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1998 ICO PRIZE WINNERS : HALDUN OZAKTAS AND DAVID MENDLOVIC

Ozaktas

Mendlovic

The 1998 Prize of the International Commission for Optics has been jointly awarded to Haldun M. Ozaktas and David Mendlovic. The Prize has been established in 1982 to recognize noteworthy contributions to optics by scientists who have not reached the age of 40. The Prize consists of a citation, a cash award and an invitation to present a lecture and receive the award at the next appropriate major ICO event. In addition, the Carl Zeiss company has accepted to donate an Ernst Abbe Medal to the recipients. The ICO Prize Committee for 1997-1999 consists of K. Chalasinska-Macukow (chair), R. Dandliker, Y. Ichioka, E. Marom, and G. T. Sincerbox. Ozaktas and Mendlovic received the award in recognition of
their contributions to several areas of optical information processing and particularly for their joint efforts in the development of the fractional Fourier transform and its applications. Several hundreds of publications have been made on the subject by many authors since the appearance of their first papers in the early nineties, some of which have been cited more than a hundred times each.

With the development of the fractional Fourier transform, the common frequency domain is seen to be merely a special case of a continuum of so-called fractional domains, a concept which is elegantly related to the notion of space-frequency distributions. Every property and application of the common Fourier transform becomes a special case of that for the fractional transform. In every area in which Fourier transforms and frequency-domain concepts are used, there exists the potential for generalization and improvement by using the fractional transform. In particular, the fractional Fourier transform has been found to have several applications in analog optical information processing,allowing a reformulation of Fourier Optics in a much more general way. Its applications in digital signal and image processing are growing steadily and it is expected to have an impact in the form of deeper understanding, new applications, or improved algorithms in every area in which the Fourier transform plays a significant role.

Mendlovic was born in Jerusalem in 1962. He graduated from Tel-Aviv University in 1991 with a PhD in Electrical Engineering. The same year, he joined the University of Erlangen-Nurnberg as a Postdoctoral Research Fellow with Adolf W. Lohmann. In 1993 he joined Tel-Aviv University as a Lecturer in Electrical Engineering, where he has been a tenured Senior Lecturer since 1997. He has authored more than 130 technical articles, 3 book chapters, and is the holder of 10 patents.

Apart from his joint work with Ozaktas on the fractional Fourier transform and its applications, Mendlovic has made many and varied contributions to the field of optical signal and image processing.

Among his key contributions, Mendlovic has been involved in the research and development of a novel way for transmitting far infrared radiation through optical fibers. This invention has been purchased by several industrial companies and is used in many routine surgical operations. David Mendlovic also contributed various ideas in the fields of optical correlation/convolution and invariant pattern recognition such as the radial harmonics that enable scale invariant pattern recognition and temporal signal processors with time lenses. Those two issues fostered intensive research in several optical signal laboratories.

More recent significant contributions of Mendlovic are related to the field of optical superresolution. An impressive example is the "SW-adaptation" approach that is helpful for understanding systems that provide superresolution performance. Superresolution is a field that occupied many of the most famous names in optics

including Abbe, Lord Rayleigh, Francon, Toraldo di Francia, Goodman and Lohmann. The theoretical concepts and the ensuing experiments by Mendlovic introduced a unified approach for analyzing and synthesizing systems with super resolving ability.

Mendlovic's contributions in the field of diffractive optical elements are highly respected also. They touch the encoding and manufacturing aspects of diffractive optical elements and their uses, mainly for pattern generation and beam shaping.

In his activities, Mendlovic has succeeded in integrating theoretical ideas and impressive experimental demonstrations that in many cases directed smart ideas toward real life applications. Examples include his significant activity in optical aspects of the wavelet transform and the Wigner distribution. Or, very recently, novel optical aspects of the triple correlation and various optical systems for analyzing and synthesizing the optical mutual coherence function.

Ozaktas was born in 1966 in Ankara. He received a BS degree from the Middle East Technical University, Ankara in 1987, and a PhD degree from Stanford University, California in 1991. During his graduate studies he was a Research Assistant to Joseph W. Goodman. He joined Bilkent University, Ankara in 1991, where he is presently an Associate Professor of Electrical Engineering. In 1992 he worked with Adolf W. Lohmann at the University of Erlangen-Nurnberg, Bavaria as an Alexander von Humboldt Foundation Postdoctoral Fellow. Over the summer of 1994 he was active as a Consultant for David A. B. Miller at Bell Laboratories, New Jersey. He is the author of over 60 refereed journal articles and several book chapters.

Ozaktas has made fundamental contributions to both analog optical information processing and Fourier optics, and to optics in digital computing and optical interconnections.

In the former category, apart from the development of the fractional Fourier transform and its applications, he has made several other contributions to general optics, information optics and optical signal processing, as well as digital signal and image processing.

In the latter category, his major contribution is his study of the physical limits to communication in digital computing systems. At the heart of this work lies abstract yet physically accurate models of optical, normally conducting, and superconducting interconnections which fully characterize their capabilities and limitations as information transfer media, and a physically accurate characterization of the scaling behavior imposed by heat removal considerations in three-dimensional systems. In addition to concentrating on the fundamental limitations of optical communication within computing systems (as opposed to long-distance communications), H. M. Ozaktas has also focused on the development of optimal optical interconnection architectures and their limitations, and how to best use optics and electronics together in high-performance computing systems. By defining the limits of what is achievable, and how it can be achieved, this body of work aims to provide a framework and a vision for the development of optoelectronic and optically interconnected computing systems which can provide flexible and effective platforms for high-performance applications.

Taken as a whole, Ozaktas's work is characterized by the combined emphasis on physical principles, and concepts from information and signal theory, and computer science.

1998 ICO GALILEO GALILEI AWARD WINNER : AJOY K. GHATAK

The 1998 Galileo Galilei Award has been awarded to Ajoy K. Ghatak. The Award was established in 1993 to recognize outstanding contributions to the field of optics achieved under comparatively unfavorable circumstances regarding the economic and social conditions and the access to scientific facilities and sources of information. It consist of the Galileo Galilei Medal, donated by the Societa Italiana di Ottica e Fotonica, funding of registration and approved local expenses at a major ICO Meeting where the Awardee will give a presentation based on his achievements, and appropriate measures of ICO to support the future activities of the winner. The ICO Galileo Galilei Award Subcommittee for 1997-1999 consists of M.J. Yzuel, chair ; K. Chalasinska-Macukow, A. Consortini, G.G. Mu, and J. Ojeda-Castaneda.

Ajoy K. Ghatak was born in Lucknow, India in 1939. He got his M.Sc. degree in Physics from Delhi University in 1959 and Ph.D degree in Engineering Physics from Cornell University in 1963. During 1963-64, he was a Research Associate at Brookhaven National Laboratory. In 1966 he joined the Physics Department of Indian Institute of Technology, New Delhi where he became a Professor in 1974.

Professor Ghatak has published over 160 research papers in internationally reputed journals. His current research interests are in Fiber and Integrated Optics. The Galileo Galilei Award committee recognized his important research contributions in developing new methods for the analysis of fiber and integrated optic waveguides and quantum well structures and also in the analysis of graded index optical imaging systems.

Professor Ghatak is a author/co-author of 14 books which range from text books to research monographs. Some of the titles are : Introduction To Fiber Optics, Cambridge University Press, UK (1998) ; Optical Electronics, Cambridge University Press, UK (1989) ; Contemporary Optics, Plenum, New York, (1978), all co-authored with K. Thyagarajan ; Fiber Optics On A PC, Viva Books, New Delhi (1994), co-authored with A. Sharma ; Fiber Optics Through Experiments, Viva Books, New Delhi (1994), co-authored with M.R. Shenoy ; Inhomogeneous Optical Waveguides, Plenum, New York (1977), co-authored with M.S. Sodha ; Optics, Tata McGraw Hill, New Delhi (1992) ; Quantum Mechanics, MacMillan India (1984) (co-authored with S. Lokanathan).

The book Inhomogeneous Optical Waveguides has been translated into Russian and Chinese and the first edition of Ghatak's undergraduate text on Optics has been translated into Chinese and Persian.

Ghatak has received the 1979 SS Bhatnagar Award (Instituted by CSIR) for outstanding contribution in Physical Sciences. He received the 1990 R L Wadhwa Award (Instituted by IETE). He received the 1991 Meghnad Saha Award (Instituted by UGC) for outstanding research contributions in theoretical sciences. He received the 1995 Amita De Memorial Award (Instituted by Optical Society of India) for life long research contributions in the field of Optics and dedicated service to the Optics Community. In 1995, he was elected Fellow of the Optical Society of America for distinguished service to optics education and for his contribution to the understanding of propagation characteristics of gradient index media, fibers and integrated optical devices.

OBITUARIES

Christian Imbert

Christian Imbert, a Professor at Universite Paris-Sud, Orsay, France, died prematurely at a heart attack on October 15, 1998 at the age of 61. Since 1984, he was the Director of Institut d'Optique, a position that combined the leaderships of Ecole Superieure d'Optique and the research laboratories at Institut d'Optique. A specialist of non homogeneous waves in Optics, Imbert devoted enthusiasm and energy to professional societies, contributing significantly to the creation of the French Optical Society in 1983 and of the European Optical Society in 1991. He served as President of the Comite Francais d'Optique, the French Territorial Committee of ICO, during the term 1989-1991 and chaired the French delegation at the ICO General Meetings in 1984, 1987 and 1993. He will be remembered for his ability as a teacher and research adviser and as a manager of research and education. An obituary notice will be published in OE Reports.

Serge Lowenthal

Serge Lowenthal, the ICO President in 1984-1987 and a Professor emeritus at Universite Paris-Sud, Orsay, France, died at the age of 73 on October 20, 1998, just a few days after his friend and former director Christian Imbert. Born in Germany, a Jewish refugee in France during the nazi period, Lowenthal joined the French resistance during world war II before entering Ecole Superieure d'Optique, then in Paris. He worked as a research engineer for industry during 1950-1968, and then joined the university to become a professor and a research group leader at Institut d'Optique, Orsay. He is known as one of the pioneers of Coherent Optics in the 1960ies after the advent of the laser, and as one of the pioneers of Coherent X-ray Optics in the 1980ies after the advent of high luminance sources in the soft X-ray range. He also contributed to optical information processing, speckle, and inverse problems in imaging. As a president of ICO, he contributed launching the ICO Prize, increasing significantly ICO membership, and fostering the links with opticists in industry. ICO remembers with gratitude his contribution to its development.

ICO GENERAL MEETING SCHEDULED FOR SAN FRANCISCO, CA, AUGUST 1999

The eighteenth Congress of ICO will meet in San Francisco, Ca, USA, August 2-6, 1999. It will consist of a scientific meeting that is expected to be the largest ICO event ever, and of the business part, known as the ICO General Meeting. Delegates from all Territories that are members of the International Commission for Optics will meet twice during ICO XVIII. The meeting will include a proposal for a significant change in the ICO statutes, that will introduce a new ICO membership category for International Organisations active in optics. A renewed and strengthened ICO will be in a position to apply for direct participation in the International Council of Scientific Unions (ICSU). The meeting will also cover the activity reports of the ICO President, Treasurer and Secretary and on the ICO Committees, and the delegates will decide on the evolution of the ICO activities the ICO budget for the coming three years. In addition, the admission of new member territories will be considered, as detailed elsewhere in this Newsletter, and the new ICO Bureau will be elected for the term 1999-2002.

At every ICO General Meeting, the General Assembly elects the President, Secretary, Treasurer and Vice-Presidents for a three-year term. The chairperson of the Nominating Committee, Professor Anna Consortini (Italy), has written to the Territorial Committees and requested nominations and endorsements for all positions. Of course, representation on the ICO Bureau is open to all Member Territories and it is hoped that a fair geographical distribution, as well as a good balance with regard to professional activity will be reached. The election procedure is detailed in the ICO Statutes and in the ICO Rules and Codes of Practice, both of which can be found under http://www.ico-optics.org, or can be obtained from the ICO Secretariat.

CALL FOR ICO MEMBERSHIP APPLICATIONS

The Commission has Members representing identified optics communities, called Territorial Committee Members. Each Territorial Committee for Optics shall either (a) be a subcommittee of the body representing the Member in the International Union of Pure and Applied Physics, IUPAP, (b) be recognised by the body representing the Member in IUPAP, or (c) if no such body exists, be recognised by the council of IUPAP. Application for membership shall be made to the Secretary- General of the Commission and may be considered and approved by the Bureau, subject to ratification at the next General Meeting of the Commission.

A Member should effectively represent independent scientific activity in optics in a definite territory and be listed under a name that avoids any misunderstanding about the territory represented. Territories are non overlapping. The word "territory" does not imply any political position on the part of the Commission which seeks to assist scientists in optics everywhere in the world to co- operate on an international level.

The Commission may accept as Associate Members applicant organisations otherwise qualified which are not ready for full membership. Associate Members pay no dues and have no voting privileges.

(From section 2 of the ICO Rules and Codes of Practice) The following are normally provided by a Territorial Committee applying for full membership:

a) if the Territory is represented in IUPAP, a statement from the president of the body representing the Territory in IUPAP, that the Territorial Committee is authorised by that body to represent optical scientists and engineers of that Territory within ICO. Otherwise, a motion to the same effect is requested from a local scientific authority (Ministry, Academy, Council of Research,....), and the Territorial Committee and the ICO secretary shall jointly take the necessary steps to request approval of the Territorial Committee by the council of IUPAP. b) A letter of application signed by the chairperson or representative of the applicant Territorial Committee, including a statement of adherence of the Territorial Committee to the ICO Statutes. c) A description of the organisation of the Territorial Committee, including the number of members, their designation procedure, their term of office, and the procedures that are set up to ensure a good representation of the optics community within the territory.

A VISIT TO INDIA UNDER THE ICO TRAVELING LECTURER PROGRAM

I have visited and given lectures on semiconductor lasers at five different institutions in India. This experience in a fast developing country has been very exciting and educational.

My first visit was to PST College of Technology at Coimbatore in the Southern part of India. This is a unique institution, where a full-fledged, heavy engineering industry and a graduate teaching and research institution share the same campus and have the same Board of Trustees. The faculty of the college and the engineers of the industry interact with each other for the mutual benefit of the two organizations. In the area of applied optics, the college offers graduate and undergraduate courses in optics and laser technology. They have a reasonably good optics and laser laboratory. Some of the research areas include laser materials processing, computer-integrated laser interferometry for surface testing, electro-optic, acousto-optic, and nonlinear optic studies. Crystal growth and characterization of optical materials is also pursued there. I gave four lectures to faculty, post-graduate and research scholars on high-power lasers, Q-switching and mode locking techniques, distributed feedback and multiple quantum well lasers.

My next visit was to the Indian Institute of Technology, Kanpur in the Northern part of India. This is one of the premier technological institutions in India and was started in the early 1960ies with American collaboration. Its laboratories in laser and in materials research are among the most advanced in the country. Areas of research in the laser laboratories include laser plasmas, quantum optics, ultrafast processes and nonlinear optics. The Materials Research Center covers, among many other subjects, optical storage material development and electro-optic and acousto-optic crystal growth. BSO and SBN studies are under progress, including the development of single crystal fibers of these materials. I gave two lectures on laser materials and new nonlinear optical materials for faculty and students.

Later, I visited several education and research institutions in Hyderabad, in the South Central part of India. I lectured at Hyderabad University, Osmania University and Bharat Degree College for women, respectively on laser materials, recent developments in semiconductor lasers, and introduction to lasers and applications. In addition, the Andhra Pradish State Council of Science and Technology and Society for Energy, Environment and Development invited me to be the resource person for their " Demonstration Cum Training on Lasers and Applications for College Degree Students ". The one day workshop was a hands-on training program on different types of lasers and their applications. In the morning, I gave an introductory lecture on lasers and in the afternoon I demonstrated several experiments related to laser beam characteristics. Other faculty conducted application experiments. There was an overwhelming response to this workshop and the final selection had to be restricted to forty students. The workshop was conducted at the Laser Laboratory of Hyderabad University, a well equipped center whose research topics include incoherent laser spectroscopy for ultra short phenomena, Z scan experiments and mode hopping and bistability in laser diodes.

I had an excellent time visiting these institutions where very good research work in optics and related fields is being conducted. I would like to thank ICO and the host organizations in India, which made this trip possible, and I would like to thank the administration at Camden County College for granting me permission to visit these institutions.

Raman Kolluri, Professor, Physics and Laser Technology, Camden County College, Blackwood, NJ, USA.

NEWS FROM ICO TERRITORIES : ARGENTINA

The ICO Territorial Committee in Argentina is formed by the members of the Executive Committees of the divisions of Optics and Photonics of the Asociacion Fisica Argentina. The Committee has elected as its National Representative to ICO Dr Guillermo H. Kaufmann of Instituto de Fisica Rosario for the period 1998-2000.