

# ASU scientists help identify new sea turtle species from 72 million years ago

**A paper on their findings was published in the Swiss Journal of Palaeontology**

By Nicole Pomerantz, ASU News  
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In 2014, retired veterinarian Mac Glaess was providing care to farm animals in Hunt County, Texas, when he spotted something huge eroding along the bank of the South Sulphur River. That something turned out to be a giant prehistoric turtle shell.

Glaess recognized the scientific importance of the specimen, so he excavated the fossil and later donated it to the [Heard Natural Science Museum and Wildlife Sanctuary](#) so it could be studied by scientists.

In 2022, Pat Kline, volunteer preparator at the museum and co-author of a study recently published on the specimen, contacted paleontologists [Brent Adrian](#) and [Heather Smith](#) to take a closer look and analyze the fossil. Adrian is an affiliated graduate student at the [Institute of Human Origins](#) and the School of Human Evolution and Social Change at Arizona State University. Smith is a visiting research faculty member in the school and an anatomy professor at a local medical school.

Adrian and Smith discovered that the shell belonged to a marine turtle species that lived with the dinosaurs 72 million years ago.

“We named the new species *Asmodochelys leviathan* after the mythological concept of Leviathan, now broadly used to refer to a gigantic, powerful entity or large sea monster. The fossil has a large shell of about four feet, or 120 centimeters in length,” said Smith, lead author of the study.

“The specimen is around 72 million years old and was one of the sole survivors of an extinct lineage of marine turtles that patrolled the gulf coast of North America near the end of the Cretaceous Period (about 66 million years ago), just before non-avian dinosaurs went extinct.”

The process for identifying a new species is long and meticulous. First, scientists have to compare the morphology (shapes and sizes of bones, including grooves, bumps and thickenings) of the fossil to all other previously described species.

Then there are measurements, a lot of measurements — photos and 3D or CT scanning — explained Smith. If the pattern and morphology of the fossil are unique, they propose a new species that is peer-reviewed by other experts.

But how do scientists like Adrian and Smith determine it was a sea turtle just from the shell?

“This particular family of marine turtles can be diagnosed by the presence of a row of extra bony ‘sawback’ elevations, called epineurals, that create a wavy ridge along the back of the shell, which may have helped the animal dive and cut through the ocean water,” Smith said. “The shell is also extremely large and full of large foramina (or holes) near the sides of the shell that help to make the shell lighter.”

*A. leviathan* is the first sea turtle ever found in the rock formation called the [Neylandville Marl](#). Other fossils found nearby are mostly teeth from marine reptiles called mosasaurs — giant, meat-eating lizards that ruled the seas during the age of dinosaurs. Adrian and Smith say it is hard to determine what *A. leviathan* ate because the skull was not found; however, clams, ammonites and oysters have been found in the Neylandville Marl and could have been food for the turtle.

“This turtle fills a gap in the fossil record for marine turtles during the beginning of the Maastrichtian age at the western end of the proto-Gulf of Mexico,” said Adrian. “The faunal zone where the turtle was found demonstrates that marine ecosystems reached a prolonged period of stability as the Western Interior Seaway, which previously bisected the continent, closed fully.”

This isn’t the first new species Adrian and Smith have identified. They’ve worked together to identify four new species of Cretaceous North American fossil turtles in their careers. Adrian has also identified two new Miocene carnivorous species from Kenya: the felid (cat) *Katifelis nightingale* and the [viverrid](#) *Kichechia savagei*.

“*Asmodocheilus leviathan* was one of the last surviving representatives of its lineage, persisting to the end of the Mesozoic age of dinosaurs, a time of global climatic cooling when other major marine turtle lineages faced extinction,” Smith said.

“The new species helps us to understand not only the evolution of extinct fossil marine turtle species, but also sea turtles alive today. The fossil record provides clear evidence that as global temperatures change, marine turtle species face increasing extinction pressures.”

[“A novel marine turtle \(Pan-Chelonioidea: Ctenochelyidae\) from the Maastrichtian Neylandville Marl Formation of north central Texas, U.S.”](#) was published in the Swiss Journal of Palaeontology.

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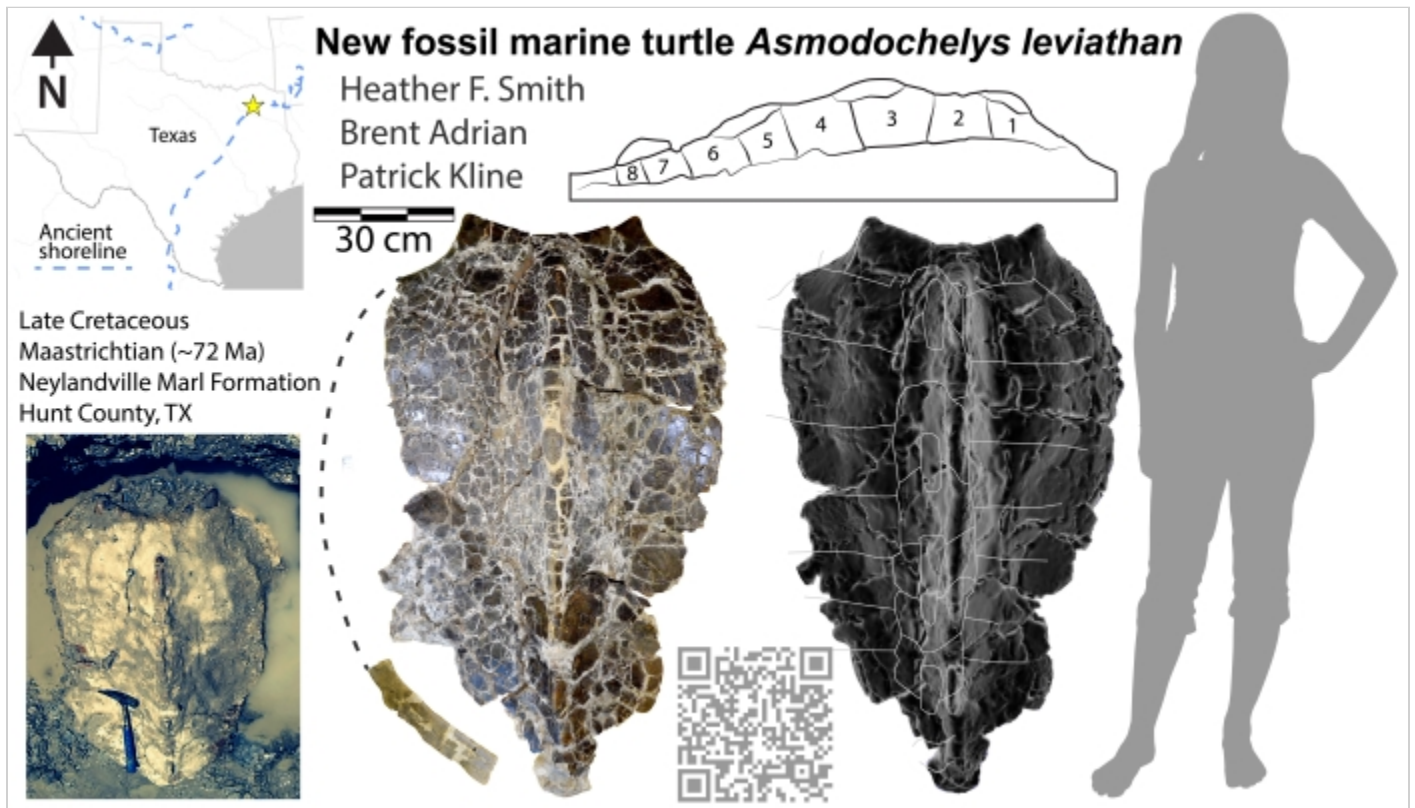
*This story originally appeared on [ASU News](#).*

## Main image



Study co-authors Brent Adrian (right), Heather Smith (back right) and Pat Kline (back left) with volunteer preparator Margie Kline (front left) pose next to the holotype shell of *Asmodochelys leviathan* at the Heard Museum of Natural History and Science in McKinney, Texas. Photo courtesy Brent Adrian

**Text image(s)**



Graphical abstract illustrating the key points regarding the discovery and description of *Asmodochelys leviathan*. Illustration by Brent Adrian