

Ostrich relative lived in North America 50 million years ago

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Nearly complete skeleton of *Calciavis grandei*, a close relative of ostriches, kiwis, and emus. Credit: Rick Edwards/American Museum of Natural History

Exceedingly well-preserved bird fossil specimens dating 50 million years

represent a new species that is a previously unknown relative of the modern-day ostrich, according to a new paper co-authored by Sterling Nesbitt of Virginia Tech's College of Science and part of the university's Global Change Center.

The bird fossils were found more than a decade ago, completely intact with bones, feathers, and soft tissues in a former lake bed in Wyoming. Nesbitt cannot hide a grin as he calls the [fossil](#) a once-in-a-lifetime discovery for paleontologists.

"This is among one of the earliest well-represented bird species after the age of large dinosaurs," said Nesbitt, an assistant professor in the Department of Geosciences.

"You can definitely appreciate how complete these fossil are," added Nesbitt of the remains, the focus of a research paper co-authored by Nesbitt and newly published in the [Bulletin of the American Museum of Natural History](#).

Some of the remains are now on display as part of the exhibit "[Dinosaurs Among Us](#)" at the New York-based history museum. The fossils Other specimens used in the study are kept by Chicago's Field Museum of Natural History and the Wyoming Geological Survey.

The new species is named *Calciavis grandei* - with "calci" meaning "hard/stone," and "avis" from the Latin for bird, and "grande" in honor of famed paleontologist Lance Grande who has studied the fossil fish from the same ancient North American lake for decades.

The bird is believed to be roughly the size of a chicken, and similar to chickens, were mostly ground-dwelling, only flying in short bursts to escape predators.

Nesbitt began studying the fossil in 2009 whilst a postdoctoral researcher at the University of Texas at Austin's Jackson School of Geosciences, under Professor Julia Clarke, whom Nesbitt considers an important mentor. Clarke co-authored the paper with Nesbitt, who joined Virginia Tech's faculty in 2014.



Lithornithid skull from the *Calciavis grandei* fossil, found in Green River Formation of Wyoming. Credit: Sterling Nesbitt/Virginia Tech

The work was funded by two grants from the National Science Foundation's Earth Sciences Directorate.

Two fossils of *Calciavis* dating from the Eocene epoch—roughly between 56 million and 30 million years ago—were found by fossil diggers within the Green River Formation in Wyoming, a hot bed for extinct fish. "These are spectacularly preserved fossils, one is a nearly complete skeleton covered with feather remains, the others are nearly as complete and some show soft tissue remains," said Nesbitt.

"Fossil birds are rare," added Nesbitt, adding that as bird bones are hollow, they are far more fragile than most mammal bones, and more likely to be crushed during fossilization. One of the fossilized birds in this rare case apparently was covered in mud soon after death.

The former lake in which the fossil was found is best known for producing scores of complete fish skeleton fossils, but other fossils such as other birds, plants, crocodylians, turtles, bats, and mammals from an ecosystem roughly 50 million years old.

Included in the extinct group of early Palaeognathae birds, the Lithornithidae, Nesbitt and Clarke call the bird a close relative of living ostriches, kiwis, and tinamous now living in the southern continents. After tropical forests disappeared in North America, *Calciavis* and other more tropical birds went extinct, said Nesbitt and Clarke.

"Relationships among species in this lineage of birds have been extremely contentious," said Clarke. "We hope the detailed new anatomical data we provide will aid finding a resolution to this ongoing debate."

"The new bird shows us that the bird group that includes the largest flightless birds of today had a much wider distribution and longer

evolutionary history in North America," Nesbitt said. "Back when *Calciavis* was alive, it lived in a tropical environment that was rich with tropical life and this is in stark contrast to the high-desert environment in Wyoming today."

The *Calciavis* skeleton will be important to interpreting new bird fossils and other fossils from the Eocene epoch that were collected decades ago. "This spectacular specimen could be a 'keystone' that helps interpret much of the sparse fossil of [birds](#) that once lived in North America millions of years ago," said Nesbitt.

Provided by Virginia Tech

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