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Invertebrate Expertise

06.18.2009 | Science A UD professor's latest work will soon add 40 years of scientific advances to the world's top reference volume on invertebrates.

Dan Goldman, an associate professor of geology, will gather a handful of scholars from around the world at UD June 27-July 1 to assemble several chapters on biogeography and paleoecology for the *Treatise on Invertebrate Paleontology, Part V, Graptolithina (Revised)*. The *Treatise* is the standard encyclopedia for invertebrate fossil organisms. He and his team expect to submit the manuscripts for publication in January.

Since the *Treatise's* 1970 issue on the class Graptolithina, improvements in biological classification and a greater understanding of graptolite evolution have brought about dramatic growth in the field of biogeography, Goldman said. His chapter will replace a mere column-and-a-half devoted to the subject in the 1970 edition.

Graptolites hold high esteem in scientific circles, Goldman said, because they're "a textbook example of evolutionary trends in the fossil record." Fossilized in limestone and in sediments that became shale, they're also considered "index fossils" because various graptolite species' brief existences can be associated with relatively narrow windows of geologic time.

Using a classification method known as cladistics, also called phylogenetic analysis, the authors will describe various graptolite species and their relationships to one another. With cladistics, scientists look for synapomorphies — similarities shared by only two groups, called sister groups. Such evolutionary novelties can provide clues to evolutionary relationships and a species' position in the fossil record, Goldman said. It's much more precise than older methods, which used gross similarities or timing of appearance to place species in groups.

The new edition of the *Treatise* will provide other benefits as well: photographic images will replace line drawings, and the text will reflect 40 years' worth of new understanding of paleoecology — the study of life on Earth up to 3.5 billion years ago — and biogeography — the study of the distribution of plants and animals around the world, Goldman said.

The *Treatise* is a publication of the Geological Society of America with sponsorship of the University of Kansas Paleontological Institute.

Besides Goldman, the team includes:

- **Roger Cooper**, Institute of Geological and Nuclear Sciences, New Zealand
- **Fan Junxuan**, Nanjing Institute of Geology and Paleontology, China
- **Michael Melchin**, St. Francis Xavier University, Nova Scotia, Canada
- **Charles E. Mitchell**, State University of New York at Buffalo
- **Peter Sadler**, University of California, Riverside