Additions to our staff:

Meet the

NEW FACULTY

Clay Kelly

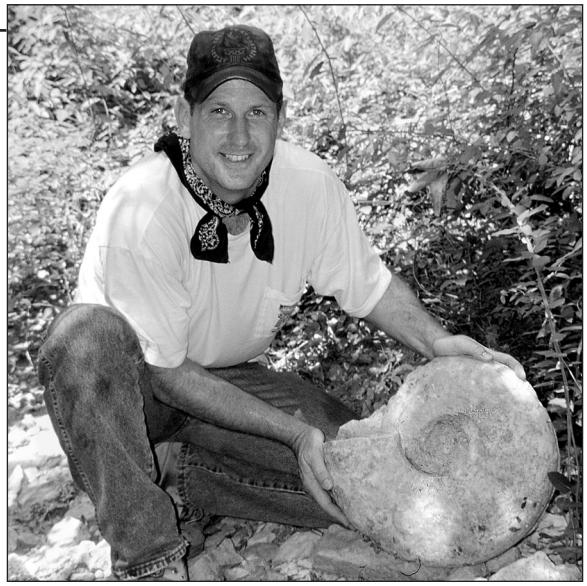


Photo courtesy C. Kelly

Clay Kelly

Charles Darwin once wrote, "The noble science of Geology loses glory from the extreme imperfection of the [rock] record." The many challenges posed to modern Earth scientists by the incompleteness of the fossil record reaffirm the prophetic nature of this statement. It is for this reason that much of my research has focused on the geologic record of microfossils preserved in the deep sea. Deep-sea sedimentary sequences are by no means perfect, but the overall detail at which Earth history has been, and is being, chronicled on the seafloor is impressive. Moreover, the tiny sizes of microfossils make it possible to examine statistically robust populations from just a very small quantity of deep-sea mud; a 5 CC sample can yield thousands of specimens.

The group of microfossils that I specialize in is the planktonic foraminifera (Figs. 1A, B). Planktonic foraminifera are a vital component of today's open-ocean ecosystem and have a fossil record that extends back in time some 150 million years. The evolutionary history of this microfossil group is replete with short-lived, extinct species that are readily identifiable; an attribute that the oil industry utilizes to correlate strata drilled at geographically distant locales. In addition to being excellent tools for age-determination, scientists routinely use foraminifera to detect past changes in ocean circulation and climate; ratios of light, stable (non-radiogenic) isotopes encoded within foraminiferal shells have become a standard tool in the field of paleoceanography. For instance, it is possible to reconstruct a history of sea-surface temperatures for a given area by measuring the oxygen isotopic compositions of planktonic foraminiferal shells recovered from different levels within cores retrieved from the seafloor.

In the past, various aspects of biotic evolution have been the centerpiece of my research. However, this avenue of study has given rise to several offshoot

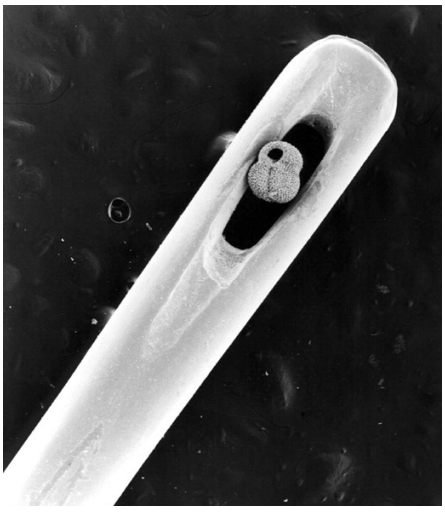
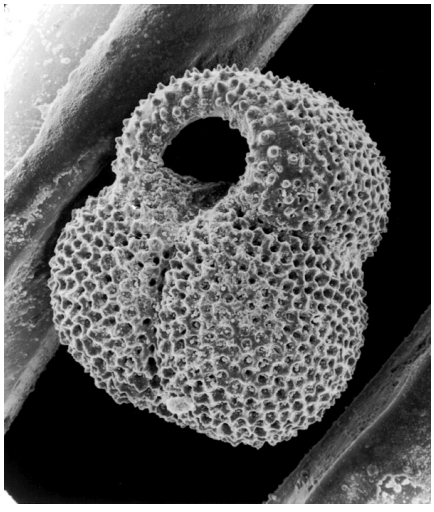


Figure 1A) Scanning electron micrograph showing shell of modern planktonic foraminifera resting inside the eye of a needle.



1B) Close up of same planktonic foraminiferal shell inside the eye of a needle. Large hole in shell is opening from which organism extrudes protoplasm.

projects that are presently underway. One such project is determining how the oceanic ecosystem responded to past episodes of global warming. In a soon to be published manuscript, I report that subtropical plankton species invaded polar waters off the coast of Antarctica during one such greenhouse event. This finding constitutes clear evidence that past pulses of global warming triggered major reorganizations among plankton population structures. This example underscores how the field of micropaleontology can be a powerful vehicle for assessing the effects of climate variability on the marine biota.

I am also an active participant in the Ocean Drilling Program which is an international consortium dedicated to furthering our understanding of the interactions between the geosphere, hydrosphere, atmosphere, and biosphere. It was while serving as a shipboard scientist that I discovered a core sample containing dozens of glassy spherules. These glassy spherules are referred to as microtektites (Fig. 2). Microtektites are condensates that form in the aftermath of a hypervelocity meteorite impact as vaporized target-rock cools and falls back to Earth. The microfossils found in this same core sample suggest that this impact event took place roughly 5 million years ago. This finding is evidence for a previously unrecorded collision between Earth and an extraterrestrial body.

Now that I've given you a feel for some of my research interests, I'd like to close on more of a personal note, that being, life is full of unexpected twists and turns. Growing up in the Deep South and completing my PhD at the University of North Carolina–Chapel Hill, I never really gave much thought to the Midwest. It was while finishing a post-doctoral appointment at Woods Hole Oceanographic Institution that I had the good fortune to be asked to join the faculty here in the Department of Geology and Geophysics. My family and I would like to thank all those that have made us feel at home here in Madison. I am looking forward to reestablishing our micropaleontology program. Thanks!

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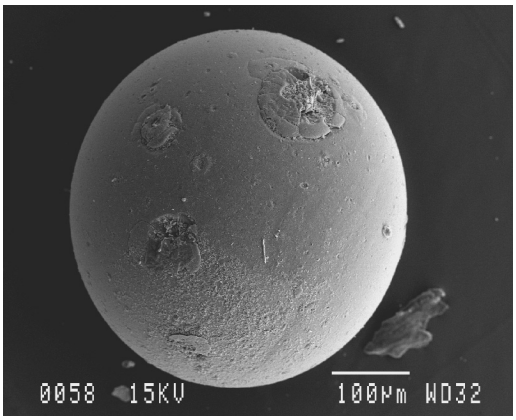

Figure 2) Scanning electron micrograph showing five million year old microtektite recovered from deep-sea sediments off the coast of Tasmania. The diameter of the microtektite is about half a millimeter.

At the Spring Banquet, left to right: Cory Clechenko, Wes Dripps, and Norlene Emerson. Norlene was presented with the Thomas E. Berg Award for Excellence in Teaching. Photo by Carl Bowser.