Michael F. A'Hearn

Internationally respected astronomer and renowned comet physics expert Michael Francis A'Hearn (1940–2017) passed away on 29 May 2017 at the age of 76.

Michael A'Hearn, affectionately called 'Mike' or 'Mike A' (as there are many Michaels in astronomy!), retired in 2011 from professorial duties but still maintained a vigorous life in research, especially in areas connected with cometary space missions and NASA's Planetary Data System Small Bodies Node.

How Mike became interested in comets is unrecorded and somewhat of a mystery. Educated at Boston College and then at the University of Wisconsin, Madison, his PhD thesis (1966) addressed an entirely unrelated topic: polarization in the atmosphere of Venus. Nevertheless, by the time he had finished his thesis, he had already published his first two refereed articles on comets!

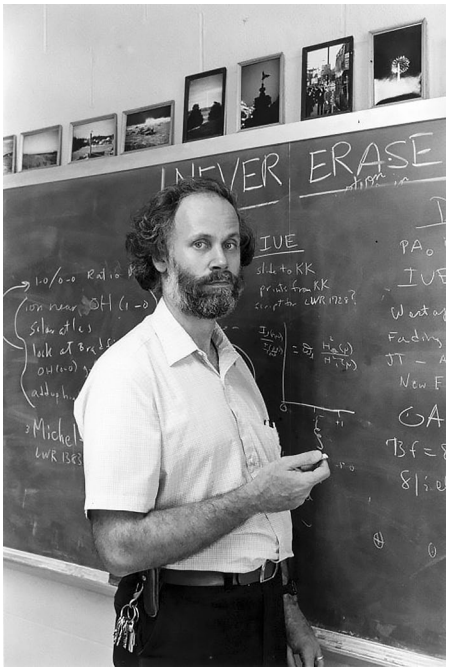
His professional life as an astronomer began in the Department of Physics and Astronomy at the University of Maryland, ultimately achieving the rank of distinguished university professor in the Department of Astronomy, now independent from physics. Mike became a virtuoso at the telescope and in the design of spectroscopic observations. Whether planning cometary observations on the International Ultraviolet Explorer, the Hubble Space Telescope or in the observing room of the then world's largest telescope (Keck), he exhibited total control.

Maybe the appearance of the bright comet Kohoutek in 1973, seven years after his PhD, triggered his refocus on comet research. In any event, starting in 1974 to the end of his career, papers on comets dominate his bibliography. His early work is a combination of theoretical and observational studies, but in the past three decades, he slowly switched his focus to the space exploration of comets. NASA's interest in including comets in their programme of exploration came late in the 1970s when it was realized that comet Halley was rapidly approaching the inner Solar System and would reach its closest point to the Earth/Sun in 1986. In the end, NASA abandoned that effort because of the lack of time to develop a mission of acceptable risk. Nevertheless, NASA supported the collection of observational data with an organization called 'The International Halley Watch', and, later, the development of CRAF, a Comet Rendezvous Asteroid Flyby Mission. Mike was intimately involved in both of these efforts. By the end of the 1980s, NASA started its Discovery Program in which the principal investigator would be the originator of the goal of the mission and responsible for both its development and implementation (see Mike's Comment on the recent selections for the Discovery Program (*Nature Astron.* **1**, 0095; 2017)). It was in this context that Mike became the principal investigator of the highly successful Deep Impact and EPOXI missions. Outside the Discovery Program, he was co-investigator in the Rosetta and Stardust-NExT (New Exploration of comet Tempel 1) missions.

Among his truly great contributions to cometary astronomy, there are three that clearly stand out. In the first, he brings Earth-based thermal and visual observations of a few obscure low-activity comets together to say something quantitative about the physical nature of cometary nuclei. This work shifted the then-current paradigm of the nucleus from a water-ice-dominated dusty conglomerate to an irregular dark object that sported a largely inactive surface. This was a big change that is largely taken for granted now.

The second is an exhaustive survey that he led over a period of 17 years and was published in 1995 as 'The ensemble properties of comets: results from narrowband photometry of 85 comets'. He was able to show that at least two separate compositional sources existed for cometary nuclei. At the time, these two contributions defined all that we quantitatively knew about the physical structure and origins of cometary nuclei.

The third contribution came as a result of his leadership in the scientific design, development and implementation of the Deep Impact mission. His insistence, through thick and thin, threats of cancellation, technical and budgetary problem after problem, on maintaining the full scientific capability of the original Deep Impact design may become legendary.



Michael F. A'Hearn (1940–2017).
Credit: Courtesy of University of Maryland

Any scientist, like Mike, who can claim to be the originator of multiple paradigm shifts in a single field during his professional lifetime is certain to receive the approbation of his colleagues, and with all of his accomplishments, it is not surprising that he collected a large number of honours and awards during his career. Perhaps the two most significant were two given by his astronomy colleagues. In 1986, Asteroid 3192 was named 'A'Hearn' in recognition of his contributions to cometary science. In 2008, he received the Gerard P. Kuiper Prize in Planetary Sciences, the top prize of the Division for Planetary Sciences of the American Astronomical Society.

Active to the end, mainly as a co-investigator for the Imaging Camera (OSIRIS) and for the Ultraviolet Spectrometer (ALICE) on the Rosetta mission, he posted no less than 2 first-author refereed papers and 43 as co-author in the last two years of his life.

Mike had other lives outside of cometary research. He was a large man with a beard who, in his later years, had a passing resemblance to Claude Monet, the French painter. On a visit to Giverny to see the painter's water lilies, he stood in front of the ticket booth beside a portrait of the painter. As the ticket clerk raised his head, he was heard to utter "Mon Dieu!", causing much laughter. He was also an accomplished navigator and seaman, occasionally taking his wife, Maxine, and family on voyages in his small sailboat along the eastern sea coast from the Chesapeake to the Boston area. As a professor, he mentored many graduate students and post-docs, many of whom are active astronomers practicing cometary science today. An inveterate traveller, he participated in many institutional and government committees as a service to the scientific community.

NASA posthumously awarded the Exceptional Public Service Medal to Michael A'Hearn on 12 June 2017. ❐

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