A publication of the Rochester Academy of Science
FOSSIL SECTION

# The FOSSILETTER

VOL. 41 Number 2 November 2023

## November Meeting

The November Rochester Academy of Science Fossil Section meeting is on Tuesday, November 14, at 7:30 PM. It is not on the usual first Tuesday so as not to conflict with election day. This meeting be at the Community Meeting Room at the NEQALS (North East Quadrant Advanced Life Support) building at 1030 Jackson Rd, Webster, 14580. From Route 104, take Holt Road exit south to end, turn left on Ridge Road, take first right at light onto Jackson Road, look for NEQALS on the left. This hybrid meeting will also be broadcast on Zoom. Details on how to login in are in the accompanying email.


*Dr. D. Jeffery Over*

Our speaker is Dr. D. Jeffery Over, Distinguished Professor of Geological Sciences at SUNY Geneseo. Dr. Over will speak on "*The Devonian of New York: Overview and guide to future research*." Dr. Over is one of the editors and contributors to this definitive revision of Devonian stratigraphy published by the Paleontological Research Institution a few months ago after years of work. We do not normally have book reports as our program, but this is something special. It is more like having the author read from their work--sort of like a "Books on CD", except by an editor and with interpretation and anecdotes as he goes. Also, he will not have time to read the 988-page, 3-volume edition of The Devonian of New York to us.

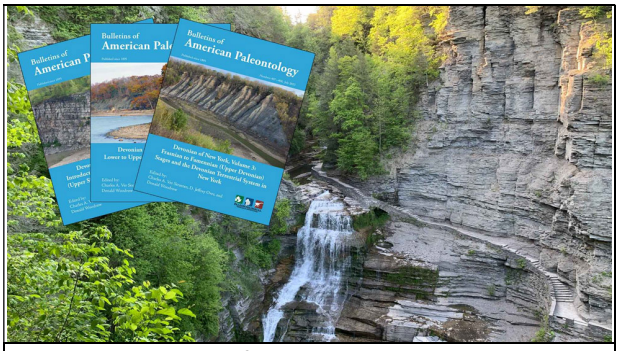



*Image courtesy of the Paleontological Research Institution. https://www.priweb.org/devonian-ny*

Dr. Over has his Ph.D. in Geology from Texas Tech University in 1990. He has been at SUNY Geneseo since 1991, following post-doc work at Texas A&M University.

He has sent the following description of The Devonian of New York: "In August of this year (2023) the long anticipated update of Rickard's 1975 "Correlation of the Devonian Rocks in New York," part of the New York State Map and Chart 24 "Correlation of Silurian and Devonian Rocks in New York State, which consisted of four charts and a 16 page summary, was released as a three volume set of the Bulletins of American Paleontology. The volumes comprise 12 chapters and the forthcoming Devonian Correlation Chart. The volumes were edited by Chuck Ver Straeten, Jeff Over, and Don Woodrow. Associate editors included Diana Boyer, Amanda Colosimo, and Jim Ebert; the chart was drafted by Ver Straten, Over, Woodrow, and Carl Brett.

"Volume 1 starts with a preface and a Dedication to Lawrence (Larry) V. Rickard (Ver Straeten, 2023a [Vol. 1, Dedication]). Chapter 1 of the first volume of Devonian of New York examines the hybrid stratigraphic philosophy and practice that has long been applied to Devonian strata in

New York. This is followed by overviews of the Devonian Period, of the Devonian in North America/Laurentia, and a history of Devonian research in New York State, concluding with a stage-by-stage overview of the succession (Ver Straeten, 2023b [Vol. 1, Ch. 1]). Chapter 2 of Volume 1 presents a different view of the lower Lower Devonian Lochkovian Stage Helderberg Group in the state, sharply contrasting with the long-standing Rickard model (Ebert and Matteson, 2023 [Vol. 1, Ch. 2]). Chapter 3 then examines middle to upper Lower Devonian strata of the Pragian and Emsian stages, including the Oriskany, Esopus, and Schoharie formations in New York State, and their correlative strata along the Appalachian Basin outcrop belt (Ver Straeten, 2023c [Vol. 1, Ch. 3]). Chapter 4 continues upward into the lower Middle Devonian, of the Eifelian Stage Onondaga Limestone and the Eifelian and lower Givetian Stage Marcellus subgroup, as defined in New York State. The chapter also presents correlation of these strata across the Appalachian Basin outcrop belt (Ver Straeten et al., 2023 [Vol. 1, Ch. 4]).

"Volume 2 of Devonian of New York continues through the Middle Devonian in three chapters. The first chapter examines the middle to upper Hamilton Group (Givetian Stage) across central to western New York. These strata comprise one of the most detailed successions in the Devonian, with shell bed to shell bed correlation across broad stretches of the state. These strata have, and continue to provide, a highly proven field lab for testing various geological and paleontological questions, such as sequence stratigraphic models, and Punctuated Equilibrium in evolution (Brett et al., 2023 [Vol. 2, Ch. 1]). Chapter 2 examines much less known marine Hamilton strata in eastern New York, presents old and new data and correlations, and outlines pathways for further research (Bartholomew and Ver Straeten, 2023 [Vol. 2, Ch. 2]). Finally, in this volume, Baird et al., 2023a [Vol. 2, Ch. 3]) present a new synthesis of the Tully and Geneseo formations and correlatives, up to the Middle-Upper Devonian boundary.

"Volume 3 of the Devonian of New York examines various aspects of the Upper Devonian marine strata of the Frasnian and Famennian stages in New York State. In Chapter 1, Over et al. (2023 [Vol. 3, Ch. 1]) lay out current understandings of Frasnian stratigraphy in western and central New York, with details of the bio- and sequence stratigraphy. Chapter 2 (Bush et al., 2023 [Vol. 3, Ch. 2]) outline new correlations between shallow-and-deep water facies proximal to the Frasnian-Famennian boundary. In Chapter 3 Smith and Jacobi (2023 [Vol. 3, Ch. 3]) examine the complexities of intra-and extrabasinal processes on chiefly Famennian-age strata in western New York. Chapter 4 of Volume 3 examines the uppermost Devonian strata and global events in western New York that includes strata in northwestern Pennsylvania and northern Ohio to reach the Devonian-Carboniferous boundary in the northern Appalachian Basin (Baird et al., 2023b [Vol. 3, Ch. 4]). Volume 3 concludes with a chapter on the Devonian terrestrial system in New York, with overviews of various aspects of the geology, paleobiology, and the state of knowledge of the largest remaining frontier of the Devonian in New York and across the eastern United States (Ver Straeten, 2023d [Vol. 3, Ch. 5])."

## Membership Renewal Time

Unless you are a life member, note that your membership will expire on December 31st, 2023. Don't wait—renew now while you are thinking of it. You can get a membership form or even complete the renewal at **rasny.org/mbform.pdf**.

## President's Report **by Dan Krisher**

The Section held its first meeting of the 2023-2024 season on Tuesday 10/23. To celebrate the first get-together for the season, the Section provided cake, ice-cream and drinks to all attendees. After a short business portion, the meeting featured a talk by Dr. Thomas Hegna, Associate Professor in the Department of Geology and Environmental Sciences at SUNY Fredonia. The title of Dr. Hegna's talk was "Tales Told by Trilobites".

Two Section members attended the annual Geological Society of American meeting held in Pittsburg from 10/14 to 10/18.

## November Meeting Recap

**by Michael Grenier**

October 3, we had Dr. Thomas Hegna of SUNY Fredonia discussing trilobites with us. After covering "what is a trilobite"—exclusively marine arthropod from Cambrian to Permian with mineralized carapace, and rare soft body (underside) preservation. They are amazingly diverse with over 20,000 species known. We are ignorant of the relationships between the various groups of trilobites.

Trilobite diversity is at its peak in the Cambrian—in fact, in most beds, the predominant fossil are trilobites.

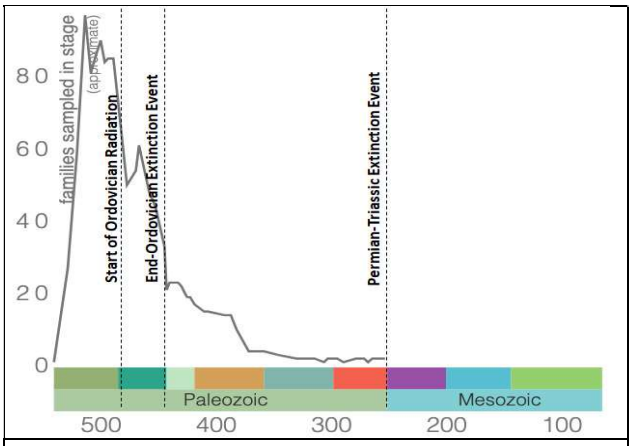
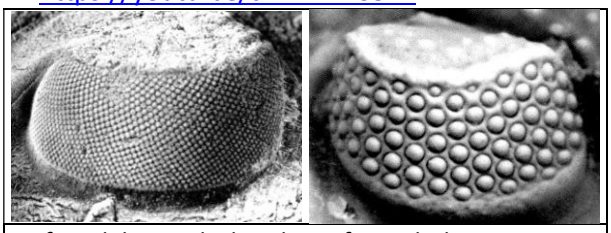


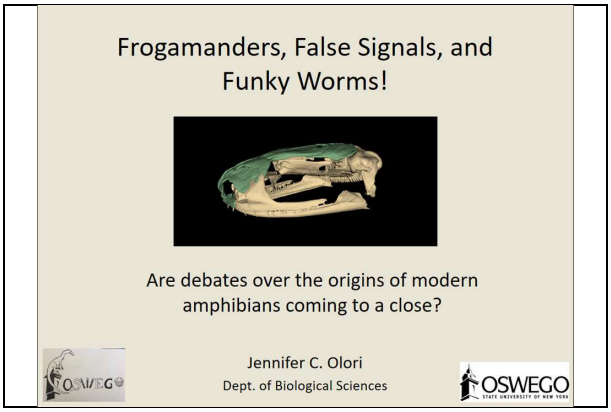

*Chart from Paleontological Research Institution's Digital Atlas of Ancient Life chapter on Trilobita. https://www.digitalatlasofancientlife.org/trilobita/. X axis in millions of years before present (MYA) (Event lines and labels added.)*

Many trilobite species have complete growth records as they went through ontogeny from hatching to maturity (we had a lecture on this with Dr. Melanie J. Hopkins, AMNH, in October 2021). They show that growth is at the tail and new segments are added behind the previous tail end. We see that in crustaceans as well. Trilobite eggs were found on *Triarthrus* a few years ago. (See our newsletter March 2017.) In the Weeks Formation, guts are preserved even though legs and other soft parts are not. Trilobites may have resorbed calcite from the carapace before molting to use in the new shell, storing it in their gut. Of course, most of the fossil trilobites we find are abandoned molted carapace parts, not whole dead trilobites. A fascinating exploration of Phacopid trilobite schizochroal eye vision may lead to improved technology in our own camera optical systems. You'll have to watch the video of the talk to learn more, which can be found at https://youtu.be/dxAkEMfo5YI .



*Left, Trilobite Holochroal eye, from Clarkson 1975. Most trilobites had this and it is similar to insect eyes today. Right, Schizochroal eye from Levi-Setti 1993. Phacopid trilobites had these. https://www.trilobites.info/eyes.htm*

## More videos




There are additional recent videos to watch on our YouTube channel. In May, we had Dr. Jennifer Olori from SUNY Oswego as our speaker. Her topic was "*Frogamanders, False Signals, and Funky Worms: Are debates over the origins of modern amphibians coming to a close*?" This also was an excellent talk—click on https://rasny.org/fossil-section-calendar to get the link for this video to watch it. There, you can also find the links to recordings of each of the following talks from earlier this year.

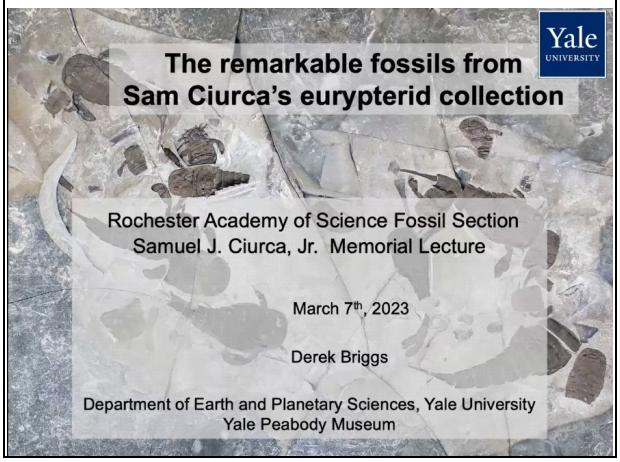
In April, we had two speakers. Our first was Dr. Jonathan Hendricks, Associate Director of Science Communication at the Paleontological Research Institution. He made a short presentation on the "*Year of the Devonian*" at the PRI.

Jonathan was followed by our keynote speaker, Gerry Kloc, with the long-awaited *"Silurian trilobites from Southern Illinois and Missouri."* recounting his findings from his work in this area.

Back in March, we had Dr. Derek Briggs of the Yale Peabody Museum as our first ever first Samuel

Ciurca, Jr. Memorial Lecture. He spoke on "*Remarkable Fossils from Ciurca's Eurypterid Collection*."

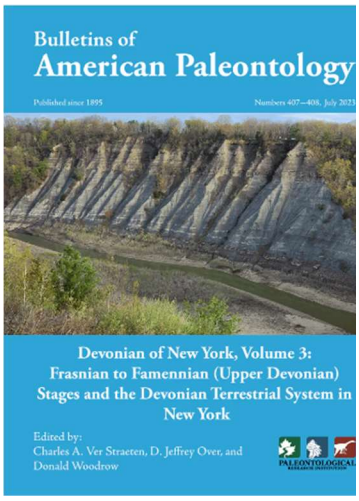





Our first talk of the year was with Dr. Matt Friedman, Associate Professor at the University of Michigan and Director at the UM Museum of Paleontology. He spoke on "*The Ages of Fishes*." reviewing important steps in the evolution of ray-finned fishes from the late Devonian up through the present with a focus on the Devonian/ Carboniferous and in the late Cretaceous/early Cenozoic.


## Book Review - *The Devonian of New York*

By Dan Krisher




The Devonian period extending from 419 to 359 million years ago has long had a prominent place in the geology of New York State. Since the mid-1800's, the Devonian strata of New York has served as the standard for North America and currently serves as a key global reference. Devonian rocks were first recognized in the state in the mid-1600s with serious study beginning in 1836 with the founding of the New York State Geological Survey.

These early studies were limited by the understanding of geologic processes at that time but none the less formed an important foundation for all future work. Beginning in the 1930s to 1960s, this early geological framework was refined and expanded through the application of improved geologic and stratigraphic concepts. The culmination of this work was the creation of Dr. Lawrence Rickard's Devonian correlation chart for New York first released in 1964 then again in 1975 with updated data. *The Correlation of the Devonian Rocks in New York* has, in the intervening years since its 1975 release, served as the reference for the Devonian strata of the state and has facilitated a vast amount of stratigraphic and biostratigraphic study within the state.

In the 48 years since the release of the 1975 chart the study the Devonian rocks of New York has not been static. Since the 1970s until today many dedicated researchers have applied a host of new techniques to further our knowledge of the Devonian stratigraphy of the state. In recent years a number of cutting-edge practices such as sequence stratigraphy, fine scale biostratigraphy, carbon isotope analysis, radiometric dating, and astrochronology have been applied to expand, refine, and in some cases overturn the understanding of the Devonian stratigraphy of the state.

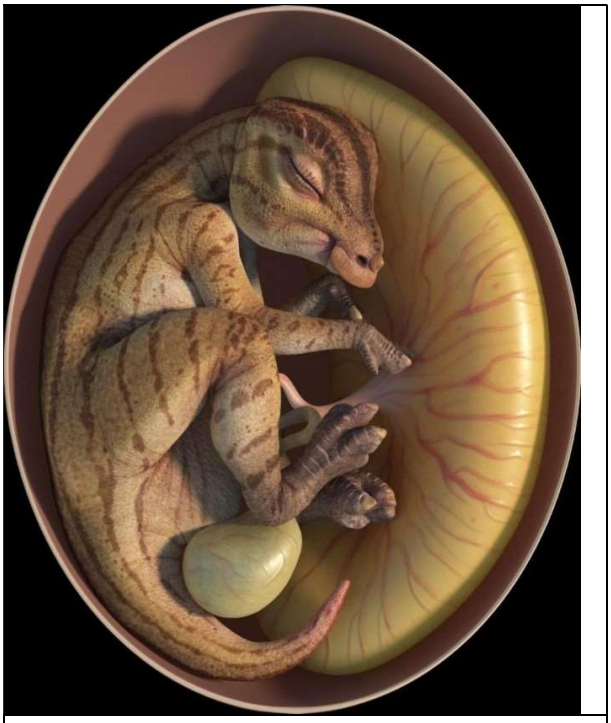
On August 1st of this year a compilation of all this work was released by the Paleontological Research Institution as a three volume set of their *Bulletins of American Paleontology*. The volumes entitled *The Devonian of New York* consist of over 900 pages of highly detailed data which will give the reader an in-depth understanding of the Devonian of New York as it is now understood. To avoid redundancy, I will not delve into the volumes in detail as their contents as well as the researchers involved are thoroughly covered in Dr. Over's abstract.

These volumes will serve as the standard for Devonian stratigraphy of New York state for the next generation and likely beyond. These volumes should have a prominent place in the libraries of anyone who studies or simply has an abiding interest in the geology and paleontology of New York. The volumes can be ordered from PRI at the following link: https://www.priweb.org/devonian-ny.

## 2023 *BMC Ecology and Evolution* image competition: the winning images

In 2023, researchers from around the world entered the *BMC Ecology and Evolution* photography competition. These photographs had to be in one of the following four categories: 'Research in Action', 'Protecting our planet', 'Plants and Fungi' and 'Paleoecology'.

Here we show the winning images of the 'Paleoecology' category. To see winners in the other categories, visit the website, https://bmcecolevol.biomedcentral.com/articles/10.1186/s12862-023-02141-x.



*A peek inside a hadrosaur egg. Submitted by Jordan Mallon. Restoration by Wenyu Ren. Hadrosauroid embryo based on YLSNHM 01373*

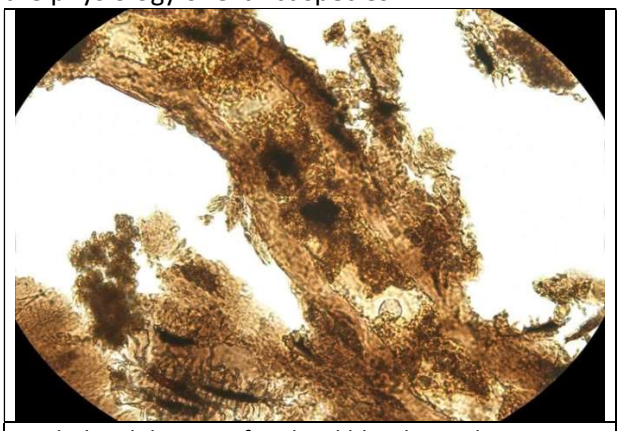
This image, submitted by Jordan Mallon from the Canadian Museum of Nature, highlighted the work a group of trans-Pacific paleontologists completed remotely during the COVID-19 pandemic. The image showcases the team's collaborative efforts in describing a remarkable discovery: a pair of hadrosauroid dinosaur eggs and embryos from China's Upper Cretaceous red beds, dating back approximately 72 to 66 million years ago. Jordan comments, "The relatively small size of the eggs, and the unspecialized nature of the dinosaur embryos inside, suggest that the earliest hadrosaurs laid small eggs and hatched altricial young. More derived hadrosaurs eventually laid eggs nearly four times larger by volume and hatched correspondingly larger young. This digital image depicts an example of a 'primitive' hadrosaur developing within the safety of its small egg expertly crafted by Wenyu Ren." For comparison, the photo next page is of the actual fossil egg content, figure 6A in the paper.

This image reminds us of the amazing wealth of information locked within fossils. The winning image was Figure 7 in their paper (Xing, L., Niu, K., Yang, T.R., Wang, D., Miyashita, T. and Mallon, J.C., 2022. Hadrosauroid eggs and embryos from the

Upper Cretaceous (Maastrichtian) of Jiangxi Province, China. *BMC Ecology and Evolution*, *22*(1), p.60.)


Fig. 6A Photograph of Hadrosauroid partial embryonic skeleton (YLSNHM 01373).

A micrograph of a fossilized blood vessel from a 150-million-year-old diplodocid dinosaur was a runner-up awardee. The image, taken by molecular paleobiologist Jasmina Wiemann of the Field Museum of Natural History, also shows remnants of the extracellular supporting structure. Wiemann and other researchers have made strides analyzing fossilized biomolecules to understand the physiology of extinct species.



Diplodocid dinosaur fossilized blood vessel, submitted by Jasmina Wiemann

## Fossil News

***Land plants changed Earth's composition, say scientists.*** University of Southampton Press release issued: *30 August 2022*
https://www.southampton.ac.uk/news/2022/08/land-plants-changed-earths-composition.page

Scientists at the University of Southampton have discovered that the evolution of land plants caused a sudden shift in the composition of Earth's continents. They have studied the effects of land plant evolution on Earth's chemical composition over the past 700 million years.

*Ferns were some of the first land plants to colonize the continents. Credit: Dr. Tom Gernon*

The evolution of land plants took place about 430 million years ago during the Silurian Period, when North America and Europe were conjoined in a landmass called Pangaea. The proliferation of plants completely transformed Earth's biosphere – those parts of the planet's surface where life thrives – paving the way for the advent of dinosaurs about 200 million years later.

"Plants caused fundamental changes to river systems, bringing about more meandering rivers and muddy floodplains, as well as thicker soils," says lead author Dr. Christopher Spencer of Queen's University in Kingston, Ontario, of the study. "This shift was tied to the development of plant rooting systems that helped produce colossal amounts of mud (by breaking down rocks) and stabilized river channels, which locked up this mud for long periods."

The team recognized that Earth's surface and deep interior are linked by plate tectonics – rivers flush mud into the oceans, and this mud then gets dragged into the Earth's molten interior (or mantle) at subduction zones where it gets melted to form new rocks. "When these rocks crystallize, they trap in vestiges of their past history," says Dr. Tom Gernon, Associate Professor of Earth Science at the University of Southampton and co-author of the study. "So, we hypothesized that the evolution of plants should dramatically slow down the delivery of mud to the oceans, and that this feature should be preserved in the rock record – it's that simple."

To test this idea, the team studied a database of over five thousand zircon crystals formed in magmas at subduction zones – essentially 'time capsules' that preserve vital information on the chemical conditions that prevailed on Earth when they crystallized. The team uncovered evidence for a dramatic shift in the composition of rocks making up Earth's continents, which coincides almost precisely with the onset of land plants.

Notably, the scientists also found that the chemical characteristics of zircon crystals generated at this time indicate a significant slowing down of sediment transfer to the oceans, just as they had hypothesized. The researchers show that vegetation changed not only the surface of the Earth, but also the dynamics of melting in Earth's mantle. "It is amazing to think that the greening of the continents was felt in the deep Earth," concludes Dr. Spencer. This paper, Christopher J. Spencer, Neil S. Davies, Thomas M. Gernon, Xi Wang, William J. McMahon, Taylor Rae I. Morrell, Thea Hincks, Peir K. Pufahl, Alexander Brasier, Marina Seraine, Gui-Mei Lu. **Composition of continental crust altered by the emergence of land plants**. *Nature Geoscience*, 2022; DOI: 10.1038/s41561-022-00995-2

**Rare Dinosaur Fossils Discovered in Prince George's County Dinosaur Park, MD**

Maryland-National Capital Park and Planning Commission press release issued: July 13, 2023. https://www.pgparks.com/rare-dinosaur-fossils-discovered-at-m-ncppc-department-of-parks-and-recreation-prince-georges-county-dinosaur-park

Prince George's County paleontologists and volunteers discovered the largest theropod fossil in Eastern North America during a dig experience program at the Dinosaur Park on April 22, 2023. Additional fossils found nearby elevate the Dinosaur Park's classification to a "bonebed." The term "bonebed" is used by paleontologists when bones of one or more species are concentrated within a geologic layer. This is the first dinosaur bone bed discovered in Maryland since 1887.

"Finding a bonebed like this is a dream for many paleontologists as they can offer a wealth of information on the ancient environments that preserved the fossils and provide more details on the extinct animals that previously may have only been known from a handful of specimens," said JP Hodnett, Dinosaur Park Paleontologist and Program Coordinator. "Most paleontologists have to travel across the country or go overseas to find something like this, so having this rare find so close to home is fantastic!"

*A "bonebed" of dinosaur fossils discovered at a Maryland park is one the most important findings on the East Coast, experts said. Credit...M-NCPPC/Prince George's County Department of Parks and Recreation.*

Hodnett made the initial discovery and identified the 3-foot-long shin bone as that of a therapod, a branch of the dinosaur family that contains carnivorous dinosaurs, such as *Tyrannosaurus rex*. His believes this fossil is an *Acrocanthosaurus*, the largest theropod in the Early Cretaceous period, estimated to measure about 38 feet long. *Acrocanthosaurus* teeth have been previously collected from Dinosaur Park.

University of Maryland Paleontologist Thomas Holtz, the first to verify the therapod discovery at the park, said "The dinosaur site at Laurel is by far the most important dinosaur dig site in America east of the Mississippi."

The Dinosaur Park located in Laurel, Maryland is a property of the Maryland-National Capital Park and Planning Commission (M-NCPPC). The park provides a variety of educational experiences where the public can assist Dinosaur Park staff and be paleontologists for a day. Fossils found at the park are about 115 million years old. The area represents what remains of an Early Cretaceous period river and wetlands, similar in environment to the Patuxent River Park in Upper Marlboro, Maryland today.

## CALENDAR OF EVENTS

**November**
**Tuesday November 14, FOSSIL MEETING 7:30 PM. LOCATION: NEQALS Community Meeting Room, 1030 Jackson Rd, Webster, 14580. Speaker is Dr. D. Jeffrey Over of SUNY Geneseo on the "Devonian of New York". NOTE 2nd Tuesday date due to elections.**

**December**
**Tuesday December 5, FOSSIL MEETING 7:30 PM NEQALS Community Meeting Room,** 1030 Jackson Rd, Webster, 14580. Our traditional Show-and-Tell with pizza and drinks provided by the section. This is a great opportunity to show off your finds from the past year. Visitors welcome.

Visitors are welcome to all Fossil Section meetings! For more information and the latest updates check the RAS Website (**www.RASNY.org**). You can also contact Dan Krisher at DLKFossil@gmail.com or John Handley at jhandley@rochester.rr.com for further information.

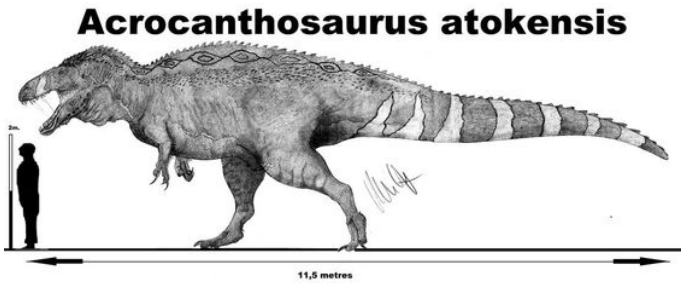
**ROCHESTER ACADEMY OF SCIENCE FOSSIL SECTION**

**Monthly meetings are now held as hybrid meetings, live but also broadcast on Zoom.** Meetings are held the first Tuesday of each month from October to December and from February to May at 7:30 pm. In person meetings are now held at the NEQALS Community Meeting Room, 1030 Jackson Rd, Webster, NY 14580 unless otherwise listed.

| **OFFICERS** | **PHONE** | **E MAIL** |
|---|---|---|
| President: Dan Krisher | 585 698 3147 | DLKFossil@gmail.com |
| Vice President/Program Chair: Michael Grenier | 585 671 8738 | paleo@frontier.com |
| Secretary: Dan Krisher | 585 698 3147 | DLKFossil@gmail.com |
| Treasurer: John Handley | 585 802 8567 | jhandley@rochester.rr.com |
| Director (three-year term): Melanie Martin | 585 413 8264 | martin@nanoparticles.org |
| Director (two-year term): Fred Haynes | 585 203 1733 | fred.patty.haynes@gmail.com |
| Director (one-year term): ***Open*** | | |
| **APPOINTED POSITIONS** | | |
| Field Trip Coordinator: Dan Krisher | 585 293 9033 | DLKFossil@gmail.com |
| FossiLetter Editor: Michael Grenier | 585 671 8738 | mgrenier@paleo.com |

The FossiLetter is published before each meeting month of the year. Please send submissions to mgrenier@frontiernet.net or by U.S. Postal Service mail to 692 Maple Drive, Webster, NY 14580. Deadline for submissions to the Fossiletter is the 15th of the month.

For scheduling changes and the latest updates please check the RAS Website (www.rasny.org) and click on the Fossil Section link. Last minute updates can also be found on the *General Announcements* page of the Academy Website.




As likely found in Maryland, with human figure for scale. Art by Teratophoneus on DeviantArt. With a three-foot-long tibia, the one in Maryland is about half this size. https://www.deviantart.com/teratophoneus/art/Acrocanthosaurus-atokensis-738844190.