Zool 430 Animal Physiology

**Animal Design Project Background**

**Background Information You will Need.** You will be creating models of four physiological systems (metabolism and heat balance, diet and digestion, respiration, circulation or osmoregulation). So the kinds of things that you will need to know are:

1) How big was your animal (rough mass estimate)?
2) What did it look like?
3) When and where did it live? What environment did it live in (general climate, ambient temperature – day/night, water regime and relative humidity, vegetation)?
4) Was it an active or sedentary animal? About how many hours a day would it have been active? Here you will draw inferences from facts such as whether it was an: Herbivore or predator? Did it hide or was it out in the open? Did it have a lot of competition? Predators? etc. Use any morphology from fossils, or base it on the biology of it's living relatives. **You should start with living relatives or animals similar in lifestyle** and adjust for differences in climate, size, etc.

**Use BOOKS to find basic information.** There are many excellent books on paleontology of mammals, fish, etc. Find at least 5 BOOKS using the library catalog. "Paleontology of …", "Avian physiology" etc. will find you some great general references. Go broad when looking for these.

**You will need to piece this information together from many sources,** including literature on the fossil itself, as well as research on the basic biology of similar animals. **You should use primary scientific literature only,** which includes *reference books, text books, and articles from peer-reviewed journals* (you may find that a good book on paleontology or a text book on the physiology of birds, etc. which may be very useful for general background). Specific facts relating to your animal or taxon can be obtained from journal articles. You may use data from websites only if it is the official website of a research or academic institution (e.g., you may get weather data from NOAA for example). http://guides.library.manoa.hawaii.edu/zoology430

**It is not important that there are a LOT of articles or fossil remains published on your work.** For example, many extinct sharks are known only from a tooth. You can use what is known about similar living animals and relate it to your fossil. It is VERY possible to do a stellar project on a fossil shark by creatively making inferences from the biology of living sharks for example.

**Think of your favorite or most interesting animal, and have fun!** Look around and choose something you're really interested in. The most interesting projects are also the most challenging – they pose conundrums. For example, the earliest known XX. Or a transition taxon between amphibians and other terrestrial vertebrates. Or an animal that was unusually large, or unusually small, or the first to fly, etc.

Please do not choose the following (or anything that another group has already chosen):

Gryposuchus croizati (largest gharial Crocodilia)

Birds

*Archeopteryx Lithographica* (oldest bird)
*Asteriornis maastrichtensis* - MRCA of Galloanserae
*Confuciusornis* (ancient bird)
*Thambetochen xanion* (Moa-nalo)
*Drepanis funerea* (Hawaiian Black Mamo)
*Archaeopteryx siemensii* (early bird)
*Brontornis burmesisteri* (Terror Bird)
*Palaeeudyptes klekowskii* (giant penguin)
*Heracles inexpectatus* (giant NZ fossil parrot)
*Ornimegalonyx* ( Cuban Giant Owl)

Non-bird Archosaurs

Sarcosuchus imperator (ancient giant crocodile)

Dinosaurs & others

*Ankylosaurus magniventris* (ankylosaurus! Armored dinosaur)
*Borealopelta markmitchelli* - Nodosaur - an ankylosaur!
Quetzalcoatlus - Largest pterosaur to ever live
*Stegosaurus* (herbivorous dinosaur)
*Spinosaurus aegyptiacus* (theropod dinosaur)
*Troodon formosus* (small bird-like dinosaur)
*Tyrannosaurus Rex*
*Scansoriopteryx heilmannii* - climbing dinosaur (non-avian)
*Plateosaurus* - Late triassic dinosaur

*Brachiosaurus altithorax* - giant long-necked sauropod dinosaur
*Velociraptor* - dromaeosaurid theropod dinosaur
*Shanag ashile* (A small raptor like dinosaur from Cretaceous Mongolia)

Mammals
Pachydectes (Biarmosuchian therapsid mammal)

Lucy (or any recent humanoid)
Gigantopithecus blacki (largest ape)
Notharctus tenebrosus (a lemur)

Mesohippus bairdi (early horse)
Desmostylus hesperus (hippo-like mammal)
Archaeopotamus harvardi - hippo relative
Megacerops coloradenis (rhinocerous-like browsing mammal)
Mammuthus primigenius (Wooly Mammoth)
Coelodonta antiquitatis (Wolly Rhino)
Aphelops mutilus (Rhino ancestor)
Platybelodon gerangeri "Shovel-Tuskers"
Bos primigenius (Fossil ox)
Griraffatitan brancai (giant giraffe)
Sivatherium giganteum - Giant Giraffe
Megaloceros giganteus (Irish Elk)

Pakicetus (early cetacean)
Basilosaurus isis (marine cetacean)
Basilosaurus cetoides - early whale ancestor
Dorudon atrox (ancient basilosaurid whale)
Ankylorhiza tiedemani - toothed whale (dolphin)
Bohaskaia monodontoides - beluga ancestor

*Enaliarctos mealsi* - ancient pinnipedimorph
Hydrodamalis gigas (Stellar's sea cow)

*Crocuta crocuta spelaea* (Ice age spotted hyena)
*Canis lepophagus*
*Canis dirus* (dire wolf)
*Epicyon haydeni* (large fossil bone crushing dog)
Acinonyx pardinensis (Giant Cheetah)
Homotherium latidens (saber toothed cat)
Panthera leo atria (american lion)
Panthera spelaea - Eurasian cave lion
Smilodon (Saber toothed tiger)
Thylacine (Tasmanian Tiger)

Kretzoiarctos beatrix - oldest panda relative
Arctodus simus - short-nosed bear

Procoptodon goliah (large short-faced kangaroo)
Thylacosmilus atrox - Saber tooth marsupial
Megatherium americanum - giant ground sloth
Obdurodon tharalkooschild - giant toothed platypus
Glyptodon clavipes (giant heavily-armored armadillo-like mammal)
Castoroides ohioensis (Giant Beaver)
Josephoartigasia monesi - giant rodent
Nuralagus rex - giant rabbit

"Reptiles"
Tetrapodophis amplectus
Archelon ischyros - Ruler Turtle
Liopleurdon ferox - short-necked pleisiosaur!
Woolungasaurus glendowerensis - plesiosaur! "Woolunga lizard"
Platecarpus tympaniticus - mosasaur! Giant aquatic lizard
*Carbonemys cofrinii* - coal turtle - giant side-necked turtle
*Titanoboa cerrejonensis* (giant boa)
*Taniwhasaurus oweni* (carnivourous marine lizard)
*Kuehneosaurus latus* (gliding lizard form the late triassic period)
*Captorhinus aguti* (distinguished hooked snout, multi-rowed teeth reptile from the Permian Period)

Amphibians
Coelacanthus granulatus - ancient coelocanth
*Diplocaulus magnicornis* - boomerang-head Permian amphibian
Ichthyosauria (stem tetrapod)

Fish
Andreolepis hedei (ancient telost fish)
Carcharocles megalodon (giant shark)
Cretoxyrhinidae mantelli (Cretaceous Jaws)
Diplacanthus crassisimus - Ancient Jawed fish
Dunkleosteus terrelli (armored fish)
Helicoprion bessonowi (spiral-toothed shark)
Helicoprion davisii (tooth whorl shark)
*Rhizodus hibberti* (Carnivorous, largest lobe-finned fish)
Tiktaalik roseae (ancient fish-quadruped)

Amniote
Westlothina lizzae (stem amniote!)

**Anything that was extinct recently enough that modern humans observed or studied it**