recently suggested to be unique for archosaurs. Furthermore, *D. maximus* possesses craniomandibular features observed in extant suction-feeding odontocetes, most specifically the false killer whale, including: shortened tooth-row, amblygnathous ("bullet-shaped") rostrum and a very short mandibular symphysis. We hypothesize that the skull and dentition of *D. maximus* were optimized for cutting large and abrasive prey items into portions small enough to swallow. *Plesiosuchus manselii*, by contrast, possesses a non-amblygnathous rostrum, a longer mandibular symphysis and microziphodont serrations, and lacks spalled or broken tooth apices and mesial/distal wear facets. Lack of crown breakage and wear suggests this species fed on soft-bodied prey. The difference in optimum gape (gape at which multiple teeth come into contact with a prey item) between *P. manselii* and *D. maximus* is considerable. As *Plesiosuchus* had a large gape and non-worn teeth, the extant sperm whale may be a good analogue. Craniodental differentiation and niche partitioning enabled these two large-bodied species to coexist in the same ecosystem.

Poster Session II (Thursday, October 18, 4:15 - 6:15 pm)

INFERRING GROWTH IN GIANT PENGUINS FROM THE PALEOGENE OF ANTARCTICA AND THE NEOGENE OF SOUTH AMERICA

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Birds evolved high rates of growth, reaching full size within one year, which histologically results in the absent of LAGs (annual lines of arrested growth) that are usually developed by endotherms. With the exception of a very few cases such as the moa and the kiwi, birds lack LAGs. Today the Emperor penguin *Aptenodytes forsteri* , one of the largest extant penguins, is considered to be the faster vertebrate to reach full adult size. Fossil representatives of penguins are known to easily exceed the size of Emperor penguins, so their patterns of growth has remains obscured even with the large amount of research and interest in fossil penguins in the last decade. We studied thin sections of four representatives of extinct giant penguins: fossil bones referred to the genus *Palaeeudyptes* or *Anthropornis* from the Eocene of the La Meseta Formation, Seymour Island, Antarctica, the species *Pygoscelis grandis* and *Spheniscus urbinai*, from the late Miocene – Pliocene of the Bahía Inglesa Formation, northern Chile. We also included the Humboldt penguin *Spheniscus humboldti*, an extant species, and the genus *Palaeospheniscus* from the middle Miocene of Argentinian Patagonia, both medium size penguins. The Antarctic species belongs to the high diversity of basal penguins while the Chilean ones are extinct representatives of an extant genus in the crown group Spheniscidae. The Argentinian representative is an outgroup to the crown group. Histology shows that fast growth in penguins is common across the entire phylogenetic sample. As is common in other birds, fossil penguins do not developed LAGs. The largest representatives (Paleogene) are characterized by a big number of secondary osteons, while all studied giant penguins do not developed the outer circumferential layer that is negatively correlated with size. As the majority of neornithines, they reached full growth within one year. Fast growth, sometimes considered in penguins an adaptation to cold, is a plesiomorphic character to this order of birds.

Technical Session I (Wednesday, October 17, 8:00 am)

A NEW GIANT CARCHARODONTOSAURIAN ALLOSAUROID FROM THE LOWER CRETACEOUS CEDAR MOUNTAIN FORMATION OF CENTRAL UTAH

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The terminal Early Cretaceous was a time of major faunal reorganization in western North America. Localized extinction of remnant Jurassic megafauna (e.g., sauropodomorphs and allosauroid theropods) co-occurred with establishment of neoceratopsians and advanced members of several coelurosaurian subclades, a transformation long attributed to faunal interchange with Asia. Here we report on a new theropod from the Lower Cretaceous Cedar Mountain Formation of Utah, representing the last surviving allosauroid species yet reported from the North American continent.

The new taxon is known from a partially preserved skeleton, including portions of the axial column, pelvis, and hind limb. Preliminary phylogenetic analysis substantiates referral to Carcharodontosauria based on extreme axial pneumaticity, including camellate vertebral structure, slit-like dorsal pluerocoels, and heavily pneumatized hypantra, as well as deep peg-and-socket iliac/ischial articulations. The new taxon exhibits shared morphology with neovenatorids including transversely compressed, cranialmost dorsal centra bearing a prominent ventral keel, as well as transversely inflated, quadrangular hypantra similar to the condition observed in *Aerosteon*. However, cranialmost dorsal centra are distinctly elongate, a feature not otherwise observed in the clade. More caudally positioned dorsal vertebrae exhibit weakly developed, flange-like lateral extensions of the postzygapophyses as in *Neovenator* and *Aerosteon*; a hypertrophied caudal centrodiapophyseal lamina; distinct, alariform, ventrolaterally trending hyposphenes unlike the sheet-like condition of carcharodontosaurids; and compact neural spines (in contrast with the approximately coeval North American carcharodontosaurid *Acrocanthosaurus*). The ilium possesses a hypertrophied acetabular shelf and autapomorphic morphology of the ventral postacetabular wing.

The new specimen derives from silty mudstone of the uppermost Mussentuchit Member, 8-9 meters above a smectitic ash horizon previously dated to 98.39 +/- 0.07 Ma and 6-7 meters below the contact with the Upper Cretaceous Dakota Formation. The presence of a new taxon refutes prior hypotheses of homogeneity in the allosauroid fauna of the continent during this interval. The new taxon also confirms both an extended temporal overlap and marked body mass discrepancy between carcharodontosaurians and advanced tyrannosauroids in the Early Cretaceous of western North America. The extinction of allosauroids as apex predators in late Mesozoic terrestrial ecosystems of western North America may have allowed opportunistic invasion of this niche by tyrannosauroids, which proceeded to dominate terrestrial ecosystems in this region until the terminal Cretaceous extinction event.

Technical Session III (Wednesday, October 17, 2:45 pm)

THE WESTERNMOST TARSIER: A NEW GENUS AND SPECIES FROM THE MIOCENE OF PAKISTAN

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As the closest living sister group of anthropoids, tarsiers (family Tarsiidae) are an important group in primate evolution. However, their fossil record is poor: only four species have been described, two from the Eocene of China and two from the Miocene of Thailand. All are from outside the range of the living species, which occur only on the islands of Southeast Asia.

Here, I describe the first fossil tarsier from Pakistan, a significant range extension. This record consists of two lower molars, an upper molar, and three fragmentary upper anterior teeth found in the Miocene Manchar Formation of Sindh Province, southern Pakistan. The lower molars are recognizable as tarsiers by their high crown, prominent paraconid, and distinct cingulum. However, they are characterized by a relatively narrow shape and the possession of an anterolabial cingulum. The single upper molar is identified as an M3. It is distinct in showing a broad buccal shelf, with the paracone and metacone relatively lingual in position. In addition, the lingual cingulum is weak.

The Pakistani tarsier is morphologically distinct from all living and fossil tarsiers, but most similar to the Middle Miocene Thai species *Tarsius thailandicus*. Though living tarsiers have traditionally been classified in a single genus, a recent revision proposed a division into three genera. The differences that separate the Pakistani tarsier from other known species are of the same order of magnitude as those between the living genera, and we have found no evidence to support a close relationship between the Pakistani tarsier and any one of the extant genera. However, the Pakistani tarsier appears to be similar to *Tarsius thailandicus*, for which the upper molars are unknown. Thus, we propose that the Pakistani tarsier and *T. thailandicus* should be placed in a new tarsiid genus.

This discovery broadens our understanding of the geographic range and morphological diversity of Miocene tarsiers and helps put the living tarsiers into their evolutionary context.