

Optical Science and Engineering in Argentina

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It is a great pleasure to have this opportunity to present the readers of *Optical Engineering* with some of the current research being performed in the field of optical science and engineering in Argentina. The 16 articles in this special section cover a broad range of topics from laser physics to optical metrology, from optoelectronics to the use of optical techniques for studying diverse phenomena. Papers were solicited from scientists engaged in research and development at universities, centers belonging to the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), and other government institutions. CONICET is Argentina's federal government research agency, which not only is the main funding institution but also supports a system of more than 100 research centers located in different towns of the country. There are no optical contributions from industrial researchers, mainly because high technology industrial research itself has not seriously started yet.

As in many countries, the initial interest in optics arose from the activities of astronomers. The first of such activities can be traced to the 17th century, when the country was a Spanish colony and the construction of rudimentary astronomical instruments was accomplished by the Jesuits. The last two decades of the 19th century saw a flourish of scientific activities with the foundation of the astronomical observatories of Córdoba and La Plata. But it was not until 1909, when the German scientist E. Bose was appointed as head of the physics department of the Universidad Nacional de La Plata, that academic activities in optics began to be carried out by Argentine scientists.

E. Gaviola and R. Platzeck were the two key figures who contributed significantly to the development of optical research in the country. Gaviola studied at La Plata, went to Göttingen in 1922, and then to Berlin where he specialized in optics and obtained his PhD. When he finished his thesis, Einstein recommended that he apply for a Rockefeller fellowship. Then he moved to Johns Hopkins University to work

with R. Wood in atomic spectroscopy until his return to Argentina in 1929. Platzeck obtained a graduate degree in mathematics at La Plata but was induced by Gaviola to work in optics at La Plata's astronomical observatory. In 1935 Gaviola moved to the astronomical observatory of Córdoba to supervise the mounting of the 1.52-m reflector telescope of Bosque Alegre. For that purpose, he also set up a complete optical workshop in Córdoba, appointing Platzeck as its leader. Later Gaviola went to CalTech to work with J. Strong in the construction and testing of telescope mirrors. Gaviola and Platzeck made outstanding contributions to the fields of optical instrumentation and astrophysics. Perhaps their more important success was the development of a caustic test to survey the deviations of a mirror surface from a true parabolic shape. This method, which was published in the *Journal of the Optical Society of America* in 1939, improved the sensitivity obtained by the knife edge Foucault test and was universally used in the manufacture of telescope mirrors. It can be affirmed that the pioneering work of these two men in basic research, academic sources, and the development of optical instrumentation was the basis for the majority of the current activities established in the country.

Even though Argentina is a large country, it has a small population. For this reason a professional society for optics does not exist. The Asociación Física Argentina established in 1944 (Gaviola and Platzeck were two of the 26 founding members) is the local society of physics and includes several divisions. The Divisions of Optics and Photophysics include the majority of optical scientists doing research and development in the country, with a total membership standing at about 150. Both divisions play an important role in the dissemination of optical knowledge through regular meetings and other activities. The country became affiliated with the International Commission of Optics in 1980. It is also worth pointing out that most of Argentina's researchers have carried out postgraduate work in several European countries and the

United States and, as a result, are heavily involved in international collaboration and programs.

All papers published in this special section went through a rigorous review process involving expert scientists from research institutions in Germany, India, Japan, Mexico, Portugal, Spain, the United Kingdom, and the United States. I wish to thank the referees for their time, useful criticism, and comments. Their utmost sense of cooperation is greatly appreciated.

Last but not least, I would like to express my thanks to the contributors for presenting to the worldwide optics community a snapshot of Argentina's achievements. Without their involvement this special section would not exist. It is my sincere hope that this special section has something of interest to all readers of *Optical Engineering* and can promote future cooperation between Argentina and other countries.



Guillermo H. Kaufmann received his DSc degree in physics in 1978 from the Universidad de Buenos Aires, Argentina. He is currently a professor at the physics department of the Universidad Nacional de Rosario and also a research scientist of the Consejo Nacional de Investigaciones Científicas y Técnicas. He is also the head of the Division of Experimental and Applied Physics at the Instituto de Física Rosario, where he leads

a group working in optical metrology. He performed postdoctoral work in 1978 and 1979 at the Division of Mechanical and Optical Metrology of the National Physical Laboratory in the United Kingdom and at the Department of Mechanical Engineering and Applied Mechanics at the University of Michigan in 1984 and 1985. He also worked as a visiting researcher at the Swiss Federal Institute of Technology at Lausanne in 1989 and at the University of Cambridge in 1990. He has performed research work at Loughborough University of Technology in the United Kingdom during his 1992 through 1993 sabbatical year and also in 1994 and 1995, sponsored by the Science and Engineering Research Council and the Royal Society. In 1993 he obtained a research award for foreign specialists from the Government of Japan to work at the Mechanical Engineering Laboratory in Tsukuba. Professor Kaufmann has authored three book chapters and more than 60 scientific papers published in refereed journals and international conference proceedings. His major research interests include the development of coherent optics techniques for strain analysis and nondestructive testing, speckle metrology, phase shifting interferometry, fringe analysis, and digital image processing. He has served as head of the Physics Department at the Universidad Nacional de Rosario, has been a member of the Physics and Astronomy Advisory Committee of the Consejo Nacional de Investigaciones Científicas y Técnicas, and has been chairman of the Instituto de Física Rosario. He also led the research group that received the 1991 Dr. C. Milstein prize awarded by the Society of Radiology of Argentina for the development of digital image processing methods for the diagnosis of breast pathologies. He has served as cochairman of the SPIE Second International Conference on Photomechanics and Speckle Metrology, San Diego, in 1991. He is a member of OSA, SPIE, and IEEE.