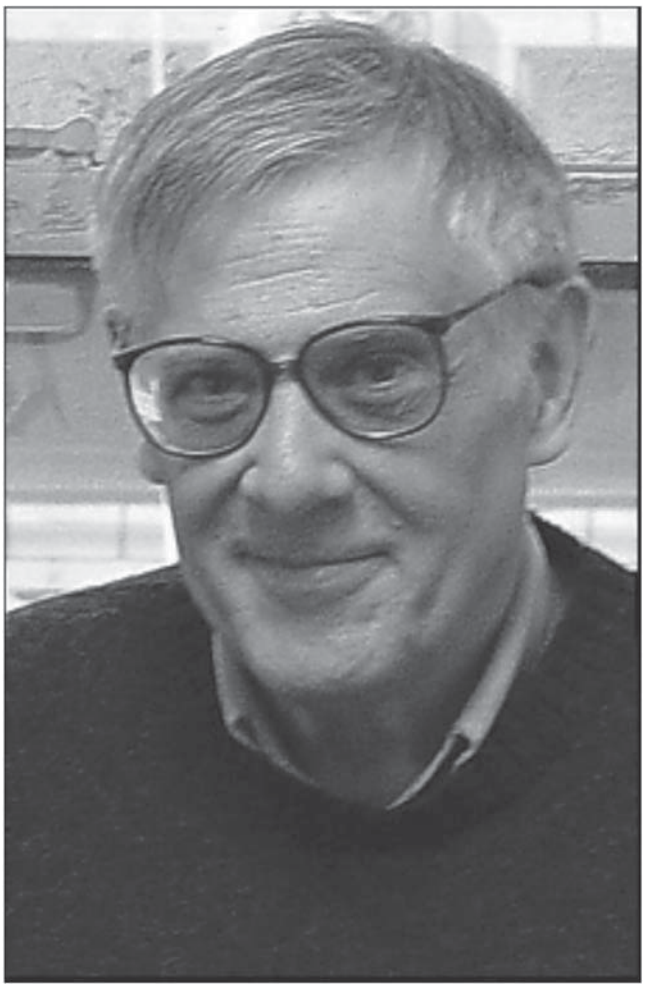
Obituaries
Prepared by the Historical Astronomy Division

IAN R. BARTKY (1934-2007)

Ian Robertson Bartky, a physical chemist who turned to history for his second career, died 18 December 2007 of complications from lung cancer. He was 73. In addition to his scientific career, he will be remembered for his meticulous research on the evolution of time systems, especially for his two books Selling the True Time: Nineteenth Century Timekeeping in America (Stanford University Press, 2000), and One Time Fits All: The Campaigns for Global Uniformity (Stanford University Press, 2007).

Ian was born on 15 March 1934 in Chicago, Illinois. He was the son of Walter Bartky, a Professor of Astronomy at the University of Chicago, and eventually its Dean of the Division of Physical Sciences. The elder Bartky's astronomy textbook, Highlights of Astronomy, published in 1935 and reprinted as late as 1964, includes a considerable discussion of time and standard meridians, which may have influenced Ian, even though his father died in 1958 at the age of 57 when Ian would have been only in his early 20s.

Imbued with the love of science from his father, Ian graduated from Illinois Institute of Technology, and went on to obtain his doctorate in physical chemistry from the University of California Berkeley. His mentor was Nobelist William F. Giauque, and Ian always spoke fondly of Giauque's influence in setting rigorous standards that Ian followed when he joined the National Bureau of Standards [NBS] in 1961. Ian spent most of his career there, and it was there that he acquired his professional interest in time, notably when the House Commerce Committee asked him in the mid-1970s to determine whether the dates of Daylight Saving Time should be extended. This resulted in an NBS report in 1976, which concluded that any energy savings would be miniscule. With his usual attention to detail, Ian researched the entire history of the problem, and thus acquired his second great love after science--history. With Elizabeth Harrison he published a well-known article on the issues involved with Daylight Saving Time in Scientific American for 1979.



Ian R. Bartky

My first interaction with Ian was leading up to the 150th anniversary of the United States Naval Observatory [USNO] in December 1980. While working on an article for Sky and Telescope on the early history of the Naval Observatory, I ran across documents in the National Archives from England proposing that the Navy's new Depot of Charts and Instruments--forerunner of the Observatory--erect a time ball as had been done in Portsmouth England in 1829. Ian had been in the National Archives working on the history of time. When I mentioned this 1829 document, he said it was impossible, because the first time ball in the world was in 1833 at Greenwich, England. But the documents told the story, and this Eureka moment led to our article in the Journal for the History of Astronomy (volume 12, October 1981), on the world's first time ball. This was to the considerable chagrin of the staff at Greenwich, who thought they had the world's first time ball, and who still ceremonially drop one at 1 PM local time. Ian went on to write the history of time balls for the Naval Observatory's sesquicentennial symposium at the end of 1980, as published in Sky with Ocean Joined. We then collaborated on another article for JHA (volume 13, February 1982) on the history of the first North American time ball, dropped at the USNO beginning in 1845.

Time balls and Daylight Saving Time were only a small part of Ian's interest in time as he began to untangle the many issues involved in the history of timekeeping and time dissemination. His book Selling the True Time is a model of scholarship, and with it Ian proved to have that rare combination--a scientist with deep technical knowledge who could also ask and answer profound historical questions. He also had a keen appreciation of the role of human nature in history, always looking for the motivations for particular historical actions. Ian was proud to have the book published by Stanford University Press. When Stanford also published his final book One Time Fits All: The Campaigns for Global Uniformity, he was very proud of the glowing endorsement from Peter Galison, one of the country's foremost historians of science. With this book Ian also became the world's expert on the International Date Line, time zones, and standard time, among other aspects of time.

Ian's historical work was supported by the National Science Foundation, the Dudley Observatory, and the National Maritime Museum of the Royal Observatory at Greenwich, where his work was highly regarded. He was active in many professional organizations, including the Historical Astronomy Division of the American Astronomical Society.

On 29 March 2008 almost exactly 50 years after the death of his father, a memorial service was held in the library of the U. S. Naval Observatory, which had become Ian's second home during his researches, often accompanied by his wife Betty, to whom he dedicated his last book, calling her his "steadfast partner in this endeavor." The service, entitled "The Time of His Life: A Celebration of Research in the Development of Standard Timekeeping," included remarks by numerous colleagues and friends, surrounded by the books he so loved. Ian is survived by his wife of 47 years, Elizabeth Hodgins Bartky of Bethesda, Maryland, a son David J. Bartky, and a daughter Anne B. Goldberg.

Steven J. Dick
NASA

RONALD N. BRACEWELL (1921-2007)

Ronald N. Bracewell, Professor Emeritus (since 1991) of Electrical Engineering at Stanford University, and a true renaissance man of science, died of a heart attack on 12 August 2007 at his home.

Ron Bracewell was born in Sydney, Australia, on 22 July 1921, one of the two sons of Cecil and Valerie Bracewell. He graduated from the University of Sydney in 1941 and received his doctorate degree in physics from Cambridge University in 1949. During World War II, Ron worked in the Australian National Radar Establishment, where he designed and developed microwave radar equipment. Like several other World War II radar scientists, after the war he used this experience to pioneer the new field of radio astronomy. With J. L. Pausey, in 1955 he published the first comprehensive textbook in this field entitled, Radio Astronomy. Bracewell joined the Stanford Electrical Engineering faculty in 1955, and from 1974 on he held the first prestigious Lewis Terman professorship. He was awarded the Outstanding Service Award of the department in 1984. In 1988, he was named an officer of the Order of Australia--the Australian equivalent of Order of the British Empire.

Soon after his arrival at Stanford, Bracewell designed and began building a solar spectroheliograph, consisting of thirty-two dish antennas in the form of a cross. This was completed in 1961 and provided daily maps of the Sun for more than a decade encompassing more than one solar activity cycle of eleven years. These maps were useful in predicting magnetic storms caused by solar activity and were used by NASA during the first landing on the Moon. In 1971 he started the building of a five-element radio interferometer, for observation of extragalactic radio sources, with the novel design of unequal spacing that gave the resolution of a ten-element array. Both telescopes are now dismantled. The common characteristics of these and other projects were that they were all built in-house with a limited budget, often a small fraction of what a national laboratory would spend on a comparable project. As a result they provided an excellent arena for training future radio astronomers. Many prominent radio astronomers were indeed trained by Bracewell as graduate students or postdoctoral researchers.

Ronald N. Bracewell

An excellent example is the often-forgotten, simple-but-elegant experiment of the first detection of the dipole (or the so-called 24-hour) anisotropy of the then-recently discovered cosmic microwave background radiation. This was done by installing a small horn microwave antenna on top of the Durand building at Stanford, which scanned the sky once every 24 hours as the Earth rotated around its axis. The result of this experiment, incorporated in Dave Conklin's Ph.D. thesis, was instrumental in establishing the Big Bang origin of this radiation and provided the first measurement of the velocity of the Earth (and our Solar System and Galaxy) with respect to the fundamental rest frame of the universe defined by this radiation.

The techniques and mathematical algorithms that Ron developed for radio interferometry have been applied to medical imaging such as X-ray tomography for detecting tumors. Bracewell, not directly involved with such experiments, often acted as a consultant to medical practitioners.

Another outcome of Bracewell's research was a book published first in 1965 titled, The Fourier Transform and its Applications, which has become the gold standard of this subject and can be found in the personal libraries of many astronomers, engineers, physicists, and medical researchers. Many years ago, before an observing run at Kitt Peak, I needed to refer to this book. I looked for it in the shelves of

the library at the National Optical Astronomical Observatory in Tucson, Arizona, but could not find it. The librarian informed me that the book had been signed out. I told her that this is a very useful book, and they should have more than one copy. She agreed and said that there were indeed eleven copies; all were in use by the resident astronomers.

A further interest of Ron was the discovery of and possible contact with extraterrestrial intelligent life. Early in his career he speculated on practical means of contacting ″superior galactic communities,″ and in 1960 he suggested that the best way might be to send satellites into orbit around thousands of planetary systems within one-hundred light years of the Solar System, with the purpose of detecting radio signals that such communities are likely to produce. These ideas were further expounded in 1974 in a monograph entitled, "The Galactic Club." A more concrete and related contribution of Ron Bracewell was the method he suggested for the detection of extra-solar planets. A modified version of this method is planned for the detection of small planets from space platforms.

Another passion, deeply rooted in his early-life experimenting with nature in rural Sydney, was Ron's love of anything arboreal. Soon after his arrival at Stanford, he began the classification of trees on campus and later he taught a course entitled ″I Dig Trees.″ In 2005, he published a book entitled Trees of Stanford and its Environs, a 300-page volume cataloging 350 species of trees.

With his highly curious mind and keen sense of observation, Ron always had a new puzzle or a problem at hand to engage everyone at every encounter. He posed them with a sense of humor and a mischievous twinkle in his eyes. He was highly sought out as a resident professor at Stanford's overseas campuses and was invited to be the presiding pundit or guru in many leisure and educational tours conducted by the university. In our annual Astronomy holiday parties Ron conversed with our post-doctoral fellows and visitors from different countries in their native tongues and charmed faculty and students alike with his anecdotes and stories. In other words Ron was the life of the party.

With his charm and gentle persuasion, Ron was instrumental in convincing Mr. James T. Bunyan, a life-long researcher at Stanford, to establish the annual Bunyan lecture series. His repeated recounting of his encounters with Mr. Bunyan remained interesting and amusing. Up to his last day you could find Ron in his office or in the corridors of the David Packard Electrical Engineering Building interacting with students and faculty. He continued to be an active member of the astronomy community at Stanford up to the end.

Professor Bracewell is survived by his wife of 54 years, Helen; by a son, Mark, of San Jose California; a daughter, Wendy, of London, England; a brother, Mark, of Melbourne, Australia; and two grandchildren.

I would like to thank emeritus professors Peter Sturrock, Anthony Fraser-Smith, and Von Eshleman for valuable advice and suggestions. The photograph is courtesy of Linda Cicero.

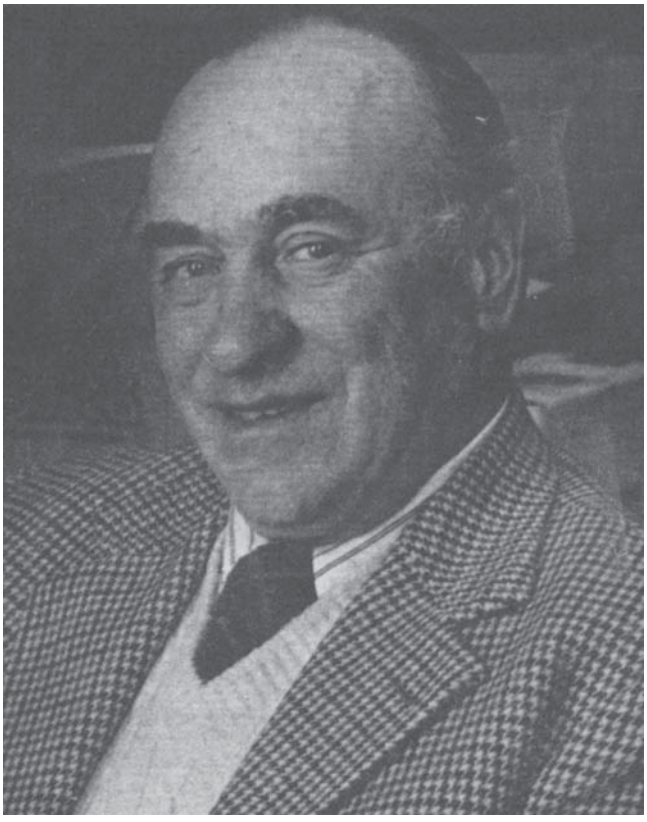
Vahe' Petrosian
Stanford University

JOHN LEROY CLIMENHAGA (1916-2008)

John Leroy Climenhaga was born on 7 November 1916 on a farm some 10 km from Delisle, a small town on the Canadian prairies, located about 50 km south-west of Saskatoon, Saskatchewan, and died at his home in Victoria, British Columbia, on 27 May 2008. His parents, Reuben and Elizabeth (nee Bert) Climenhaga, were farming folk, and he carried their honest and open attitude to the world throughout his life. John was the seventh born, and last to die, of their ten children. His father also served as an ordained minister of the Brethren in Christ.

In early adulthood, John worked on his father's farm, but then attended the University of Saskatchewan, obtaining a B.A. with Honors in Mathematics and Physics and an M.A. in Physics, in 1945 and 1949 respectively. Between these events he worked as a Physics Instructor at Regina College from 1946 to 1948.

In 1949 Climenhaga joined the faculty of Victoria College, as one of only two physicists in a small institution that was then part of the University of British Columbia. He remained in Victoria for the rest of his career, playing a major role in the College's growth into a full-fledged university, complete with thriving graduate programs in physics and astronomy as well as in many other fields. He served as Head of the Physics Department during the 1960s, a period which saw the College become the University of Victoria, with a full undergraduate program in Physics, and campaigned successfully for the establishment of a program in Astronomy, which began in 1965. From 1969 until 1972 he held the position of Dean of Arts and Science, and championed the



John Leroy Climenhga

university's participation in the Tri-University Meson Facility, whose high-current medium-energy beam was ideal for the production and study of mesons and their physics. That period was a turbulent one in the university's history, but John's integrity and his balanced and fair-minded approach to conflicts were of immeasurable importance in steering the young institution through it.

John's interest in astronomy was kindled by contacts with staff of the nearby Dominion Astrophysical Observatory, notably Andrew McKellar, who oversaw much of the research John carried out for his doctoral thesis at the University of Michigan, where he had first obtained a second M.A., this time in astronomy. His Ph.D. was completed in 1960, guided by McKellar and by Leo Goldberg, who first drew John's attention to the significance of carbon-isotope ratios in the cool carbon stars. His thesis was a major contribution to the study of those ratios.

After his term as dean, John took a well-earned sabbatical year, spending about four months in each of Tokyo, Cape Town, and Torun, Poland. In the latter place he began a collaboration with the late Jan Smolinski, which continued for nearly twenty years, and led to some twenty papers, initially on carbon stars, but mostly on the properties and erratic behavior of very luminous stars (hypergiants) of types
F, G and K.

John retired at the age of 65 in 1982, but continued teaching undergraduate courses for a dozen years thereafter. On his retirement the university renamed its observatory in his honor, and established a scholarship in his name, which has helped to support the studies of numerous students who went on to distinguished careers.

John served as treasurer of the Canadian Astronomical Society from 1983 to 1989 and gave numerous popular talks in the community. On his seventieth birthday the IAU named asteroid (3034) "Climenhaga" in his honor and in 1996 the University of Victoria awarded him an honorary D.Sc. His interest in the work of the University continued for the rest of his life, and he would attend seminars, or visit and chat with colleagues in their offices, but never interrupt their work for long, thus ensuring that he never outstayed his welcome, until he became confined to a wheelchair and too frail to make the trip. Even after that, despite failing eyesight that made reading difficult, his mind remained clear and interested in new discoveries that might be reported to him by visiting colleagues.

On 29 September 1943 John married Margaret Grace Garratt, who remained with him until her death on 17 August 2001. They had two children, Joan and David, who survive him, along with their spouses and David's two daughters, to whom John was a proud and loving grandfather. Their home was always a warm, welcoming, and hospitable one to the younger colleagues who joined the Department of Physics (now Physics and Astronomy) during John's tenure as Head and Dean. On 26 July 2003, John was married again, to Ila Buffam, whose gentle care softened his last years, and who survives him.

I am indebted to Harry Dosso, a colleague for many years to both John and myself, for providing some of the above details, particularly those of John's early life.

Colin Scarfe
University of Victoria

WALTER G. EGAN (1923—2003)

Walter G. Egan, a scientist and engineer with a professional life spanning well over half a century, died on 3 November 2003.

Born to Caroline and George Egan on 12 October 1923 in New York City, Egan studied Electrical Engineering at the City College of New York from 1941 until 1943 when he was called to active duty in World War II, switching from enlisted reserve status. During the war, he served honorably in both the Signal Corps and the Medical Corps. Following his discharge in 1946, he resumed his college studies, obtaining a BEE in 1949 from City College of New York, an MA in Physics in 1951 from Columbia University, and a PhD in Solid State Physics in 1960 from the Polytechnic Institute of Brooklyn. Egan's PhD thesis was "Ferromagnetic Resonance in thin Nickel Films," performed under advisor H. Juretschke.

Egan's professional career covered both industry and academia. In the summer of 1942, he worked for the Bruce Engineering Company. From 1957 to 1963, he worked for Ford Instrument Company, a Division of Sperry Rand Corporation, successively as an Engineering Project Supervisor, Assistant Director of Research, and Executive Assistant to the Director of Research. From 1964 to 1986 Egan worked as a Staff Scientist at the Grumman Corporation Corporate Research Center where his pioneering work consisted of research and development of remote sensing equipment and techniques for the remote sensing of terrestrial and space targets and backgrounds. I came to know and work with him during his tenure at the Grumman Corporation, where we co-authored many papers and a book. His insight into remote sensing engineering and research, shared willingly with younger colleagues, was a major stimulus to my future research in this field. Egan instilled a sense of discipline in publication, so our work could be shared with others in a timely way. This drive to share his knowledge with others also made him an excellent teacher. Subsequently, he held the position of Research Associate at the Mohonk Preserve, New Paltz, New York; Professor of Physics at York College, City University of New York; Research Professor of Physics at Polytechnic University, Brooklyn New York; and Professor of Earth Sciences at Adelphi University, Garden City, New York. Research was the focus of his professional life. At various points in his career Egan was a member of Tau Beta Pi, Sigma Xi, Eta Kappa Nu, Sigma Pi Sigma, the American Radio Relay League, the Research Society of America, the American Physical Society, the American Astronomical Society, the Institute of Electrical and Electronic Engineers, the American Geophysical Union, the Optical Society of America, the American Meteorological Society, the Institute for Aerosol Research, and the Society of Photo-optical Instrumentation Engineers.

A long and distinguished professional career was accompanied by more than two-hundred published works in the fields of Planetary Astronomy, Geophysics, Atmospheric

Walter G. Egan

Physics, Soils Physics, Materials Properties, Photometry, Polarization, Remote Sensing, Aerosols, Oceanography, and Optics. We co-wrote the book Optical Properties of Inhomogeneous Materials (Academic Press) in 1979. This was followed by Egan's two books on remote sensing: Photometry and Polarization in Remote Sensing (Elsevier) in 1985 and Optical Remote Sensing, Science and Technology (Marcel Dekker) in 2004. These books have become classical references in today's remote sensing courses. He brought clarity to this burgeoning field of research at a time when it was just developing.

Egan is survived by his wife, Joan K. Egan. He also leaves behind many younger colleagues, myself included, who considered him both a mentor and a friend.

Theodore Hilgeman
Northrop Grumman Corporation

JAMES C. KEMP (1927-1988)

James C. Kemp was born in Detroit, Michigan on 9 February 1927, and died in Eugene, Oregon, on 29 March 1988. He went to high school in Mexico City and did undergraduate studies at the University of Michigan and University of California at Berkeley. Kemp was an active observational astronomer, having migrated from earlier interests in Slavic languages, in which he majored, electrical engineering, and physics. He obtained a PhD in electrical engineering at Berkeley in 1960 and did post-doctoral work there with Erwin Hahn on spin resonance. He went to the University of Oregon in 1961 and conducted research in magneto-optics, developing, in the process, a piezo-optical birefringence modulator to measure circular polarization. The modulator is described by Tinbergen (1996).

Kemp explored new areas as he measured magnetic fields in the sunspots with polarized infrared light, and developed polarimeters and photometers to study the behavior of such astronomical sources as white dwarfs, the relativistic jets of binary SS 433, the x-ray binary Cyg X-1, and the bright eclipsing binaries Algol and e Aurigae on the 61- and, later, 81-cm telescope at the Pine Mountain Observatory, of which Kemp was director until his death from cancer. His measurement of circularly polarization in the continuum light of the white dwarf GJ 742 (Grw +70° 8247, Kemp et al. 1970b) was an important discovery, and through his study of Algol (Kemp et al. 1983; Wilson & Liou 1993), he appears to have been the first to discover the limb polarization in eclipsing binaries predicted by Chandrasekhar (1946ab).

Although it has taken twenty years for the BAAS to publish his obituary notice, it is somewhat appropriate that his former student, Gary Henson, who provided much of the background for this article, is involved with a polarimetry team to observe and analyze data from e Aurigae, as it approaches ingress of the next primary minimum beginning summer, 2009. The author acknowledges with gratitude the additional assistance of T. A. Clark and R. E. Wilson in preparing this article.

Representative Publications and References:

Chandrasekhar, S. 1946a, ApJ, 103, 361.

Chandrasekhar, S. 1946b, ApJ, 104, 110.

Donnelly, R. J. 1989, "James C. Kemp," Physics Today, 42, 94.

Henson, G. D. 2008, private communication.

Kemp, J. C., 1969, "Piezo-optical birefringence modulators: new use for a long-known effect," J. Opt. Soc. Am., 59, 950.

Kemp, J. C. and Henson, G. D., 1983, "Broad-band circular polarization of sunspots, 0.27-4.5 microns," ApJ, 266, L69.

Kemp, J. C., Macek, J. H., Nehring, F. W. 1984, "Induced atomic orientation, an efficient mechanism for magnetic circular polarization," ApJ, 278, 863.

Kemp, J. C., Swedlund, J. B., and Evans, B. D. 1970a, "Magnetoemission from incandescent sources," Phys. Rev. Let., 24, 1211.

Kemp. J. C., Swedlund, J. B., Landstreet, J. D., and Angel, J. R. P. 1970b, "Discovery of Circularly Polarized Light from a White Dwarf," ApJL, 161, L77.

Kemp, J. C., Henson, G. D., Steiner, C. T., Powell, E. R. 1987, "The optical polarization of the Sun measured at a sensitivity of parts in ten million," Nature, 326, 270.

Kemp, J. C., Henson, G. D., Barbour, M. S., Kraus, D. J., and Collins, G. W. 1983, ″Discovery of Eclipse Polarization in Algol,″ ApJ, 273, L85.

Kemp, J. C., Henson, G. D., Kraus, D. J., Beardsley, I. S., Carroll, L. C., Ake, T. B., Simon, T., and Collins, G. W. 1986, ″Epsilon Aurigae: Polarization, Light Curves, and Geometry of the 1982-1984 Eclipse,″ ApJL, 300, L11.

Kemp, J. C., Henson, G. D., Kraus, D. J., Carroll, L. C., Beardsley, I. S., Takagishi, K., Jugaku, J., Matsuoka, M., Leibowitz, E. M., Mazeh, T., and Mendelson, H. 1986, ″SS 433: A 6 Year Photometric Record,″ ApJ, 305, 805.

Tinbergen, J. 1996, Astronomical Polarimetry, (Cambridge: Cambridge University Press), pp. 95-96.

Wilson, R. E., and Liou, J.-C. 1993, ApJ, 413, 670.

E. F. Milone
University of Calgary

JAMES N. KILE (1958-2007)

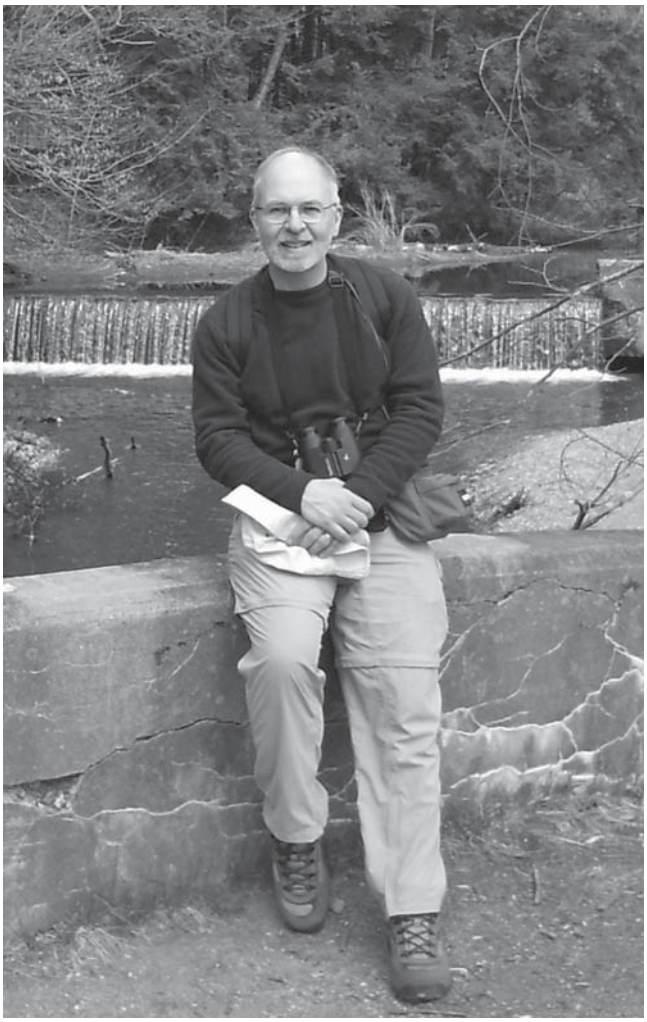
James N. Kile, of Needham Heights, Massachusetts, died on 17 August 2007, following a brave two-year battle with cancer.

One of three children of David R. Kile and Betty Jane Kile, Jim was born in Niagara Falls, New York, on 20 April 1958 and lived in the nearby village of Lewiston before his family settled in Alden, an hour east of Niagara Falls, when Jim was nine. Jim's father worked for American Telephone and Telegraph for 37 years, and his mother was a homemaker.

Jim earned his Bachelor's degree in Physics from Rensselaer Polytechnic Institute in 1980, a Master's degree from Northwestern University in 1982, and a Doctorate from Tufts University in 1996 under the direction of Robert Willson. His thesis involved comparison of radio data from the Very Large Array and the Russian RATAN 600 telescope with Yohkoh soft X-ray data, with an emphasis on understanding the relationship between solar noise storms and coronal magnetic fields. While working on his thesis, Jim collaborated with one of us (EWC) at the Air Force Research Laboratory on an investigation of the 154-day periodicity in solar flares. The resulting publication (ApJ 370, 442, 1991) is his most cited work. Jim co-authored four other papers in refereed journals. Jim's professional affiliations included the American Astronomical Society, the American Institute of Aeronautics and Astronautics, the American Geophysical Union, and the Astronomical Society of the Pacific.

Jim worked as a contractor in the defense industry from 1982 until the time of his death, settling in the Boston area in the early 1980s. He worked for Calspan Corporation from 1982-1989, the Ultra Corporation from 1989-1994, and the Riverside Research Institute from 1994-2007. He was a highly-respected expert in radar systems, including radar data and systems analysis, systems engineering, and planning support for radar acquisition programs and technology development. The work entailed frequent extended travel to Norway for system testing.

During the summer of 1997 Jim was an instructor for introductory physics laboratories at Simmons College, and in 2002 he developed and taught a synthetic aperture radar measurement and signature intelligence course for the Air Force Institute of Technology in Dayton, Ohio, where he was appointed Adjunct Assistant Professor of Physics in the Department of Engineering Physics, a position he held until 2005. On the local level, Jim assisted in astronomy education projects, such as nighttime telescope viewing, in the Needham public schools and stargazing/astronomy courses at several Massachusetts Audubon wildlife sanctuaries.



James N. Kile

Jim met the love of his life in the mid-1980s, and he and Elaine were married within the year, on 19 October 1985. They shared a passion for birding and a love for nature witnessed up close when hiking, kayaking, snowshoeing, and cross-country skiing. Jim had a wide range of interests. He was an accomplished folk musician, playing the guitar and ukulele. He was a devoted "Trekkie" who could quote every line from early Star Trek episodes and was a life member of the American Radio Relay League [ARRL].

Jim had the warm and open personality characteristic of those raised in the snow-belt. He was always good company. His courage as he was dying, much too soon, was a great source of strength for his family.

Jim is survived by his wife Elaine C. (Smith) Kile, his father David R. Kile, his sister Diane Kile and her husband David Galson, his brother David M. Kile and his wife Susan Kile, and four nephews, one niece, and a great niece and nephew. He was predeceased by his mother Betty Jane Kile.

Edward W. Cliver
Air Force Research Laboratory
Kenneth R. Lang & Robert F. Willson
Tufts University

WILLIAM L. KRAUSHAAR

Professor William L. Kraushaar, a former MIT physics professor and a pioneer in the field of high-energy astronomy, died 21 March 2008 of complications from Parkinson's disease. He was 87.

Kraushaar received his bachelor's degree from Lafayette College in 1942. During World War II he worked at the National Bureau of Standards on projects that included development of the proximity fuse for artillery shells. After the war he earned his doctorate at Cornell University. In 1949 Kraushaar was appointed research associate at MIT, where he made the first measurements of the mean life of the pi meson at the MIT electron synchrotron. Over the next fifteen years he rose through the faculty ranks, becoming a full professor before leaving MIT for the University of Wisconsin at Madison in 1965.

In 1957 Kraushaar began a decade-long effort to map the sky in the ″light″ of cosmic gamma rays. Their detection promised to open new ways to investigate high-energy processes in the universe. Initial balloon-borne experiments failed due to background gamma rays generated in the residual atmosphere above the highest attainable altitudes. In 1958, Kraushaar seized a new opportunity for experiments above the atmosphere. Working with Professor George Clark, he directed the development in the MIT Laboratory for Nuclear Science of a gamma-ray detector for a satellite experiment that was launched in April 1961 as Explorer 11. It registered 31 events with the electronic signatures of cosmic gamma rays with energies greater than 50 MeV. Kraushaar then initiated a second and more refined experiment to be carried on OSO 3. In this project Kraushaar and Clark were joined by Gordon Garmire, a former student of Kraushaar. The OSO 3 experiment, launched in March of 1967, registered 621 cosmic gamma-ray events. It yielded the first all-sky map of high-energy cosmic gamma rays showing a concentration of gamma rays from directions in the Milky Way where gamma-ray producing interactions of charged cosmic rays with interstellar matter are most abundant. It also demonstrated the existence of extra-galactic gamma-ray sources that have since been identified as giant black holes at the centers of distant galaxies. The OSO 3 experiment opened the field of high-energy gamma-ray astronomy, which has become one of the most active areas of space research. Upon his move to Wisconsin, Kraushaar established a research group in the new area of X-ray astronomy. Using instruments flown on ″sounding″ rockets, he and his colleagues produced the first all-sky map of low-energy X rays that revealed the spatial distribution of million-degree interstellar gas. They extended these results in several satellite experiments. Kraushaar was appointed the Max Mason Professor of Physics in 1980.

Kraushaar was a fellow of the American Physical Society, and a member of the American Astronomical Society, the International Astronomical Union, the National Academy of Sciences, and the American Academy of Arts and Sciences. He received Fulbright and Guggenheim fellowships and the Senior Scientist Award of the Humboldt Foundation. He served on numerous advisory committees of the National Academy of Sciences and NASA. Kraushaar co-authored with Professor Uno Ingard a college text, Introduction to Mechanics, Matter, and Waves. After his retirement, Kraushaar moved to Maine where he resided in Scarborough with summers at his cabin in Denmark, Maine. He is survived by his wife, the former Elizabeth Rodgers, and by three children from his first marriage.

This obituary is based on an article that appeared in the 2 April 2008 edition of MIT Tech Talk.George W. Clark
Massachusetts Institute of Technology

HOWARD H. LANNING (1946-2007)

Howard H. Lanning died 20 December 2007 in Tucson, Arizona. He was a Software Quality Assurance Engineer for the Data Products Program at the National Optical Astronomy Observatory [NOAO] in Tucson, having returned to his native West after twenty years at the Space Telescope Science Institute [STScI] in Baltimore, Maryland.

Throughout his career in roles supporting other astronomers, Howard steadily and persistently worked at his own research programs, most notably the identification and study of UV-bright sources in the Sandage Two-Color Survey of the Galactic Plane. Minor planet 2000 QJ248 has been named (61913) Lanning in recognition of his contributions.

The son of James Clyde Lanning and Ethel Malan Lanning, Howard was born 26 May 1946, in Brawley, a small community near Calipatria, California. His parents worked for the local school district where his late father was Superintendent of Maintenance and Grounds and his mother was a school principal. After graduating from high school in a class of 52, Howard earned his A.A. degree at Imperial Valley Junior College, majoring in Astronomy and minoring in

Howard H. Lanning

Mathematics. He completed his A.B. degree in Applied Arts and Sciences at San Diego State University [SDSU] in 1969 with the same major and minor. In 1974, he completed his M.S. in Astronomy at SDSU with a thesis on the period variation of the white-dwarf eclipsing binary BD +16°516.

During his time at SDSU Lanning was a Research Assistant/Observer at the former Hale Observatories, working on the optical identification of X-ray sources under the direction of Allan Sandage. His second refereed paper, the first of several finding lists of UV-bright stars arising from this work, appeared in 1973. Fellow students and faculty remember that he was a self-starter, initiating many observing projects of his own at Mount Laguna Observatory and encouraging others to do the same.

For more than a decade Lanning was an observer and night assistant at Mount Wilson Observatory, operating the 1.5m and 2.5m (Hooker) telescopes and supporting users. He was one of the principal observers in the HK project, which used the 1.5m to study the variations in chromospheric activity and rotational modulation of late-type stars. He used his observing time expertly to obtain photometry and spectroscopy of close binary stars for his own research projects. Former Caltech graduate students who were fortunate to have Lanning as a night assistant marveled at his knowledge of the telescopes and instrumentation, in particular his ability to read setting circles and acquire targets by engaging the gravity-driven clock drive of the Hooker telescope at exactly the right moment.

In 1985 Lanning, with his wife, Sheryl Falgout, and stepson, Mario Lanning, relocated to Baltimore, to a position with Computer Sciences Corporation at STScI. He was an Operations Astronomer and then Software Testing Engineer, providing instrument and contact support for the Goddard High Resolution Spectrograph and the Space Telescope Imaging Spectrograph. In 2005, the family moved to Tucson and NOAO. His work on the UV-bright star survey continued at both locations, with various collaborators.

Lanning was active in the broader astronomical community, writing newspaper articles on astronomy for the lay person; giving talks to civic groups, school children, and amateur astronomers; and, from 2006, coordinating the Donation Archive Program of the AAS.

Lanning published 26 scientific papers in major journals, along with numerous other contributions, circulars, and technical reports. His finding lists and other studies of UV-bright stars, emphasizing crowded star fields where modern surveys have not probed, remain of value today. Several stars from these lists have turned out to be cataclysmic variables. Most recently, a study of the reduced proper motions of these objects has demonstrated that the Lanning stars are a rich source of heretofore unidentified white dwarfs.

Lanning is survived by his wife of 25 years, a stepson, and his mother.

The authors acknowledge valuable assistance from Sheryl Falgout, Burt Nelson, and Paul Etzel.

Richard A. Wade
Pennsylvania State University
D. Jack MacConnell
Computer Sciences Corporation, STScI

ALBERT GRAY MOWBRAY (1916-2002)

Albert G. Mowbray was born on 23 June 1916. He was the son of Albert Henry Mowbray, a professor of economics at the University of California, Berkeley [UCB], and Elizabeth Gray Mowbray. He had one sister, Mary Elizabeth.

Mowbray did undergraduate and graduate work at UCB. His 1943 PhD. dissertation had to do with the apparent sizes of globular clusters. Mowbray became an observing assistant at Lick Observatory in about 1942; later that year he went to the Perkins Observatory, operated for Ohio Wesleyan University by the Ohio State University [OSU]. Due to the wartime shortage of instructors, he also taught physics at OSU. In 1946 Mowbray joined the Jet Propulsion Laboratory. By 1948 he lived in Pasadena California, and was a volunteer observer at the Mount Wilson Observatory. Later, until 1956, he was employed by UCB professor Leland Cunningham, a solar-system dynamicist. Mowbray did computations and measured plates for Cunningham. Mowbray joined the physics faculty at San Jose State College (now California State University, San Jose) in 1957.

In addition to the AAS, Mowbray was a member of the Astronomical Society of the Pacific. He died in San Francisco, California, on 21 August 2002.

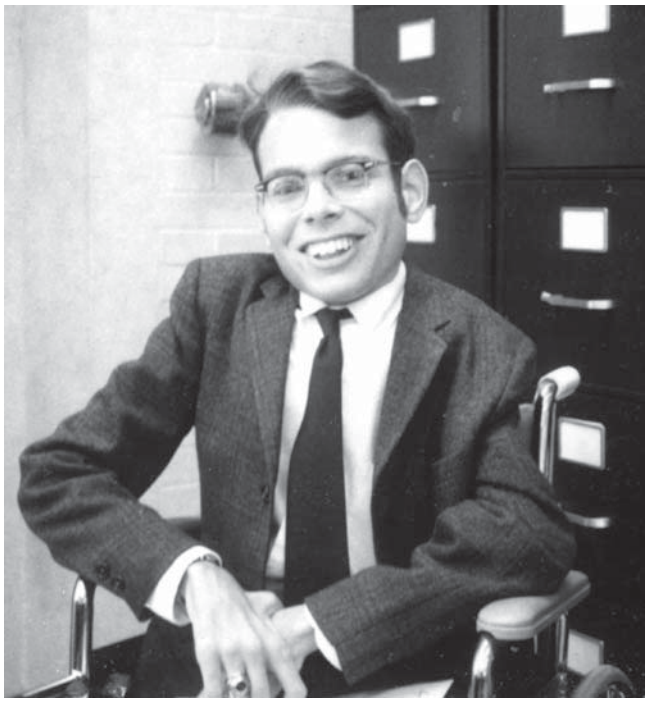
The kind assistance of George Herbig, Virginia Trimble, and Elizabeth Roemer is acknowledged.

Thomas Hockey
Historical Astronomy Division

BJARNE NILSEN (1947-2005)

Bjarne Nilsen was born 2 April 1947. He earned a Bachelor degree at Saint John Fisher College and in 1972 received a Masters degree from the Physics and Astronomy department of the University of Rochester with an interest in astrophysics. To my memory, he was the only student we enrolled who was confined to a wheelchair permanently. During his stay at Rochester he served as a research assistant with H. Van Horn and the undersigned.

Nilsen's research for me may have contributed to the resolution of a significant contemporary problem of the time and is thus worth noting. Martin Harwit, then of Cornell, conducted a sounding rocket program to measure the night-sky flux at wavelengths ranging from 0.1 mm to 1.5 mm. Signals received appeared to exceed that expected from the cosmological black-body radiation. A conversation with Charles Seeger in 1953, who was then at the Leiden Observatory, impressed me with the sensitivity of microwave measurements to sources behind the antenna. I asked Nilsen to estimate the fluxes from an assumed background terrain at 270 K to the observed signals. Seeger had embedded his horn antenna in an extended conducting screen to minimize back signals resulting from the visibility of induced boundary currents from the horn's interior. We assumed the detector was embedded in a circular waveguide terminated with a sharp edge, and Nilsen's calculation convinced us that the controversial signal might well be terrestrial. Since the detailed experimental circumstances were not available to us,



Bjarne Nilsen

we communicated our result informally to Harwit. Subsequent observations with modified equipment did not confirm the high fluxes.

We had no further contact with Nilsen after he left Rochester.

Malcolm P. Savedoff
University of Rochester

RONALD A. PARISE (1951-2008)

Ronald A. Parise

Ronald A. Parise, astronomer and astronaut, passed away at his home in Burtonsville, Maryland, in the presence of his family on 9 May 2008. He died of a brain tumor at age 56 after several years of valiant struggle. He was an inspiration to many students, ham operators, astronomers, and friends the world over. His enthusiasm for astronomy and space exploration was infectious. We, colleagues at Goddard Space Flight Center and Computer Sciences Corporation, treasured his contributions to space astronomy and human spaceflight.

Ron, along with Samuel Durrance, flew as Payload Specialist on Astro-1 and Astro-2. They were selected by peers from the instrument teams of the Hopkins Ultraviolet Telescope (HUT provided by Hopkins University), the Ultraviolet Imaging Telescope (UIT, Goddard Space Flight Center) and the Wisconsin Ultraviolet Photo-Polarimetry Experiment (WUPPE, University of Wisconsin). Astro-1 flew 2-10 December 1990 on the Columbia. Astro-2 flew 2-18 March 1995. Ron carried along amateur radio equipment and operated on the air during his free time during the missions.

Ron was born 24 May 1951 in Warren, Ohio, to Henry and Catherine Parise. His interests first were in amateur radio, becoming a licensed operator by age eleven. He later was attracted to both astronomy and aviation, becoming a pilot in his teens. Ron graduated from Western Reserve High School in 1969 and attended Youngstown State University where he received a bachelor of science degree in physics with minors in mathematics, astronomy. and geology. His graduate work was at University of Florida where he obtained a masters degree in 1977 and a doctorate in 1979 in astronomy.

Ron joined Operations Research, Inc. upon graduation, working at Goddard Space Flight Center where he supported studies of several NASA missions. In 1980 he joined Computer Sciences Corporation supporting the International Ultraviolet Explorer [IUE], first as a data-management scientist and later as the section manager of the IUE hardcopy facility. By 1981 he joined a team of engineers and scientists beginning the development of the newly selected the Ultraviolet Imaging Telescope (UIT), selected by NASA to fly on board the space shuttles as an attached Spacelab experiment. The UIT project, headed by Ted Stecher as Principal Investigator, was one of three ultraviolet experimental telescopes selected to fly together as an Office of Space Sciences [OSS] payload. Initial plans were for multiple flights with emphasis of observing Halley's Comet in three missions from November 1985 to summer 1986.

Ron's responsibilities involved flight hardware and software development, electronic system design, and mission planning activities for UIT. His proficiency led to his selection by the Principal Investigators of the three instruments as a Payload Specialist candidate and acceptance by NASA as one of three payload specialists in support of the series of missions. He, Samuel Durrance, and Kenneth Nordsieck shouldered the responsibilities of training as payload special-

ists for the instruments integrated on a common pointer, the Spacelab Instrument Pointing System, IPS. As a team they represented the operational needs of the instrument teams and trained to fly with the shuttle team. Preparations moved forward to the March 1986 launch date of Astro-1 to observe Comet Halley and well over a hundred astronomical sources.

Unfortunately, the Challenger accident occurred 28 January 1986, thirty-five days before the intended launch date of Astro-1. Ron and Sam, as prime Payload Specialists, and Ken as backup/ ground communicator, took the delay well, staying focused on training to ensure that Astro-1, delayed until December 1990, would be an outstanding success. With at least thirteen launch delays, and on-orbit operational problems, they, the professional astronaut crew, the science teams, and the multitude of engineers and mission support staff managed to accomplish a very successful astronomy mission. Even though Comet Halley was not observed by Astro-1, well over a hundred papers on multiple astronomical sources resulted from Astro-1 and Astro-2.

Ron participated in a number of observational astronomy projects using data from ground-based observatories, Copernicus, IUE, and the Astro observatory. His interests were primarily in circumstellar matter within binary star systems and globular- cluster evolution. He bridged the gaps between science, engineering, and spaceflight operations. After the completion of the two Astro missions, Ron supported NASA studies in advanced communications for spaceflight missions and was involved in projects in the Advanced Architectures and Automation Branch developing standard Internet Protocols [IP] in space-data transmission applications.

Throughout his career, Ron supported education both by appearances at schools and through his amateur radio interests. Indeed, he had a large following of ham radio operators as he, along with Frank Bauer, brought about the Shuttle Amateur Radio Experiment [SAREX] payload that enabled many schools to talk to Shuttle crew members in space. Ron's love for amateur radio and for inspiring students came to focus through the Amateur Radio on the International Space STation [ARISS] program. His volunteer help was key in the development of those systems now on board the ISS.

As Frank Bauer, a ham colleague, put it in his tribute to Ron Parise, WA4SIR SK: may your exploration spirit live on in us all!

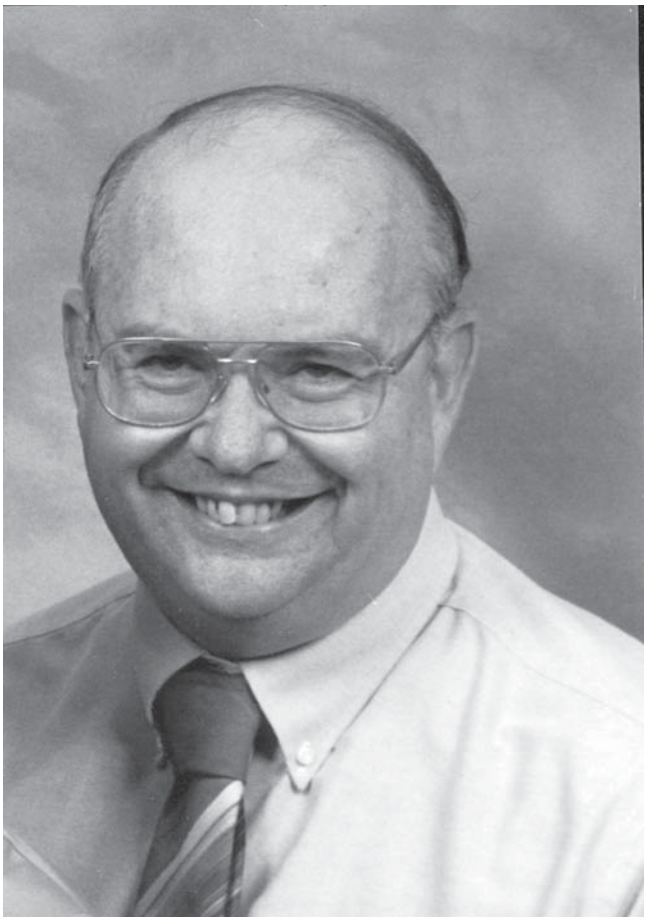
Ron leaves behind his wife, Cecilia; son, Nicholas; daughter, Katharine; his parents Henry and Kathryn Parise; and sister, Rita Parise.

Theodore R. Gull
former Astro Mission Scientist

RONALD EUGENE PITTS (1949-2008)

Ronald Pitts, systems engineer in the Commanding Branch of the Space Telescope Science Institute and longtime Computer Sciences Corporation employee, died suddenly of a stroke on 4 May 2008 at his home in Laurel, Maryland. He was a dedicated scientist-engineer, husband, father, volunteer, and cherished friend to many.

Ron was born on 19 January 1949 in Tucson, Arizona, and was raised, along with his sister Suzanne, on his parents' turkey farm outside Tucson. He picked up practical knowledge from his father, Vernon, and became a competent amateur electrician and plumber, skills he kept honed and used throughout his life. His mother, Ruth (Stephens), was a nurse and taught him compassion and patience and encouraged his inquisitive mind. Ron attended public schools and enrolled at the University of Arizona, graduating with a B. S. in Astronomy in 1971. Being from a family of modest means, he put himself through school working summers and part-time at a large copper mine south of town.



Ronald Eugene Pitts

Ron enrolled in the graduate astronomy program at the Ohio State University [OSU] in the fall of 1971 where he was a first-year fellowship student. During his second and third years, he was the Perkins Assistant, taking spectra for the very exacting but appreciative Philip Keenan who once remarked to another faculty member that Ron was the best observer he ever had. Later, in 1980, Ron was co-author with Keenan on "Revised MK Spectral Types for G, K, and M stars" and again in 1985 in a study of supergiants in open clusters. He met his future wife, Patricia Moore, also a graduate student in the department, and they were wed in 1973.

Ron was also partially supported during his early OSU years by an NSF grant to Robert Wing, writing parts of Wing's photometric reduction code and observing on the program at Kitt Peak and Flagstaff in the summer of 1974. Wing remembers him as being very competent and pleasant to work with. Ron's thesis topic was "Oscillator Strengths

for Neutral Iron and Silicon" under the direction of Gerald Newsom, and he was awarded the PhD in 1979. Newson recalls his facility with instrumentation, designing new circuitry to solve problems with the shock tube and ferreting out sources of systematic errors, and that it was enjoyable to work with him. In the fall of 1979, Ron went to Ball State University where he taught undergraduate astronomy classes for four years.

In the summer of 1983, Ron left academia for the position of IUE Resident Astronomer with Computer Sciences Corporation [CSC] at the Goddard Space Flight Center where he joined a small contingent of other Ohio State graduates. For the next eleven years, he supported guest observers, implemented work-arounds as the IUE gyroscopes failed, improved calibrations, and had several proposals accepted to obtain spectra of spectrophotometric standards and to observe upper-main-sequence stars in the Pleiades, a Per, and NGC 2244, work that he did with Nancy Remage Evans. Ron worked diligently on the software to combine the best IUE calibration with ground-based data of the hot cluster stars and to fit the temperature and gravity. He also became interested in advanced technology for lunar remote telescopes and co-authored several studies with Peter Chen and others. After their children were of school age, Ron's wife Pat also worked for CSC/IUE for part of this period.

In October 1994, Ron transferred to the Space Telescope Science Institute in Baltimore, Maryland, where he joined the science instrument commanding group under the direction of Vicki Balzano. His first task was helping to write the commanding software controlling the Space Telescope Imaging Spectrograph to be installed in HST in February 1997, and he became the in-house expert on the workings of this complex instrument, in particular on the details of the time-tag mode. In time, he became familiar with all the on-board instruments and oversaw the approval of the instrument commanding before the weekly HST command loads were distributed to the Goddard Space Flight Center for uploading to the telescope. In recent years, Ron participated in developing the onboard Javascript code for commanding the James Webb Space Telescope's Near-Infrared Spectrograph operations. He also helped write special commanding to support some activities to follow the final HST servicing mission. His "behind-the-scenes" contributions to IUE, HST, and JWST helped and will help astronomers around the world obtain their data.

Ron seemed knowledgeable about almost any subject and could talk engagingly and at length on politics, economics, a variety of technical topics, the history of the early Church, and science fiction, among others. He was one of those people who always appeared to be smiling. He, Pat, and their daughter Marie enjoyed singing in the Central Maryland Chorale, and he served his church as an elder, Sunday-school teacher, and choir member. Ron sat on various church committees, set up and maintained the computers, and devoted many hours to the upkeep of the building. After Hurricane Katrina, he went on two mission trips with church members to help victims in Mississippi. Once again, his carpentry, electrical, and plumbing skills made him a valuable team member.

Ron is survived by his wife, Pat, a cartographer at the National Oceanic and Atmospheric Administration, their son Mark, a graduate student in astronomy at the University of Hawaii, and their daughter Marie, a graduate student in biology at the University of Maryland.

D. Jack MacConnell
Computer Sciences Corporation

HELEN DODSON PRINCE (1905-2002)

Helen Dodson Prince, a pioneer in the observation of solar flares, a pioneer in women's rise in the profession of astronomy, and a respected and revered educator of future astronomers, died on 4 February 2002 in Arlington, Virginia.

Helen Dodson was born in Baltimore, Maryland, on 31 December 1905. Her parents were Helen Walter and Henry Clay Dodson. Helen went to Goucher College in nearby Towson with a full scholarship in mathematics. She turned to astronomy under the influence of a legendary teacher, Professor Florence P. Lewis, and she graduated in 1927. Funded by grants and private charity, she earned the Ph.D. in astronomy at the University of Michigan under the direction of Heber Doust Curtis in 1933. Dodson taught at Wellesley College from 1933 until 1943, when she went on leave to spend the last three years of World War II at the MIT Radiation Laboratory. She returned to Goucher after the war as professor of astronomy and mathematics, and in 1947 she came back to Michigan both as professor of astronomy and staff member of the McMath-Hulbert Observatory, of which she became associate director. In 1976 she retired from Michigan and spent her later years in Alexandria, Virginia. In 1932 Dodson held the Dean Van Meter fellowship from Goucher; in 1954 she received the Annie Jump Cannon Prize from the AAS; and in 1974 The University of Michigan honored her with its Faculty Distinguished Achievement Award. She published over 130 articles, mostly on her research specialty, solar flares.

Dodson's interest in the Sun began at Michigan, although her dissertation was, like so many Michigan dissertations of the era, on stellar spectroscopy, "A Study of the Spectrum of 25 Orionis." She came to Michigan during the establishment and growth of the solar observatory at Lake Angelus, the creation of three gifted and industrious amateurs. Heber Curtis fostered the growth of the McMath-Hulbert enterprise and brought it into the University. Dodson's solar activity grew as a result of a number of summers spent, during her Wellesley years, at the solar observatory at Meudon, near Paris.

When she returned to Michigan, Dodson became involved in the study of solar flares, based upon the long series of daily observations made with the tower telescopes at Lake Angelus and the improved spectroscopic equipment developed by Robert McMath, Orren Mohler, Leo Goldberg, Keith Pierce, and others. Her colleague during most of these years was Emma Ruth Hedeman, who co-authored many articles with her. Among her great accomplishments was the Comprehensive Flare Index, a widely used measure of flare activity. A "real live wire" and "a marvelous woman," in the words of students and colleagues, Dodson was also a kind

Helen Dodson Prince

and effective teacher, not at all vain about her accomplishments: She held that solar behavior has a way of making people humble.

Dodoson was married to Edmund L. Prince and lived across Lake Angelus from the McMath-Hulbert Observatory; often she sailed to work, a joy denied to almost all other astronomers. During her years at McMath-Hulbert, The University of Michigan was the sole major American research university to have two women holding professorial positions in astronomy: Helen Dodson Prince and Hazel Marie Losh. One of the founding members of the Solar Physics Division, Professor Prince was a major factor in the rise and success of the McMath-Hulbert Observatory, even when, after the 1950s, urban growth and upper Midwestern weather conditions conspired to cripple the advantages the observatory's technologies had once conferred. Her colleagues and students recall her with great respect and affection.

Rudi Paul Lindner
University of Michigan

EDMOND M. REEVES (1934-2008)

With great sadness we report that Edmond (Ed) M. Reeves, a former leader of solar space research projects at Harvard College Observatory [HCO] and the Harvard-Smithsonian Center for Astrophysics [CfA], died on 8 August 2008, in Arlington, Virginia, after a long and heroic struggle with cancer.

Ed was born in London, Ontario, Canada, on 14 January 1934. During his undergraduate and graduate years at the University of Western Ontario [UWO], he was in the Royal Canadian Navy (Reserve) as a Cadet (1952—1956), then as Instructing Officer, HMCS Prevost (1956—1959), and Lieutenant, Royal Canadian Navy (Reserve) retired. He received a Ph.D. in 1959 from the UWO, specializing in atomic and molecular physics. After two years of postdoctoral research in ultraviolet atomic spectroscopy at the Department of Physics, Imperial College, London, England, Ed joined the HCO Solar Satellite project, working with Leo Goldberg, Director of HCO, and pioneer in solar spectroscopy.

Edmond M. Reeves

In 1968, Ed was appointed Senior Research Associate at HCO, and in 1973 he received a joint appointment as Physicist at the Smithsonian Astrophysical Observatory [SAO] when the CfA was initiated under George Field. During his seventeen years at the Observatory, Ed led a large and vibrant group of engineers and scientists in the Solar Satellite Project, developing a series of space missions to explore the extreme ultraviolet emission from the Sun.

Ed also maintained his interest and research in laboratory atomic and molecular astrophysics and enjoyed a vigorous involvement in the HCO Shock Tube Laboratory. In the early 1960s, in the area of molecular spectroscopy, Ed and Bill Parkinson photographed the vacuum ultraviolet absorption spectrum of CO (the Fourth Positive system), which was produced at high temperature in a shock tube. This laboratory spectrum shortly led to the discovery of CO as an important source of opacity in the solar ultraviolet. Goldberg, who first identified CO vibration-rotation bands in the infrared solar spectrum in 1951, recognized at around 180 nm the prominent CO features in the shock tube spectra and in the solar spectra. The identification was confirmed by comparing the high-temperature laboratory spectra with published solar spectra taken by the Naval Research Laboratory with a rocket-borne spectrograph.

Ed's work for the Solar Satellite Project included planning and carrying out laboratory, Vacuum UV absolute-intensity

calibrations of the early rocket and satellite spectrometers. He set the requirement that the solar spectroscopic instruments have radiometric calibrations in the Vacuum UV, traceable to a laboratory standard.

The space missions began with rocket experiments in the early 1960s, progressed to the Orbiting Solar Observatory [OSO] program in the mid-1960s, and culminated in the Extreme Ultraviolet Spectroheliometer on the Apollo Telescope Mount [ATM] of the Skylab missions in 1973 and 1974. Ed received NASA's Exceptional Scientific Achievement Medal in 1974. This sequence of space instruments laid much of the early groundwork for our current understanding of the outer solar atmosphere. For example, the OSO observations revealed for the first time coronal "holes," which we now know are the seat of the fast solar wind.

Another experiment of particular interest and importance to solar physics resulted from the launch of a rocket-borne objective grating spectrograph into the path of totality of a solar eclipse from Wallops Island, Virginia, on 7 March 1970. This lucky "rocket group" included Ralph Nicholls from York University, Canada; Reg Garton and Bob Speer from Imperial College, London; Bob Wilson, then from Culham in the UK; and, of course, Leo Goldberg and colleagues from HCO, a group made up of mentors, advisors, teachers, and friends of Ed's. The eclipse spectrogram revealed strong emission from neutral hydrogen (Lyman-alpha) in the solar corona. The discovery of the Lyman-alpha corona inspired the project for a Lyman-alpha coronagraph. At a Retirement Symposium dedicated to Ralph Nicholls in 1992, Ed recalled that at a coffee break about twenty years earlier, during the Skylab program at Houston, he, Bob Noyes, and Bob MacQueen outlined the need to develop a rocket-borne coronagraph to observe the hydrogen Lyman-alpha corona. Later, after returning to the CfA, Ed, Bob Noyes, and Bill Parkinson planned a rocket-borne spectrograph to image the extended corona, expecting to use a circular occulter. John Kohl joined the fledgling coronagraph project, and he realized that a linear external occulter would be better and also would match a spectrometer slit. This project became the origin of the Lyman-Alpha Coronagraph series of rocket and Spacelab experiments under John Kohl's leadership, culminating in the still-operating Ultraviolet Coronagraph Spectrometer [UVCS] experiment on the SOHO spacecraft.

In 1978, Ed joined the High Altitude Observatory in Boulder, Colorado, where he was Head of Administration and Support before moving to NASA Headquarters in 1982. There he became Director of the Flight Systems Office in the Office of Life and Microgravity Sciences and Applications, with responsibility for integrated planning and science operations for research using the Spacelab, Spacehab, and Mir missions. He led the activities for the research requirements and planning for the International Space Station and served as the Space Station Senior Scientist, the Executive Secretary of the Space Station Utilization Advisory Subcommittee, and the Executive Secretary of the Space Station Utilization Board at NASA Headquarters He also served as NASA's representative to the international Users Operations Panel, which coordinates the utilization planning for the Station across the international partners. Ed retired from NASA in 1998.

Ed was an outdoors man who enjoyed camping, canoeing, and cross-country skiing with his family. He is survived by his wife Vivian, son Dr. Geoffrey Reeves, daughter Laurie Webster, and three grandchildren. Ed's son Geoff is Group Leader for Space Science and Atmospheric Science at Los Alamos National Laboratory, Los Alamos, New Mexico. A funeral service took place on Friday, 15 August at The Falls Church, Falls Church, Virginia.

Robert Noyes & William Parkinson
Harvard- Smithsonian Center for Astrophysics.

MAURICE M. SHAPIRO (1915-2008)

Maurice Shapiro was an outstanding scientist and educator whose contributions spanned a range of fields: He was the leader of the "Water Effects" group (study of underwater explosions) within the Los Alamos Ordnance Division in the Manhattan project during World War II; he witnessed the Trinity test and there "shared a blanket with Hans Bethe." Shapiro understood the nature of the new weapons and helped to form the Association of Los Alamos Scientists [ALAS] to lobby for a civilian atomic-energy commission. (He was chair of ALAS in 1946.) He also worked at Oak Ridge on design of a power reactor just after the war (similar to those used in naval vessels). In 1949 Shapiro joined the Naval Research Laboratory's nuclear physics division, where he started a new program in high-energy physics and cosmic rays, his primary interest throughout his life. In 1977, he founded the International School of Cosmic-Ray Astrophysics in Erice, Italy, where many outstanding scientists in the field were students at early stages of their career. He served as director of this school until his death. Shapiro was inter-

Maurice M. Shapiro

ested in understanding the origin, acceleration, and propagation of cosmic rays and the role of high energy neutrinos and their detection. He played a major role in starting the field of high-energy neutrino astronomy.

Maury, so of J. Simon Werner and Miriam Rivka, was born in Jerusalem on 13 November 1915. His father never returned home from World War I, and his mother married Rabbi Osher Shapiro two years later. The family migrated to Chicago, Illinois, during the early 1920s. Maury's given name was Moishe Mendel Werner. The only father he knew was Rabbi Shapiro, hence the origin of the name we know him by.

His parents had planned a theological career for him; however, Maury opted for the study of Physics at the University of Chicago. He did his Ph.D. with Arthur Compton (1942) using early emulsions exposed at Mount Evans--both emulsions on glass plates and stripped emulsions--to study cosmic-ray induced stars. Maury wrote definitive reviews on the emulsion technique (use of high-density visual detectors) in 1941 in Reviews of Modern Physics and then an article entitled "Nuclear Emulsions" in the Handbuch der Physik of 1958. He did many experimental investigations related to cosmic rays and particle properties after the war when he joined NRL.

Using emulsion-chamber techniques and high-altitude exposures, Maury measured and verified saturation of relativistic rise in ionization, a measurement of helium and proton flux at high rigidity, and accurate measurements of secondary-to-primary ratio (Li, Be, B/CNO); with his colleagues he did one of the best measurements of neutral pion life time. He also did important measurements of properties of heavy baryons.

My association with Maury started when I joined University of Maryland's High Energy group in 1961, a time when Maury had a very active group working in particle physics and cosmic rays using nuclear emulsions and was starting a bubble-chamber group. (Some of the members were Bernard Hildebrand, Bert Stiller, Rein Silberberg, C. H. Tsao, and Robert Glasser.) There was active interaction between George Snow (University of Maryland) and the NRL group, both studying properties of high-energy particles with nuclear emulsions and bubble chambers. I was a consultant with the NRL group for some ten years.

In 1960s, Maury investigated the ramifications and limitations of supernova theories for the origin of cosmic rays and discussed the production of high-energy neutrinos and gamma rays from these sources. He was one of the active members of the DUMAND project to study high-energy neutrinos. With Rein Silberberg he explored the capabilities of such a project.

Maury's group made seminal contributions on quantitatively exploring isotope ratios (using isotopes to determine the time lag between explosion and acceleration in supernova sources--to suggest the importance of FIP in injection), the detailed analysis of the so- called Slab-model, and re-acceleration of cosmic rays (Shapiro, Silberberg, and Tsao in Cosmology, Fusion and other Matters, edited by Fred Reines, 1972).

When he became emeritus, Maury was still very active both in research and in running the Erice School of Cosmic Ray Astrophysics (after 1982). He was interested in having a base of operations for the school. He approached me asking whether Maryland would be a possibility. I was delighted and suggested a Visiting professorship to be able to continue his work (without having to move out of the Washington, DC, area). Thus started Maury's association with Maryland which continued until his death.

Maury was not only an outstanding scientist, but he was a true gentleman and a good friend. He was an ambassador for the field of Cosmic Rays. His friendly personality, always warm and kind to students and colleagues, was quite infectious. Maury contributed to both experimental and theoretical investigations of cosmic rays and their central role in connecting many diverse disciplines in particle physics, astrophysics, geophysics, acoustical physics. He was outstanding scientist and was greatly concerned about world peace and human affairs.

Maury passed away on 27 February 2008, at the age of 92, in Alexandria, Virginia. Four years prior to his death he was still swimming in the Mediterranean during the Cosmic Ray School sessions at Erice. He is survived by his wife, Ruth Auslander, and children Joel N. Shapiro, Elana Ashley, Raquel T. Kislinger, Mark and Bonnie Auslander, Beth Kessler, Lionel Ames, and Naomi Mirvis and grand children.

Gaurang B. Yodh
University of California, Irvine

HARDING EUGENE (GENE) SMITH, JR. (1947-2007)

Harding Eugene Smith Junior, or Gene, as he was known to family, friends, and colleagues, passed away after an automobile accident in Encinitas, California, on 16 August 2007. He was 60 years old. Gene had recently retired from UCSD after thirty years of service. A memorial service was held at Quail Botanical Gardens in Encinitas, California, on 23 August 2007. A web page is dedicated to his memory at http://harding.smith.muchloved.com, where contributions of memories are invited.

Gene was born in San Jose, California in 1947, to Harding Eugene Smith Senior, and Bernice Smith (nee Smith). Harding Smith Senior was an air-force navigator; therefore Gene spent his childhood moving from one air-force base to another. Although an only child, Gene was very close to his cousin Meg, whom he lived nearby to in Gilroy for a time, and the two were like brother and sister. The elder Harding Smith was lost in action over Cambodia in the mid-sixties.

Gene was a dedicated student, a boy scout, and a Presidential Scholar. He majored in Physics at Caltech, where he also took a lively interest in the football team and the Glee Club, and was elected a House Officer. To his close friends, he was known at Caltech as Smitty, and the closest of them was Rob Drew, who gave a glimpse into that period of Gene's life at the memorial: "Gene arrived early at campus his first year, in response to an invitation to join the football team. Gene's size and features reminded the head coach of a long-forgotten player named 'Johnson.' After a few days of confusion, Gene simply replaced the name on his helmet.

Harding Eugene (Gene) Smith, Jr.

'Johnson!' coach would yell, 'get in there!' If Johnson was going to get to play, Gene was going to be the best Johnson available!"

Gene spent the summer of 1966 working at Kitt Peak, where his lifetime love of observing with ground-based telescopes began, though he learned some things the hard way, such as the fact that trying to squeeze 40,000 numbers onto a computer that stored only 32,000 resulted in blown fuses. In a final letter of that summer back to Drew he wrote: "My summer is now complete. I have achieved the highest pinnacle in my quest for fulfillment. Striking a blow for humanity I just blew the whole Kitt Peak CDC3200 computer system. Those fuses were nothing compared to this!"

Gene's graduate work, on the metal abundances in HII regions of nearby galaxies, was done at Berkeley, where Hyron Spinrad was his thesis advisor. He loved observing and spent numerous fun nights at Lick, Kitt Peak, Cerro Tololo, Keck, and many other observatories. He joined Margaret Burbidge at UCSD for a postdoctoral fellowship, and joined the teaching faculty there in 1978.

Gene spent his entire professional career at UCSD. His research ranged from the study of quasar absorptions lines to the astrophysics of Ultra-luminous Infrared Galaxies. He was a key participant in UC-wide astronomy support, including being the chair of the science-advisory committee for the Ten Meter Telescope project, which later "morphed" into the Keck Observatory. His contributions to enabling that project were both essential and unheralded.

Gene was a dedicated and enthusiastic teacher. One of his favorite undergraduate classes gave him the opportunity to dress up in Renaissance garb and pretend to be Galileo, while the experiment most loved by his students was when they got to attempt to drop an egg on his head from several stories high. Gene was also an outstanding advisor and mentor, and both his first post-doc, Rick Puetter, and his last graduate student, Brian Siana, were able to attend his memorial service and provide some special memories of their experiences with him.

Rick recalled a memorable trip to Cerro Tololo when they packed up two infrared spectrometers for the trip, and everything conceivable went wrong, from inspections at the airport to spectrometer parts broken on the plane and instrument failures at the observatory, to finally being completely clouded out. Brian recounted: "I spent countless cloudy nights listening to Gene's stories that began with ″When men were men and giants roamed the Earth . . . ″. I still don't know what that means, but it always preceded some sage advice."

Besides astrophysics, Gene's passions included horse riding (the faster the better), sailing, hiking, the northern California coast and mountains, black-and-white photography, extremely strong coffee, travel (especially European castles and cathedrals, and any road-less-traveled that he came across), cooking and fine restaurants, Native American pottery, basketware and kachinas, and classical music. He also loved to sing, and friends would say he had a song for every occasion. He was a dedicated and enthusiastic supporter of all causes environmental and conservationist, and among figures he greatly admired were John Muir and Ansel Adams.

Gene is survived by his wife of eighteen years, Dr. Carol Jean Lonsdale; step-daughter Kimberley; daughter Tamsyn; cousins Meg and Chris Bailey; in-laws Colin and Marilou Lonsdale, and Graham Lonsdale; niece Joanna; and two nephews Greg and Wes. He is also greatly missed by his many friends and colleagues, his golden retriever, Jasper, and his palomino horse, Sundance.

Carol Lonsdale & Tom Soifer
California Institute of Technology

PHILIP M. SOLOMON (1939-2008)

Philip Solomon, one of the pioneers and leading researchers in molecular astrophysics, died on 30 April 2008 at his apartment on the upper west side of Manhattan after a battle with cancer. His pioneering research included both theoretical and very extensive observational studies of stellar atmospheres, interstellar molecules, high redshift galaxies, and the Earth's stratosphere. Phil was Distinguished Professor at The State University of New York [SUNY], Stony Brook, where he had been since 1974.

Phil was born on 29 March 1939 in Manhattan, New York City, to Nat and Betty Solomon. Nat Solomon was a labor organizer and a printer. Phil attended the University of Wisconsin, where he received his BS in 1959 and where he met his future wife Sheila who was studying art. His Ph.D., "On the Role of Light Molecules in Astrophysics," was also from the University of Wisconsin under the guidance of Art Code

and Bob Bless. After postdoctoral positions at Princeton and lectureships at Columbia and the University of California, San Diego, Phil spent two years as a Professor at the University of Minnesota. After two years at the Institute for Advanced Study in Princeton, he came to SUNY, Stony Brook, as Professor of Astronomy in the Department of Earth and Space Sciences. In 1988 Phil was selected as a Humboldt Senior Distinguished Scientist, and, in 1999, he was honored with the rank of Distinguished Professor at SUNY. Phil took sabbatical and other leaves at Churchill College and the Institute of Astronomy, Cambridge; the Institute for Advanced Study; l'Ecole Normale Superieure, Paris; Institut d'Astrophysique, Paris; and the Institut de Radioastronomie Millimetrique [IRAM], France. Phil published more than 160 papers and supervised seven Ph.D. students. He served on numerous review, visiting, and advisory panels.

Phil's first theoretical research focused on opacity and abundance of light molecules such as H2, CO, and CN in stellar atmospheres, but then shifted quickly to the formation, excitation, and astrophysics of interstellar molecules, which had just been discovered in the late 1960s. In 1969, Phil and Chandra Wickramasinghe were among the first to suggest that the denser interstellar clouds, which were deficient in atomic hydrogen, were principally molecular hydrogen with the H2 formed on the surface of cold dust grains and protected from dissociating UV by a self-shielding H2 layer at the cloud surface. With L. Lucy, Phil then developed the radiative transfer and mass-loss mechanism operative in hot OB star winds and QSOs--where the radiative momentum is absorbed in resonance lines of ions.

In the late 1960s and early 1970s, the detection and mapping of interstellar molecules moved rapidly from the early discoveries of maser emission in H2O and OH to the thermal emission lines of simple molecules like CO, CN, CS, and HCN, to more complex species containing up to thirteen atoms. Phil was a major force in pushing these new detections and in using the thermal emission as astrophysical probes. This explosive growth of spectroscopic detections occurred primarily as a result of Phil's collaborations with A. Penzias, K. Jefferts, R. Wilson, and P. Thaddeus, along with other competing groups using the NRAO 36-foot telescope at Kitt Peak. This was a most exciting period with the mm-wave window finally accessible to spectroscopy and each observing run on the telescope typically yielded one or two new detections. Phil was probably the one most responsible for providing the astrophysical motivation to push the technology towards mm-wavelengths. He clearly elucidated the fact that high densities were required for the thermal excitation of the higher dipole moment molecules such CS and HCN--at the same time pointing out, for the first time, the critical role of line photon trapping in the optically thick lines.

In collaboration with N. Scoville and D. Sanders, Phil initiated the early surveys of CO emission from the Milky Way molecular gas. They first pointed out that the molecular gas resides largely in self-gravitating clouds (not in pressure equilibrium with the diffuse atomic and ionized gas) and coined the term Giant Molecular Clouds. They also discovered that the molecular gas had a Galactic distribution very different from the atomic gas--a massive central concentration within 300 pc of the Galactic center and the molecular cloud "ring" at 4 to 8 kpc radius. Throughout this work, he clearly elucidated the astrophysical importance of the dense molecular clouds as the sites of virtually all star formation. During this period, Phil, in collaboration with W. Klemperer, provided important theoretical insight into the formation of simple diatomic molecules via gas-phase charge exchange reactions.

Philip M. Solomon

As the sensitivity of mm-wave receivers improved, Phil extended the observations of CO and HCN emission first to nearby galaxies in collaboration with J. Barrett and L. Sage and then to higher luminosity, more-distant objects with Y. Gao, D. Downes, and P. Vanden Bout. Solomon and Gao very significantly showed that for the most luminous infrared galaxies, the infrared luminosities were linearly proportional to the amount of dense, star-forming gas (as traced by HCN) and hence, they argued, that the source of luminosity could be entirely star formation rather than quasar activity. With Downes, Phil was introduced to mm-wave interferometry (at last, I should say, since he was basically a single-dish astronomer at heart), and they were among the first to produce high-resolution images of the most luminous infrared galaxies. Phil's most recent work, in collaboration with Vanden Bout, Carilli, and Maddalena to detect CO and HCN from the highest redshift galaxies was on-going, but resulted in a recent Annual Reviews paper that provides a forward look to the future of this field.

Phil also realized that mm-wave spectroscopy could be used for remote sensing of the terrestrial stratosphere to trace the abundance of ClO and hence monitor the ozone layer depletion. This work, in collaboration with R. deZafra, J.

Barrett, and A. Parrish, led to their setting up remote, automated observing systems in Antarctica and in Hawaii; these efforts continued over twenty years up to the present.

For those of us who collaborated with Phil, he will be greatly missed. Phil had a keen sense for interesting and significant science; he had a real enthusiasm for discovery; and he enjoyed the competition of forefront scientific research where recognition of significance was vital but where discussion of interpretation was rational, albeit with strong argument. The pleasure of an observing run with Phil was supreme due to his enthusiasm and focus on the astrophysics; these runs also were creative since if the original plans did not quite pan out, he was always ready to modify the observations to take advantage of what one learned from the data coming into the telescope. Often this resulted in much better science--in contrast to the current paradigm with fixed observing programs and queue observing. Phil was also a major presence at scientific meetings giving stimulating talks and provoking challenging discussions.

Phil is survived by his wife Sheila, daughter Nina, son-in-law John, granddaughter Sarah, and brother Mark.

Nick Scoville
Caltech

EUGENE RICHARD TOMER (1932-2007)

Dr. Eugene R. Tomer passed away on 2 July 2007 at his home in San Francisco, California. The cause of death was cancer. Tomer was a consulting applied mathematician with a wide range of interests in dynamical astronomy, electromagnetic theory for use in communications, and computational methods of applied mathematics. He was a member of AAS, and the Society for Applied and Industrial Mathematics [SIAM]. With K. H. Prendergast, he co-wrote the influential paper ″Self-consistent Models of Elliptical Galaxies,″ published in the Astronomical Journal 75 (1970), 674-679. This paper has been cited over eighty times.

Tomer was born on 13 June 1932. He earned the Ph.D. in Mathematics at the University of California-Berkeley in 1978 (title of dissertation: On the C*-algebra of the Hermite Operator). In 1996 he and A. F. Peterson wrote ″Meeting the Challenges Presented by Computational Electromagnetics,″ a publication of the Naval Postgraduate School at Monterey, California.

This writer met Eugene at the 1992 Annual SIAM meeting in Los Angeles in connection with the Activity Group on Orthogonal Polynomials and Special Functions, which the writer chaired at the time. Eugene volunteered to edit the Newsletter of the group, which he did from July 1992 to July 1995. Thanks to his skills and efforts, the Newsletter became a carefully edited, professional publication. Eugene not only organized a Problems Column, attracting questions in pure and applied mathematics, but he also designed the logo for the group. He gave much time and effort to this service, in an era when copy had to be physically assembled and mailed to SIAM Headquarters. Eventually he felt he had done what he could for the Activity Group. He told me that he hoped the Group would get seriously involved with applications such as in astronomy, physics, and sciences that use special function solutions of differential equations.

During Tomer's editorship, we communicated mostly by e-mail, our homes being far apart. He was a good friend to the Group and to me, as much as one can be over a separation of thousands of miles. As well, Eugene was an active amateur radio operator, much appreciated by his local amateur radio community, with call sign WI6X. He left behind family, friends, and one son.

Charles F. Dunkl
University of Virginia

HEINRICH JOHANNES WENDKER (1938—2008)

Heinrich Johannes Wendker, retired professor at Hamburg University, died on 3 April 2008 at the age of 69 at Reinbek near Hamburg, Germany. He was born on 30 June 1938 in Gimbte, near Münster, Westphalia, Germany. In 1958 he finished high-school and started his studies of mathematics, physics, and astronomy at Münster University. In 1960 Wendker joined the Astronomical Institute at the University and became attracted to the relatively new field of radio astronomy. In the same year he participated in a radio survey (at a wavelength of 11 cm) with the 25-m dish of Stockert observatory. In 1964 he joined the NRAO in Green Bank, Virginia, for one year and started with observations of the Cygnus area of the Galactic plane that would become a real passion for him (resulting in over twenty publications about the Cygnus X region, a deep study of the structure of the local spiral arm). Wendker was awarded the Ph.D. in 1966 (University of Münster), and in the same year he accepted an appointment at the University of Illinois at Urbana. There he participated in the All Sky Survey of the Vermilion Radio Telescope including the Cygnus region. In 1968 he joined the newly founded Max-Planck-Institut für Radioastronomie at Bonn, Germany, where he got involved in planning the institute's new building among other things. In 1972 Wendker was appointed Professor of Astronomy at Hamburg University where he would spend most of his academic career. From 1985 to 1989 he was director of the observatory (Hamburger Sternwarte), and from 1989 to 1991 he was Dean of the physics department.

Wenker's research activities concentrated on the radio structure of the Milky Way, especially on the Cygnus region, observing the radio continuum emission at different frequencies in order to separate thermal from nonthermal emission (i.e., HII-regions and SNRs). He identified foreground stars and extragalactic sources in the background. Additional observations of molecular lines and of the neutral atomic hydrogen completed these studies. These activities culminated in participation with the Canadian Galactic Plane Survey [CGPS] of the Dominion Radio Astronomy Observatory [DRAO]. With the detection of radio emission from Betelgeuse (a Ori) Wendker opened the field of normal radio stars (e.g., the editorial in Nature 241, 9 (1973)). He detected dozens of radio stars, among them MCW349 and P Cyg. Another highlight was the detection of radio recombination lines in MCW349. Observations of a few dozen radio stars led to the conclusion that many of them possessed atmospheres not known before. Wendker collected and catalogued all radio observations into a catalog of radio stars (1978, 1987, 1995). This data collection of spectra of the radio con-

tinuum emission of radio stars contains clues relating to the radiation mechanism responsible for the observed radio emission. Variability of the emission of some stars points at nonthermal radiation.

Together with Alfred Weigert, Wendker published a textbook on astronomy and astrophysics, Astronomie und Astrophysik--ein Grundkurs. For the 4th edition, L. Wisotzki became a co-author. This introductory text is widely used at high-schools and for the first-grade university level in German speaking countries.

Wendker is survived by his wife, Walburga, and two sons, Martin and Andreas. He was a dedicated researcher and academic teacher. Many colleagues will remember his advice and support. We have lost a colleague and a good friend.

Walter Huchtmeier & Wilhelm Altenhoff
Max-Planck-Institut für Radioastronomie

ANDREW STEPHEN WILSON (1947-2008)

On 24 May 2008, Andrew Stephen Wilson passed away at the age of 61, in his home in Silver Spring, Maryland, from complications resulting from a painful spinal illness. Andrew was arguably one of the first truly multi-wavelength astronomers of his generation. His scientific work on active galactic nuclei [AGN] spanned the entire electromagnetic spectrum from the radio to the X-rays.

Andrew was born in Doncaster, Yorkshire, England, on 26 March 1947. He was the younger of two brothers whose births were separated by the Second World War. His father, Norman, came from a relatively affluent family who were coal merchants. His mother, Mary, came from a less comfortable background, one of seven children, daughter of a skilled cabinet maker/French polisher, who went through a very hard time during the depression. As a teacher, she placed enormous value on hard work and education as a way of gaining advancement in life.

Andrew Stephen Wilson

When Andrew was four, the family moved to Skipton, a nice market town in the Yorkshire dales. Andrew went to a small village school until age eleven when he entered Ermysted's Grammar School. He was an enthusiastic soccer and cricket player. He never lost his enthusiasm for soccer and supported the local soccer team, Leeds United, for all his life. Andrew also followed the Yorkshire county cricket team.

Andrew's interest in astronomy stemmed from the fact that at Ermysted's Grammar School someone donated a four-inch refracting telescope, so he and his friends used to go back in the evenings to investigate the rings of Saturn, the moons of Jupiter, and various nebulae. While an undergraduate at Cambridge, Andrew joined the astronomy club and ground an 8-inch mirror by hand as a part of a telescope that he set up in the backyard of his parents' house. Andrew spent hours observing with this telescope, and it was the wonder of the family.

At Cambridge, Andrew obtained his bachelor's degree with first-class honors in 1969. During a short visit in London with his fellow students to celebrate the end of their exams, Andrew met Finnish summer student, Kaija Kettunen, whom he married in 1975 in her home town of Lieksa, Finland. They had a son, Daniel, now living in South Riding, Virginia, and a daughter, Caroline, living in Oakland, California.

In 1973, Andrew obtained his doctorate degree in physics at the Cavendish Laboratory, working under the direction of Martin Ryle, winner of the 1974 Nobel Prize in physics. Andrew's PhD was dedicated to a study of the Crab Nebula at the highest radio frequencies at which the Cambridge One-mile Telescope could operate. This work, which included both intensity and polarization data, was a triumph of perseverance and skill in the reduction of an extremely complex data set. This experience stood him in excellent stead for his future career.

After his PhD, Andrew went on to be a postdoctoral research fellow at Sterrewacht, Leiden, Netherlands, and then at the Astronomy Centre of the University of Sussex, England. By that time, Andrew wanted to leave England, because he thought that he would be able to secure a permanent position in astronomy faster in another country. He also loved traveling and getting to know other cultures, and he learned foreign languages easily. In 1978, Andrew and his wife had two choices: One was to accept a position at the European Southern Observatory in Garching and the other was to come to the University of Maryland. Together they decided to come to the United States rather than go to Germany because of the language and culture.

Andrew remained at the University of Maryland for his entire career. He was a scientist of extraordinary productivity and impact over his lifetime: He wrote more than three-hundred scientific publications and accumulated more than 11,000 citations to this large body of work. In the 1970s and 1980s, he pioneered the use of radio telescopes for the study

of active galactic nuclei, writing in collaboration with his students a number of seminal papers that are still standard references in the field today.

In the last 15 years, Andrew became an avid proponent of two of NASA's Great Observatories, the Hubble Space Telescope and Chandra X-ray Observatory. Since 1985, he was NASA Interdisciplinary Scientist and member of the Science Working Group for the Chandra X-ray Observatory. He was also an adjunct astronomer at the Space Telescope Science Institute in Baltimore since 1994.

Taking advantage of this leap in technology, Andrew used these facilities to examine the environment of black holes in unprecedented detail and led a research group that was second to none in this area of research. Over the years, Andrew trained and supervised twelve Ph.D. students and more than fifteen postdoctoral research scientists, all of whom are active members of the astronomical community today.

This group's work on nearby radio galaxies (e.g., Cygnus A, M87, and Pictor A) and Seyfert galaxies (e.g., the Circinus galaxy, NGC 1068, NGC 4151, and NGC 4258) is simply outstanding, a monument to Andrew's passion and perseverance to seek a complete physical understanding of the AGN phenomenon.

Andrew was at his best in one-on-one discussions. He did not beat around the bush. He was always direct, frank, and honest, all for the sake of better science. He also never did anything halfway. Andrew was fully devoted to his science and held himself and others to the highest intellectual standards. He inspired many by his example, his discipline, and a sense of humor that was equally charming and disarming. The twinkle in his eyes and mischievous smile were sure signs that he was about to say something provocative and witty.

Andrew will be dearly missed by the entire astronomical community.

I thank Andrew's wife and brother, Kaija and Martin Wilson, for their assistance in writing this obituary.

Sylvain Veilleux
University of Maryland

PETER ROBERT WILSON (1929-2007)

It is with great sadness that I report the passing of Peter Robert Wilson, a well-known and well-loved figure in the solar physics community. Peter was on the faculty of the Department of Applied Mathematics at the University of Sydney for 39 years, and Chair of the department for 24 of these years. He was the author or co-author of more than 80 scientific research papers and a book, Solar and Stellar Activity Cycles (1994), published by Cambridge University Press. He died suddenly of a heart attack, at his home in Glebe, Australia, in the early morning of 11 November 2007.

Peter was an organizer of, and participant in, many international conferences and workshops. He traveled extensively, holding visiting appointments at the University of Colorado (JILA), at Cambridge University, at the College de France (Paris), and at the California Institute of Technology [CalTech]. Most of his work was in the field of solar physics, but he also did some work on the philosophy of science and on tides.

Peter came from a line of mathematicians. His father, Robert Wilson, immigrated to Australia from Glasgow in 1911, and became a mathematics teacher at Scotch College, a private school in Melbourne. There his name was changed to "'Bill' because 'Bob' was already taken."

Peter's enjoyment of this story as characteristic of Australian academia (as any fan of Monty Python would understand) is indicative of his infectious sense of humor. In a similar vein, he claimed ancestry traced back to the eighteenth-century Scottish mathematician Alexander Wilson, Professor of Astronomy at the University of Glasgow. That Wilson is famous in the solar physics community for his discovery, known as the "Wilson Effect," of the photospheric depressions associated with sunspots. Peter himself could not resist writing a paper on this subject, and was delighted when the bait was taken by some less-informed colleagues who chided him for "naming an effect after himself."

"Bill" Wilson married Naomi Christian, a Melbourne native, and together they had three children. Peter was the eldest; he was born on 17 October 1929. He attended Scotch College, where his father taught, and went on to the University of Melbourne where he eventually earned an M. Sc. in experimental physics. This was not his cup of tea, however, and he first endeavored to follow in his father's footsteps, taking short-term appointments teaching mathematics at the secondary-school level abroad, in England, and in Scotland. After a few years Peter returned to Melbourne and took a post at Scotch College following his father's retirement. He soon decided, however, that teaching young boys in a private school was not his cup of tea either, and in 1959 he secured a position in applied mathematics at the University of Sydney. He had just married his first wife, Margaret, and they moved north together to start their family.

Peter flourished at the University of Sydney, but his advancement in rank was hampered by the lack of a Ph. D. The problem was solved by Ron Giovanelli, Chief of the Division of Physics at Australia's Commonwealth Scientific and Industrial Research Organization [CSIRO], an astrophysicist whose interest lay in the transfer of radiation through the outer layers in the Sun. Giovanelli took Peter on as a thesis student. This both earned him the needed Ph. D. and started him on his research career in solar physics. He now began to move up the academic ladder at Sydney.

To satisfy his love of adventure, Peter was also able to take a series of visiting positions in the United States, working with Dick Thomas and others at JILA and Sacramento Peak Observatory (National Solar Observatory) in New Mexico. During this time he created a framework for further collaborations that became known as the Sydney-Boulder Astrophysics Association [SBAA].

In 1971 Peter was appointed Professor and Chair of the Department of Applied Mathematics at Sydney, and for the next two decades he worked hard to strengthen this department. He was very successful in this endeavor; he had a reputation for fairness and honesty and was well liked. Under his leadership the department grew in both size and quality. Peter fostered a group of outstanding students, including Chris Cannon, David Rees, and Lawrence Cram. One of his

proudest accomplishments was to recruit several women onto the faculty and to increase the number of female students. One of these, Nalini Joshi, is presently Head of School. After Peter resigned as Chair, he went on to several other positions associated with the governance of the University, including the Academic Senate, the Governing Council of the Women's College, and the Board of Trustees.

Peter and his first wife were divorced in 1982, after their two children, Sally and Michael, had grown up and left home. A few years later he met and married Geraldine Barnes, a Senior Lecturer in the English Department. This proved to be a fabulous match; they supported each other's academic pursuits, attended each other's conferences, enjoyed a rich social life centered around the university, and traveled extensively together. Their marriage helped both of them refocus their careers. Geraldine steadily advanced in rank, and is now Head of the School of Letters, Arts and the Media. Peter became one of the chief organizers of a series of workshops focused on the solar activity cycle.

The first solar cycle workshop was held in 1986 at CalTech's Big Bear Solar Observatory [BBSO], and it was at this meeting that I first met Peter. There were three subsequent meetings, roughly a year apart, held at the University of Sydney, at Stanford's Fallen Leaf Lake in the Sierras, and at Sacramento Peak Observatory, and these were very successful in bringing together the main players in this research field. My subsequent association with Peter involved several trips back and forth between Portland (Oregon), Boulder, and Sydney and collaborations on about a dozen controversial research papers. Together with Peter Fox and Pat McIntosh, we became the solar-physics "gang of four."

A dinner in Sydney with Geraldine, Peter, and their friends always meant liberal amounts of fine Australian wine, lively conversations on every imaginable topic (except physics), much laughter, and a deliciously endless meal. A weekend at their beach house in Killcare was even better, featuring long walks on the golden-sand beach and in the nearby bush. Kookaburras, Currawongs, and Rainbow Lorikeets frequented the outdoor deck, and the bush teemed with large and fascinating spiders. Back in Sydney, short-term visitors enjoyed lodgings and excellent breakfasts at the University of Sydney's Women's College, with Peter on the Council.

Peter was a man of many interests. He was an expert sailor, a small-plane pilot who took colleagues and friends on adventurous flights, and a lover of sports. He was a skier, a hiker, and a good tennis player who disdained proper form but usually won the point. In 1994, one day after his 65th birthday, Peter suffered a serious stroke. Recovery from this was extremely difficult, painful, and slow; he did, however, recover to a remarkable degree. He had to learn to walk all over again and his vocal chords were partially paralyzed, but after several years of determined work, Peter was able to play a little tennis and squash, and he could bowl and hike. During the last decade of his life he traveled to Easter Island, to the Galapagos, and to the Ross Ice Shelf in Antarctica.

Peter continued to take pleasure in his research to the end, in collaboration with close colleagues who were always among his closest friends. Among these was Chris Durrant, who had been Head of the School of Mathematics and Statistics from 1994 to 1998. They were writing a series of papers on the mechanism of the Sun's polar field reversals. I was looking forward to joining them this coming summer. My last visit with Peter was in Phoenix, Arizona, where Geraldine was participating in a conference. We hiked into the Superstition Mountains, and I remember him walking slowly, being careful of his balance, but going the whole distance with pride and in good spirits.

Peter was a truly remarkable man with, as Geraldine has put it, "a genuine gift for leadership and the encouragement of team spirit." He was a creative and productive scientist with a tremendous life force, a great sense of adventure, and a warm heart. My own collaborations with him were a joy. His death is a sad loss to all who knew him, and he will be sorely missed, but Peter R. Wilson lived life to the fullest and gave his best to the world. We should be glad for him. At the end of his (unpublished) autobiography, where he describes his recovery from the stroke, he writes:

"So as I forecast in 1994, I have continued to 'soldier on', and must admit that a miracle has indeed occurred, at least 80%; I wouldn't have missed the past ten years for anything. Who knows what the inevitable advance of old age may hold, but I cannot complain that I have been 'short changed' in any way."

Herschel B. Snodgrass
Lewis & Clark College