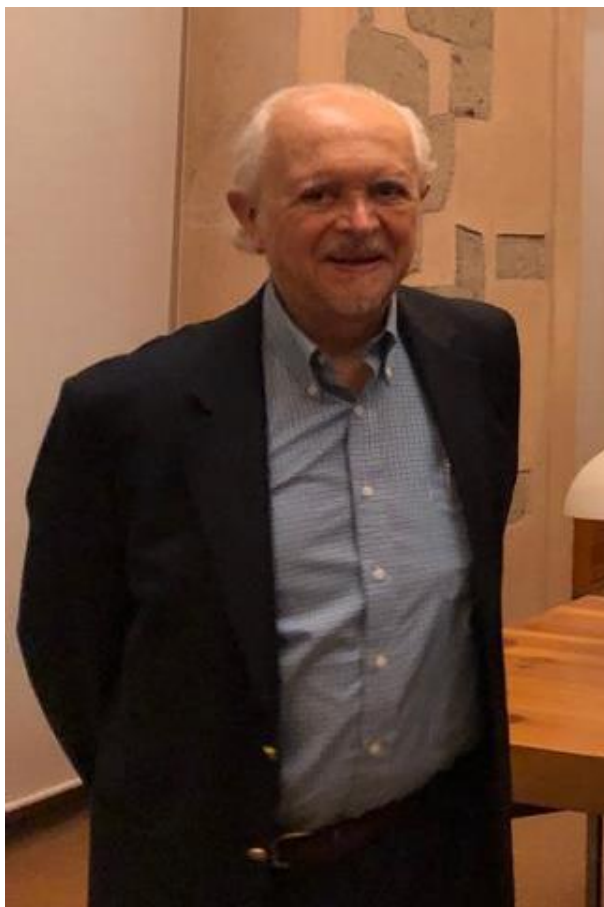


Mario Molina (1943-2020)

Mario Molina was an outstanding scientist, reaching the highest academic echelons, winning the Nobel Prize in Chemistry for his work on the effects of chlorofluoromethanes on the ozone layer. Mario also made important -although not as well known- contributions to other areas of including geosciences.



Dr. Mario Molina
Colegio Nacional, Biblioteca, Diciembre de 2019

Mario Molina was born in 1943 in Mexico City. He studied chemical engineering at the Universidad Nacional Autónoma de México (UNAM) and got his PhD in the University of California Berkeley in 1972. Between 1973 and 1975 he took a postdoctoral position at the University of California Irvine, working with Prof. Sherwood Rowland in atmospheric chemistry and then joined the Department of Earth, Atmospheric and Planetary Sciences and Department of Chemistry of the Massachusetts Institute of Technology as a faculty member. In 1995 Mario Molina was awarded the Nobel Prize in Chemistry jointly with Paul J Crutzen and F. Sherwood Rowland “for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone”. Mario unexpectedly passed away on the 7th of October 2020. Above all, Mario should be remembered as a generous human being committed to making this planet a better world.

In 1974 Molina and Rowland published a Nature paper on “Stratospheric sink for chlorofluoromethanes: chlorine atom-catalysed destruction of ozone”. In this paper, they proposed that these gases, widely used as refrigerants and propellants, remain in the atmosphere and, when transported upwards, are affected by ultraviolet radiation, releasing chlorine atoms that destroy the thin ozone layer allowing in turn more radiation to reach the planet’s surface. The studies of the Nobel awardees and others demonstrated the role, complexity and the importance of understanding the chemical reactions in the atmosphere, particularly in the stratospheric ozone layer. These findings faced strong a backlash from the industry but by the mid 1980`s, evidence of the of atmospheric ozone layer depletion at the south polar region clearly demonstrated the deleterious effects of these gases. In addition to continuing with his research, Mario became a committed advocate of recognizing the effects of climate change and the importance of protecting the environment. In 1987, a major international agreement, the Montreal Protocol was signed establishing a timeline for phasing out the use of these gases.

Less well known are Mario’s close links the Earth sciences and with Mexico. In the same year that Molina and Rowland published their Nature paper, they also reported on the stratospheric abundances of chlorine species in Geophysical Research Letters followed by a 1975 paper on chlorofluoromethanes in the environment in Reviews of Geophysics. Mario had a long association to AGU, as member of the atmospheric sciences section and Fellow from 1998. He had a close relationship with AGU attending several of the society’s meetings and publishing papers to the Society’s associated journals including studies on gas-phase glyoxal and secondary organic aerosol in Mexico City (2007) and sea salt OH uptake (2009) and OH diffusion temperature dependence (2009). In 2018, Mario was chair for the AGU-CAS (China Academy of Science) Joint Meeting on Atmospheric PM2.5 in China: change, impact, mitigation and global perspective held in Xi`an, China.

Mario had close links with other scientific societies, he was an elected member of the National Academy of Sciences, the Pontifical Academy of Sciences and National Academy of Medicine of the Vatican City and the Third World Academy of Science (TWAS), among others. Mario was a frequent attendant to the Lindau Nobel Laureates annual meetings. He was particularly involved in the 2017 Lindau Nobel meeting, in which Mexico was the invited country in the international program with the Mexican Academy of Sciences. In Lindau Mario and his wife, Guadalupe, shared their experiences with students and young researchers during the international connecting cultures and get-together evenings. Recently, in early October 2020 he was an invited speaker in the Science and Technology for Society (STS) Forum held online from Kyoto, Japan in the Sustainable Society session.

Although Mario spent most of his working life at various institutions in the USA, he developed and maintained strong links with his native Mexico. In 2004, he founded the Mario Molina Center for Strategic Studies on Energy and the Environment in Mexico City that focuses on projects and initiatives on a wide range of areas of scientific research and public policies. The Megacity Initiative: Local and Global Research Observations, is a project that seeks to identify and quantify the anthropogenic pollutant emissions in a megacity at local, regional and global spatial-temporal scales. The project involves several experiments and observational campaigns with different platforms that allow the study of emission, transport and dispersion of pollutants in the atmosphere. This year he devoted considerable efforts to investigate the airborne transmission of the coronavirus. His research was particularly important in designing mitigation policies and the use of face coverings. The COVID-19 pandemic has severely affected Mexico with large numbers of contagious and fatalities and Mario used his influence to highlight the use of scientific research to strengthening the health system and for policy design and implementation.

Mario was also highly committed to strengthening science communication and education in STEM subjects in Mexico. He created the Molina Center education program, focusing on increasing awareness among children and youngsters on science themes such as climate change. Mario was very active and a frequent contributor to initiatives of the Mexican Academy of Sciences and El Colegio Nacional. The latter is an institution that brings together around 40 renowned artists, writers, composers, philosophers and scientists with a strong focus on promoting science outreach and promotion of culture. In El Colegio Nacional, he organized seminars and meetings on educational programs and outreach activities. His commitment and generosity with his time was reflected in his activities, with frequent conferences and openness to students and young researchers.

Mario benefited from valuable influences during the development of his career and he was a major force in developing the careers of many others. He had many long-term friends in the academic sphere, with whom he had a shared interest in atmospheric chemistry as well as concerns and worries regarding environment degradation and climate change. One of them was Ralph Cicerone with whom he shared not only their research on atmospheric chemistry and stratosphere ozone but also on the broad issues and challenges on science, education and technology. Mario shared his recollections on Ralph Cicerone and their friendship in Eos (23 March 2017). Many aspects of his character and personality shine through his words.

Mario Molina was a gifted and multifaceted scientist and will be greatly missed. His unshaken commitment for a better world and his legacy will, no doubt, be remembered for many years to come.

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