

Bradford Adelbert Smith

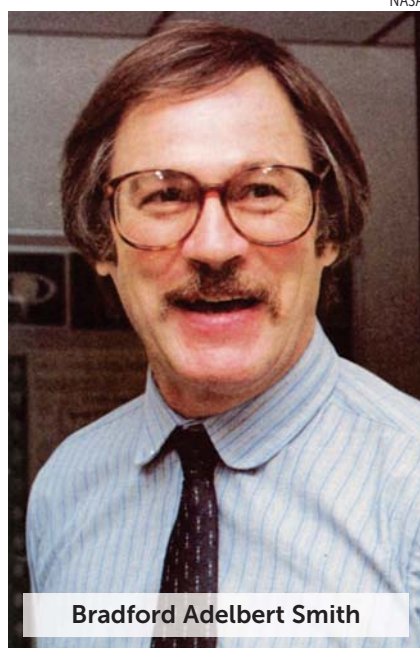
Planetary astronomer Bradford Adelbert Smith, who led the imaging team on the Voyager mission to the outer solar system in the 1980s, died peacefully at his home in Santa Fe, New Mexico, on 3 July 2018 from complications from myasthenia gravis.

Born on 22 September 1931 in Cambridge, Massachusetts, Brad graduated in 1954 from Northeastern University with a BSc in chemical engineering. Despite that early training as a chemical engineer, Brad's first love was astronomy. After college, he spent two years in the US Army, working as an astronomer at the White Sands Missile Range in New Mexico, where he began a long and productive association with Clyde Tombaugh, the discoverer of Pluto. His first project, with Tombaugh at Lowell Observatory, was a search (with negative results) for possible natural satellites of the Moon during the November 1956 lunar eclipse.

Soon thereafter, Brad followed Tombaugh to New Mexico State University (NMSU). In 1958 they established a program of systematic, ground-based telescopic imaging of the planets to support NASA's upcoming robotic planetary missions. That cutting-edge work earned Brad membership in the first generation of explorers to execute humankind's initial reconnaissance of the solar system.

From the 1960s through the 1980s, Brad was involved in many US and international space efforts, including NASA's *Viking 1* and *Viking 2* and the USSR's *Phobos 1* and *Phobos 2* missions to Mars, the USSR's *Vega 1* and *Vega 2* missions to Halley's comet, and the *Hubble Space Telescope's* Wide Field/Planetary Camera team. He rose to deputy team leader for the imaging investigation on *Mariner 9*, which in 1971 became the first spacecraft to orbit another planet. Asteroid 8553 is named Bradsmith for him. Along the way, he received his PhD from NMSU in 1973.

Brad also continued to push the limits in Earth-based astronomical imaging. In 1976 he and his colleagues were the first to use a CCD detector on an astronomical telescope; that work yielded the first high-resolution IR images of Uranus and Neptune. In 1984 he was the first to use a coronagraph on a nonsolar object, the star β Pictoris, and discovered the star's



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circumstellar debris disk, the first direct evidence of a planetary system beyond our own. That discovery initiated the observational study of extrasolar planetary systems, the fastest growing field in astronomy today.

Brad's most renowned and beloved role, however, was in 1972–89 as leader of the imaging team on the most celebrated interplanetary mission of all, *Voyager*. A long, risky undertaking to journey to the outer planets and beyond the solar system, *Voyager* became iconic in its scope and significance—more rite of passage than expedition, more mythic than scientific. The extraordinary images of alien worlds and stunning marvels, so unexpected, and that precognitive sense of being there that they evoked were the means by which laypeople the world over felt connected to a grand pilgrimage, with Brad as head pilgrim, rendering meaning along the way. And he excelled at it: He was well-spoken, commanding, knowledgeable, and witty.

At the same time, Brad was responsible for the phenomenal scientific success of the whole imaging investigation. He was one of a few who foresaw that the satellites and, later, the rings of the outer planets would be as fascinating as the planets themselves. He also saw the need for a high-resolution imaging capability to address both. Those realizations drove him to insist on a change in the optics of the *Voyager* cameras and to personally appoint to the original NASA-selected

imaging team (against the wishes of NASA officials) both scientists with expertise in atmospheric science, geology, and planetary rings and scientists directly involved in ground-based studies of the bodies that *Voyager 1* and *Voyager 2* would visit. And he was gender blind: three of those additions, from 1977 to 1988, were women, including me. He simply went after the best.

Brad was worldly and engaged in life in ways many of his colleagues were not. Maybe it was that trait that moved him to extend a hand, again without official approval, to scientists from other countries at a time when it was rare to do so. For the Neptune encounter, he invited onto the imaging team André Brahic from France and Sasha Basilevsky from the USSR.

Many of us chosen for the *Cassini* mission back to Saturn were among those Brad added to the *Voyager* imaging team. I surely would not have become *Cassini's* imaging team lead had he not selected me for *Voyager*. He might have had a reputation for being unapproachable and intimidating, but under it all, away from the politics and pressure, he was a gentleman, loved by many for his encouragement, open-mindedness, and willingness to listen. He was there for me through some difficult times over *Cassini's* 27 years. He knew firsthand what the job of imaging team leader entailed, what deep resentment from colleagues came with the very public-facing nature of the job, and how politically charged it could be. Through it all, he was a steadfast supporter.

Once *Cassini* reached Saturn, Brad would occasionally send me emails that only someone who had held the seat in an earlier era could write. This one I received only days before *Cassini's* end: "I can remember my own emotions as *Voyager 2* headed away from Neptune, ending the imaging phase of the mission. So, I can only imagine the emotion you will be going through seeing your beloved *Cassini* die after all your years together."

In the history of human life, Bradford Smith was consequential in the most meaningful of ways. He will be fondly remembered.

I thank Diane McGregor, William Sheehan, and Faith Vilas for their assistance.

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