

World's largest-ever flying bird identified

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A reconstruction of the world's largest-ever flying bird, *Pelagornis sandersi*, identified by Daniel Ksepka, Curator of Science at the Bruce Museum in Greenwich, Conn. Credit: Liz Bradford

Scientists have identified the fossilized remains of an extinct giant bird that could be the biggest flying bird ever found. With an estimated 20-24-foot wingspan, the creature surpassed size estimates based on

wing bones from the previous record holder—a long-extinct bird named *Argentavis magnificens*—and was twice as big as the Royal Albatross, the largest flying bird today. Scheduled to appear online the week of July 7, 2014, in the journal *Proceedings of the National Academy of Sciences*, the findings show that the creature was an extremely efficient glider, with long slender wings that helped it stay aloft despite its enormous size.

The new fossil was first unearthed in 1983 near Charleston, South Carolina, when construction workers began excavations for a new terminal at the Charleston International Airport. The specimen was so big they had to dig it out with a backhoe. "The upper wing bone alone was longer than my arm," said author Dan Ksepka of the National Evolutionary Synthesis Center in Durham, North Carolina.

Now in the collections at the Charleston Museum, the strikingly well-preserved specimen consisted of multiple wing and leg bones and a complete skull. Its sheer size and telltale beak allowed Ksepka to identify the find as a previously unknown species of pelagornithid, an extinct group of giant seabirds known for bony tooth-like spikes that lined their upper and lower jaws. Named '*Pelagornis sandersi*' in honor of retired Charleston Museum curator Albert Sanders, who led the fossil's excavation, the bird lived 25 to 28 million years ago—after the dinosaurs died out but long before the first humans arrived in the area.



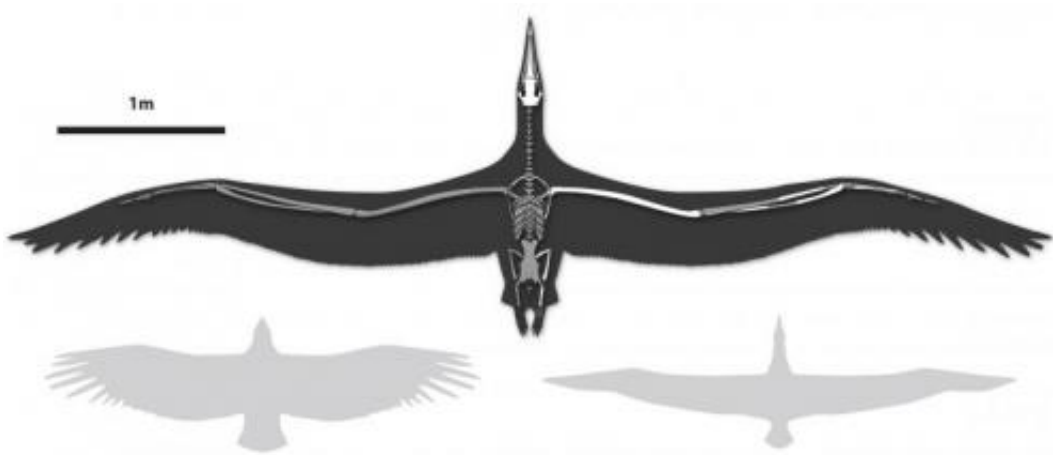
Dr. Daniel Ksepka, Curator of Science at the Bruce Museum in Greenwich, CT, studies the skull of *Pelagornis sandersi*, the world's largest-ever flying bird.
Credit: Courtesy of Dr. Ksepka

Researchers have no doubt that *P. sandersi* flew. Its paper-thin hollow bones, stumpy legs and giant wings would have made it at home in the air but awkward on land. But because it exceeded what some mathematical models say is the maximum body size possible for flying birds, what was less clear was how it managed to take off and stay aloft despite its massive size.

To find out, Ksepka fed the fossil data into a computer program designed to predict flight performance given various estimates of mass, wingspan and wing shape. *P. sandersi* was probably too big to take off simply by flapping its wings and launching itself into the air from a standstill, analyses show. Like *Argentavis*, whose flight was described by a computer simulation study in 2007, *P. sandersi* may have gotten off the

ground by running downhill into a headwind or taking advantage of air gusts to get aloft, much like a hang glider.

Once it was airborne, Ksepka's simulations suggest that the bird's long, slender wings made it an incredibly efficient glider. By riding on air currents that rise up from the ocean's surface, *P. sandersi* was able to soar for miles over the open ocean without flapping its wings, occasionally swooping down to the water to feed on soft-bodied prey like squid and eels.



A line drawing of the world's largest-ever flying bird, Pelagornis sandersi, showing comparative wingspan. Shown left, a California condor, shown right, a Royal albatross. Credit: Liz Bradford.

"That's important in the ocean, where food is patchy," said Ksepka, who is now Curator of Science at the Bruce Museum in Greenwich Connecticut.

Researchers hope the find will help shed light on why the family of birds that *P. sandersi* belonged to eventually died out, and add to our

understanding of how the giants of the skies managed to fly.

More information: "Flight performance of the largest volant bird," by Daniel T. Ksepka , *PNAS*,

www.pnas.org/cgi/doi/10.1073/pnas.1320297111

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