently his group was able to establish Hanbury Brown and Twiss-type noise-correlation techniques for the detection of strongly correlated many body quantum phases of ultra-cold atoms in periodic potentials (*Nature*, 2005).

Bloch studied physics at the University of Bonn, with a subsequent research visit to Stanford University. He received his PhD from the Ludwig-Maximilians-University in Munich for his work on atom lasers and phase-coherence properties of atomic BEC in the group of Theodor W Hänsch. Subsequently, he became junior group leader for ultra-cold quantum gases at the Max Planck Institute for Quantum Optics, Garching, and the Ludwig-Maximilians University in the same group.

In October 2003, at just 31 years of age, he was appointed to full professorship of physics (C4) at the Johannes Gutenberg-University in Mainz, Germany.

He has received several prizes for his research activities, among them the Otto Hahn Medal of the Max Planck Society (2002), the Rudolf-Kaiser Prize (2003) recognizing his work on ultra-cold quantum gases, and the 2005 Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), considered the most valuable prize in German research.

Bloch is expected to deliver an invited plenary lecture at the forthcoming ICO Topical Meeting in Optoinformatics, which will be

held in Saint Petersburg in September 2006, where the corresponding award ceremony will take place.

The ICO Prize Committee, chaired by Prof. Asher Friesem and comprising Profs. Henri H Arsenault, Guofan Jin, Giancarlo Righini, Bahaa E A Saleh and Andrew M Weiner, is now seeking nominations for the 2006 ICO Prize. Nominators are asked to follow the instructions given at the ICO website. Nominations should be sent by 15 April 2006 to Prof. A Friesem, Chair of the Committee, Department of Physics of Complex Systems, The Weizmann Institute of Sciences, P O Box 26, Rehovot 7610, Israel. Fax: +972 89344109. E-mail: friesem@wicc.weizmann.ac.il.

## ICO Congress in Changchun is biggest ICO event ever



Opening ceremony of ICO-20 at the hall of CIOMP. The ceremony was chaired by the president and vice-president of the Chinese Academy of Science, Yongxiang Lu and Jianlin Cao respectively, who warmly welcomed the congress delegates.



Discussion at the poster sessions.

ICO holds its General Congress every three years, consisting of a scientific meeting and the triennial General Assembly of the Commission. ICO-20 was held at the Changchun Institute for Optics and Fine Mechanics (CIOMP), Changchun, China, on 22–26 August 2005.

More than 900 attendees, from 34 countries all over the world, met for the scientific part of the event, which consisted of 11 parallel scientific sessions: Optical Devices and Instruments; Optical Communications; Biomedical Optics; Optical Information Processing; Lasers and Laser Technologies; Materials and Nanostructures; Display Devices and Systems; Remote Sensing and IR Devices and Systems; MEMS, MOEMS and NEMS; Illumination, Radiation and Colour Technologies; and Optical Design and Fabrication, together with corresponding poster sessions.

More than 1000 papers were submitted for presentation at ICO-20, and the Programme Committee selected around 830 of them. The congress started with three plenary sessions. Charles H Townes, winner of the Nobel Prize for Physics in 1964, gave a lecture entitled "Development of the Science and Technology of Electromagnetic Waves", in which he demonstrated that dynamism and enthusiasm are possible at the age of 90. Jianlin Cao's lecture "The Current State and Progress of Optics in China" included statistics showing the emerging potential of optics and photonics in China (with currently 150 000 PhD students). Tingye Li, from AT&T Labs, presented "Innovations, Economics and Applications: Revolution and Evolution in Optics Communications". James C Wyant lectured on "Advances in Interferometric Surface Measurement", while A W Lohman and J Jahns spoke on "Diffractive Optical Processing of Temporal Signal" and H Philip Stahl on "NASA's Challenge in Optics for Future

Space-based Science Missions". The award ceremony and third plenary session consisted of the presentation of awards and medals and four lectures, presented by ICO prize-winners Benjamin Eggleton (ICO Prize 2003), Ashok V Khrishnamoorthy (ICO Prize 2004), Milivoj Belic and Caesar Saloma (both Galileo Galilei Award 2004). Four hundred and eighty-three oral communications (including more than 80 invited papers) and 345 poster contributions were presented during the week.

In that same week, an exhibit on optics and optoelectronics industries was organized at the Changchun International Conference and Exhibition Center, an impressive modern building located in the new industrial area of Changchun. Under the lemma "Light of science leads to the future" more than 200 enterprises in optics manufacturing, telecommunications and related technologies were present in the hall. To give an idea of the dynamism of the exposition, local and national industries distributed in the order of 300 000 invitations. Moreover, the banquet of the ICO meeting took place in a magnificent park area where the most qualified tourist points were located, under an appealing Chinese atmosphere.

ICO gratefully acknowledges Guoguang Mu (general chair), Guofan Jin (Programme Committee chair), Arthur H Guenther (International Advisory Committee chair), Jianlin Cao (International Organizing Committee chair), Ming Xuan (Local Organizing Committee chair) and their colleagues at the conference committee sessions for the considerable amount of work they did, which resulted in a very enjoyable and fruitful event.

As is traditional, the ICO General Assembly took place in two subsequent sessions, where the reports of the president, secretary, associate secretary and treasurer were presented. Moreover, the various committees of the ICO Bureau presented their corresponding triennial



Some members of the old and new ICO Bureau at the gate of CIOMP, where ICO-20 took place. From left to right, first row: A Wagué, M Gu, G Jin, A Guzmán, M Kujawinska, M L Calvo, I Yamaguchi and Y Kim. Second row: J Love, A Friberg, R Dändliker, H Arsenault, A A Friesem, G C Righini, G Von Bally, P Chavel, G Sincerbox, A Sawchuk and T Tshudi.

reports. Among the activities at the General Assembly were the election of the new Bureau for the next triennial term and the approval of admittance of new members, as well as the designation of the location for ICO-21. In the forthcoming sections of this newsletter, summaries of these aspects are reported.

As a satellite meeting of ICO-20, the 5th International Workshop on Adaptive Optics for Industry and Medicine (IWAQIM) was held in Beijing from 28 August to 1 September, with Wenhan Jiang as chairman of the Programme Committee. Development of adaptive optics has reached the stage of extending the applications of optics from astronomy and laser propagation to many fields of industry and medicine. Many new advances have been achieved in recent years. Four successful work-

shops on AO for industry and medicine have already been held.

ICO felt it was very important to support this valuable event. Many topics were presented during the workshop, including AO for lasers and communication; medical applications; new wavefront correctors; new wavefront sensors; wavefront reconstruction and control algorithms and hardware; beam diagnosis; and innovative systems and theory.

To summarize, it is remarkable that this was the first time that an ICO General Congress was organized in a developing country, and the third time in an Asian country (after those in Japan and South Korea). The Congress was a great success, and the hospitality of the CIOMP, all the organizers and the city of Changchun was an added bonus.

## Two Territorial Committees become new members of ICO

During the last three years, three Territorial Committees – Ecuador, Greece and Moldova – have applied to become ICO members. Greece and Moldova were accepted unanimously as members by the ICO General Assembly in Changchun.

The presidents of the Greece and Moldova Territorial Committees are Prof. Nikos Vainos, from the Engineered Photonic Media Laboratory, the National Hellenic Research Foundation, Athens, and Prof. Andrei Andries from the Center of Optoelectronics, the Institute of Applied Physics, Academy of Sciences of Moldova, Chisinau.

Moreover, Ecuador, Tunisia and Morocco have been accepted as “associate members”. Recently, a new application for associate mem-

bership has been received from South Africa, through Prof. Philemon Mjwara from the National Laser Center of South Africa, Pretoria.

The Bureau has been authorized by the General Assembly to transform associate membership into full membership during the forthcoming triennium as soon as all the required conditions are fulfilled.

Moreover, each international society member designates its representative to the ICO Bureau. The LAM Network appointed Prof. Ahmadou Wagué of University Cheikh Anta Diop (Dakar, Senegal) and OWLS appointed Prof. Min Gu of the Center for Microphotonics, Faculty of Engineering and Industrial Sciences, Swinburne University of Technology (Australia), as their ICO vice-presidents.

## New ICO Bureau elected during the General Assembly

During the General Assembly, the new ICO Bureau was elected by the members. It consists of: **president** – A Friberg (Finland); **past-president** – R Dändliker (Switzerland); **secretary** – M L Calvo (Spain); **associate secretary** – G Von Bally (Germany); **treasurer** – A Sawchuk (USA); **IUPAP Executive Council delegate** – Y Petroff; **vice-presidents** – H H Arsenault (appointed by SPIE), S N Bagayev (Russia), A Guzmán (Colombia), G F Jin (China), M

Kujawinska (Poland), B Y Kim (South Korea, from industry), H Lefèvre (France, from industry), J Love (Australia), M Gu (appointed by OWLS), T Tshudi (appointed by EOS), A Wagué (appointed by the LAM Network), A M Weiner (appointed by IEEE/LEOS), I Yamaguchi (Japan); **senior adviser “ad personam”** – P Chavel (France). In addition the OSA representative now has to be designated by the OSA Board.

## News from ICTP: Gallieno Denardo wins Educator Award

The International Society for Optical Engineering (SPIE) established the Educator Award in 2003. The award is given to prestigious colleagues in recognition of outstanding contributions to optics education as SPIE instructors or educators in the field. The award

has an honorarium of \$2000. For 2005 the Educator Award has been given to Gallieno Denardo of the Abdus Salam International Centre for Theoretical Physics (ICTP), Italy. Denardo has been very active during the last two decades in promoting optics and photonics



Gallieno Denardo, ICTP faculty member and local organizer of the series of Winter Colleges in optics at ICTP, Trieste, Italy.

activities at the ICTP. Among these activities is the Winter College on Optics, usually held in January and February of each year, offering since 1995 various relevant topics and lectures to attendees from all over the world, and in particular from developing countries.

The Winter College is an activity sponsored as well by ICO, and international societies like SPIE, OSA and OWLS.

Since 2004 Denardo has been involved in new initiatives like the Trieste System Optical Sciences and Applications (TSOSA) advisory group. This is a new body created to help the ICTP promote optical sciences in the developing world. One of its priorities is the develop-

ment of mentoring activities for ensuring quality programmes for the exchange of students from developing countries, so that they can get specializations in reputed laboratories and research centres. ICO is also supporting this mentorship programme along with IAEA, EOS, OSA, OWLS, SPIE and UNESCO. It is expected that in forthcoming years proposals will be received from specific qualified centres to initiate this joint venture.

The Educator Award was won by Judith Donnelly in 2003 and James R Janesick in 2004. For more information see <http://oemagazine.com/fromTheMagazine/jun05/pdf/spieworld.pdf>.

## ICO-21 to be held in Sydney, Australia, in July 2008

One of the ICO General Assembly's responsibilities is deciding the location of the next ICO General Meeting and General Assembly. In Changchun we considered the bid received from the Australian Optical Society and presented by John Love, from the Research School of Physical Sciences and Engineering, Australian National University. The bid, supported by a high-quality presentation and

details of the forthcoming organization, was unanimously approved. Therefore, we will hold ICO-21 at the Sydney Convention Centre in Sydney, Australia, in July 2008. In due time more information will be provided. The call for bids for ICO-22, to be held in 2011, is now open to all our territorial committees. Bids should be sent to Ari Friberg ([ari.friberg@imit.kth.se](mailto:ari.friberg@imit.kth.se)).

## Contacts

International Commission for Optics (<http://www.ico-optics.org>).

### Bureau members (2002–2005)

**President** R Dändliker  
**Past-president** A H Guenther  
**Treasurer** G T Sincerbox  
**Secretary** M L Calvo, Departamento de Óptica, Universidad Complutense, 28040 Madrid, Spain. E-mail: [mlcalvo@fis.ucm.es](mailto:mlcalvo@fis.ucm.es).  
**Associate secretary** A T Friberg  
**Vice-presidents, elected**  
A A Friesem, N Gaggioli, G F Jim, B Y Kim, M Kujawinska, G C Righini, L Wang, I Yamaguchi  
**Vice-presidents, appointed**  
H H Arsenault, G von Bally, A A Sawchuk, T Tschudi, A Wagué, A M Weiner  
**Senior adviser (ad personam)**  
P Chavel  
**IUPAP Council representative**  
Y Petroff



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## Forthcoming events with ICO participation

### 2005

#### 5–7 October 2005

##### MUSCLE XIV (Multiple Scattering Lidar Experiment)

Quebec City, Canada. Contact: Dr Gilles Roy. E-mail: [gilles.roy@drdc-rddc.gc.ca](mailto:gilles.roy@drdc-rddc.gc.ca).

#### 17–20 October 2005

##### International Topical Meeting on Optoinformatics

St Petersburg, Russia. Contact: Dr Ekaterina Yutanova. E-mail: [conf\\_optics@mail.ifmo.ru](mailto:conf_optics@mail.ifmo.ru). Web: <http://ysa.ifmo.ru/tmo2005/>.

#### 24–26 October 2005

##### 9th International Conference on Education and Training in Optics and Photonics (ETOP)

Marseille, France. Contact: Serge Ungar. E-mail: [serge.ungar@popsud.fr](mailto:serge.ungar@popsud.fr). Web: [www.ETOP2005.org/](http://www.ETOP2005.org/).

#### 12–15 December 2005

##### International Conference on Optics and Optoelectronics (ICOL-2005)

Dehradun, India. Contact: J A R Krishna Moorthy. E-mail: [krish@irde.res.in](mailto:krish@irde.res.in). Web: [www.icol2005.com/](http://www.icol2005.com/).

### 2006

#### 30 January – 10 February 2006

##### Winter College on Quantum and Classical Aspects of Information Optics

ICTP, Trieste, Italy. Local organizer: G Denardo. E-mail: [Smr173@ictp.it](mailto:Smr173@ictp.it).

#### 4–7 September 2006

##### ICO Topical Meeting on Optoinformatics 2006

Saint Petersburg, Russia. Contact: Dr Ekaterina Yutanova. E-mail: [Pavlov@soi.spb.ru](mailto:Pavlov@soi.spb.ru).

#### 26–29 October 2006

##### 7th International Young Scientists Conference "Optics and High Technology Material Science SPO 2006"

Kiev, Ukraine. Contact: Dr Viktor O Lysiuk. E-mail: [lysiuk@univ.kiev.ua](mailto:lysiuk@univ.kiev.ua).

### 2008

#### 7–11 July 2008

##### 21st Congress of ICO

Sydney Exhibition & Convention Centre, Darling Harbour, Sydney, Australia. Contact: Prof. John Love. E-mail: [jdl124@rshysse.anu.edu.au](mailto:jdl124@rshysse.anu.edu.au).

Responsibility for the accuracy of this information rests with ICO. President: Professor René Dändliker, Institute of Microtechnology, University of Neuchâtel, CH-2000 Neuchâtel, Switzerland. Associate Secretary: Professor Ari T Friberg, Royal Institute of Technology, Optics, Electrum 229, SE-164 40 Kista, Sweden; e-mail: [ari.friberg@imit.kth.se](mailto:ari.friberg@imit.kth.se).

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