Meteoritics & Planetary Science 41, Supplement, A5–A6 (2006)
http://meteoritics.org

Award

2006 Leonard Medal for Michael J. Gaffey

Where do meteorites come from? For two centuries, this question has defined meteoritics and offered glimpses into the collective psyche of its practitioners. The realization that meteorites originated from outer space, rather than clouds, first separated meteoritics from meteorology. For many modern meteoriticists, the obvious answer is that meteorites arrive in boxes from museums. For the rest of us, the all too common answer is that meteorites come from meteorite parent bodies. For these fictive worlds, we can define petrogenesis, structure, cooling rates, isotopic compositions and ages, yet we have no idea where they existed in time or space. Michael J. Gaffey was never satisfied with these answers. His career has been dedicated to linking asteroids and meteorites. He understood that these links were a key to unraveling the formation of individual asteroids and the asteroid belt as a whole.

Mike began his work in the early 1970s at MIT working with Tom McCord. McCord and Clark Chapman had already begun collecting spectra of asteroid and meteorites and establishing relationships between them. Mike understood that for these links to solidify, a complete database of meteorite spectra was needed. The first paper from his Ph.D., published in *Science* in 1974, provided potential parent asteroids for carbonaceous chondrites, basaltic achondrites, stony-irons, and irons. His 1976 *Journal of Geophysical Research* paper that presented the meteorite spectra remains a literature classic.

During his career, Mike's approach to asteroid spectroscopy has constantly evolved, displaying a keen insight for developing critical techniques and approaches. Rather than utilize only single hemispheric asteroid observations, Mike began using meticulous observations obtained during the rotation of asteroids to unravel surface lithologic heterogeneities. His lithologic map of 4 Vesta revealed a dark, howardite-like surface with areas resembling diogenites and dunites, and presumed to be craters. This work established the paradigm for envisioning the structure and distribution of differentiated asteroids and will be tested by the DAWN mission.

With Ed Cloutis, Mike undertook spectral studies of terrestrial analogs for meteoritic minerals, including mineral mixtures. Combined with a careful examination of meteorite spectra, Mike developed from this work techniques for extracting mineralogical information from the positions and strengths of the absorption bands found in reflectance spectra. These parameters have been widely accepted and applied as tools for deciphering mineral abundances and compositions. His seminal work on S asteroids revealed that they sampled a range of materials and geologic histories, from chondritic through partially differentiated.

Michael J. Gaffey

In the early 1990s, Mike played a key role in unraveling the meteorite analog and geologic history of 433 Eros, which he had studied at the dawn of his career with Chapman, McCord, and Carlé Pieters. When the NEAR MSI/NIS team was faced with the daunting task of unraveling the mineralogy of 433 Eros, Mike developed a self-consistent solution during the course of the mission utilizing his extensive knowledge of meteorites. When coupled with other data from the mission, this work finally resolved the issue of whether ordinary chondrites originated from some S asteroids.

Intimately linked to his own scientific achievements, Mike has played a key role in the growth of asteroid spectroscopy and links to the meteoritics community. The list of students he has worked with reads like a modern day who's who of asteroid spectroscopy, including Jeff Bell, Ed Cloutis, Ted Roush, Lucy McFadden, Trude King, Tom Burbine, Mike

Kelley, Paul Abell, and Paul Hardersen. He has also been a presence in meteoritics, regularly attending the Meteoritical Society meetings and serving as an Associate Editor for *Meteoritics & Planetary Science.* He is truly cross-disciplinary, and both meteoritics and asteroid science have benefited from his willingness to straddle these two communities.

It is for these contributions that the Meteoritical Society awards Michael J. Gaffey the 2006 Leonard Medal.

Timothy J. McCoy
Smithsonian Institution
Washington, D.C.
USA