Giorgio Fiocco (1931–2012)

Giorgio Fiocco was found dead in the roof garden of his mother's house on 31 July 2012, with pliers and a screwdriver in his hands. He was apparently fixing the watering system for her flowers. The passion for laboratory work never left Giorgio, and his contributions to very different aspects of experimental geophysics will remain his most important legacy. Immediately after the invention of the laser, Giorgio was the first to demonstrate many applications using this technology. The most important was light detection and ranging (lidar), which is now one of the most important sounding techniques for the atmosphere. He pioneered the first Doppler lidar to measure wind and the development of a very long baseline laser interferometer to measure the strain rate of seismic faults or the detection of gravitational waves.

Giorgio was born in Rome and schooled there, graduating in 1956 with a degree in electrical engineering from the University of Rome. The following year he moved to England to work on the development of airborne Doppler microwave radar for the Marconi Company. By 1960 he was at Cornell University's Aeronautical Laboratory, where he worked with ionospheric radar and became familiar with incoherent scattering techniques. In 1961 he joined the Massachusetts Institute of Technology's Research Laboratory of Electronics directed by Louis Smullin. In May 1962 the researchers conducted the Luna See project (he joked about project Lunacy), which consisted of the detection of laser pulses sent to and reflected by the surface of the Moon. During that experiment in 1962, Giorgio and Smullin observed returns from the Earth's atmosphere as well, demonstrating atmospheric lidar for the first time.

In 1963, Giorgio also initiated the technique of plasma diagnostics by detecting light scattering from an electron beam. That same year, scientists first applied lidar principles, but only in 1964 did the technique become sufficiently refined to produce meaningful data showing the effect of the 1963 Agung volcanic eruption on the stratospheric aerosol load. It was in these years that the first tentative lidar observations of mother of pearl clouds and mesospheric noctilucent clouds were made. These experiments preceded, by almost 20 years, the spaceborne observation of the high-altitude features by the stratospheric aerosol measurement and Stratospheric Aerosol and Gas Experiment satellite instruments. Those early lidar observations used vast amounts of Polaroid film, and analysis was time consuming, considering that each photograph had to be individually digitized. This was before the age of present-day electronics where counting is highly simplified.

In 1968, Giorgio worked for the European Space Research Institute (ESRIN), which at that time was a laboratory of the European Space Research Organization (now European Space Agency) in Frascati, Rome, Italy. Here Giorgio started an atmospheric research group that broke new ground in several aspects of observational techniques. The first Doppler lidar experiment was reported in 1971. To maintain a leadership in the lidar research, a 3-meter mosaic telescope consisting of 36 adjustable mirrors was built at the site. During the same period, capability was developed in the detection of gravitational waves, starting with the classical massive detectors and then using long baseline laser interferometric instruments. The expertise gained was later used to build a very sensitive laser strainmeter to measure seismic fault movements.

When the research activity at ESRIN was closed, the Italian National Research Council (CNR) inherited the lab, but essentially the group was disbanded. In 1971, Giorgio became a full professor of geophysics at the University of Florence, where he remained for 3 years before moving back to his alma mater in Rome. His joining the Italian academic world was an unusual event considering that he was a complete outsider to this environment. In Rome he taught many students his approach to the Earth sciences, and many of them chose to follow him in the lab. His research pace was frantic. He devised and carried out several experiments ranging from the following: operation of lidars in the polar region (Antarctica and Thule) to study polar stratospheric clouds, the development of an airborne lidar operated from the stratospheric Geophysica aircraft, and the study of the planetary boundary layer using sonic detection and ranging (sodar) and microwave radiometers.

Giorgio also had the intuition to recognize the right research opportunities, for example, as with the underground Gran Sasso Laboratory. This was conceived as an underground laboratory for particle physics. He was able to persuade managers and designers of the lab to add a tunnel during its construction where a laser interferometer could be located. It is now a two-branch, 90-meter interferometer that crosses a well-known fault line in the Apennine Mountains. During the 2009 L'Aquila, Italy, earthquake (30 kilometers from this site), the data gathered shed some important light on the earthquake's seismic mechanisms.

Giorgio made significant impact within the difficult Italian research environment when he was appointed commissioner of the CNR Institute of Atmospheric Physics (now ISAC-CNR) from 1976 to 1978 and then director of the same institute until 1982. For the years 1994–1995 he was appointed president of the Italian Space Agency (ASI). In both cases, he found a number of problems with science management that resulted from the complex interactions of politics and industry. Nevertheless, he was able to leave a tangible sign of his presence by starting the Small Satellite Program in ASI. In 1982 he was elected to the Accademia Nazionale dei Lincei; at that time he was one of the youngest members. At the Accademia he was a strong promoter of workshops and meetings in Earth system science.

Giorgio was an enjoyable fellow, very affectionate and encouraging, especially with young people. His presence in Italy has drastically changed the research perspectives in that country for atmospheric physics. However, although the atmospheric physics community has grown impressively in numbers and accomplishments, the academic environment has not progressed. Italy lacks a specific university degree in atmospheric science or meteorology (including a Ph.D. program), a situation that Giorgio lamented and regretted strongly. The most important tribute that his disciples could pay to him would be to work together to improve this situation.

Giorgio Fiocco

Giorgio is survived by his wife, Gabriella. His only daughter, Silvia, was lost tragically a few years ago. Accademia dei Lincei has instituted a prize in her memory for young researchers in the field of leukemia and lymphoma.

About 10 years ago, Smullin was invited to give a speech to celebrate Giorgio's 70th birthday. He gave Giorgio's career as an example of life-long learning. Smullin noted that, because of the rapid changes in the scientific world, a professional must continuously learn new material. Giorgio outpaced everybody at this game by not only learning but also inventing new ideas, always with a smile in his face.

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