In Sweden, the many words in memory of Stig Hagström share a common theme; they express gratitude for his interest in the well-being of his beloved native country and for his contributions to Swedish higher education and research and its interactions with US institutions. Here in the US, he will be missed for his long-term vision, his warm and thoughtful guidance, and his enthusiasm for bringing together scholars from Sweden and Stanford.

Arthur Bienenstock
Stanford University
Stanford, California
Charles S. Fadley
University of California, Davis
Bo Sundqvist
Uppsala University,
Uppsala, Sweden

Aden Baker Meinel

Aden Baker Meinel, an astronomer, optical scientist, atmospheric physicist, and telescope designer, died in Henderson, Nevada, on 2 October 2011. He was the founding director of Kitt Peak National Observatory and of the College of Optical Sciences at the University of Arizona (UA).

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Aden Baker Meinel

Born in Pasadena, California, on 25 November 1922, Aden developed an interest in astronomy in high school. By age 18 he was working at the Mount Wilson Observatory optical shop. The next year he entered Caltech as a sophomore. In 1942 Aden dropped out of school to join the US Navy's Caltech rocket program, and by 1944 he was designing rocket launchers and had become a US Navy ensign. The navy sent him to Europe in 1944 to investigate the German V-2 rocket factory at Nordhausen and its underwater-rocket testing facility at Toplitzsee. In addition to convincing German rocket scientists to come to the US, Aden advised the navy on which rocket hardware to ship back from Germany.

Aden returned from Europe in 1945 and was admitted to the graduate school of astronomy at the University of California, Berkeley, where he earned his PhD in three years, under the GI bill. His adviser was C. D. Shane. For his dissertation, he designed and built a Schmidt telescope with which he made the first observations of the IR emission bands of molecular oxygen and hydrogen in the atmosphere and demonstrated that auroras are produced by solar protons. He graduated in 1947 and accepted an appointment to Yerkes Observatory at the University of Chicago.

In 1955 NSF appointed Aden to search potential sites for a national observatory to provide telescope access for astronomers in the US. The result was Kitt Peak National Observatory, and Aden was its first director. There he invented a slumping process for the honeycomb Pyrex mirror, which was used in an innovative 84-inch telescope.

In 1960 Aden became director of the UA's Steward Observatory and astronomy program. He designed the Multiple Mirror Telescope, a joint project of UA and the Smithsonian Institution that proved the practicality of segmented telescope mirrors. The UA astronomy department, which Aden began expanding, was instrumental in the development of the Large Binocular Telescope and of Roger Angel's mirror laboratory, which has produced many of the world's large telescope mirrors.

Aden recognized the need for an interdisciplinary academic center of excellence in optical science. In 1964 he became the first director of the UA's Optical Sciences Center—now the College of Optical Sciences—and created a graduate degree program in optics. During his nine-year leadership, a 77 000-square-foot building was constructed, the department grew from 4 to 25 faculty members, and the number of students grew to 100. Today the college has more than 1 500 graduates and 100 faculty teaching more than 90 courses.

Aden joined NASA's Jet Propulsion Laboratory (JPL) in 1983 to work on concepts for a 50-meter-diameter submillimeter, segmented space telescope. His work laid the foundation for today's *James Webb Space Telescope*. In 1986 JPL director Lew Allen Jr asked Aden for his ideas on future missions for NASA. Aden concluded that although extremely difficult, the characterization of exoplanets using space telescopes was feasible. Those efforts became the NASA exoplanet program.

After his official retirement from JPL in 1993, Aden worked on the design of the Keck telescopes' interferometer and on the proposed Caltech–University of California 30-meter telescope. In 2002 he published two papers on lightweight space telescopes built using blazed high-order diffractive membranes.

During an active research career that spanned almost 70 years, Aden published more than 200 papers and 6 books—covering pioneering work in solar energy, atmospheric science, and telescope design—and a catalog of emission lines in astronomical objects. He was recognized for the diversity of his work with numerous awards. Among them were the first Helen B. Warner Prize in 1954 from the American Astronomical Society and the Optical Society's 1980 Frederic Ives Medal. He and Marjorie Meinel, his wife and long-time research collaborator, jointly received three awards from SPIE.

Aden conceived of many successful projects and laid a firm technical and scientific foundation for others to carry on while his interests jumped to the next amazing project. Aden was a high-energy, hard-working individual focused on starting successful innovative ventures in telescopes, instruments, and science. He was approachable and friendly and infused those around him, particularly students and faculty, with the excitement of discovery and accomplishment. He was as knowledgeable discussing detailed aerospace and systems engineering problems as he was discussing aspects of astrophysics.

James B. Breckinridge
University of Arizona
Tucson, Arizona
Helmut A. Abt
Kitt Peak National Observatory
Tucson, Arizona

Rosalyn Sussman Yalow

Renowned medical physicist Rosalyn Sussman Yalow, a co-recipient of the 1977 Nobel Prize in Physiology or Medicine, died on 30 May 2011 in New York City.

Rosalyn was born on 19 July 1921 in New York City. Although her parents were not able to attend high school, they passed down to Rosalyn their lifetime love of learning. Her fondness for chemistry was influenced by her high school chemistry teacher. In 1941 she

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Rosalyn Sussman Yalow

became the first physics graduate of Hunter College, part of the City University of New York system and at that time a women's college. Her love of physics was inspired by two of her professors there.

In pursuing a graduate education, Rosalyn faced several obstacles: She was a woman in a man's field, she was Jewish, and she spoke with the broad accents of New York City. With her usual determination, however, she was able to attend graduate school at the University of Illinois at Urbana-Champaign, where she started in 1941. Of the 400 people in the College of Engineering, she was the only woman. Maurice Goldhaber, who would later direct Brookhaven National Laboratory, served as her adviser. In 1943 she married physics graduate student Aaron Yalow, also a New Yorker and the son of a rabbi. Two years later Rosalyn received her PhD in nuclear physics—much of her research involved radioactivity. She received encouragement from Gertrude Goldhaber, a practicing physicist married to Maurice.

After graduate school, Rosalyn took a job in New York at an ITT laboratory until it left the area a year later. She then returned to Hunter, this time to teach. Aaron, who by that time had joined Montefiore Hospital in the Bronx, introduced her to Edith Quimby, a trailblazer in medical physics. Quimby brought together Rosalyn and Gioacchino Failla, a pioneering biophysicist at Columbia University, who was very impressed with Rosalyn. Failla then convinced Bernard Roswit, chief of radiation therapy at the Bronx Veterans Administration Hospital, to hire her. She would spend her entire career in the VA hospital system.

In 1950, while at the Bronx VA Hospital, she began her 22-year collaboration with internist Solomon Berson. Together they developed radioimmunoassay, a revolutionary technique that uses radiolabeled antibodies to measure antigens. They focused their research on the clinical diagnosis of thyroid diseases and the kinetics of iodine metabolism. The team developed an interest in serum proteins. At a time when highly purified insulin was readily available, Rosalyn and Berson soon determined that patients treated with animal insulins built up antibodies to them. They recognized that they had in their hands a means to measure circulating insulin. By 1959 they were able to put to practical use the measurement of plasma insulin in humans. Radioimmunoassay testing has now been largely replaced with fluorescent techniques; however, immunoassay is still used in routine blood tests.

Berson died in 1972 and never saw the full recognition of his and Rosalyn's work. In 1976 Rosalyn was presented with the Albert Lasker Basic Medical Research Award, considered by many to be a precursor to the Nobel Prize. The following year she was a co-recipient of the Nobel Prize in Physiology or Medicine. She was again recognized in 1988, this time with the National Medal of Science, for her groundbreaking work.

Rosalyn and Aaron were deeply involved in the establishment of organizations dedicated to medical physics. In 1948 they helped found the Radiological and Medical Physics Society of New York, and in 1958 they became charter members of the American Association of Physicists in Medicine.

Rosalyn took great pride in the many physicians and scientists that she and Berson mentored. Later in life, to ease the public's fears about radiation exposure, she spoke in numerous US venues on the topic.

Some 70 years after Rosalyn was the only woman in her graduate program, it is tantalizing to ask how things have changed. She would be the first person to start that discussion. She had made it her mission to inspire talented women in their pursuit of science and mathematics careers. Although Rosalyn would never classify herself as a feminist, many women scientists saw her as a role model, just as she viewed Marie Curie. Those of us to whom she has passed the torch have lost a champion and mentor. We will try to live up to her challenge.

Jean St. Germain
Lawrence N. Rothenberg
Memorial Sloan-Kettering Cancer Center
New York City ■

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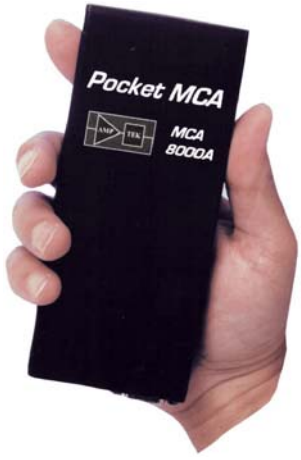

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