

INTERNATIONAL COMMISSION FOR OPTICS



# **TOWARDS ICO-22**

## *EN ROUTE VERS ICO-22*

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ICO Secretary General

“ICO, the place where the world of optics meets”

## IN MEMORIAN OF GIULIANO TORALDO DI FRANCIA

*THE ICO MOURNS THE PASSING OF A PIONEERING ICO LEADER*



*Giuliano Toraldo di Francia in the Dolomiti mountains. (Courtesy of his family)*

Giuliano Toraldo di Francia, professor emeritus of physics at the University of Florence, and an ICO pioneer, died in Florence on 26 April 2011, aged 94. After gaining a degree in physics from Florence University in 1939, he joined the National Institute of Optics, now INO-CNR, where he started his research. In 1943 he moved to the Ducati company, where during the next seven years he designed optical systems. In 1951 he came back to INO as professor of optics, until 1958. During that period he wrote one of his most translated scientific books, *Electromagnetic Waves* (1953) and a few years later, in 1958, the book *La diffrazione della luce* was published, gaining noticeable international attention.

Toraldo di Francia also went to America, spending two years at the University of Rochester as professor of optics before returning to Europe, when in 1959 he was hired as chair of optics at the University of Florence. In 1963 he moved to the chair of higher physics, a position he held until retirement in 1991. From 1968–73 he served as president of the Italian Physics Society (SIF). From 1976–81 he directed the University Institute of Higher Physics, which he

founded. After his return from the US he collaborated with the Institute of Electromagnetic Waves of the National Research Council of Italy, IROE-CNR (now IFAC-CNR). He promoted research on microwaves and optics and, very early after the demonstration of the laser, he fostered the CNR programme “Maser and Laser”, which introduced laser activity to Italy. From 1970–81 he was also IROE’s director.



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|----------------------------------|------------------------------|---------------------------------|-------------------------------------|
| 1. M <sup>me</sup> OUILLET (J.). | 14. LAURENT.                 | 27. PLATIEUX (R.).              | 40. M <sup>me</sup> BAVAY.          |
| 2. HOPKINS (H. H.).              | 15. JACQUINOT (P.).          | 28. PERROT (M.).                | 41. M <sup>me</sup> TOUVAY.         |
| 3. VAN HEEL (A. C. S.).          | 16. M <sup>me</sup> MAGNY.   | 29. SLANEY (S.).                | 42. HEDLICKA (J.).                  |
| 4. M <sup>me</sup> BLUM (M.).    | 17. ZERNIKE (F.).            | 30. IVANOFF (A.).               | 43. DEATE (M.).                     |
| 5. KÖNIG (H.).                   | 18. DURAND (E.).             | 31. SCHMID.                     | 44. VÉRET.                          |
| 6. WRIGHT.                       | 19. NISBET (B. R. A.).       | 32. TERNIER (J.).               | 45. M <sup>me</sup> ROSSIGNOL (N.). |
| 7.                               | 20. BOUT (A.).               | 33. ANDRADE.                    | 46. JURK (B.).                      |
| 8. MARCHEL (A.).                 | 21. COTTON (P.).             | 34. DE GROOT (S. R.).           | 47. LENUISER (R.).                  |
| 9. HENNINGER (M.).               | 22. TORALDO DI FRANCIA (G.). | 35.                             | 48. M <sup>me</sup> FLANARD (F.).   |
| 10. FLEURY (P.).                 | 23. SIMON (J.).              | 36. DOURNEAU (F.).              | 49. MONNET.                         |
| 11. CASANNE (J.).                | 24. BLAINNE.                 | 37. MISSEL (J. C. B.).          | 50. HAVELKA (B.).                   |
| 12. DUPUIS.                      | 25. M <sup>me</sup> ANDRADE. | 38. JAVUREK (K.).               | 51. BAYLE (A.).                     |
| 13. WYNNE (C. G.).               | 26. SMITH (T.).              | 39. M <sup>me</sup> DEATE (M.). | 52. AERULF (A.).                    |

*The photograph was taken at the “Réunions d’Opticiens” in Paris, October 1946, where the creation of an International Commission for Optics was discussed. The list of persons identified is from the Proceedings volume (editions de la Revue d’Optique, 1950).*

Toraldo di Francia was the last surviving member of the ICO founders from Prague in June 1947. In preparation for the first plenary session of ICO in Amsterdam in July 1948, the Italian delegation prepared a report on diffraction theory, under the responsibility of Toraldo di Francia. He served two terms as ICO vice-president and was president from 1966–69.

Toraldo di Francia was a great scientist who made outstanding contributions to the field of electromagnetic waves and optics. One of his first results in diffraction by surfaces was in 1941 with the formulation of the “Inverse interference principle”, a particular case of which (diffraction by plane surfaces) gave rise to Fourier optics. Other seminal results came from the demonstration of the existence of evanescent waves in diffraction phenomena, extensive studies of the quasi-Cherenkov effect based on evanescent waves, and deep investigation of geodesic lenses. Working on antennas, he introduced the concept of super-resolution, showing that with suitable filters in the pupil plane of an aperture (Toraldo filters) it is possible to increase the resolution in a given direction, beyond the diffraction limit. Another of his innovative contributions to optics was the introduction of the “Degrees of information of images”, where he offered a new approach based on information theory and on information content of the images, to the classical concept of resolving power.



*Photo from the ICO meeting in 1947 (courtesy of Pierre Chavel). Toraldo is clearly recognizable: he is in the second row beyond the important person with the medal and has a clear dress.*

Toraldo di Francia had a great interest in philosophy and its relationship with physics. His book *The Investigation of the Physical World*, in which he presented physics methods to the scholars of philosophy, was also published in English. In 1984 he founded the Forum for the Problems of War and Peace, which is still active. His passion for music led to him to be involved in the School of Music of Fiesole, and he also wrote the “libretto” for *Talgor*, an opera by Riccardo Luciani. Toraldo di Francia was an OSA Fellow and Honorary Member of the Italian Society of Optics and Photonics, SIOF. Some of the recognitions that he received include

the Young Medal of the Institute of Physics, the OSA C. E. K. Mees medal, and the Gold Medal of the Ministry of Public Instruction of Italy.

**Anna Consortini (University of Florence) and  
Giancarlo Righini (Istituto di Fisica Applicata “Nello Carrara”), Florence, Italy**



## ICO MOURNS THE LOSS OF SANG SOO LEE (1925-2010)

Sang Soo Lee known as the “Father of Optics” in Korea passed away on May 7th, 2010, in Korea. He was 84. Dr. Lee received a B.S. in Physics from Seoul National University in Korea (1949) and a Ph.D. from Imperial College of Science and Technology, University of London, UK (1959). Being the first Ph. D. in Optics in Korea, Dr. Lee devoted his life to lay the foundation for optical science and engineering in Korea for more than four decades as an educator, researcher, and administrator in science policy.



*Sang Soo Lee, “Father of  
Optics” in Korea*

From 1960-70, he worked at the Korea Atomic Energy Research Institute (KAERI), as Head of the Physics Research Division (1960-67), and then as Director (1967-70). After a year as Director General of the Office of Korea Atomic Energy (1970-71), Dr. Lee went to Korea Advanced Institute of Science and Technology (KAIST) as the first President to establish a new government funded graduate school. From 1989-91, he again served a term as President of KAIST. He played a pivotal role in founding the Optical Society of Korea (OSK) in 1989 and served as its first president. During his teaching career, Dr. Lee mentored 50 doctoral and more than 100 masters’ degree candidates in the areas of laser physics, wave optics, and quantum optics. Many of his former students have become leaders in academia, government-funded research institutes, and industry both in Korea and abroad. He published more than 250 technical papers and authored five textbooks, including “Wave Optics”, “Geometrical Optics”, “Quantum Optics”, and “Laser Speckles and Holography”.

Dr. Lee was an active member in the international scientific community. In addition to his pioneering scholastic achievements at KAIST, he served as a Vice President of the International Commission for Optics (ICO), a Council Member of the Third World Academy of Sciences, and a Council Member of the UN University, serving as an ambassador for the optics community, which showed a significant example of how a developing country like Korea can serve the international optics community.