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Marx brook

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In September, **Thomas George** became the chancellor of the University of Missouri–St. Louis. George, who has a doctorate in theoretical chemistry, had spent the previous six years as the chancellor of the University of Wisconsin–Stevens Point.

Robert Hwang, formerly manager of the thin film and interface science department at Sandia National Laboratories in Livermore, California, joined Brookhaven National Laboratory last spring as director of the Center for Functional Nanomaterials.

Obituaries

Marx Brook

Marx Brook, a longtime professor of physics and an atmospheric physics researcher at the New Mexico Institute of Mining and Technology (New Mexico Tech), died on 3 September 2002 in Albuquerque, New Mexico, during recovery from surgery.

Born in New York City on 12 July 1920, Brook received his BS in physics from the University of New Mexico in 1944. He then attended UCLA, where he earned his MA (1949) and PhD (1953), both in physics. There, he worked with his former UNM professor Robert Holzer and subsequently with Joseph Kaplan on spectroscopic studies of NO and N_2.

In 1954, another of Brook's UNM professors, E. J. Workman, recruited him to New Mexico Tech, where he began a long and distinguished career of studying lightning and the electrification in thunderstorms. He initially collaborated with Steve Reynolds in observations of the onset of electrification in storms and laboratory studies of rebounding collisions between ice crystals and hail as the potential cause of the electrification. After Reynolds became the state engineer in 1956, Brook steadily expanded his research to include time-resolved photographic and electrical investigations of lightning and the development of special radars for observing storms.

Brook was a master at designing and building equipment and instruments for observational studies. He also recognized the value of joint research. In 1958, he began the first of several collaborations with Japanese scientists for electric field and optical measurements of lightning. In the initial study, he and Nobu Kitagawa obtained the first detailed measurements of cloud-to-ground and intracloud lightning, in which they cleverly used a specially designed camera to capture microsecond time-resolution oscilloscope traces on moving film. Subsequently, Brook and Toshio Ogawa obtained more detailed observations of the elusive and poorly understood intracloud lightning discharge.

Marx Brook

Those studies led Brook and the author to perform multistation electric field and radar measurements of lightning charge centers in New Mexico from 1968 to 1971, and then to conduct more detailed lightning charge and radar studies of thunderstorms from 1976 to 1978 at NASA's Kennedy Space Center in Florida. The KSC studies, a collaboration with Roger Lhermitte of the University of Miami and other researchers, resulted from Brook's investigation, with New Mexico Tech colleagues Charles Moore and Charles Holmes, of the lightning incident triggered by Apollo 12 in 1969. The New Mexico and Florida observations showed that the main negative charge region in thunderstorms is distributed horizontally through the precipitating part of the storm and tends to be at similar temperature levels in the two locations, despite significant differences in the storms' vertical depth and moisture content.

Brook studied volcanic lightning with Moore and Sveinbjörn Björnsson during the eruption on Iceland's Heimaey Island in 1973. He also conducted pioneering studies of the newly discovered positive polarity cloud-to-ground lightning discharges during winter storms in Japan in 1976 and 1977. With long-time colleague Bernard Vonnegut, he followed up on the KSC studies with investigations of lightning for NASA from U-2 aircraft above thunderstorms and from the space shuttle. Brook had a career-long interest in using radar to study storms and pioneered the use of broadband noise transmissions for suppressing clutter fluctuations from storms. He implemented the noise transmission technique first in the "red ball" fast-scanning radar in the early 1970s and then in a larger and more versatile dual-polarization radar beginning in the late 1970s. The dual-polarization radar was used in 1991 to study electrical alignment of ice crystals at KSC and in the late 1990s to develop the simultaneous horizontal and vertical (H-V) polarization transmission technique for dual-polarization measurements of precipitation.

Brook was chairman of the New Mexico Tech physics department from 1968 to 1978 and subsequently directed Tech's research and development division until his retirement in 1986. As research director, he established the Center for Explosives Technology Research and recruited Per-Anders Persson as the center's director.

In retirement, Brook continued to be an active researcher, extending his winter storm lightning studies at SUNY Albany in 1987 and 1988 and studying rocket-triggered lightning at KSC during the Convective and Precipitation/Electrification (CaPE) project in 1991. He was set back by two strokes in early 1992 and late 1993 but subsequently remained as active as possible. He oversaw measurements of lightning during NASA's Tropical Ocean Global Atmospheres/Coupled Ocean Atmosphere Response Experiment (TOGA/COARE) project in the western Pacific in 1992 and subsequently made key observations of energetic narrow-bipolar lightning discharges and of charge transfer during sprites.

Brook found time to be an accomplished woodworker and photographer and enjoyed entertaining his family with the mandolin. In 1980, he took a colleague, Rit Carbone, on a European odyssey in search of the twin to a lost mandolin. They didn't succeed in finding it, but the trip was characteristic of Brook's zeal and determination. (For

more on that trip, see "In Search of the Lost Mandolin," published in 2002 in the *Bulletin of the American Meteorological Society*, volume 83.)

Brook had an engaging and dynamic personality that endeared him to his colleagues and friends, but was also plainspoken and not afraid to speak up when circumstances warranted it. Of his various awards and honors, the one he was most proud of was an informal Lifetime Achievement Award presented to him and two corecipients at the fall annual meeting of the American Geophysical Union in December 1993. The award was signed by more than 120 colleagues in the atmospheric electricity and radar meteorology communities. It recognized not only Brook's outstanding research record but also his extraordinary mentorship of students and young colleagues and selfless assistance to many researchers worldwide.

Paul Krehbiel
New Mexico Institute of Mining and Technology
Socorro

Wilfried Wolfgang Daehnick

Wilfried Wolfgang Daehnick, a distinguished experimental nuclear physicist and research administrator, died of lymphoma on 24 January 2003 in Pittsburgh, Pennsylvania.

Born in Berlin, Germany, on 30 December 1928, Wilfried managed to pursue his education without major interruptions, despite World War II and its aftermath. In later years, he would speak openly and honestly, and sometimes with wry humor, about what was needed to survive in those difficult times. He received a BS in physics from the Technical University in Munich in 1951 and an MS in physics from the University of Hamburg four years later. In 1958, working with John Fowler, he earned a PhD from Washington University in St. Louis, Missouri, for a study of the reaction $d + d \rightarrow {}^3He + n$. After a postdoctoral position at Princeton University, he joined the faculty of the University of Pittsburgh (Pitt) in 1962, where he became a full professor in 1969.

Wilfried was a masterly experimenter in nuclear physics; his research was characterized by thoroughgoing attention to every aspect, both experimental and theoretical, of each project. He pushed experimental techniques beyond the state of the art. For example, he very early on (1967) developed a large position-sensitive detector incorporating particle identification for the focal plane of the magnetic analysis system. That technique allowed rapid accumulation of data with the highest possible energy resolution. In his work with the accelerators at Pitt from 1962 to 1980, he concentrated on direct nucleon-transfer reactions (stripping and pick-up) to probe nuclear structure in terms of the nuclear shell model. Through distorted-wave Born approximation analysis of stripping (for example), he determined the distribution of a given shell-model single-particle state among the various final nuclear states of the same spin and parity, and by applying sum rules, he measured the degree of occupation of that single-particle state in the target nucleus. Inelastic scattering and $(p,n\gamma)$ coincidence experiments provided subsidiary information on individual nuclear states. In 1983, he built on that work and produced a major *Physics Reports* review article on residual interaction matrix elements extracted from data on nucleon-transfer reactions.

Wilfried Wolfgang Daehnick

By that time, Wilfried was doing transfer experiments at the higher energies available at the Indiana University Cyclotron Facility (IUCF). In 1987, he was among the first users of IUCF to recognize the potential of its new electron-cooled storage ring. His proposal to use the "Cooler" to study pion production in proton–proton collisions marked a shift in his research interest to more fundamental questions, and called for the addition of a large-gap magnetic spectrometer. As it turned out, that spectrometer was to remain the only magnetic separator available to Cooler scientists until the shutdown of the facility in 2002. The spectrometer was an important tool for