

A publication of the Rochester Academy of Science FOSSIL SECTION

The FOSSILETTER

VOL. 42

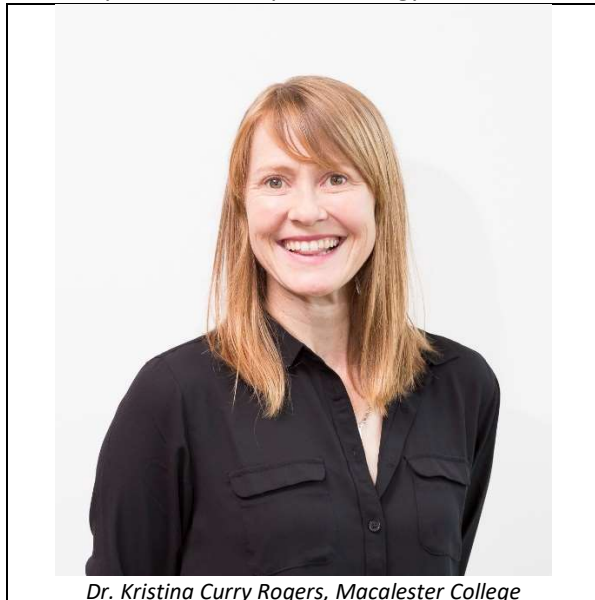
Number 4

February 2024

February Meeting

The February section meeting is on Tuesday, February 6th at 7:30 PM. This meeting will be on Zoom only. The Zoom Link is included in the cover email for this issue.

Our speaker this month is Dr. Kristina Curry Rogers, vertebrate paleontologist and the DeWitt Wallace Professor in Biology and Geology at Macalester College in St. Paul, Minnesota and past Chair of the Biology Department. She will be speaking on, “The Unlikely (but Very Lucky!) Triumph of Dinosaurs.” Dr. Rogers is a leading authority on dinosaur paleobiology and evolution.

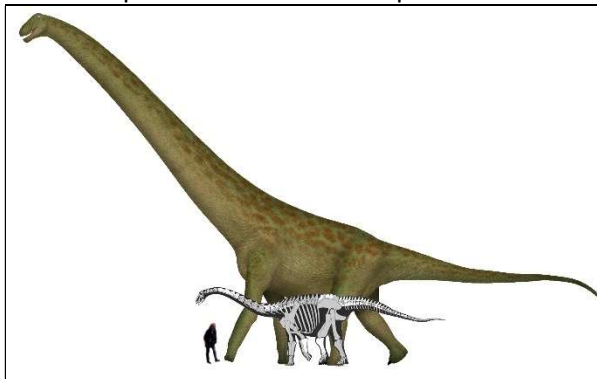


Dr. Kristina Curry Rogers, Macalester College

Her research includes bone histology to understand dinosaur growth and she has applied that to the effects of environmental stress on the bones of backboned animals, for which she was awarded an NSF CAREER grant. She is an excellent speaker which you can see by viewing her talks on YouTube (e.g., DINOSAURS EGGS AND BABIES Rediscovering the Age of Dinosaurs Masterclass, <https://www.youtube.com/watch?v=xBaC5KJDKZ>, among others). She has won the Jack and Marty

Rossman Award for Excellence in Teaching. This is presented each spring to one faculty member who has been identified by colleagues and students as exemplifying Macalester teaching goals.

Kristi specializes in sauropods, which were the long-necked dinosaurs such as *Brachiosaurus* and *Diplodocus*, with a particular interest in the titanosaurs. Many of her summers are spent in the southern hemisphere former Gondwana lands where titanosaurs made their home. She has been on field expeditions to find and collect new specimens in Argentina, Madagascar, Montana, South Africa, and Zimbabwe. From the Madagascar collecting, she has described and named two dinosaur species, *Rapetosaurus krausei* and *Vahiny depereti*. *Rapetosaurus* is the most complete Cretaceous sauropod found so far.



Reconstructed juvenile Titanosaur *Rapetosaurus krausei* skeleton based on found remains with human female figure for scale and expected adult *Rapetosaurus* size behind. Scaling is approximate. Juvenile image from Rogers, K.C (2009). The postcranial osteology of *Rapetosaurus krausei*. Adult image from en.wikipedia.org/wiki/File:Rapetosaurus

Kristi is the author of more than 50 scholarly articles, has published two articles in *Scientific American*, and is editor (with Jeffrey Wilson) of the book *The Sauropods: Paleobiology and Evolution*, available on Amazon. Her second *Scientific American* article—*Tiny Fossils Reveal Dinosaurs'*

Lost Worlds—is in the current (February 1) issue and can be accessed at scientificamerican.com/article/tiny-fossils-reveal-dinosaurs-lost-worlds/. Her husband, Dr. Ray Rogers, is co-author.

Kristi offers the following description of her talk, “When most of us imagine dinosaurs, we think of the colossal sauropods, ferocious theropods, and bizarre horned and armored creatures that rule museum exhibit halls. These magnificent characters ruled Earth’s terrestrial ecosystems for 150 million years. But how did they get that way? In this talk we’ll explore the humble origins of the Dinosauria. Our story begins in the wake of the most precipitous mass extinction the world has ever seen and follows the trail of the group that would eventually birth the dinosaurs, the Archosauria. We’ll touch on the lucky breaks that paved the way for dinosaur evolution, meet some of the earliest representatives of the group, and speculate on a few of the potential specializations that fueled their rise.”



Kristi in her Macalester College lab

President's Report by Dan Krisher

The Section’s December meeting was held on 12/5 and featured our annual pizza party and show-n-tell. Members brought in a variety of fossils and each contributor gave a brief overview of the specimens they brought.

On December 30th and 31st, the Section participated in an outreach event at the Rochester Museum and Science Center. Section members John Handley, Michael Grenier, Mathew Lopez Alarcon, Howard Heitner, and Dan Krisher staffed the display which drew a crowd throughout the event.

While at the event the Fossil board members present discussed the need to put together a high

quality, readily mobile and easily available outreach “kit” which would be available for any member conducting a sanctioned outreach event. The board decided to set up a workshop by the end of the month for the board members and any interested members to brainstorm what is needed.

Upcoming Meetings

- March 5 – Our annual **Samuel J. Ciorca, Jr. Memorial Lecture**, featuring Dr. James Lamsdell on eurypterids with an opening short talk by Dr. Derek Briggs on recent publications featuring Sam Ciorca Collection fossils. **Zoom meeting only.**
- April 2 – Member George McIntosh on Late Devonian crinoid ghost lineages. Live at NEQALS.
- May 7 – TBD. Live at NEQALS.
- June 4 – Picnic at ASRAS observatory

November Meeting Recap

by Michael Grenier

We had a great meeting in November with Dr. Tom Hegna. The room was full and we had another 21 attending on Zoom, including 16 members of MNHS, MGS, BGS, DD, and NCFC. Tom gave a great talk on *Tales Told by Trilobites*. This was recorded and is on our YouTube channel at <https://youtu.be/dxAkEMfo5YI>. You will learn things about trilobites that you never knew.

Buffalo Geological Society’s 54th Annual Gem-Mineral-Fossil Show

by Jerry Bastedo, Show Chairman

“Birthstones” are being featured at the Buffalo Geological Society’s 54th Annual Gem, Mineral and Fossil Show on Saturday March 16, 2024, 9 am to 6 pm, March 16-17, 2024, and on Sunday, March 17, 2024, 10 am to 5 pm, at the Erie County Fairgrounds in the Grange, Market and New York State Police Buildings in Hamburg, NY.

This annual show provides an instant museum of Buffalo Geological Society Members fossils, minerals, and jewelry; demonstrators; the famous Mini-Mine for young collectors; the mining operation for children and adults; mineral and fossil identification; and a variety of non-profit

The Buffalo Geological Society, Inc.

54th ANNUAL GEM MINERAL FOSSIL SHOW



**1 DAY
ADMISSION
\$7
PER PERSON**

**2 DAY
ADMISSION
\$10
PER PERSON**

Sat. March 16, 2024 • 9 am to 6 pm
Sun. March 17, 2024 • 10 am to 5 pm
In the Market, Grange, and NYS Police Buildings
located the Fairgrounds in Hamburg, NY

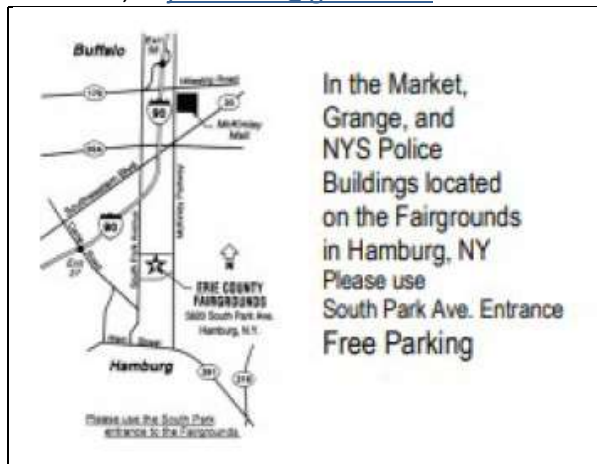
exhibitors. This highly educational family event affords attendees the opportunity to interact with demonstrators who work with minerals and gems. Demonstrators include fossil preparation, jewelry designers, and other lapidary artists. A fluorescent mineral exhibit will be available.

In addition, over 33 dealers selling gems, beads, minerals, fossils, and jewelry, selling their items from around the world. A food vendor and hourly door prizes will be available.

Young scientists can visit the "Mini-Mine" that offers them the chance to search for mineral specimens in a simulated mine setting. The mining operation is for young miners (under 100 years of age) who can search for minerals and fossils in a bag of sand that they wash. All who attend can experience hands-on fun and learn something new about the geological sciences. Professional Geologists will be available to discuss what geologists do and what types of jobs are present in the area for geologists. Boy and Girl Scouts will be

able to earn badge requirements during the show. The Geology Department from SUNY Fredonia will have a stream table demonstrating how rivers behave when water flows change.

This is a perfect family field trip to learn more about the geological sciences. Boy Scouts, Girl Scouts, students, teachers, the public, and rock hounds are welcome. Adults are \$7 each, **scouts in uniform and children under 12 are FREE**. A 2-day admission for \$10 each is also available. Door prizes are drawn hourly. FREE parking. Wheel chair and stroller accessible. For any additional information or questions, please contact Jerry Bastedo, Show Chairman, at jcbastedo@gmail.com.



SPECIAL LECTURE AT GEM SHOW

Saturday, March 16 & Sunday 17, 2024 from 11:00 AM to 11:30 AM in NYS Police Building

Fluorescent Minerals of Northern New York
Presented by Dino Zack, P.G., Senior Geologist/
Project Manager, AECOM Technical Services, Inc.

Approximately 5,955 different mineral species have been identified by the International Mineralogical Association as of July 2023. Over 500 of them are known to fluoresce visibly in some specimens. Dino Zack will discuss the various types of luminescence with a detailed explanation of mineral fluorescence as well as touch on the various ultraviolet lights and associated safety while using them. Fluorescent rock and mineral specimens from Northern New York State, as well as world-renowned locations, will be on display and used to demonstrate the many types of luminescence including fluorescence, phosphorescence, triboluminescence, thermoluminescence, and tenebrescence. Whether you are a novice, an

expert, or just curious about fluorescent minerals, you will find this presentation very enlightening!

GSA Northeast Regional Meeting

The 59th Annual Meeting of the Northeastern Section of the Geological Society of America will be held in Manchester, NH on 17–19 March 2024. Manchester is the largest city in northern New England, situated on the Merrimack River about 50 miles northwest of Boston and 60 miles south of the White Mountains. GSA Section Meetings are interdisciplinary for all aspects of geology, including paleontology. They provide technical sessions presenting current research, field trips, and short courses.

Early registration deadline is 13 February 2024. The Abstracts deadline has passed. See <https://www.geosociety.org/GSA/Events/SectionMeetings/GSA/Sections/Home.aspx?hkey=88411fd7-3278-41be-aa78-f451032e17f3> for more details and for information on other regional meetings.

Fossil News edited by Michael Grenier

Earliest Multicellular Ediacaran Fossils Dated for First Time

Curtin University Press release issued January 16, 2024. <https://www.curtin.edu.au/news/media-release/key-moment-in-the-evolution-of-life-on-earth-captured-in-fossils/>

Near the beginning of the Ediacaran, at a site in Wales, some of the oldest fossils of complex multicellular life in the world are found. This was a pivotal moment in the history of Earth when the seas began teeming with new lifeforms after four billion years of containing only single-celled microbes. Researchers from Curtin University precisely dated these fossils for the first time, using volcanic ash layers like bookmarks in the geological sequence.

“Located in the Coed Cochion Quarry in Wales, which contains the richest occurrence of shallow marine life in Britain, we used outfall from an ancient volcano that blanketed the animals as a time marker to accurately date the fossils to 565 million years, accurate down to 0.1 per cent,” Lead author Anthony Clarke said. “With similar Ediacaran fossils found at sites around the world including in Australia, dating the fossils identifies

them as being part of an ancient living community that developed as Earth thawed out from a global ice age [Cryogenian Age].

Study co-author Professor Chris Kirkland said, “These Welsh fossils appear directly comparable to the famous fossils of Ediacara in South Australia. The fossils, including creatures like the disc-shaped *Aspidella terranovica*, showcase some of the earliest evidence of large-scale multicellular organisms, marking a transformative moment in Earth’s biological history. Ediacaran fossils record the response of life to the thaw out from a global glaciation, which shows the deep connection between geological processes and biology.”

[*Aspidella terranovica* are disk-shaped fossils, possibly holdfasts, or bases, of larger frond-like organisms. They are found in South Australia, Newfoundland; England, Wales., and most other Ediacaran fossil assemblages. — editor.]



Remains of two individuals of *Aspidella terranovica* from Ferryland, Newfoundland. 5 cm scale bar shown. Courtesy of Marc Laflamme. <https://www.semanticscholar.org>

This paper (Clarke, A.J., Kirkland, C.L., Menon, L.R., Condon, D.J., Cope, J.C., Bevins, R.E. and Glorie, S., 2024. U–Pb zircon–rutile dating of the Llangynog Inlier, Wales: constraints on an Ediacaran shallow-marine fossil assemblage from East Avalonia. *Journal of the Geological Society*, 2024; 181(1)), is available at DOI: [10.1144/jgs2023-081](https://doi.org/10.1144/jgs2023-081).

Long Needed Trilobites have been Found

Paleontologists love finding fossils buried by volcanic ash, as the newly-formed zircon crystals in the ash allow very precise dating by measuring the ratio of uranium atoms trapped in the crystals to its lead radioactive decay product. (See

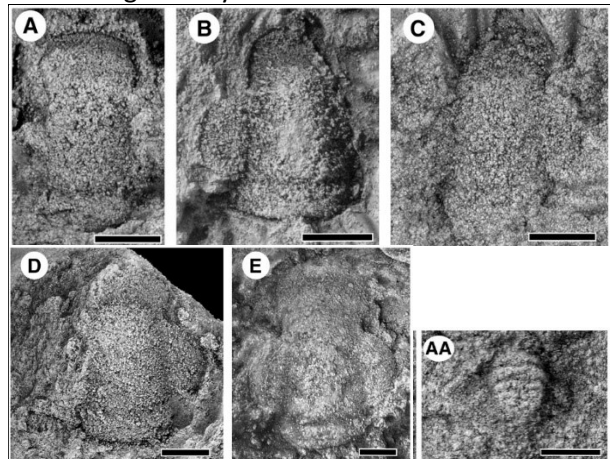
<https://www.thoughtco.com/uranium-lead-dating-1440810> for more discussion on this process.)

A recent study resulting in a 100-page monograph has found 12 trilobite species in Thailand that are already known from Australia and elsewhere. They also found 10 new species.

University of California, Riverside press release issued 20 November 2023.

<https://news.ucr.edu/articles/2023/11/20/trilobites-rise-ashes-reveal-ancient-map>.

The fossils were uncovered on the coast of an island called Ko Tarutao. It is about 40 minutes southwest from the Thailand mainland and is part of an UNESCO geopark site that has encouraged international teams of scientists to work there. The trilobite fossils were trapped between layers of petrified ash in sandstone, the product of old volcanic eruptions that settled on the sea floor and formed a green layer called a tuff.



Wernette et al. (2023) Fig. 37.A–E, *Haniwa mucronata* Shergold, 1975, cranidia: AA, *Haniwa mucronata*?, pygidium. Most specimens found are pieces from molts. These examples are typical of the preservation found. The recovery of *H. mucronata* throughout Ao Talo Topo provides another species level correlation with the fauna of Australia’s Shergoldia nomas Zone.

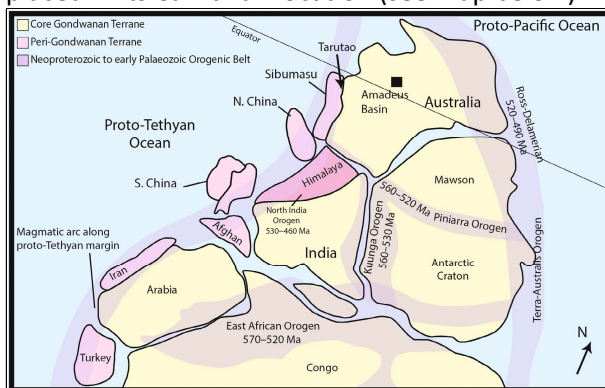
Tuffs contain crystals of zircon — a mineral that formed during an eruption and are, as the name of the rock layer containing them suggests, tough. Zircon is chemically stable as well as heat and weather resistant. It is hard as steel and persists when minerals in other kinds of rocks erode. Inside these resilient zircon crystals, individual atoms of uranium gradually decay and transform into atoms of lead. Radio isotope techniques are used to

precisely date when the zircon formed and thus find the age of the eruption, as well as of the fossils.

It is rare to find tuffs from this particular period, the late Cambrian, between 497 and 485 million years ago. “Not many places around the world have this. It is one of the worst dated intervals of time in Earth’s history,” said Nigel Hughes, co-author and UC Riverside geology professor. “The tuffs will allow us to not only determine the age of the fossils we found in Thailand, but to better understand parts of the world like China, Australia, and even North America where similar fossils have been found in rocks that cannot be dated,” said Shelly Wernette first author of the monograph.

Until now, poor Late Cambrian dating prevents associations between peaks of magmatism and extinction. This new data from numerous tuffs in Ko Tarutao will enable more precise correlation within the late Cambrian Stage 10 and the early Ordovician Tremadocian stage across Gondwana.

The 10 known trilobites not only allow dating of similar fauna and their rock strata in Australia, North China (Sino-Korea), South China, Kazakhstan and even Laurentia (North America); they also enable the Thai terrane (Sibumasu—also includes parts of Malasia, Myanmar, and Yunnan) to be placed in its Cambrian location (see map below).



Wernette et al. (2023) Fig. 3. One of the plausible Cambrian–Ordovician palaeogeographic reconstructions of northern Gondwana. Locations of the Amadeus Basin and Ko Tarutao are approximations to indicate their relative proximity. Modified from Hughes (2016); orogenies from Cawood et al. 2007; equator from Burrett et al. 2014.

This paper (Shelly J. Wernette, Nigel C. Hughes, Paul M. Myrow, Apsorn Sardrud. Trilobites of Thailand's Cambrian–Ordovician Tarutao Group and their geological setting. *Papers in*

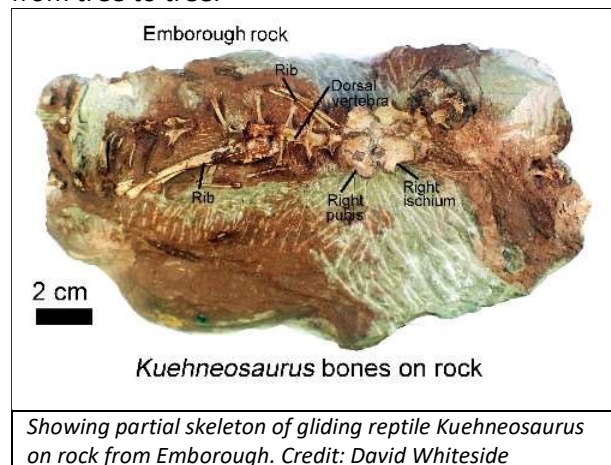
Palaeontology, 2023; 9 (5)) is available at DOI: [10.1002/spp2.1516](https://doi.org/10.1002/spp2.1516).

200-million-year-old flying reptile discovered in England

University of Bristol Press release issued 22 January 2024.

<https://www.bristol.ac.uk/news/2024/january/ancient-flying-reptiles-.html>

Gliding winged reptiles were amongst the ancient crocodile residents of the Mendip Hills in Somerset, England, researchers at the University of Bristol have revealed. *Kuehneosaurs* looked like lizards but were more closely related to the ancestors of crocodilians and dinosaurs. They were small animals, which could fit neatly on the palm of a hand, and there were two species, one with extensive wings, the other with shorter wings, made from a layer of skin stretched over their elongated side ribs, which allowed them to swoop from tree to tree.

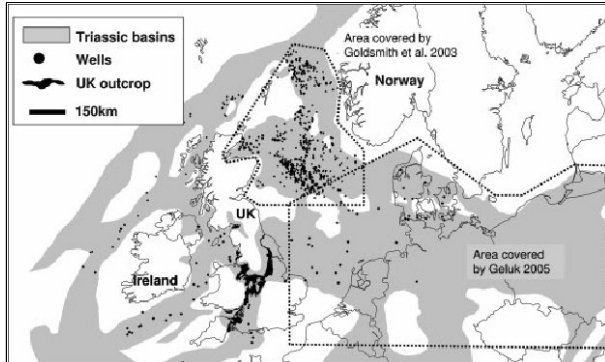


Showing partial skeleton of gliding reptile *Kuehneosaurus* on rock from Emborough. Credit: David Whiteside

Like the modern flying lizard *Draco* from southeast Asia, they most likely wandered about on the ground and climbed trees in search of insect prey. When startled, or if they spotted a tasty insect flying by, they could launch themselves into the air, and land safely 10m away.

The discovery was made by University of Bristol Masters student Mike Cawthorne, researching numerous reptile fossils from limestone quarries, which formed the biggest sub-tropical island at the time, called the Mendip Palaeo-island. The collections had been made in the 1940s and 1950s when the quarries were still active. The study also records the presence of reptiles with complex teeth, the trilophosaur *Variodens* and the aquatic

Pachystropeus that probably lived similarly to a modern-day otter likely eating shrimps and small fish. The animals either fell or their bones were washed into caves and cracks in the limestone.



Triassic Map: McKie, T. and Williams, B., 2009. *Triassic palaeogeography and fluvial dispersal across the northwest European Basins. Geological Journal, 446(6), pp. 711-741.*

The area around Bristol 200 million years ago in the Late Triassic was an archipelago of small islands set in a warm sub-tropical sea.

This paper (Cawthorne, M., Whiteside, D.I. and Benton, M.J., 2024. Latest Triassic terrestrial microvertebrate assemblages from caves on the Mendip palaeoisland, SW England, at Emborough, Batscombe and Highcroft Quarries. *Proceedings of the Geologists' Association.*) is available at <https://www.nature.com/articles/s41598-022-24549-z>.

Study reshapes understanding of mass extinction in Late Devonian era.

Indiana University Purdue University Press release issued 6 December 2023.

<https://news.iu.edu/live/news/33770-study-reshapes-understanding-of-mass-extinction-in>

A new model suggests that volcanic eruption combined with ocean detoxification pushed Earth's biology to the tipping point. Diverse and full of sea life more than 370 million years ago, the Devonian era saw the emergence of the first seed-bearing plants, which spread as large forests across the continents of Gondwana and Laurussia.

However, a mass extinction event near the end of this era has long been the subject of debate.

Some scientists argue the Late Devonian mass extinctions were caused by large-scale volcanic eruptions, causing global cooling. Others argue a mass deoxygenation event caused by the expansion of land plants was to blame. A new study now posits that both factors played a role.

The work is the first to unify two competing Late Devonian extinction theories into a comprehensive cause-and-effect scenario. The group concluded that both events — mass volcanism and deoxygenation by land plants flushing excess nutrients into oceans — needed to occur for the mass extinction to take place.

“The key to resolving this puzzle was identifying and integrating the timing and magnitude of the geochemical signals we determined using a sophisticated global model,” Filippelli said. “This revealed that the magnitude of nutrient events we were seeing based on the geochemical records could drive substantial marine extinction events, but the events duration required both factors—tree root evolution and volcanism—to sustain the conditions that were toxic to organisms.”

With experts in sedimentology, paleontology, geochemistry, biogeochemistry and mathematical modeling, the group literally dug deep to geochemically analyze hundreds of samples scattered across different continents.

In the present day, Gilhooly noted, activity such as fertilizer runoff emptying into the ocean, combined with heating from fossil fuel combustion, are reducing oceans' oxygen levels. The previous occurrence of this similar scenario in the Late Devonian had catastrophic outcomes.

This paper (Matthew S. Smart, Gabriel Filippelli, William P. Gilhooly, Kazumi Ozaki, Christopher T. Reinhard, John E. A. Marshall, Jessica H. Whiteside. The expansion of land plants during the Late Devonian contributed to the marine mass extinction. *Communications Earth & Environment, 2023; 4 (1)*) can be had at DOI: [10.1038/s43247-023-01087-8](https://doi.org/10.1038/s43247-023-01087-8)

CALENDAR OF EVENTS

February

Tuesday February 6, FOSSIL MEETING 7:30 PM. Virtual Meeting on Zoom. Speaker is Dr. Kristina Curry Rogers, Professor in Biology and Geology at Macalester College speaking on, “*The Unlikely (but Very Lucky!) Triumph of Dinosaurs.*” Visitors welcome.

March

Tuesday March 5, FOSSIL MEETING 7:00 PM. Virtual Meeting on Zoom. Note earlier start time. Opening speaker is Dr. Derek Briggs of the Yale Peabody Museum of Natural History with short talk on recent publications of fossils from the Samuel Cieurca Collection. Featured speaker is Dr. James Lamshed, Associate Professor of Geology at West Virginia University, on recent eurypterid research. 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

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Vice President/Program Chair: Michael Grenier

Secretary: Dan Krisher

Treasurer: John Handley

Director (three-year term): Melanie Martin

Director (two-year term): Fred Haynes

Director (one-year term): **Open**

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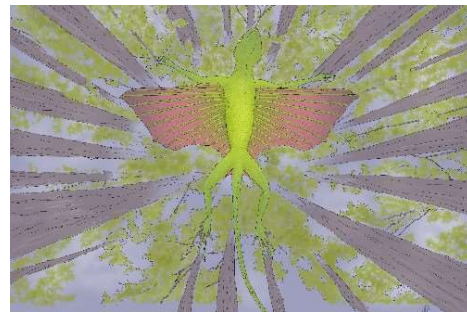
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The FossilLetter is published before each meeting month of the year. Please send submissions to mgrenier@frontiernet.net or by U.S. Postal Service mail to 692 Maple Drive, Webster, NY 14580. Deadline for submissions to the FossilLetter is the 15th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



Artist's impression of a gliding reptile Kuehneosaurus. Credit: Mike Cawthorne