Bulletin of the AAS • Vol. 53, Issue 2

Malcom P. Savedoff (1928–2021)

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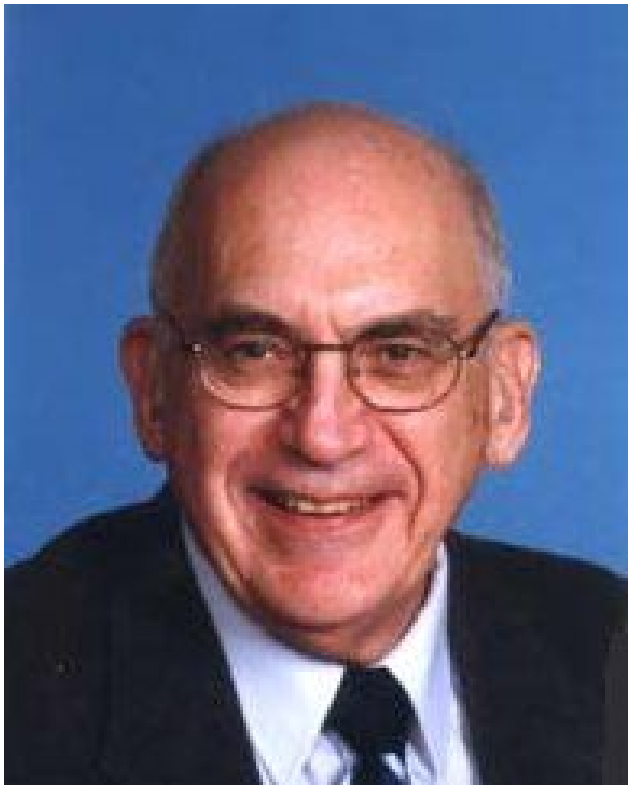
Published on: Jun 29, 2021

Malcolm Paul Savedoff died on Tuesday the 20th of April, 2021.



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Malcolm Paul Savedoff, a respected professor emeritus of astronomy at the University of Rochester, died in Rochester, New York, on Tuesday April 20, 2021. He carried out fundamental research in astrophysics, with primary interests in stellar interiors, the interstellar medium, and hydrodynamics on cosmic scales.

Malcolm was born on July 4, 1928 in New York City. He attended the Bronx High School of Science, where he met his future wife, Roberta, at a high school dance. After graduating from high school, he earned his A.B. degree from Harvard in 1948 at the young age of 20, and he and Roberta were married. He went on to Princeton University for his graduate work, receiving his M.Sc. in 1950. His first scientific paper reported work done as a junior collaborator with Martin Schwarzschild (1912–1997) [1]. In 1951–1952, he held a National Research Council Fellowship at the Mount Wilson and Palomar Observatories. There he worked with Walter Baade (1893–1960) and Baade's bright young graduate students Allan Sandage (1926–2010) and Halton C. ("Chip") Arp (1927–2013) on the first observations of globular clusters (GCs) with the then-new 200-inch (5-meter) telescope and new red-sensitive Kodak emulsions. This work was revolutionary. The team solved the problem of the strange GC color-magnitude diagram (as compared with open clusters and nearby stars) by detecting the GC main sequence. They thereby demonstrated that the GCs are very old, compared to open clusters and most stars in the field, and they demonstrated that the so-called "cluster variables" are RR Lyrae stars. This finally made it possible to resolve the distance-scale problems within the Milky Way Galaxy. Malcolm's paper on M13 [2], which included sketches of the color-magnitude diagrams of M3 and M92, is a founding document of the modern study of stellar evolution.

Malcolm received his Ph.D. from Princeton in 1952 for research performed under the supervision of Lyman Spitzer, Jr. (1914–1997) [3]. Upon receiving his doctorate, Malcolm obtained a fellowship from the National Science Foundation that enabled him to accept a postdoctoral appointment at Leiden University in the Netherlands, where he worked with Adriaan Blaauw (1914–2010). About a dozen years later, he returned again to Leiden on sabbatical with his young family.

At the conclusion of his postdoctoral appointment in Leiden, Malcolm became the first astronomer to be appointed to what was then the Physics Department at the University of Rochester. He received a travel grant from the Office of Naval Research. One of his most frequently cited papers appeared in 1956 [4], when he held a joint appointment in the Physics Department and the Institute of Optics at Rochester. Two years later, the Department appointed a second astronomer — H. Lawrence (Larry) Helfer (1930–2021) — and officially changed its name to the Department of Physics and Astronomy. Malcolm and Larry had known each other since junior high school, when they were both members of the Junior Astronomy Club in New York City.

Malcolm played a key role in growing and shaping the astronomy program at Rochester, not only in teaching courses in the subject and guiding the work of the first astronomy graduate students [5][6] but also in helping to lay the foundation for the establishment of the University's C. E. Kenneth Mees Observatory in the Bristol Hills some 40 miles south of the city. The Observatory was officially established in 1964, with Malcolm as its founding Director.

During the 1960s, electronic digital computers were being acquired rapidly by universities and used to solve tedious mathematical problems in essentially all academic disciplines. In astrophysics theory, the so-called "Henyey method" became available for the rapid computation of mathematical models of the interiors of stars, enabling the beginnings of a real study of their evolution [7]. Malcolm's Princeton colleague Martin Schwarzschild, who was already interested in stellar evolution, rapidly devised his own version of this code, and Malcolm obtained a copy for use at Rochester. There, he and his Ph.D. student Samuel C. Vila put this code to work on the University's IBM 7074 mainframe computer to study the final evolution of a star as it becomes a white dwarf. They used a simplified model to avoid the complications involved in thermonuclear "burning" of the lighter chemical elements, but it contained enough of the fundamental physics to enable them to investigate the important role of neutrino emission from the deep interior of the dense star and its transition to a phase of gradually slowing cooling as it grew fainter and fainter. This marked the beginning

of interest by the Rochester astrophysics group in both stellar evolution and white dwarf stars and led to Malcolm's hiring of Hugh M. Van Horn as a postdoctoral research associate in astrophysics theory in 1965.

In 1971, the Department added Judith L. Pipher as an instructor in astronomy. She rapidly developed a strong observational program in infrared astronomy, and her senior colleagues enthusiastically joined in this effort. Malcolm worked on a team with Judy, J. Graeme Duthie (1934–2019), and Terry Herter on a lamellar grating interferometer that they flew on the Kuiper Airborne Observatory, and in 1976, they published an observational study of the compact HII region Sharpless 106 using this instrument [8].

Also in 1976, Malcolm led an observational study of the far-ultraviolet spectrum of the white dwarf Sirius B, using data acquired with the *Copernicus* satellite. He realized that by subtracting the digital spectrum of Sirius A, obtained with the slit of the *Copernicus* spectrograph oriented to exclude the white dwarf, from the spectrum of Sirius A + B it was possible to extract the spectrum of Sirius B alone. This enabled a more accurate determination of its effective temperature and radius than had previously been available [9]. To interpret the spectra of such hot white dwarfs, Savedoff and Van Horn jointly supervised the Ph.D. thesis research of Francois Wesemael (1954–2011), which generated a grid of very hot model atmospheres that became one of the authors' most heavily cited papers [10].

Even after he retired in June, 1991, Malcolm frequently came into the Department to attend the weekly colloquia before the global COVID-19 pandemic shut down in-person gatherings. He never stopped thinking about scientific problems. In a telephone conversation just weeks before his death, he remained interested in the latest astronomical research and was pondering questions concerning the nature of dark matter. Malcolm was preceded in death by Larry Helfer, his long-time friend and faculty colleague, by less than two weeks. Both are remembered by their colleagues and former students as smart, interesting, kind, curious, and generous men who loved to argue with each other over technical points. Both were always willing to engage with undergraduate and graduate students as well as others on almost any topic. The deaths of these two astronomers truly mark the end of an era at the University of Rochester.

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