Fossil Hunting at UT Martin Coon Creek Science Center

ALL AGES ARE WELCOME

Article by Dr. Michael A. Gibson and photographs by Bryan Huff

The year 2026 marks the centennial of one of the most significant natural history publications in Tennessee: U.S. Geological Survey Professional Paper 137—The Fauna of the Ripley Formation on Coon Creek, Tennessee, by Vanderbilt University geology graduate and Tennessee native Bruce Wade. This was Wade's Ph.D. dissertation from Johns Hopkins University that established the McNairy County fossil site as one of the premier fossil localities in North America for paleontologists from around the world.

Thanks to the efforts of the Memphis Pink Palace Museum and the University of Tennessee at Martin, the UT Martin Coon Creek Science Center is also where visitors are encouraged to spend the day "fossicking"—collecting fossils and building personal collections. Fossicking at 76-million-year-old Coon Creek deposit is an easy task for any age group, as fossils are everywhere within the ancient seafloor sediments exposed along the creek banks and are easy to collect. Visitors are likely to find numerous fossils, including the official state fossil of Tennessee, the extinct clam called *Pterotrigonia thoracica* (which has recently undergone a name change in the scientific literature to become *Tennessiella thoracica*), commonly known as the pearly brooch clam.

What makes the Coon Creek Formation, as it was renamed in the

1960s, so significant to paleontologists? First, it represents dinosaur time in Tennessee. Coon Creek Formation sediments, the actual seafloor from that time, experienced a high rate of sediment washing into the shallow sea, which ensured quick entombment of over 700 species of bivalves, oysters, snails, crabs, lobsters, shrimp, sponges, sea biscuits, plankton, and swimming reptiles like mosasaurs and plesiosaurs. Fossils of sea turtles, shark teeth, and fish teeth and vertebrae occur, contributing to one of the most diverse marine ecosystems to exist during the Cretaceous Period.

The site even preserves plants that washed in from the surrounding coastal regions. The ancient environment represented by the Coon Creek fossils was part of a vast inland sea that connected the current Gulf of Mexico with the Arctic Ocean, splitting North America into two landmasses—the highest sea level stand on Earth in the past 100 million years.

Most important for collecting, the fossil shell chemistry remains the same today as it was when the shells were secreted by the living organisms. Most fossils undergo compaction and alteration by groundwater so that they are recrystallized or replaced with other minerals. Not only is the original secreted mineralogy of the shells intact, but trace compounds that the animals were exposed to, such as toxins, were absorbed into the shell and have remained for the past 72 million years.

The incredible preservation, species richness, and abundance of easily extracted fossils have earned the site an exalted status in the field of paleontology. The Coon Creek site is known in scientific circles as a "lagerstätten" deposit, German for "mother lode," which is a special class of fossil deposit reserved for sites that exhibit exceptional preservation. Most lagerstätten achieve this status due to the exceptional quality of preservation or due to the abundance of species; however, Coon Creek is unique in that the deposit possesses both pristine preservation of the fossils, as well as incredible abundance and diversity of fossil organisms.

The science center was constructed in 1988 by the Memphis Pink Palace Museum. Paleontologists at the University of Tennessee at Martin provided expertise to the site from the beginning of the science center's activities and provided many teacher training opportunities for Tennessee educators over the years. In 2019, under my directorship as UT Martin paleontologist, the university took over the running of the site. UT Martin expanded the public programming and research facilities there and added the Clinton W. Lively Paleontology Lab and a fossil preparation pavilion. At the groundbreaking ceremony, University of Tennessee system president Randy Boyd remarked that the Coon Creek Science Center property was now "the oldest campus in the UT system, under development for 72 million years."

Along with conservation of the fossil resource, citizen science and experiential study are cornerstones to the philosophy of educational programming at the site. Thousands of school-age children, amateur collectors, homeschoolers, and tourists visit the site yearly for a personalized fossil-collecting experience provided by the staff of the science center. Students, amateur clubs, and teachers participate in ongoing research

Left: A *Crassatella vadosa* fossil, cleaned and preserved. It is an extinct clam fossil found by Maria Campbell that was donated to the research collections at UT Martin Coon Creek Science Center. **Below:** Maria and Alan Campbell begin their excavation of a fossil-rich portion of the creek bed.

at the site. The guiding principle for the science center is to provide the public with experiential learning experiences related to fossils and Tennessee's geological history. Unlike most fossil sites, personal collecting of the fossils at Coon Creek is encouraged.

Visitors begin their experience with an orientation by Josh Ratliff, director of education, who explains the history of the site and how the fossil deposit was formed, and personally guides the groups through their collecting experience. Ratliff makes sure that each visitor has collecting materials and is instructed on how to collect fossils without damaging them.

Conservation of the fossil resources at Coon Creek is part of the mission of the site. Each fossil uncovered is potentially scientifically significant. These fossils have been safely entombed for 76 million years, so every effort is made to ensure that the exhuming of the fossil is done in such a way as to protect the fossil and its value to science. With few exceptions, the fossils uncovered by visitors belong to the visitor. However, visitors are encouraged to donate those fossils that the staff feel are important to science. Visitors are encouraged to focus their hunting efforts on specific taxa of fossils to support ongoing research by professional paleontologists.

A Community Day program is held at the site every third weekend of the month, available by reservation. For the September 2025 Community Day, two sessions were run, each about four hours in duration with nearly 40 visitors. Maria Campbell, who first learned of Coon Creek as an education major at Middle Tennessee State University, and her husband Alan, were part of this group. This was Maria's fifth trip to Coon Creek. The creek was dry at that time of year so they began their digging in the creek bottom at a spot where they could see some pieces of shell poking up from the sediment, including the state fossil *Pterotrigonia*, of which they found several specimens. After several hours of careful digging, they had collected dozens of pristine fossils of several species. They were careful to keep plenty of the seafloor sediment attached to each fossil to help protect it, but also because they knew that there were more unseen fossils buried within the blocks they excavated.

In the afternoon, Maria and Alan carried their fossil riches, now filling several buckets, to the fossil preparation pavilion for processing and conserving. Using dental tools, small brushes, and

water bottles, the fossils were slowly exposed and cleaned. The attached sediments were either removed entirely or carved into decorative shapes to better display their fossils. A protective clear compound made of floor wax and water was then painted on the shells to harden them, which prevents weathering in the modern atmosphere. After drying, the sediment matrix was also painted with the compound to keep it from disintegrating.

During the preparation process under the pavilion, UT Martin paleontologists roamed among the visitors explaining the different finds each visitor had prepared, identifying the species, and looking for significant fossils that might be valuable to ongoing research at the site. Among the numerous finds for the day were many species of bivalves and snails, several crab pieces, a shark tooth belonging to the extinct genus of Goblin shark called *Scapanorhynchus*, and fish vertebra.

One of Maria's fossils was a clam called *Crassatella vadosa*. Her specimen was unique because it was articulated (both valves present and attached at the hinge) but was partially opened in a state referred to as being butterflied, because of the shell's resemblance to spread wings of a butterfly. This style of preservation is unusual, for it means that the animal, which lived within the sediment, died without being exposed on the seafloor surface for an extended period of time and was quickly buried.

Most beachcombers are familiar with bivalve shells on the beach where only one of the two shells is found. Maria's *Crassatella* also had the shell of another animal, an encrusting brachiopod called *Crania americana*, attached to the shell. *Crania americana*, a species named by Wade in 1926, was a sclerobiont, which is an organism that lives attached to any hard substrate. Maria donated this fossil to the center to be used in the studies of the paleoecology of the Coon Creek fossil site, and said she will be back to dig at the site again soon.

Above: Carefully excavating a fossil bivalve from the ancient Coon Creek seafloor sediments. **Left:** Josh Ratliff, UT Martin Coon Creek Science Center's director of education, instructs visitors on the cleaning of their fossils.

The UT Martin Coon Creek Science Center Community Day occurs the third weekend of each month, and reservations are required. All ages are welcome for this program, and collecting supplies are provided. Reservations can be made by calling 731-646-1636 or emailing cooncreek@utm.edu.

Learn more: utm.edu/offices-and-services/coon-creek-science-center.

(*Dr. Michael A. Gibson* is the professor emeritus of geology at the University of Tennessee at Martin and emeritus director of the UT Martin Coon Creek Science Center. He is a paleontologist specializing in paleontology of the Southeast and Central America.)

LEARN MORE