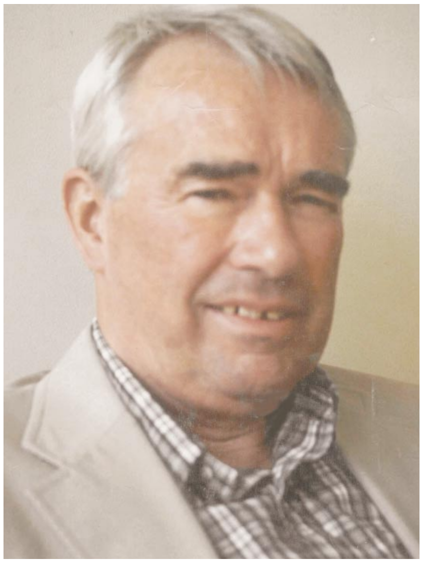

GEORGE WILSE ROBINSON

profound impact not only in photochemistry and photobiology, but in other fields as well.

Wilse and his group at Caltech developed experimental and conceptual techniques to examine triplet states, excitation energy transfer and photosynthesis, and exciton phenomena in organic crystals and biological systems. Wilse used molecular dynamics (MD) simulations to study the structure and dynamics of argon clusters. The two papers from this work are still heavily cited in the field of vapor-phase homogeneous nucleation. Wilse also was one of the first chemists at Caltech to use lasers in his research.

Wilse left Caltech in 1975 to become chairman of the physical chemistry department at the University of Melbourne in Australia. His group there was one of the first university groups to publish papers in the emerging field of picosecond spectroscopy.

In 1976, Wilse took the position of Robert A. Welch Professor at Texas Tech University, where he continued the use of picosecond spectroscopy to study liquid-state problems, including the hydrated proton and electron. He began to rely heavily on MD simulations to solve a variety of problems, including salt solutions, isomerization reactions, and liquids in high-electric fields, and in confined geometries, such as between parallel plates. In addition to MD simulations, Wilse and his research group developed analytical models to understand chemical reactions such as isomerization in liquids. In a *Physical Review Letters* article in 1992, the group demonstrated that the rate of activated barrier crossing obeys certain scaling laws.

For nearly two decades, Wilse endeavored to understand the most important liquid known to humankind: water. To quote Caltech's eminent inorganic chemist, Harry Gray, "When the dust settles, and someday it surely will, Wilse Robinson will be recognized as the scientist whose work led to a fundamental understanding of the properties of this amazing substance." Wilse's most important contribution to the study of water was a two-state model that explains its anomalous properties, including the famous density maximum at 4°C. Using this model, Wilse and his group showed that this anomaly, as well as other properties of water, arises from outer-neighbor structural transformations.

In a 1996 *Physical Review Letters* article, he showed that a simple one-dimensional analytical model could reproduce the density maximum. No other current model is able to reproduce the density and other properties of water over a wide range of temperatures and pressures. In a 1999 *Biophysical Journal* article, Wilse showed that the curvature in the total free-energy function for protein unfolding can be attributed to the steep change with temperature of the proportions of ice-Ih–type and ice-II–type bonding in the liquid. This behavior, which leads to cold and heat denaturation, had never before been explained.

Although he was diagnosed with cancer in the spring of 2000, Wilse continued to lead his research group until he entered the hospital. He also gave an oral presentation at the Gordon Research Conference on Water in New Hampshire. After the meeting, he said that it was the best presentation on water that he ever gave. Sadly, it was also his last.

Wilse loved doing science and passionately tackled each problem. He held high scientific standards: In most of his scientific advances, he strove first to obtain a physical understanding of the problem. He also trained numerous students and postdoctoral coworkers, many of whom have become outstanding researchers in physical chemistry and chemical physics. He was not afraid to propose ideas that differed from the mainstream thought. However, more often than not, he was ahead of the rest in terms of understanding a problem. With his death, the scientific community has lost a great member.

EDWARD L. QUITEVIS
Texas Tech University
Lubbock

William George Fastie

William George Fastie, a preeminent optical physicist and spectroscopist who helped start the Johns Hopkins University space program in the late 1950s, died of pneumonia on 14 July 2000 in Baltimore.

Born in Baltimore on 6 December 1916, Fastie grew up during the Depression. After graduating from high school with what he called an "undistinguished scholastic record," he worked at a grocery store to help support his family. From the time he was a teenager, he displayed a flair for physics. He attended the Johns Hopkins University from 1934 through 1941, first as a student in the evening college and later as a graduate student in physics, working under the supervision of A. Herman Pfund, Robert W. Wood, and Gerhardt H. Dieke. Remarkably, he did not complete the requirements for either an undergraduate or graduate degree.

During World War II, he worked as a research assistant in the department of physics and developed infrared detectors. In 1945, he left Hopkins to become a research physicist at Leeds and Northrup Co; however, in 1951, professor of physics John Strong lured Fastie back to academe at Hopkins.

Fastie's scientific work at Hopkins was extremely inventive. In his first publications, he described a new type of spectrometer that today bears his name. Because of the subsequent widespread adoption of this type of instrumentation, he became well known among spectroscopists. With the advent of Sputnik, Fastie recognized the promise of spectroscopy from spaceborne platforms, so he began a program of rocket research that has continued at Hopkins. At first, the rocket program emphasized the spectroscopic study of the constituents of Earth's upper atmosphere. But from the mid-1960s, it quickly evolved into an astronomy program, with accurately pointed telescopes carried on space vehicles.

Fastie was a coinvestigator in the Mariner 5 flyby of Venus in 1967 and the Mariner 6 and 7 flybys of Mars in 1969, and was also the principal investigator for the ultraviolet spectrometer experiment on Apollo 17 in 1972. All the missions except for the first flyby carried ultraviolet spectrometers based on the design discovered by Fastie in 1952. Known today as the Ebert–Fastie spectrometer, it is

WILLIAM GEORGE FASTIE

similar to a design proposed by Hermann Ebert at the beginning of the 20th century that was rejected and subsequently forgotten because of concerns with fabrication feasibility. Without prior knowledge, Fastie rediscovered and significantly improved the design. With characteristic humility, when he learned of Ebert's prior work, he insisted that the design be named solely for Ebert. Fastie's recollections about the reinvention of the Ebert spectrometer were published in PHYSICS TODAY (January 1991, page 37).

During the mid-1960s, Fastie also shifted his interest to astronomy. He designed several precision-pointing telescopes whose designs are still used by the sounding rocket community. He designed the prototype for the Hopkins Ultraviolet Telescope that flew on the space shuttle in December 1990 and March 1995 and tested it on a sounding rocket.

Fastie's skills as a scientist were recognized with his 1977 appointment by NASA as a member of the Hubble Space Telescope (HST) science working group. In 1979, the Association of Universities for Research in Astronomy Inc requested that Hopkins serve as the proposed site for the Space Telescope Science Institute. Fastie played a significant role in preparing the proposal, particularly in the detailed formation of the concept of the institute.

Fastie also worked on diverse topics such as the bioluminescence of the Chesapeake Bay and the development of new kinds of spectroscopic instrumentation. He had a gift of encouraging enthusiastic coworkers and young scientists.

Fastie retired from Hopkins in 1982. However, he continued to work on campus through 1997 as a telescope scientist and a member of the HST science working group. Until 1996, he also continued to lead a program to search for extrasolar planets using HST.

In recognition of his scientific achievements, Fastie received the David Richardson Medal for 1972 from the Optical Society of America and the Exceptional Scientific Achievement Medal for Outstanding Contributions to the Space Program from NASA in 1973.

Fastie, who had a sharp wit and an infectious sense of humor, will be missed.

PAUL D. FELDMAN
RICHARD C. HENRY
H. WARREN MOOS
Johns Hopkins University
Baltimore, Maryland

Robert Michael Hjellming

ROBERT MICHAEL HJELLMING

Robert Michael Hjellming, an astronomer at the National Radio Astronomy Observatory (NRAO) in Socorro, New Mexico, and an adjunct professor of physics at New Mexico Tech (New Mexico Institute of Mining and Technology) for more than 30 years, died of natural causes on 29 July 2000 while he and his wife Carol were making scuba certification dives in Santa Rosa, New Mexico.

The concept of scuba diving in New Mexico seems surreal to me. But Bob had a proven history of making his high-risk "adventures" pay off handsomely throughout his professional career. As one of Bob's students, I saw a mentor who moved on, always with intensity, intelligence, agility, and unflappable civility, leaving us with the illusion that his students could do so too.

Born in Gary, Indiana, on 12 December 1938, Bob earned his degrees from the University of Chicago: BS in physics in 1960, and MS and PhD in astronomy and physics in 1961 and 1965, respectively. His doctoral thesis was on physical processes in regions of ionized hydrogen. He began his post-PhD career at Case Western Reserve University in 1965.

In 1968, Bob joined NRAO, working in Charlottesville, Virginia. From 1969 to 1971, his interests shifted from numerical models of radiation transfer in ionized nebulae to analytical models of clouds in the cold interstellar medium. He also was interested in analyzing statistical populations of upper energy levels of hydrogenic atoms to successfully explain the stimulated amplification of radio recombination lines propagating through the interstellar medium.

That was just the start of a careening career. In 1970, Bob teamed up with Campbell Wade, an NRAO colleague, to try to detect radio emission from stars, an idea so conjectural at the time that they started the program during engineering time at the Green Bank Interferometer (GBI) in West Virginia. During the two years that followed, there was a veritable blizzard of new discoveries of radio stars, novae, and x-ray sources.

In 1973, Bob and his family moved to Socorro, where he headed the team that developed the initial data calibration and analysis software for the Very Large Array (VLA)—at that time an interferometer without any antennas—an irony well suited to a theoretician! His successful conversion from theorist to astute but wary observer seemed effortless, and he wound up writing the comprehensive VLA user manual, commonly referred to as the "VLA Greenbook."

By the late 1970s, Bob jumped off the management treadmill to reinvigorate his scientific career. He moved with agility between theory and observations, concentrating first on one type of star, then another. He published 71 papers on about 20 objects in the 1980s alone, including many reviews. Simultaneously, he mentored students, having supervised a dozen more PhD students and postdocs by the time of his death.

Bob had many long-term associates and collaborators who worked in teams to observe the evolution in shape and spectrum of various types of transient galactic radio sources. The most famous of these was the