

Manchester Geological Association
Flying Fossils
Saturday 13 January 2018

How to make a bird from a dinosaur

Dr Steve Brusatte, Chancellor's Fellow in Vertebrate Palaeontology and Reader, School of Geosciences, University of Edinburgh

A very short abstract: Birds evolved from dinosaurs, which means they are dinosaurs. But how did evolution take an animal like *T. rex* and turn it into a small, feathered, winged, warm-blooded, intelligent, fast-growing bird? In this talk I will explore the evidence that birds evolved from dinosaurs, and tell the story of how tens of millions of years of gradual evolution resulted in the birds of today. In doing so, I will share stories of my own research into some of the most important fossils found over the past several decades: the famous feathered dinosaurs of China.

What were pterosaurs? I mean, really?

Dr Mark P. Witton, Honorary Research Fellow, School of Earth & Environmental Sciences, University of Portsmouth

Flying reptiles are among the most famous prehistoric animals but what, really, do we know about them? Popular portrayals as 'flying dinosaurs', raptor-like fliers able to savage human-sized animals or - in more educational contexts - analogues of seabirds are erroneous or, at best, problematic. The identity of pterosaurs has long been mysterious because their relationships to other reptiles has been unclear, but new fossils and research is bolstering a long-held suspicion that they are closely related to (but not part of) Dinosauria. These groups shared many unexpected features, including a fibrous skin covering, an advanced lung system and an upright limb posture, but retained some fundamental differences in reproduction structure and flight anatomy. Long-overdue academic interest in pterosaur lifestyles is recasting these animals as ecologically diverse. Seabird-like lifestyles remain likely for some groups, but others ate shelled prey, strained food from water, used chewing mechanics to smash insect cuticles, and many species were adaptable generalists. Trackway data and reassessments of skeletal mechanics show that pterosaurs were as at home on the ground or in water as they were in the air, and new fossils are showing pterosaurs in the most unexpected of habitats, such as woodlands and deserts. These findings are cause to rethink pterosaur extinction: their demise was not the snuffing out of a lineage surviving through serendipity, but the end of a long and successful experiment in reptilian flight.

How did the largest animals to ever fly get off the ground? Biomechanics of pterosaurs

Dr Liz Martin-Silverstone, University of Bristol

Pterosaurs were the first vertebrates to take to the skies, and the largest animals ever to achieve powered flight. The largest had wingspans rivalling small airplanes at 10-11 metres. The biggest birds today are nowhere near this size, with albatross wingspans measuring 3-4 metres, while extinct birds may have reached up to 8m in size. Why were pterosaurs able to reach this great size? How were they able to fly? Exactly how heavy were these animals? With unique adaptations, pterosaurs were able to dominate the sky for over 150 million years.