Science AMA Series: We're a group of paleontologists and geologists on our way to Antarctica to look for fossils of non-avian dinosaurs, ancient birds, and more. AUA!

AntarcticPaleo [1] and r/Science AMAs[1]

[1]Affiliation not available

April 17, 2023

Abstract

Hi Reddit! Our research team—collectively working as part of the Antarctic Peninsula Paleontology Project, or AP3—is on a National Science Foundation-supported research vessel on its way to Antarctica. This will be our third expedition to explore the Antarctic Peninsula for fossils spanning the end of the Age of Dinosaurs (the Late Cretaceous) to the dawn of the Age of Mammals (the early Paleogene). During that time, roughly 90–60 million years ago, Antarctica was relatively warm and lush, as well as home to a great diversity of plants and animals—including dinosaurs! Antarctica may have also been the place of origin for several key animal groups seen in today's ecosystems—such as modern birds and certain kinds of mammals. On our past expeditions we've made important discoveries, including fossils of non-avian dinosaurs, fish, marine reptiles, and birds. During our 2011 field season, we discovered additional fossils of Vegavis iaai, an extinct bird that is related to ducks and geese. Vegavis is the only undoubted example of what is considered to be a modern bird that co-existed with non-avian dinosaurs. We also discovered a previously unrecognized set of rocks that were laid down during the Cretaceous–Paleogene (K–Pg) boundary interval, one of the very few such sets of rocks to be recognized on the entire Antarctic continent. This recently-identified rock section could yield new insights into the effects of the (in)famous K–Pg mass extinction that killed off all non-avian dinosaurs. These paleontological and geological discoveries have provided many clues as to what Antarctica was like tens of millions of years ago, but countless mysteries remain. That's why we're off to Antarctica to explore for new fossils and to gather data that will help us better understand how the environment has changed through time. We are: Matt Lamanna, the AP3 director, a paleontologist and the principal dinosaur researcher at Carnegie Museum of Natural History, who specializes in the study of dinosaurs from the Southern Hemisphere. Julia Clarke, a professor of paleontology and evolutionary biology at The University of Texas at Austin who named and described the Antarctic fossil bird species Vegavis iaai in 2005. Julia studies the evolution of dinosaurs, birds, and flight to better understand major transitions in the history of life. Pat O'Connor, a professor of anatomical sciences at Ohio University whose research interests include the evolution of crocodiles, dinosaurs, and birds during the Cretaceous Period. Ross MacPhee, a curator of mammalogy and professor at the American Museum of Natural History who studies paleobiogeography, extinction, and cranial development in mammals. Eric Gorscak, a doctoral candidate in Pat O'Connor's lab at Ohio University who studies the evolutionary history of titanosaurian sauropod dinosaurs during the Cretaceous. Abby West, a PhD student at Columbia/American Museum of Natural History studying fossil mammals. Chris Torres, a PhD student of Julia Clarke's, studying fossil birds. Kerin Claeson, a paleontologist at the Philadelphia College of Osteopathic Medicine studying fossil fishes. Meng Jin, a paleontologist at the American Museum of Natural History studying fossil mammals. Steve Salisbury, a paleontologist at The University of Queensland studying fossil crocodilians and non-avian dinosaurs. Eric Roberts, a geologist at James Cook University. Zubair Jinnah, a geologist at the University of the Witwatersrand. Check out our expedition website: antarcticdinos.org Follow us on Twitter at: @AntarcticDinos #ExpeditionAP3 We'll be back at 12 pm et (9 am PT, 5 pm UTC) to answer your questions, ask us anything!

the WINNOWER

REDDIT

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ANTARCTICPALEO R/SCIENCE

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Check out our expedition website: antarcticdinos.org Follow us on Twitter at: @AntarcticDinos #ExpeditionAP3
We'll be back at 12 pm et (9 am PT, 5 pm UTC) to answer your questions, ask us anything!

READ REVIEWS

WRITE A REVIEW

CORRESPONDENCE:

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- Will you be digging under deep layers of ice? If so, how?
- In terms of lattitude/longtitude, where was the continent that is now Antarctica back in the period you are studying?

sirgog

Hello! First off, thanks Jigaboo_Sally for providing that link. Antarctica, more or less, is still in the same location as it was during the Late Cretaceous. But at the time the Antarctic Peninsula was still connected to the southernmost tip of South America as well as Australia on the other end.

We will not be digging through ice for our expedition. Our expedition is timed for the end of the Austral summer, when most rock along the northernmost tip of the peninsula is readily available. There will be glaciers where we will be working but they will not be covering all of the islands where we will be working. Unfortunately, the possibility of a snow storm can still limit the amount of exposed rock with fossils.

- Will you be digging under deep layers of ice? If so, how?
- In terms of lattitude/longtitude, where was the continent that is now Antarctica back in the period you are studying?

sirgog

Meng Jin: 1) No ice digging - it's impossible to dig the ice. This is why we went in the summer in the South when the ice melt so that rocks are exposed. 2) The time period we are working with (Late Cretaceous to Eocene), Antarctica is not far from its current position; the final break-up between Antarctica and South America was around 34 millions years ago, near the Eocene-Oligocene.

This is the AMA I've been most excited for in a long time! The trip sounds fascinating and best of luck in your discoveries.

1. How will your tools and equipment differ compared to projects in warmer climates?
2. What is the biggest anticipated challenge this expedition will face?
3. What food will you miss most from home?

shinycaptain13

1) The tools we will be bringing will be similar to what we normally bring on our expeditions. The exception would be the plaster which may have some difficulty setting in the colder environment. We will also be wearing more clothes and layers than normal.

2) Weather. Period. The weather can change drastically and snow can cover the rock, limiting what we can prospect and explore.

3) Julia: Breakfast Tacos; Eric G: Pulled Pork; Chris: Fresh North Carolina Biscuits; Zubair: KFC; Abby: Fresh Veggies; Patrick: Chips and Salsa; Eric R: Cappuccino and donuts

Due to its being so cold, do you think you have a better chance of finding "workable" DNA?

preachers_kid

Ross answering

Regrettably, no. The upper limit for at least partial genomic recovery for a mammal is currenty about 700,000 years, for a Pleistocene horse from Yukon, Canada. Some of us are getting interested in recovering proteins, which can also give information about relationships--and they last much longer. Indeed a recent study provided good evidence for the recovery of amino acids (for the protein myosin) from dinosaur material about 80 Mya. We are being a bit more conservative and concentrating on the Cenozic (last 66 Mya). But of course on this trip we will try everything!

How hard will it be to find fossil beds (around ancient rivers/waterways) that haven't been disturbed by the glaciers that cut through those regions after it started freezing? Will you be able to trace the fossils you do find back to their original depositional environment based on known glacial/ice movement? (I'm a marine geology student with very little knowledge about paleontology, but I've always been fascinated by dinosaurs.)

Ganjambra

The real challenge we face is finding exposed Cretaceous rocks that are not currently covered by glaciers. Where glaciers have already cut through the landscape and melted, good fresh rock exposures exist. We figure out the original environments by studying the rocks in which the fossils are found in. These rocks provide the clues that help us to reconstruct ancient environments.

How hard will it be to find fossil beds (around ancient rivers/waterways) that haven't been disturbed by the glaciers that cut through those regions after it started freezing? Will you be able to trace the fossils you do find back to their original depositional environment based on known glacial/ice movement? (I'm a marine geology student with very little knowledge about paleontology, but I've always been fascinated by dinosaurs.)

Ganjambra

Hi Ganjambra, This is Ross. Removal of sediments by glaciation is always a problem (it is a problem in northern Canada, for example). Our problem is compounded by the fact that the vertebrates we are after never lived on the islands--they were seafloor until a local uplift event raised them above sea surface. So where do the bones from, then? In life they lived on the Antarctic Peninsula. When they died (we think) streams took their remains down onto the continental shelf. It is about 100 km from the Peninsula to James Ross Island, for example. At that distance, bones and teeth get broken up and we never find anything in articulation. But it is what it is, and even poorly preserved specimens have useful information.

How hard will it be to find fossil beds (around ancient rivers/waterways) that haven't been disturbed by the glaciers that cut through those regions after it started freezing? Will you be able to trace the fossils you do find back to their original depositional environment based on known glacial/ice movement? (I'm a marine geology student with very little knowledge about paleontology, but I've always been fascinated by dinosaurs.)

Ganjambra

Meng Jin: It's not that hard to find the fossil beds if they are there, but it's hard if they are covered by snow or ice. If exposed, finding fragments of fossils are not that difficult. Well, the original depositional environment was where the fossils were buried and found today. The glacier didn't move the settings where fossils were buried. By looking at the sediments, we can probably tell whether these fossils were buried in a river, lake or in off-shore environments. In addition to dino and other vertebrates, we are also looking for mammals.

For each of you, what is your proudest accomplishment thus-far in your scientific fields?

What kinds of life thrived in Paleo-Antarctica? What adaptations would it need?

What kinds of life do you expect to find? Want to find?

If you found something new, what would you name it?

RestInPeaceHBK

Steve Salisbury here: Most of the rocks that we will be focusing our efforts on come from the end of the Age of Dinosaurs, from around 80-65 million years ago. At this time Antarctica was pretty much in the same position it is today. Like today, light would have been the main limiting factor for the plants and animals that lived there. Fossil wood and leaves show that the land was forested in a mix of conifers, early flowering plants, ginkgos, tree ferns, cycads and various ferns. Fossils of back-boned animals recovered so far include various types of fishes, marine reptiles, aquatic birds and rare dinosaurs. Oh, and various animals without backbones (ammonites, moluscs, crabs, crustaceans, etc). The land would have been much warmer back then than it is today mainly because there was no Southern Ocean, with Antarctica still connected to South America and Australia. This meant that warm tropical waters circulated down to the Antarctic coast, and this is probably the main reason it was much warmer than it is today. So provided the animals and plants that lived there could cope with a few months of darkness (and light) each year, conditions would have been much like they were in others parts of the world at this time.

For each of you, what is your proudest accomplishment thus-far in your scientific fields?

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What kinds of life do you expect to find? Want to find?

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RestInPeaceHBK

Meng Jin: 1) I haven't thought about what the proudest accomplishment in my work, yet; several could be, but if I could find a fossil mammal, that will be counted on the top of my list. 2) The time interval spans from the Cretaceous to Eocene (as recorded by rocks exposed in the area we have been working). For that period of time, what we found in South America could be found in Antarctica, all kind of life from vertebrates, invertebrates and plants. And because the environments had been changing during that period of time, such as present of non-avian dino in the Cretaceous but absent in the Paleocene, different patterns of adaptations will be present. 3) It's one of my dreams to find a Mesozoic mammals from the Cretaceous sediments in Antarctica. 4) I don't know, but I may use "australis" as a species name for the new animal.

Are the fossils you're searching for from the era when Antarctica was part of Gondwanaland? What

was postulated latitude of the environment in which these creatures evolved and lived? Even if the climate was much warmer than today, would this area still have been a polar climate with corresponding long days in summer and long nights in winter; with corresponding harsher winter temperatures?

shiningPate

1) For the rock we are interested in, mostly Campanian–Maastrichtian, Antarctica was still connected to South America and Australia. Antarctica at this time had been 'disconnected' from Africa, India, and Madagascar.

2) The lat/long is similar to the location it is occupying now.

3) For the Antarctic Peninsula, it would have experienced similar degrees of day and night as it does today. However, the climate would be more akin to a temperate rain forest but there is, unfortunately, not a true analog that exists today.

What is the most interesting thing we don't know about these trips?

Endless_Vanity

The planning. For this specific trip it took years to plan, finalize, fund, etc. Additionally, we had to delay this trip a few years because of the amount of sea ice that blocked access to the locations in which we are interested. We are thrilled that this trip is finally happening and so far the weather looks to be on our side!!!

Hi Julia! Former masters student stopping by to say hi. You can probably guess who I am from my username :-)

My question- did that fossil penguin from Peru with the feather impressions ever get published? One of the coolest experiences in my short paleontology career was seeing that specimen be prepared in the Lima museum, revealing a beautiful array of well-preserved feather imprints.

Good luck on your expedition.

acrocanthosaurus

Hi Drew: Where are you now? Antarctica?

Our giant penguin with feathers was published in 2010. Its name is Inkayacu. It was great to have you along that expedition.

Thanks!

Questions from my three kids (9, 7 and 4):

- "How do you know what color the dinosaurs were?"
- "What would you do if you found a real living dinosaur? Would you be scared?"
- "What does it feel like to find a dinosaur bone? Is it exciting"
- "What kind of new bones or dinosaurs are scientists finding?"
- "Do you think you could ride a T-Rex?"
- "If you find a dinosaur egg, can you take a picture and put it online?"

Thanks so much for doing this!

karateexplosion

1. We don't for sure! We compare the dinos with living animals from similar habitats to estimate what color they might have been.
2. Because birds are living dinosaurs, we would not be at all surprised! I hope we see some penguins and albatross. (If we found a living Non-Avian Dinosaur, we would be VERY SURPRISED!!)
3. It is exciting! When you find a fossil, you are the first living creature to see it since it died!
4. Where we are going, we hope to find fossils of early birds and mammals from the Age of Dinosaurs.
5. I wouldn't want to... (Chris: I WOULD!)
6. Anything we find will end up being studied by our team and other collaborators, and published in a scientific journal. The actual fossils will go to museums and be put on display for anyone to come and see. Thanks for the great questions!!

My 5-year old goddaughter has a few questions! She is absolutely fascinated with anything she can touch, dig into, and look at, be it dirt, flowers, rocks, or small bugs! (I recently got her a little microscope to play with).

Here are some questions! I told her to write them down and pick out her two favorites to ask:

- What is your favorite discovery?
- How do you know if it's really old?

And here's a few from me:

- How did your journeys into your careers begin? Were you like her as a child?
- What can I do to further encourage her interest?

Thank you so much! Very excited about this.

Zefrine

(Abby)My favorite discovery was a fossil mammal skull, in Wyoming. We can figure out how old a fossil is by studying the rocks it's found in-- we can compare the layers of rock (stratigraphy) to figure out which one is oldest, or use methods similar to carbon dating to get a numerical age.

(Chris) From the sounds of it, I was just like her. And based on your presence here, I can tell you were just like my mom! My journey dinosaur journey began kind of by luck! For some reason, no matter how into science I was as a kid, it never occurred to me that I could do it as a career! So I ended up in a law major in college, which was totally not my thing. I ended up taking a dinosaur course taught by Dr. Clarke and I realized that if I could have any job I wanted, it would be hers! So I switched majors on the spot and here I am. How do you further encourage her interests? Indulge her! Teach her how to answer her own questions using research; that's what we do for a living! And don't ever stop taking her to museums. I'm officially a paleontologist and I still go to museums with my mom!

What makes the Peninsula more appealing than another sector of Antarctica for something like this?

mrenormous

Steve Salisbury: The Antarctic Peninsula is one of the few places in Antarctica where the rocks are exposed during summer. The only other places are in parts of the Trans Antarctic Mountains, which are VERY hard to get to. Fortunately for us, the rocks of the Antarctic Peninsula come from the end of Age of Dinosaurs, and were deposited in environments conducive to the preservation of fossils (shallow marine conditions, close to the mouth of rivers, etc). So it all lines up! We just need to find the fossils...

What makes the Peninsula more appealing than another sector of Antarctica for something like this?

mrenormous

Because the islands off the Peninsula are among the very few land masses in Antarctica that offer ice-free areas. And even so there is not a lot of bare ground. It's just the way it is, and we do our best with the hand we've been given.

What makes the Peninsula more appealing than another sector of Antarctica for something like this?

mrenormous

Pat answering here:

Great question. Three things drive us to the peninsula. First, there is relatively less ice covering the rocks on the peninsula...Second, rocks that were deposited at the end of the age of dinosaur are well exposed on the peninsula...and third, it is relatively accessible from southern South America (and specifically, using a research vessel based out of Chile).

Thanks.

What route will you take to Antartica and what are some of the more notable things you do to prepare for your trips?

Joey_Cummings

We left Punta Arenas, Chile, three days ago on our big red Icebreaker, the NBPalmer. We are in the middle of the Drake Passage and anticipate seeing the continent around 11am tomorrow am.

We had a week of packing and other preparations before we left Chile!

For Dr. Clarke: I want to thank you! We met a number of years ago when you were at NC State! I was a little kid in love with fossils and the like, and my mom managed to get in contact with you, and you agreed to meet up with us and answer some of my questions! I'm in college now, and still love fossils and paleontology, so thank you for meeting with me so many years ago! My question is, when we met, you told me that you were searching for penguin ancestors in Argentina. What ever became of that? Thanks!!

TheUSARMY45

Hi there! Thank you for your note. It was great to meet you! In Peru we found some really neat fossils that indeed told us about early penguin evolution. The highlight was the first fossil penguin with feathers but we also described another two new species (Inkayacu, Icadyptes and Perudyptes). I wonder- are you studying science? JAC!

Seeing that Antartica is basically a forbidden land, how hard was it to get permission to go?

indio007

Sanjispride is right-- Antarctica is protected by the multi-national Antarctic Treaty, to conserve its

environments and ecosystems. To go there, we must abide by the conditions of the treaty, and make sure we have all the necessary permits (eg. to collect and remove fossils and rocks).

Hi this may seem off topic and all that because of everyone asking about the project and everything but mine is different. My dream job is to be a paleontologist or a marine Biologist. I've never gotten the chance to speak to an actual paleontologist and i would like to know. Is there and actual need in the field for more of us. I want to do this but I don't want to just become someone who can't do anything with the degree he got. It's something my parents have told me for years and have tried to get me to give up on this idea to follow what I want. And I suppose that's my question, is there a need for new paleontologists in this day and age?

fheonix99

Matt: There is ABSOLUTELY a need for paleontologists. There is so much left to discover: every time we find something new, it opens up a whole new set of questions-- the field is continually expanding into new areas of research. To the naysayers: people used to say the same things to me, but nothing was ever going to dissuade me from pursuing this career-- and I'm very glad I wasn't dissuaded.

Abby: A funny thing about basic research is that sometimes it's hard to see the immediate application of any single discovery. Added together, however, all those increments have the power to vastly reshape our understanding of the world. As a result, students can feel pressure to go into fields with more immediate & obvious human relevance. I would say that both types of career path are important, and you have to think about what you individually find interesting & rewarding.

I always found isolation in remote yet beautiful places to be refreshing for the first 2 months as you really get into the task at hand. However as you tire and the novelty wears off the tasks start to seem tedious and the isolation makes you question your performance as well as your stability.

What is your team doing to keep motivated and cheerful in harsh conditions?

I found that something as simple as a BBQ sauce or seasoning could make bland repetitive food more interesting. Are you taking any special flavors on your trip?

Do you get much time to email and call home to friends and family?

The bitter cold of sub -40 weather combined with being stuck outside much longer then the work rest cycle allowed caused extreme discomfort, painful frostbite, and sickness. What does your team do to prepare for the worst possiblities such as vehicles breaking down and heaters failing? Do you have to fend for your selves in field maintenance or do you have support?

What is the biggest creature comfort that you wish you could bring but you can't?

Finally, if there was a slam dunk ultimate goal you hope to achieve with this expedition what is it?

vqhm

1) Dance parties, stories, banter, exciting prospect for new fossil discoveries. 2) Our Australian teammate, Steve Salisbury brought Vegamite. Julia Clarke brought hot sauce and chocolate. Chris Torres brought gummis! 3) We do have access to internet and phone capabilities on the research vessel. We are limited to about 20 megabytes/day/person for the internet. 4) We have some training for survival but the research vessel has plenty of support in case we need it. 5) Pets and significant others. 6) Find fossils... and lots of them!

Not to be the pro-hysteria candidate, but how realistic is the fear that during such research you might actually uncover an ancient virus or bacteria? Not to be silly, but to you educated folks is this a realistic concern? Or is it akin to the fear of nuclear bombs setting the entire atmosphere ablaze, the stuff of novels and tall tales?

Fred_Evil

None of us are experts on that sort of thing, but it seems to all of us that this is unlikely in the extreme.

Is there anything unique about the current Antarctic environment, or state of preservation that makes fossil discoveries there potentially interesting? I am often fascinated by the remoteness of the continent, and the effect time and continental drift has had on the climate and endemic species. Curious how the climate and isolation might affect your work.

gwinerreniwg

Much like the marsupial mammals of Australia today, dinosaurs and other organisms in Antarctica during the Mesozoic were geographically isolated-- leading to some really interesting, unique species!

Hi ! Is there any future project to investigate the history of the Antarctic fauna during the Cenozoic ? Since Antarctica shared landmass with Australia and South America, should it be expected to find big marsupials and monotremes fossils from later eras ?

Naliju

Yes! There are known Cenozoic localities, for example Seymour Island has yielded numerous marsupials and placental mammals from the Eocene, including some with relatives in South America. Also one fossil of a Mesozoic mammal group, the gondwanatheres, that is the only one known from the Cenozoic.

How do you preserve the location of your important finds, what mapping software, survey equipment ect?

Furthermore, is the spatial analysis done in Antarctica or shipped back home?

And12rew

All the prospecting teams will have GPS to record important localities. Compiling a list / map of these will be a job for downtime on the ship or in camp. Geographically, the sites are fairly small-- more important will be recording what rock formations the fossils are found in.

Hello you all science lovers! I just have one question:

How can I follow up with this research you are doing, posting updates and such?

Edit: Formatting

RicVR

Pat here:

The best way to follow up on this and to monitor the project is via:

our website: www.antarcticdinos.org

Twitter: @antarcticdinos

Hello you all science lovers! I just have one question:

How can I follow up with this research you are doing, posting updates and such?

Edit: Formatting

RicVR

Our website, AntarcticDinos.org and twitter: @AntarcticDinos

Thank you for your AUA!

1) Does climate change affect your work in Antarctica?

2) What is your opinion regarding whether dinosaurs were warm-blooded or not?

adalhaidis

Think we've answered climate questions upthread. Re: question 2: Matt thinks the answer is complex. Probably small feathered dinosaurs were warm blooded, but the giant long necked sauropods may not have been.

Hello, thanks for the AMA. How do you know that the previously unrecognized rock formation (or group?) was deposited during the Late Cretaceous - Paleogene? What dating methods have been selected? Interested geology student.

Seekra_C

Hi interested geology student. Great question. We have a team of geologists and paleontologists with expertise doing just this. First, we look at the rocks and compare them to formations we know. If the rocks are different than anything we have seen before, then we look at the fossils. These are often good for telling us the general age of the rocks. Finally, we collect samples for radioisotopic dating. In particular, we will date volcanic ashes if possible via U-Pb or Ar/Ar dating. Second, we will date detrital minerals like zircon, to constrain the depositional ages (i.e. determine the age of the youngest grains- which tell us the oldest possible age of the sediment) and finally, we measure the strontium isotope ratios in mollusc shells and match the ratios to know curves that track Strontium isotope ratios in seawater through time.

There are multiple theories on how flight evolved in birds/dinosaurs. I believe most of them can be categorized into "ground-up" theories or "tree-down" theories. Given the current evidence, which of these do you think is more likely? Is there any hope that the fossils found in Antarctica will shed some light on this?

Also, why were avian dinosaurs able to survive the mass extinction that killed off all other dinosaurs?

Thank you for doing this AMA; this is a very exciting topic!

reticulated_python

Great questions and sorry for answering so late -- we can't keep up with all you guys! (Hopefully you'll see this anyway.) This is Matt, and though I can't speak for the whole team, I think the 'trees down' hypothesis is much more plausible, and also more in keeping with recent advances in our understanding of the theropod dinosaur-to-bird transition (e.g., discoveries in the past 15 years or so of 'four-winged,' probably gliding theropods in China and elsewhere).

Yes, fossils found in Antarctica might shed light on the origins of birds. Indeed, in the case of the origin of modern birds (Neornithes or Aves depending on the terminology used), they already have! Vegavis, described from 70 million-year-old Antarctic rocks a decade ago by AP3 team member Julia Clarke, is closely related to modern ducks. It is the only undoubted member of a modern bird group that's ever been found anywhere in the world.

Re: why birds survived when non-avian dinos did not, great question. First, lots of kinds of birds DID die out in the great extinction at the end of the Cretaceous (among them are enantiornithines, or 'opposite birds,' a primitive group that were super-diverse and abundant during the Cretaceous but that left no descendants). Second, nobody knows why neornithines were the only dinosaurs of any kind that survived the extinction, though one idea we're exploring goes something like this: neornithines were present in Antarctica at the end of the Age of Dinos, so they may have been pre-adapted to relatively cold, dark conditions -- adaptations that may have served them well in the 'nuclear winter'-like conditions that may have followed an asteroid impact.

Thanks again for your fantastic questions!

1. Has the caps melting revealed any places that were once hidden that you're all going to be going to in hopes that the melting has revealed some treasures?
2. Though this is primarily for fossils will you be getting soil samples looking for new strains of viruses and bacteria that have still been undiscovered?
3. How do you believe the shifting climate will affect your ability to research or the results as you collect your samples.

Good luck and have a safe expedition.

GeneralHavok

1. Yes-- there are certainly rocks being revealed on Vega Island, for example. Newly exposed rocks might contain new fossils!
2. We are not looking for any currently living organisms. Just fossils!
3. Sea level changes might obscure some potential fossil sites, but on the other hand, see point 1 about glaciers.

I used to work with one of the agencies involved with the South African expeditions to Antarctica (SANAE), so I'm quite interested in the logistics of your expedition -

1. How long is the expedition?
2. How do you get there? (Also, where in Antarctica is the base?)
3. How many people will be going?
4. How much time can one spend working outside on a clear day in Antarctica (assuming safe conditions)? I imagine the cold must make it hard to get a lot done in a single day.

Thanks!

Edit: fixed formatting

starrymirth

1) Our expedition is Feb. 1 – March 23. We will roughly have about a month conducting field work. The rest of the time is mostly travel, planning, packing, training, etc.

2) We are on the research vessel RVIB Nathaniel B Palmer. Once we are in the James Ross Island, we will be traveling via boats (Zodiacs) and helicopters, if the weather permits.

3) Our team is 13 strong, including a documentarian that will be filming all aspects of our expedition.

4) We will have roughly 17-19 hours of daylight; however, we will not be working that entire time. We will likely be working roughly 8–12 hours a day. The remaining hours of the day will be dedicated to rest, preparing food, and cataloging our finds!

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1. How long is the expedition?
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Thanks!

Edit: fixed formatting

starrymirth

Pat and Kerin answering here:

1. The expedition will be approximately 5 weeks in length.
2. We are traveling to the peninsula from Chile via a research vessel. And we will not using any of the bases located in our research area.
3. We have 13 people working as part of our team.
4. An average day looks something like this: out the door at 9AM and back by 6PM.

what are non avian dinosaurs ?

1980sumthing

Literally, any dinosaur that is not a bird. Birds are a living lineage of dinosaurs that survived the mass extinction that happened 66 million years ago. This a handy phrase to provide a distinction between what people normally think of as dinosaurs (those that are extinct) versus birds, which are the surviving group of dinosaurs.

What evolutionary adaptation that happened over the course of any one dinosaur's lifetime do you still find particularly amazing to discover? I'm in the field of Egyptology, but I always found the various ways that Dinosaurs regulated heat and body temperature to be particularly wonderful.

montymort

An adaptation occurs over the evolutionary history of a group of organisms, rather than in the lifetime of an individual. To Matt and Abby, who are writing this answer, the most amazing adaptation of any group of dinosaurs was that some small feathered dinosaurs evolved the ability to fly about 160 million years ago (birds!!). Matt would like to also add that he works on Egyptian dinosaurs, and thinks it's cool that you are an Egyptologist!

Hi, I'm actually quite curious about

- expenses for an exploration with this scale. If it is NDA, can you just tell it in vague way (tens of mil, hundreds of mil, etc) Is majority of it from sponsor or grant?
- What is the most memorable thing from exploration beside finding the treasure?
- What is usually the most annoying thing in an exploration? (can be multiple answer if region exclusive)

Thank you and Good luck!

ImpedingMadness

1. We don't know the total expenses of the trip-- with the exception of the grant amounts our specific team received.
2. Memorable moments (so far!) Learning survival techniques in case of a helicopter accident Watching the Super Bowl in Chile Being seasick
3. Most annoying thing- Weather conditions that prevent us from accessing our field sites.

There have been a lot of dinosaur nests revealed, footprints, even skin prints of dinosaurs. This relatively new theory that later dinosaurs were often feathered: wouldn't there be copious evidence of feathers in the fossil record? Dropped in mud and preserved everywhere dinosaur tracks and eggshells are found?

brookest

Two-part answer: first, there IS definitive, and fairly abundant, evidence of feathered dinos in the fossil record. Second, the preservation of feathers as fossils requires very special conditions (eg. the bottom of a still lake or lagoon, very fine sediments, often a lack of oxygen in the water) -- that's why we don't find them more often.

I know fossils are important, but I also know that tons of really excellent meteorites are found out there in Antarctica.

Have you guys ever found one? Are you allowed to study it or just ziplock it for some other scientists later?

Digitalneo

Meterorites are not that hard to find, according to my colleagues, because they show up well agust the ice. I've never seen one that I know of, but then we are never on the ice as such

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Have you guys ever found one? Are you allowed to study it or just ziplock it for some other scientists later?

Digitalneo

That's correct, lots of meteorites have been found in Antarctica. Our team has never found one though (and I'm not sure we'd know one if we saw it :).

What would be your "Holy grail" discovery?

What do you do to keep entertained in your down time?

Were there any unexpected challenges that you personally hadn't forseen?

I_H0pe_You_Die

For me the most coveted discovery would be a Mesozoic mammal. The only fossil mammals recovered in Antarctica to date are a number of marsupials and placental species from Seymour Island. But these are only Eocene in age (around 40-45 Mya): we want 66+ Mya!

For Julia Clarke: How does it feel name an animal that holds such an important piece of the evolutionary puzzle? Also, how did you decide on the name?

Plethorgalg

It was really a highlight! Scientific names are often chosen to reference the place where the name-bearing fossil was found or the discoverer (if the discoverer is not also the author of the new species description) or a key attribute of the beast etc.. In the case of Vegavis, it is named for Vega Island and for the collectors who were part of the Instituto Antarctico Argentino- hence the "iaai" species epithet. Thanks! -Julia

What kind of specialized equipment is required for excavations in a environment like this?

hbk1966

Warm clothing! Usually we're worried about staying cool but here we want to stay warm and dry! We also have helicopters, which are going to be super useful! They will help us carry our supplies, explore places no one has ever seen before and recover fossils from the field.

1. What tools/process are used to find fossils?
2. What is the lowest you can find fossils and how long does that depth date back? And is there a legal limit to how deep you can go?

LordB3n

1. Fossil hunting is pretty simple -- though there's more to it than this, the basic idea is that one walks

around the area of interest looking for bones (or other kinds of fossils, depending on what's being targeted) that have weathered out of the surrounding rock through natural processes. Once found, you either pick them up by hand or dig them out using hand tools or (in rare cases) machinery such as rock drills and saws.

2. The oldest known fossils are those of single-celled organisms, and are on the order of 3.5-4 BILLION years old. No legal limits that I'm aware of, though due to time and logistical concerns we won't be digging more than a few feet down in Antarctica. (Not to mention that the permafrost would prevent us from going much deeper than that.)

Since Antarctica is an archipelago under all the ice, how many different species of non avian dinosaurs do you expect to find? Do you think something similar to Darwin's Finch's could occur here?

jaynil96

West Antarctica is a jumble of terrains, including islands. But east Antarctica is cratonic--immensely old. I'm sure there are many marvelous discoveries waiting underneath the ice. But if the ice ever went, we would have more important porblems to deal with than dino phylogeny

Considering the thickness of the ice, is it possible that there might be remains embedded in the ice itself? Of course, the glaciation of the continent happened much after the extinction event, but one can imagine that through geological action, some remains might have been pushed up. So, is that possible?

Akesgeroth

Definitely not of dinosaurs, but it seems possible that remains of much more recent organisms (maybe up to a few thousand years old) could be frozen in ice in Antarctica. See, for example, the famous discovery of the several-thousand-year-old "Iceman" in Europe (Italy? I can't remember) a couple decades ago...

Hi AP3! Recently graduated paleo student here--but I mostly focused on Eocene-Oligocene mammals since Oregon is about as young as I am.

1. Can you expand on the fact that Antarctica used to be connected to South America/Australia and how this affected the biodiversity of the Southern Hemisphere?

2. Can you explain how I, no longer in academia but hoping to work towards grad school, can become a part of an Antarctic research project (or explain your path in life that is taking you there)? I've always wanted to go!

tbw875

1. When they were connected, passage between continents was mostly unimpeded for those animals which could make the trip. After they separated, populations on different continents couldn't intermix anymore and so they remained isolated and went on their own independent evolutionary paths. So, we would expect animals living in the Cretaceous to be fairly similar across connected continents but by the Eo-Oligocene, after the continents have become isolated, we would expect them to be quite different after having evolved independently for so long.

2. I wish it was as easy as just emailing the right person but this expedition has been in the works for years and years! The best advice we can give you is to figure out what it is about science that you

are particularly interested in and then find folks who are doing research that matches it. Keep up with the literature. Go to meetings (like SVP). Get involved!

What sort of modifications to standard dig techniques do you need to make on account of the cold? E. g., is your hand dexterity limited by large gloves vs. limited dexterity due to cold if you take the gloves off?

What primarily exposes fossils in Antarctica? How do you find dig sites?

What special political considerations must be taken for specimens to be removed from Antarctica, given that nobody owns it yet many countries have odd half-claims to the land?

What makes you "call it a day" and stop digging considering the sun doesn't set on the site and your specimens can be worked on 24/7? Do you have to enforce a schedule to prevent physical strain?

BillyBuckets

1) The gloves do hinder dexterity but is not too limiting. A lot of our focus will be on prospecting and finding new rock rather than digging or quarrying. Unless, of course we find something big ;)

2) Erosion! We find sites by prospecting, satellite images, maps, etc.

3) All of these considerations are governed under the Antarctic Treaty.

4) Usually when we are exhausted or the sun goes down. Oh, and supper time!

So crocodiles have some immense ancesters. I've heard that modern crocs have crazy digestive capability. Based on what we know of crocodiles today, how much food would an ancient crocodile consume on a regular basis to survive? Or are modern crocodiles different enough that comparing them based on diet doesn't translate without large species of dinosaur?

Blocktimus_Prime

Steve: crocs don't have to eat that much-- they can go long periods without food. One of the giant extinct crocs you're probably thinking of is called Sarcosuchus, and it might have had to eat a couple of cow-sized dinosaurs every month.

Thanks for doing this AMA! I've got two questions.

- Giant titanosaurs have been found in both South America and Australia - since you're working with rocks of the right age, do you expect to find titanosaur fossils there? Or is it unlikely to find bones of that size in the area?
- As someone who may possibly be doing paleontological fieldwork in Antarctica within the next few years (no dinosaurs - I believe it'll be Silurian/Devonian-age formations. And of course it all depends on landing a position in the trip :P), what's a typical packing list like for someone on the expedition?

Thanks again for coming out today!

Diplotomodon

1) There has been a single fossil of a titanosaurian recovered from Antarctica. However, it is a partial caudal vertebra. So we know that they lived here but we need more fossils to know what kind of titanosaurians lived here and how it was related. We expect and hope to recover more. 2) Depends

where you will be going (South Pole vs Peninsula, overwintering or not). The logistical support for such an expedition is well supported. USAP provides plenty of clothing, transportation, and food for these expeditions. You'll find out more when you get to go ;)

All of the pictures I've seen of exposed land in Antarctica seem to show only broken rock. Do you have any realistic expectations of finding some large fossils or do you expect to find only fossil fragments?

Kittyhawk54

We do expect to find some important, relatively complete fossils, because previous teams, including us, have found them there before.

Concerning the fossils that you may find during your expedition; who will own them? I know for expeditions to places such as various countries in West Africa, the fossils all still are technically owned by the country of origin. What are the rules with Antarctica?

Jdog928

Pat here:

The fossils that are collected as part of this project will be reposited at one or more institutions in the US...like Carnegie Museum of Natural History and/or the American Museum of Natural History.

Antarctica is known to have vast lakes or bodies of water connecting landmasses with thick sheets of ice covering them. Would it be easier to find fossils and remains of non-avian dinosaurs in the soil/ rock under these lakes because it is less frozen, or is this not a step you are taking at this time?

Gaz0rpaz0rpfield

We too have heard of these lakes under ice in Antarctica, but since they're under massive ice sheets there's no way to access them, or whatever may be underneath them.

Do you all use some sort of ground penetrating X-Ray to find fossils faster? Also do you use earth moving equipment to remove layers of snow? Thanks for doing this important work for Paleontology! Links to past dig pictures will be warmly accepted.

Edit: left out a couple words

jpstiel

No, we do not use GPR nor earth moving equipment. That in and of itself would be way more costly $$$. We will be sticking to pick and shovel when needed but most our our work will be dedicated to prospecting exposed rock. We are not planning to deal with ice directly.

Hi guys!

What do we know about what the climate was like in Antarctica during all the different time periods? And what size dinosaurs have been found from these periods?

Can this help us to understand how they were thermoregulated?

Thanks a lot and best of luck!

baconface_

Hi back! I think we've answered the climate question a couple times already-- please see above. Interestingly, the dinosaurs that have been found so far from 85-70 million years ago in Antarctica are generally pretty small, by dinosaur standards. The biggest would be about the size of an elephant, but most were cow-sized or smaller. Re- thermoregulation: the short answer is we don't really know. That said, Antarctica, though warmer, would still have been subjected to months of darkness on end. This suggests that perhaps the dinosaurs living there had some strategy for dealing with extended periods of darkness and cooler temperatures. That strategy could have been warm-bloodedness. Thanks for the good wishes & great questions! :-)

(1) What kind (if any) imaging techniques do you use? I imagine that the fossilized remains must be very difficult to discern from the surrounding rock formations.

(2) I am in imaging and have always wanted to know how to get involded in this sort of thing. Any tips?

wht_smr_blk_mt_side

One novel tool we are trying out is spectral satellite maps. These allow us to distinguish different types of rock, even down to identifying from satellite images which rocks are from the Cretaceous Period. That lets us target our search once we do get on the ground.

As far as imaging the fossils once we find them, micro CT scanners and medical CAT scans are often useful in seeing through the rock to the fossils inside. In our imaging lab at the AMNH, we have a couple of super awesome techs who have backgrounds in geology and imaging, whose work is essential to that kind of research.

How did/do you know where to look for fossils? Antarctica is a big place!

kyote42

We use the geological maps compiled by previous Argentine/British/American scientists. Since we're looking for Cretaceous animals, we go to Cretaceous rock layers. Previous researchers were able to date rocks using their invertebrate fossil content.

Hey this is great, thanks for doing this ama! How long is your field season and what is the weirdest animal you've found? E.g are there any species you weren't expecting so far south or in a specific level, or just something with a interesting niche not many people have heard of? Thanks!

notharctuspugnax

This one is roughly a month of actual fieldwork (mid-February to mid-March) with some time in Punta Arenas, Chile and on a ship in the middle of the Drake Passage tacked on to either end. We left home on February 1 and will touch back down at home March 25. We're still on the ship ride over so we haven't found anything yet this season but keep an eye on our Twitter (@AntarcticDinos) and our website (www.AntarcticDinos.org) to keep up with our expedition!

Matt: to me, the weirdest animal that has been found here is, ironically, the one that would be the most familiar to us today: the duck-like bird Vegavis. It's weird because birds living at the same time elsewhere in the world are only distantly related to modern birds (they had teeth, may have been fairly

poor fliers, etc). Also the plesiosaur Morturneria is thought by some to have been a filter-feeder, which would be pretty weird. Imagine a marine reptile trying to be a humpback whale!

Is there any sort of special training, related to survival or paleontology, you guys had to undergo given the extreme conditions?

mcgillycuddy412

Yes! We spent about a week in Punta Arenas, Chile, doing all sorts of training: we learned survival rules and skills for very cold weather, as well as helicopter and boat safety.

This is actually more a question for archaeologists, but how often do you get confronted/contacted by conspiracy theorists accusing you of 'covering up' Earth and mankind's 'real history'? I have some archaeologist friends who do CRM work that get some very disturbing emails.

browwiw

Not very often, actually.

Will you be doing a dive anywhere there as well? I've always been curious of the prehistoric aquatic species in colder arctic regions

Oh_Look_A_Camera

No diving, but-- the rocks we will be looking at were deposited on the floor of a shallow sea, so we expect to find fossils of quite a few marine animals. For example: sharks, other fish, plesiosaurs, and mosasaurs (like the one in Jurassic World!).

Will you be doing a dive anywhere there as well? I've always been curious of the prehistoric aquatic species in colder arctic regions

Oh_Look_A_Camera

No, we will not be doing any diving this time around.

Hi!! My name is Brooke :D I visited the Smithsonian a few years ago and never got past all the ancient bones, not just dinosaurs! Digging up fossils has always amazed me.

What lead you to choose this as your career?

Is there anything specific your hoping to find on this trip to Antarctica?

What's the largest fossil you've personally seen unearthed? And what was it?

Have any of your fossil ended up in museums we could visit?

And how comfortable are you guys while you're working? I can see you guys in your big coats with frost on your face. Haha, that's probably affected by movies though as I've never been out of North America. Thanks!

BwookieBear

Hey Brooke! Matt here. I went into paleontology because I told my parents I wanted to be a paleontologist when I was four, and never really thought of doing anything else. Yes, I'm hoping for just one decent partial skeleton of a non-avian dinosaur. Really any kind will do. A fossil bird skeleton would be a nice bonus. Largest fossil: I've had the good fortune to have helped discover two of the world's largest dinosaurs: Paralititan in Egypt in 2000 and Dreadnoughtus in Argentina in 2005. The limb bones of those things are almost as tall (or in a couple cases, taller) than I am, and I'm 5' 11". Yes, many of us have discovered fossils that are currently on display in museums, though many of these are overseas in the countries in which they were found. For example, the bones of Paralititan are in the Egyptian Geological Museum in Cairo and those of Dreadnoughtus are in the Museo Padre Molina in Rio Gallegos, Argentina. Last, your conception of us working is pretty spot on -- we do often have to wear big parkas, and we do get pretty cold (though probably not to the point where we'd have frost on our faces). Thanks for the great questions!

Hello ! Where do you plan to search/dig during this expedition ? Are you returning to your previous expedition dig site ?

On another topic, since Antarctica was experiencing a dramatic climatic and topographic change (going from a cold, tundra style, to a hot, lush climate), are there lots of morphological change in the fossil record ? Is there any special adaptation to the long polar night/day condition ?

bravach

We are targeting the James Ross Basin area of the Antarctic peninsula, and yes, we are returning to previous sites. As to the second question: some paleontologists have suggested that dinosaurs living inside the Antarctic circle might have had adaptations to long periods of darkness such as bigger eyes-- though this is still controversial. This is based on some fossils found in Australia, from a time when that continent was located much further south.

Hi. My understanding is that the actual landmass is below a permanent sheet of ice a few km thick. How does the drilling/excavation happen?

sekva

Where we are going, we won't need drills! The Antarctic Peninsula is relatively far north for Antarctica so that during the Austral summer, it is relatively warm; much of the rock is not covered in ice/snow.

Hello Antarctic Paleontologists!

Thanks for doing this AMA. When most people think about field work in paleontology, they imagine the arid deserts of the Southwest US, the Gobi Desert of Mongolia, or the Patagonia of Argentina. Dry, hot, rainless deserts. These places present their own challenges to field work, but how does research in Antarctica compare? Once you find sediments, how difficult is it to get the fossils out of the rock? Is there any camping involved?

Stay warm! And bring back many cool new organisms.

DrEugeniaGold

Abby & Matt: HI!! There is camping involved, with some extra layers and tents that can stand up to very high winds. It can be really difficult to get fossils out of rock here, because sometimes the ground is

frozen. Attempts to melt / chainsaw permafrost have been mostly unsuccessful. Another challenge is that in such cold weather, it's hard to get plaster jackets to set... that's a challenge we'll be glad to face, though, as it will imply we've found a big fossil! (Matt: a big DINOSAUR fossil) Thanks for participating! :-D

What was Antarctica like 60 million years ago? (climate, geography, wildlife, plants etc.)

NikKerk

Warm. With forests. And about in the same position it is today.

I'd love to know how geology and paleontology makes all of you feel?

Geology is my degree, and that feeling of childlike excitement is still going strong;

- Hand me an igneous rock "WOAH THIS USED TO BE LAVA"
- Show me evidence of bioturbation "FLIP ME ACTUAL LIVING ACTUAL MOVING MILLIONS OF YEARS OLD ORGANISMS MADE THOSE!"

Take me to a quarry and I'm skipping around like a five year old. Talk to me about isotopes and I'll become hand-flailingly happy.

So I guess I just wanted to give all of you the opportunity to go back to your basic geo/paleo loving bones, and describe why it is that you enjoy this subject so darn much.

Roald-Dahling

A couple of things that never fail to inspire awe: --Remembering that the fossil you're holding used to be part of a living creature. --Thinking about/trying to conceptualize the VAST timescales we study. 70 MILLION YEARS! And that's not even super long, in the context of the history of the earth!

Where do you guys stay/sleep for the entire trip? Is there a small community already built there for exploration?

llama2301

Pat:

Once we arrive in the research area, we will put tented camps in place via zodiac boats and/or helicopters. We will not be going into or be based out of any of the permanent camps/bases.

Where do you guys stay/sleep for the entire trip? Is there a small community already built there for exploration?

llama2301

Our permanent base is aboard the RVIB Nathaniel B. Palmer, a NSF science research ship. From there, different groups from our team will be going ashore to camp at various localities.

OK. I'm sure people ask you this all the time, but this is for my three guys who just went to school. How possible is it to reconstruct dinosaurs from the DNA found in bones and insects in amber? Movies like jurassic Park make it look easy. I'm sure it's not, and as someone pointed out, the dinosaurs were hybrids and someone's imagining how they'd look, rather than actual clones of dinosaurs. My sons would appreciate the answer to this when they get home.

WalkTheMoons

Abby here: there is a growing field of study that aims to extract and sequence DNA and protein molecules from fossils. In some of my own research, I have sequenced genes from the bones of wooly mammoths and ancient bison. Unfortunately, the maximum lifespan of DNA (before it has all decayed away) seems to be only a few hundred thousand years, so we probably won't be able to get any DNA from the Age of Dinosaurs :-(

I have become quite in paleoecology recently and I would be interested to see if you could answer any questions I have related to your expedition!

1) What was the diet of Vegavis iaai? 2) Did Vegavis iaai migrate? 3) What would today's ecosystems be like had the dinosaurs not become extinct? 4) Did the early ancestors of modern mammals fulfill similar ecological roles? If not, why did their roles change?

lromaine

Good questions!

1. Vegavis was a close relative of living ducks, so might have had a similar diet and lifestyle.
2. No fossils of Vegavis have ever been found elsewhere, so we have no idea if it migrated.
3. Wow. Um, Jurassic Park? Seriously though, it is a really interesting thought experiment. We really don't know!
4. Most mammals from the age of dinosaurs were small, and would have occupied niches similar to those of rodents and insectivores today.

Thank you for doing this AMA. So, when I was a little kid, I, like so many other kids, loved dinosaurs and wanted to be a paleontologist, but I particularly wanted be paleontologist in Antarctica. My big sister taught me about the ice sheet covering the continent and I thought: "I'll bet there are a lot of fossils no one has ever found because of all that ice." Ever since I was 4 I wanted to look for dinosaurs in Antarctica.
What did I miss? What was the thing that made you not just a paleontologist, but a paleontologist that went looking for fossils in Antarctica?

streamweasel

Matt: that question sounds like one I might have written myself. I, too, wondered about the dinosaurs buried under the ice in Antarctica as a kid. What made me a paleontologist? Hard work, persistence, patience, and a whole lot of luck.

My 5 year old son is so excited for your AMA and research. He has had dreams of becoming a paleontologist since he was 3. His question is: What type of non avian dinosaur do you think you could find? Would it be similar to a troodon?

He also wanted me to tell you that he once "discovered" a dimorphodon "fossil" at the playground.

CoconutDreams

Previous non-avian dinosaurs have been found on Antarctica. One of these discoveries is a partial foot of a dromaeosaur, a close cousin to troodons and birds. Other discoveries include fossils of hadrosaur, ornithopod, titanosaurian sauropod, ankylosaur, and avian dinosaurs. In addition to these known dinosaurs, we may expect to find abelisaurid theropod dinosaurs–even any unexpected dinosaurs! Tell your son to continue exploring for more fossils!

I learned that the fossils of identical species of primitive euprimates have been found in Africa and South America, and scientists have no real idea how they migrated out of Africa to South America, since it would be too statistically impossible for the species to identically evolve independently of eachother. One proposed theory is that they migrated across Antarctica tens of millions of years ago. On your expeditions to Antarctica, have you discovered anything that may give this theory any backing?

Meexley

There is certainly a hypothesis of a connection between South America and Africa via Antarctica. To test it, we would want to find fossils that are closely related to South American and/or African species, and occurred at a time during which there was a land connection.

This isn't related to your Antartica trip specifically, but I'm a Geology undergrad right now. I don't know what I'm going to go into, but the most interesting part of geology to me has always been paleontology. However, I'd also like to be able to get a job :). In your experience, what have the job prospects been like for a paleontologist?

Oreosmooshy

In all honesty, the job prospects for vertebrate paleontologists at least (i.e., those of us who study fossils of backboned animals) aren't super these days. All of us know good people who are unemployed, or at least under-employed. But as somebody said above, if you love paleo you'll find a way to make it work. We're never going to try to discourage anybody from following their dream.

From a plate tectonics standpoint, where was the Antarctic peninsula 60 to 90 million years ago? Was it connected to any other land masses, and would these fossils be found anywhere else?

slowlyslipping

From roughly 90-60 Ma (the end of the Age of Dinosaurs and the beginning of the Age of Mammals) the Antarctic Peninsula was close to where it is now, though much closer to the southern tip of South America. As a result we'd expect that many types of fossil organisms typical of South America would also have lived in Antarctica at the same time. For example, most of the few non-avian dinosaurs that have been found in Antarctica to date are thought to be closely related to South American species.

So with what you've found so far / hope to find. Do the fossils seem more like South American animals? Any evidence of marsupials? I always wondered if any made it there and flourished before it got cold.

0minous

Excellent question. So far, the dinosaurs and other animals found in Antarctica at the end of the age of dinosaurs do seem to be mostly closely related to South American species. As for marsupials, they have been found in younger rocks in Antarctica (roughly 45 million years old) and so yes, they did flourish here before the advent of the ice.

What are your salaries for these sorts of jobs?

DartTheWolf

Don't really think I should share that (not to mention that our salaries vary some), but let's just say that none of us are rich.

What data will you be recording with the fossils you uncover, and seeing as how many of you are from different museums or universities, where will they be stored?

ShrimpMage

Data will include things such as geological and geographical context (i.e., where and in what rock unit was a particular fossil found), spatial position relative to other bones in a quarry, etc. All fossils collected this year will be permanently housed at Carnegie Museum of Natural History in Pittsburgh, the home institution of project leader Matt Lamanna.

What data will you be recording with the fossils you uncover, and seeing as how many of you are from different museums or universities, where will they be stored?

ShrimpMage

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What was your favorite finding/discovery?

Mink2

Matt here -- my favorite discovery that I was a part of was in Egypt in 2000, when some grad school buds and I found a new species of dino that's one of the largest ever discovered, Paralititan stromeri.

Hi! I'm currently looking to get my masters in human adaptability in extreme environments when faced with climate change. Can you tell me some things to expect when working in extreme environments?

DirtyCavePainter

In the Antarctic environment, one can expect extreme cold and isolation from one's friends and families. Predictably those things can negatively affect a person's outlook. (We'd reply in more detail but we still have lots more questions to answer, sorry.)

Are there outcrops that are becoming exposed with climate change that you're particularly interested for future expeditions?

Sanpaku

Yes. This is a double-edged sword. We are trying to focus on areas that have recently been exposed by warming and retreat of snow and ice. Unfortunately, even though new rock is becoming exposed, it does not necessarily mean that we can access these places because pack ice and fast ice can block our access to these places.

If I wanted to start a career in paleontology what would my best course of action be?

Scat_In_The_Hat

When you get to college (if you're not already there), major in geology and/or biology and do as well as you can. Go to a professional conference or two, meet potential graduate advisors, then apply to graduate school to work with one or more of them. Pick a grad school and go on to get a Master's and/or Ph.D. (Easier said than done, but you can do it!)

What kind of fossils do you expect to discover? What would excite you about them?

speqter

Expect: fossil wood, leaves, fishes, marine reptiles, and birds. Hope: a good skeleton of a non-avian dinosaur and/or another of a bird. A non-avian dinosaur would be one of the very few ever found from the end of the Age of Dinosaurs in Antarctica, whereas a nice fossil bird could clarify the origins of the modern bird group, Neornithes.

Not sure if it's been asked yet, but what is the most enjoyable part of going on these types of expeditions? How do the process of digging in Antarctica differ from digging in a warmer climate? Are there different safety precautions you need to take in preserving any fossils you find?

AmandaLemons

Chris: finding stuff, and getting away from civilization! For the other parts-- see our answer to a few other similar posts, above.

Hello!

My question to you guys is: How do you get involved in stuff like this? In a week i'll be starting a science degree at uni, hoping to major in Earth science. Will the path to being on a research time somewhere become clearer to me as I progress through Uni? Thanks in advance!

Ps Penguins

AltyThings

PENGUINS! Yes-- try to stay involved in your lab, either by working on projects for your profs or volunteering, etc.

Which dinosaurs do you hope to/expecting to find?

imcyooming

We hope to find an Abelisaurid theropod, a horned/ornamented predatory dinosaur or a titanosaurian sauropod, a large herbivorous dinosaur. Dinosaurs are rare in the rocks we plan to explore. The most likely kind of dinosaur we may find would be an ornithopod, a small-bodied herbivorous dinosaur.

I've heard that people on Antarctica missions always watch The Thing when they arrive there... Is this true ?

thepetrochemist

Some of our team just watched it in the ship's lounge today. Not joking.

Hello fellow Antarctic Explorers! I'm sitting in Christchurch airport waiting for my flight home after 4 months at McMurdo! I hope you all have an excellent deployment and do some great science! Good luck!

Sanjispride

Thanks! Hope you had a successful time at McMurdo. And thanks for chipping in with answers on some of the other questions above!

Have you encountered any evidence of large albino penguins and if you did how would that affect the accepted ancestral chain of flightless birds?

pjcircle

No fossil evidence of albino penguins that we know of, though AP3 member Julia described a large fossil penguin from Peru a few years back that seems to have had brown feathers.

Hi, thank you for doing this!

Just wanting to ask, I'm finishing up my Bachelor of Science with a major in Palaeobiology and I'm just wondering how does one get involved in these kinds of projects?

DarkSoren17

Work in your prof's lab, either as a volunteer or as a grad student. Get involved in the paleo community.

Hi guys,

Sounds like an exciting adventure!

Which parts of Antarctica will you be researching, and do you have permission to access any part of it?

Wuleta

Thanks! We're studying the James Ross Island area of the northern Antarctic Peninsula, and yes, we have all of the permissions needed to access that area.

What is the best way to enter the field of paleontology? Can you go on to get a masters in paleontology if your bachelors is in biology, or does your bachelors need to be in geology?

Throw-AwayDixieLand

It's about 50/50 bachelors in biology/geology-- paleontology occupies a spot right in between those two fields!

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Thank you! Re: fossils that have been found and that we hope to find, please see some of our other answers in this AMA.

Is there anyway you're allowed/ able to upload pics as the progress comes?

N1cko1138

Yes! Please check our website http://antarcticdinos.org and/or Twitter feed @antarcticdinos. We'll be posting (including pics) to those as often as our connectivity allows.

How do you decide on what areas you're going to? Are there specific details that make you believe you'll find fossils there?

CampBenCh

Matt here: I think I answered more or less the same question a bunch of posts above, so please check there.