Science AMA Series: We're the Association of Polar Early Career Scientists (APECS), here to talk about life and science in the polar regions, Ask Us Anything!

Polar$_S cience^1 andr/ScienceAMAs^1$

[1]Affiliation not available

April 17, 2023

Abstract

Hi Reddit! The Association of Polar Early Career Scientists (APECS) is here to promote Polar Week! What is that? There are two International Polar Weeks each year – one in March and one in September – which coincide with the equinoxes, the only time when everywhere on Earth has 12 hours of daylight. Polar Week is a series of international events with the goal of promoting the science that takes place in polar latitudes, and educating the public about all things polar. For the upcoming Polar Week we are specifically highlighting #PolarPeople, humans and their activities and impacts on the poles. Did you know that there are people living in Antarctica year-round? Or that permafrost thaw is causing infrastructure damage and affecting communities worldwide? This AMA is just one of many events being held world-wide to connect and educate the public about all things polar. See a full calendar of events here: http://www.apecs.is/outreach/international-polar-week/upcoming-polar-week.html APECS is an international and interdisciplinary organization for undergraduate and graduate students, postdoctoral researchers, early faculty members, educators, and others with interests in Earth's Polar Regions (Antarctica and the Arctic) as well as the wider cryosphere. Our goals include creating opportunities for the development of innovative, international, and interdisciplinary collaborations among current early career polar researchers as well as recruiting, retaining, and promoting the next generation of polar enthusiasts. Learn more here: http://www.apecs.is APECS members participating in this AMA are early-career polar scientists in a variety of research areas with experience working in the polar regions in remote field locations and in some native communities, studying everything from sea-ice interactions to charismatic animals like penguins. We will be answering questions related to our research, what it's like to work in the polar regions, or even how to get into polar research. Learn more about and join APECS for free here: http://www.apecs.is/get-involved/join-apecs.html Participants: Liz Ceperley: PhD student at the University of Wisconsin-Madison researching the dynamics and history of glaciers in the Arctic, such as the Petermann Glacier in Greenland and well the paleoclimate of the last 20,000 years and has conducted fieldwork in the Arctic five times. Linkedin Alex Thornton: Master's student researching the ecology of Pacific walrus and oceanography in response to environmental change. Website Jean Holloway: PhD student at the University of Ottawa in Canada, researching the impacts of forest fires on discontinuous permafrost in the Canadian arctic. She has done work in the Canadian arctic over the past 5 years, travelled to a remote fly-in site, and seen a polar bear face-to-face. Samantha Darling: PhD student at McGill University's Sustainable Futures Lab, with research focusing on natural resources, governance and capacity in Northern Canada. Website Linkedin Aja Ellis: Postdoctoral researcher at Carnegie Mellon University working on aerosols, biomass burning, and Antarctic paleoclimate. Sara Strey: Meteorology Teaching Fellow at Northland College in Ashland, Wisconsin, USA. Sara's research focuses on interactions between Arctic climate change and midlatitudes.

the WINNOWER

REDDIT

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POLAR_SCIENCE R/SCIENCE

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READ REVIEWS

What is one or two easy things normal people can do to prevent the polar regions from melting (global warming) ?

WRITE A REVIEW

CORRESPONDENCE:

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XaioPuppy

I think the biggest influence normal people can have on climate change is engaging politically. Write to your congressmen, and urge them to fulfill our obligations to the Paris Climate Agreement. Send postcards. Call the offices. These things matter to politicians - they need to hear from their constituents, and its a quick and easy thing to do.

As far as day to day activities, think about the impact of the food you are eating. Beef has a disproportionately high carbon footprint! If everyone ate a few less beef-based meals a week, it would have a significant impact.

-Aja

Is it true that mosquitoes compromise a substantial proportion of biomass in polar regions such that exterminating them would be damaging to the ecosystem? Why/how are there so many mosquitoes in these regions? I had always assumed they needed a fairly warm place to survive, are they a different specieis?

hiero10

So mosquitoes play several different roles in the polar ecosystems, likely most prominently being food for bats, birds, and fish. There are many different species of mosquitoes, including those adapted to polar climates. There are many fruitful breeding grounds for mosquitoes, such as pools of shallow stagnant water that can develop in both boreal and tundra ecosystems. Really, mosquitoes need a place to hatch and then warm blooded animals to feed on, both of which are available in large amount in the polar ecosystem.

Thanks for doing this AMA! I am fascinated by the polar regions. I have two questions: 1. What is the most devastating example you can give of polar melting? 2. As someone with a Bachelor's degree already, are there any programs I can take to get more involved in these studies or any type of volunteering that can be done by adults?

Bananas_are_theworst

Howdy Bananas!

Polar melting is currently pretty devastating. In both the Arctic and Antarctic, March has set records for low sea ice extent. It is currently winter in the Arctic and summer in the Antarctic. The winter in the Arctic has been warm so the sea ice hasn't reached its usual extent, in fact, it has set a record low. The summer in the Antarctic has been similar, allowing for a record minimum sea ice extent down south. Glaciers are also melting in both hemispheres. To learn more and keep up with the current state of the ice, check out http://nsidc.org/, the National Snow and Ice Data Center. They keep up to date accounts of what is going on.

To answer your second question, if you would like to get involved in performing polar research yourself there are master's and PhD degree programs all over the world that will pay your way to do so. The APECS website keeps fairly good track of these programs (http://www.apecs.is/career-resources/job-board.html). To volunteer, that is a more difficult question. Unless you live locally in the Arctic it would be difficult to get there to volunteer. There are some programs where you can pay for a trip to go do work, but I'm unsure about how reputable they are.

I hope I've helped!

-Sara Strey

Hi! I have a question or two that may be dumb, but: how are you able to do this for a living? Is APECS funded by another company or organization? Do you sell your research somehow? If so, who, or what, determines how much your research is worth?

AfterBurner0

Thanks for your question! As listed in the bios above we are all polar scientists working at major colleges and universities around the world, getting paid to teach undergraduate courses and conduct research. APECS is a non-profit housed in Germany working to bring together young polar scientists, but our association with APECS is purely volunteer. As researchers, we and our colleagues and advisors receive grants from organizations like the National Science Foundation and NOAA to conduct research, and panels and editors comprised of our peer scientists are who deem whether the research we conduct is fundable and publishable. -Liz

Hello! As a biochemistry undergraduate student, what are the ways I can go about doing research in Antarctica in the future? I'm studying in the UK but I'm from Singapore, if that's relevant.

I was always fascinated by the idea of a distant, almost alien continent right at the bottom of the planet and learning more about the life in these extreme areas is pretty interesting.

Thanks!

wildcard1992

It is always great to find new polar scientists in the making, wildcard!

I would definitely recommend that you consider going to graduate school. You will be presented with a plethora of options (all over the world) that can get you to Antarctica. Check out our job board to give you some ideas that can get you started (http://www.apecs.is/career-resources/job-board.html). -Sara Strey

Hello! As a biochemistry undergraduate student, what are the ways I can go about doing research in Antarctica in the future? I'm studying in the UK but I'm from Singapore, if that's relevant.

I was always fascinated by the idea of a distant, almost alien continent right at the bottom of the planet and learning more about the life in these extreme areas is pretty interesting.

Thanks!

wildcard1992

There are! We've got a group of members who are very active in Malaysia, so they might be able to offer you more relevant resources than I have for undergrads in that area. If you e-mail our National Committee Coordinators, they can put you in touch. As for the UK, try joining the UK Polar Network! You can also check our jobs board for all kinds of academic, volunteer, and career opportunities. Check out our website: www.apecs.is

As early career scientists, how worried are your about the future of funding in your field? We've already seen the current administration propose a budget with enormous cuts to many agencies that fund scientific research. What other countries are involved with studying the polar regions and what will the consequences be if the United States becomes less involved?

shiruken

I won't lie to you, shiruken. I'm an American scientist and I'm fairly nervous about these budget cuts, especially to the Environmental Protection Agency. A lot of research funding currently comes through the EPA and that will be gone when they cut it.

Fortunately, countries all over the world (too many to name them all!) participate in polar research. From the website of the Arctic Council, the US States its mission in the Arctic as follows "National security, economic development and scientific research are important U.S. interests in the region. U.S. Arctic policy emphasizes environmental protection, sustainable development, human health and the role of indigenous people" (http://www.arctic-council.org/index.php/en/about-us/member-states). It is then fair to say that we will not only be risking our environment by not understanding climate change where the world is most currently vulnerable, but we will also be risking our national security.

-Sara Strey

As early career scientists, how worried are your about the future of funding in your field? We've already seen the current administration propose a budget with enormous cuts to many agencies that fund scientific research. What other countries are involved with studying the polar regions and what will the consequences be if the United States becomes less involved?

shiruken

Very. I'm actually on the verge of dropping out and being homeless in about two months. One of my advisors has no salary either as of mid-summer. I've been seeking funding for years and it's really hard to come by. In all reality, I'm not sure I'll make it in this field simply because you have to be in the right place at the right time for money (intelligence and prior research counts, but there's also a lot of luck).

There are a number of countries with polar programs. COMNAP has many of the Antarctic ones and Arctic programs can be found through Wikipedia.

If the US becomes less involved, we lose a seat at the negotiating table and that means loss of control over resources/ability to conserve ecosystems. (Whomever tells you there isn't a lot of political maneuvering even for for a sovereign territory is lying.) -Alex Thornton

IS it true that penguins don't feel any fear around humanS?

Depressed_Words

I can't speak for other species, but the Emperor Penguin is super cheeky and curious. They like to come up and say "whats up dude". -Aja Ellis

IS it true that penguins don't feel any fear around humanS?

Depressed_Words

While we don't know if they're "fearful," penguins do display aggressive behaviors towards encroaching humans, which leads up to believe that - at the very least - they're not always thrilled to have us around. Like any individual animal, there are personality differences between them, too.

-Alex Thornton (I study walruses, but I'm really a penguin person)

In the show Futurama, to reduce the effects of global warming, they devise a way to propel the Earth slightly farther from the sun. Has this ever been considered as a solution, and if not, what other solutions have been proposed, other than reducing our footprint. I'm 100 percent serious.

therevofev

As much as I love Futurama, therevofev, their plan just wasn't feasible. Disrupting Earth's orbit would take technology we just don't have and it would probably produce devastating consequences.

Other plans have been tested, these are called geoengineering plans. For example, one group put a giant white sheet over part of Greenland to see if increasing the albedo (the reflectivity of the surface) would reduce melt. Harvard researchers are planning a project with a similar idea behind it but different methods. They plan to increase the albedo/reflectivity of the Earth's atmosphere by shooting a bunch of reflective particles into the stratosphere. Other geoengineering projects are simpler, like reducing the amount of energy cities absorb by painting roofs green or even planting plants on skyscrapers.

Because of possible unforeseen consequences projects like these are often controversial. -Sara Strey

What are the polar regions? And how is their relationship related to our world like?

SeanMendez

Polar Regions are the Arctic and Antarctica, so everywhere above 66 degrees latitude North and South. We call them the Poles because they are where the North Pole (in the Arctic) is located and the South Pole (in Antarctica). The North Pole location is located under sea ice, so not a fixed location, but at the South Pole scientists actually live there year-round! Check it out- https://en.wikipedia.org/wiki/Amundsen%E2%80%93Scott_South_Pole_Station -Liz

What are the polar regions? And how is their relationship related to our world like?

SeanMendez

There is also the so-called 'third-pole," or the glaciers of the Tibetan Plateau. This is a particularly interesting and alarming region of massive change due to the industrialization of China and the Asian region, and provides water to a huge population! The shrinking of Tibetan glaciers is a real and immediate problem.

-Aja

What are the polar regions? And how is their relationship related to our world like?

SeanMendez

To add to Liz's post, the magnetic north and south pole are always moving, and determine how our compasses work and also affect migration patterns, particularly for birds. So they are really important for our modern technology that depends on locations! - Sam

Have the polar ice caps ever melted away completely and not existed for long periods of time? Could such a thing happen in the future?

EDIT: Thank you for answering my question, Liz. Take care :)

vaxamot

Thanks Vaxamot for your question- if current warming continues then yes we are heading towards a new climate and glacial state where ice caps will not exist. Throughout the last 2.5 Million years there are cycles (lasting 100,000 years and 40,000 years) of glacial periods, then interglacial periods (when ice sheets and glaciers are smaller). One of the last times this happened was 125,000 years ago when the world had a time without glaciers and large ice caps for thousands of years. However, the last time that CO2 was as high as it currently is was was back in the Pliocene Epoch, which lasted from 2.5-5.3 Million years ago, before we had ice sheets in the Northern Hemisphere. Many scientists are looking at the Pliocene Epoch to predict what our world might look like without ice sheets and high levels of CO2 in our atmosphere. Let me know if this answers your question! -Liz

Thanks for doing an AMA. How is the infrastructure that supports Antarctic research doing? It seems like the south pole station is doing ok, but much of the other infrastructure is WWII-era, and badly in need of repair, which means funding. I remember something about increasing the tourism to Antarctica to pay for it, but of course that has its own costs.

beezlebub33

There are some really state-of-the-art facilities down in Antarctica - there are something like 30 countries with research stations or activities. That being said, there is still a lot of old infrastructure in operation (places like McMurdo, etc.) I remember there was talk of a big NSF grant to support repairs and renovations, Antarctic Infrastructure Modernization for Science (AIMS). I don't know their current funding status, but considering the political climate for science support and research...

I am hesitant to support increasing tourism to the continent, partly because increase tourism means increased carbon emissions (like black carbon) that can pollute the snow. Not to mention the increased traffic in super-fragile ecosystems.

-Aja Ellis

The multinational effort to ban CFCs in response to the destruction of the ozone layer and expanding ozone hole seems like the last time the United States made a concerted effort to protect the environment. Since you likely work with researchers from many different countries, what are their opinions about the United States' refusal to accept climate change and global warming as dire problems? What needs to be done to change public opinion on the matter? Would better education on climate change be enough to sway voters' minds?

shiruken

I'm a Canadian based scientist, though I have done work with and have friends that are both US and international scientists. I think that looking at recent climate talks are probably a good indication of international opinion, and I would point out that the US isn't alone in it's climate change denial. Many countries are not overly enthusiastic, though none as vocally as the US. To change public opinion is hard. I try to approach it through pointing out obvious changes that we have been seeing (like spring weather or the frequency of storms, for example) that are undeniable. It's even better if you can point out how these things affect the economy, as people always listen when money is involved. Equally, I think science education from an early age is a good way to help sway older generations. Kids can be very convincing! This is a topic of interest for me, so I could go on, but I'll finish by saying that if we influence the sphere that we live individually (our friends and neighbours), that will as big a difference as most things. - Sam

I would imagine that more sea-going transport will take advantage of the declining ice in the North. Is there any concern that shipping may cause environmental harm? What if, say, an oil supertanker sank in Baffin bay? Cleanup would be very difficult.

heeza_connman

There is a very large conversation going on about exactly this concern. The biggest piece of this is the discussion of whether the Northwest Passage is internal waters for Canada, or an international throughway, as the US is claiming. This means vastly different things in terms of who is responsible for clean up and enforcement. Luckily, there are some agreements already in place, like the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, which came into effect in 2013. However, there continues to be discussion about what increased shipping in the Canadian archipelago will mean for the environment. - Sam

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heeza_connman

I'm a disaster responder and have many colleagues who responded to the Exxon Valdez spill. If a oil supertanker sank in Baffin Bay, it'd be all but impossible to clean. This is a tremendous issue that is being actively discussed, including at the Effects of Oil on Wildlife Conferences. -Alex Thornton

Do you consider yourselves APECS predators?

whataboutelevensies

Haha! You made me laugh out loud and, as a vegan and APECS member, I am going to use this joke. Thank you. :)

-Alex Thornton

How fluffy are polar bears?

BabyFossaMerchant

Polar bears are REALLY fluffy, especially in winter, when they have a big under coat to keep them warm and contribute to their water-proofing. - Sam

How fluffy are polar bears?

BabyFossaMerchant

More than being fluffy, polar bears are extremely aggressive and dangerous. In fact, research groups going out on the sea ice are required to have someone there with a gun, called a bear guard to ensure the safety of the group. -Sara Strey

What is the most striking evidence of climate change that you have encountered in your work?

enormousloser

My polar research actually began with a striking piece of evidence for climate change. At the time in 2007, the Arctic reached a record minimum for sea ice extent. As a life-long resident of Great Lakes States in the US (lake effect snow!), I had to wonder what all that anomalous open water would do to the atmosphere. It turns out that it changes weather patterns all the way down to the mid latitudes where most people live. -Sara Strey

What is the likelyhood of Antarctica being habitable in the distant future?

seands

I assume you're referring to human habitation of the Antarctic. In that regard, people have been living there for quite a while year-round. While it does take extreme logistical support right now, I do not think it would be impossible for humans to survive without it on places like the Western Antarctic Peninsula. The bigger issue is the Antarctic Treaty system, which would forbid humans living here other than for reasons laid out in that policy (e.g., science). -Alex Thornton

if things keep up with how they are now, how long are polar bears and penguins going to exist or at least stay in their natural habitat?

otakucraze

The short answer is we really do not know.

Penguins are at their lowest species diversity since they began to take off in an evolutionary sense, though this could be due to increased specialization of remaining species and/or climate-related impacts. I expect some penguins will continue to see decreased body conditions, lower fecundity, and overall population decline while other penguins will thrive. They will need to deal with not just changing sea ice (some don't need sea ice and prefer rocks), but also increased temperatures (increases physiological efforts) as well as problems like changes in the food web (e.g., there may be more gelatinous creatures to eat instead of fattier krill, which changes hunting strategy and requires different amounts of food). It's hard to say exactly what will happen beyond some species will do well and others won't (but I could talk your ear off about it for a long time...).

Polar bears (PBs) face a different scenario than penguins. There are currently 19 recognized subpopulations of PBs and, of these, 3 are declining, 6 are stable, 1 is increasing, and 9 are too data deficient to render a determination as to their status. Each of the subpopulations face different degrees of impacts, though the most significant is loss of Arctic sea ice habitat. In many, researchers see decreased body conditions, lower fecundity, and overall decline in abundance; they are listed as vulnerable by the IUCN. PBs will not immediately go to terrestrial habitat just because conditions are poor; instead, they will migrate in search of sea ice – even swimming distances further than they are to land – and, only when they cannot find suitable habitat or food over extended periods of time and space will they go to shore. This indicates a strong species preference for sea ice habitat and a more significant relationship between regional (e.g., large-scale) as compared to local (i.e., fine-scale) sea ice conditions. However, in recent years, PBs have been more frequently observed on land, utilizing terrestrial nutritional resources and even breeding with brown bears (BBs). Unfortunately, there is limited information known about the evolution of PBs, though it is currently believed that PBs evolved from a common ancestor to the BB lineage approximately 600,000 years ago. Some argue it could be as little as 100,000 years ago, but... there is strong evidence to suggest that PBs and BBs continued to hybridize throughout the Late Pleistocene (i.e., with warmer temperatures, suitable sea ice habitat would decrease), after the species originally diverged from each other. A subpopulation of BBs on

Admiralty, Baranof, and Chichagof Islands (“ABC Islands”) in southeast Alaska shows genetic evidence that these BBs descended from PBs stranded there when sea ice retreated at the end of the last glacial period. These PBs mated with BBs who migrated northward as sea ice later retreated, evolving "back" into BBs. Continued gene mixing through hybridization is hypothesized to have allowed PBs to survive interglacial warm phases, when they would have needed to rely more on terrestrial resources due to decreased sea ice habitat. As well, it is thought to have provided enough genetic diversity to BBs to allow them to subsist in subarctic ecosystems (e.g., ABC Islands). Repeat hybridization over time provides strong evidence towards PB resiliency to environmental change through rapidly evolutionary adaption. All that to say... I don't think they're doomed, but don't expect PBs as we know them to exist again until sea ice conditions improves.

(That was longer than I had intended.)

-Alex Thornton

I have just one question, have there been any major archaeological findings in the polar regions as people have been suggesting recently?

Piff710

There are several! They just found Franklin's lost expedition ships last year, using some really cool technology. There are graves from Franklin's expedition found on Beechey Island sometime in 2013. There are the Bluefish Caves in the Yukon that are said to be the first signs of humans in North America. National Geographic and Canadian Geographic both have great coverage of these stories. There is a rich archaeological history in the Canadian north. - Sam

Thanks for doing this AMA! I've always been fascinated by "adventure scientists". I'd like to ask you some questions about your day-to-day. How do you deal with the dramatic shift in day / night lengths while doing research in the polar regions? What is one thing that is surprisingly "normal" about living there? What is something that's truly "unearthly" about your routine?

andanteinblue

I haven't done a winter, but summers in the poles really throw off your sleep schedule! The sun just does circles in the sky and never sets, and it was sometimes disorienting to look at your watch and see 1am with the sun overhead!

Surprisingly normal: dishes and cleaning the toilet. Also, never ending snow shoveling.

Unearthly - sun halos !!

-Aja

Thanks for doing this AMA! I've always been fascinated by "adventure scientists". I'd like to ask you some questions about your day-to-day. How do you deal with the dramatic shift in day / night lengths while doing research in the polar regions? What is one thing that is surprisingly "normal" about living there? What is something that's truly "unearthly" about your routine?

andanteinblue

I live in Fairbanks, Alaska, right now and it's definitely a pretty dramatic shift. Right now we're gaining about a lot of light each day (here's an annual sun graph showing the rise/set times and day/night

length). It's really annoying to not see the sun for days at a time if you happen to be inside during the few hours of real sunlight in the winter. However, I wasn't expecting that for a lot of the year it's mostly just a constant dawn/dusk, with the sun skirting the horizon. I got myself a sun lamp and an alarm clock that mimics the sunrise, plus take lots of vitamin D. I love being able to hike in daylight at like 1am in the summer; it makes an academic schedule awesome. Some people claim the winter dark does the same, but I'm not convinced. Since I've been here, we've gone down to -60F/-51C (but routinely down to -20 to -40F/-29 to -40C) and it gets quite warm in the summer at an average of 65F/18C (but it was over +101F/+38C since I've been here, too). I do not enjoy walking outside and literally every hair freezes - from nose hairs to actual hair - and it feels like you're lungs seize if you breeze too deep/quickly (because of cold air).

Nothing really changes in people's routines. Instead of hiking, people ski. We put on snow tires and moose lights if you live far out, and you can still get around (though my poor 2WD sedan has a hard time). Grocery stores here are huge and I can get lots of things (as a vegan, I can live quite well on veggies, but they also have a variety of vegan/veg products - more than places I lived in the lower 48). However, I live in a big city - for Alaska - so it's easier here. Go out into the villages or even smaller towns and it's a different story.

As for unearthly, I do still get thrilled to see the aurora borealis/northern lights; it's particularly magical if you have someone else drive you (someone has to watch for moose and the road) along a dark road at night and it's swirling above you. I also really enjoy seeing moose from a distance. When I went to the Antarctic, the quiet is what shocked me; turn off all the engines and it's a sound I've rarely heard even in the most "remote" places in the US. There is something very impressive about seeing life thrive in these harsh places - they go from peaceful calm to weather that will kill you within minutes.

Also - going to your outhouse at 1am at -60F/-51C is just miserable (I have no running water).

-Alex Thornton

Here is a satellite time lapse from 1984 to 2016, watch it loop several times and notice how the snow and ice "snaps back" when it resets to 1984.

https://earthengine.google.com/timelapse/#v=73.49027,-71.37426,1.656,latLng&t=2.07

The snow and ice appears to dwindle significantly. Has this much snow and ice really melted? Or is this an illusion because of better satellite imagery?

Vepr762X54R

That's actual melting.

I have a question for Aja Ellis: what type of research are it doing on aerosols? What should the general public know about them and their effects?

Bananas_are_theworst

Hi Bananas! Some of my work is on black carbon aerosols, or soot, from combustion (vehicles, coal power plants, wildfires, etc). Black carbon is a lesser known contributor to climate change: since its black, it absorbs solar radiation in the atmosphere. The poles are particularly sensitive to black carbon emissions, since the black particles on the snow surface absorb more solar radiation and can accelerate melting of the glaciers. Its like wearing a black shirt in summer!

Another cool thing about black carbon is we can reconstruct the history of biomass burning (forest and bush fires) by looking at the black carbon stored in polar ice cores! There is a lot of evidence that

climate change will affect the prevalence of forest and bushfires around the world, and thereby the concentrations of black carbon in the atmosphere and on on snow surfaces.

-Aja

What is one thing that has peaked your curiosity about the polar regions of the world?

WittyGuy_

For me, its all about the sea ice <3 -Sara

What is one thing that has peaked your curiosity about the polar regions of the world?

WittyGuy_

The poles have been very interesting geopolitically. For example, Antartica has been divided up amongst countries, but is not owned by any of those countries. Instead, there is the Antarctic treaty that governs how things proceed on the continent, making it an area of high collaboration. Similarly, the North Pole is an area of high collaboration, with the biggest dispute of territory being Hans Island, where Denmark and Canada take turns leaving bottles of Aquavit and Crown Royal (respectively) to mark their claim. Remoteness has a way of bringing people together for the sake of the common good that I find refreshing. - Sam

How big of an issue is seasonal depression among the researchers? Can you qualitatively tell if someone is going to be affected, or is it a totally random sort of thing?

nate

This is a good question - mental health is really important for scientists that work at the poles, partly due to the harsh conditions and partly due to the isolation. Most countries have a psychological assessment for researchers and support staff that will be spending significant time in the field. I think there is actually lots of ongoing research on the psychology of polar workers.

-Aja

How big of an issue is seasonal depression among the researchers? Can you qualitatively tell if someone is going to be affected, or is it a totally random sort of thing?

nate

Mental health in general is a very serious issue for any researcher, let alone someone studying in extreme, potentially dangerous environments. Before being deployed, national programs, universities, and even funding agencies have physical and mental health screenings (more intensive if you stay over the winter).

There is a huge field of social scientists and medical health professionals researching this topic for a couple decades now. Whenever I go to big polar conferences, there's usually whole sections dedicated to this topic. I have this paper saved as an older example, but this is a bit out of my area of expertise.

-Alex Thornton

Have any of you read Ernest Shackleton's account of his attempts at reaching the southern pole? If so, are there interesting differences between his descriptions of Antarctica and your own experience?

birdsky

I haven't read Shackleton, though I know his story, and I've read on Franklin, in the Arctic. I've also only done fieldwork in the Arctic, so I can't speak directly to your question, but I will say that the main difference between polar fieldwork now and polar fieldwork then is accessibility. For them, it was a minimum 3 year commitment with no guarantee that you would come back. Now, it can be as little as a 2 week commitment (depending on where you are going), and you know that someone will come get you if you really get into trouble. They were true explorers. - Sam

Have any of you read Ernest Shackleton's account of his attempts at reaching the southern pole? If so, are there interesting differences between his descriptions of Antarctica and your own experience?

birdsky

I had the immense fortune of visiting Shackleton's hut near McMurdo a few years back. I was blown away by the clothing that was left over in the hut - my feet were cold in fancy high-tech boots, whereas these old explorers wore patched socks and thin old leather boots. I was struck by the human fortitude to persist in extreme conditions!

-Aja

Are there any efforts being done towards minimizing the amount of CO2 that will be released by thawing permafrost?

UbuntuNomads

Thanks for the question, UbuntuNomads. The bigger concern with melting permafrost is methane release. Methane is known to be an even more potent greenhouse gas than CO2! Estimates are showing an additional cost of 43 Trillion dollars in global climate change related damages from melting permafrost. The troubling thing is that, as far as I know, there are no large-scale efforts to do anything about it just yet. Check out this article for more details (http://www.cam.ac.uk/research/news/emissions-from-melting-permafrost-could-cost-43-trillion). -Sara Strey

What symptoms did you see as an effect of pollution?

rare_wolf

There are many symptoms of pollution at both poles. Arctic Council runs a program called the Arctic Monitoring and Assessment Program that has been looking at Arctic contaminants since 1991. Some examples are abandoned sites from the Distance Early Warning sites and other military installations left over from WWII. Others are atmospheric pollution that gets carried from other areas of the world and dropped in the cold, dry Arctic conditions. - Sam

How can an IT guy get into polar science? Need someone to run your servers?

Thanks for all your work!

polartechie

It's not as hard as one might think if you're good with fixing things with limited supplies. Always! Check out job postings. :)

Can you guys talk a bit about what relationships you have with international entities up in the Arctic Circle, such as the Arctic Council? Have you noticed any political pressuring or posturing in the science arena as concerns grow over the future of these spaces?

Reacher777

APECS has great relationships with a lot of different polar organizations (not all listed here). Some of our members contribute to Arctic Council working groups like the Arctic Monitoring & Assessment Programme (AMAP) and Conservation of Arctic Flora & Fauna (CAFF).

There is absolutely politic pressure and posturing - from who can go where to research or even shipping lanes. I expect a lot more action from that political theater in the future.

-Alex Thornton

What tools do you bring when you are out on an expedition in the colder weather? I am from Texas and have no idea what habits or tricks one would need to survive in the snow, but I am moving soon to somewhere with quite a lot snow.

My passion is to start a non-profit that deals with aquaponics, since it is a very efficient way to farm, producing two crops of fish and plants. In your opinion, do you think this project would be feasible in arctic conditions and/or possibly even better off due to the periods of constant sunlight? In Texas, I planned to use tilapia. I'll probably have to research a different type of fish for colder conditions. They would be in 275 gallon containers.

In my city, I volunteer with an extension of a university to do the "state vegetable trials." We plant different strains of vegetables, keeping them very well labeled, to see which type grows the best in our climate. Most of the food gets donated to the food bank. One of the OPs in this AMA mentioned they were from Alaska, this question is for you, do you know of anything similar to this (or anything at all) in Alaska that I could get involved with?

Thank you for everything you do. :)

Edit: I recommended a show in another thread and it made me think about how in a lot of movies/shows I've seen, arctic stations have hydroponic grow systems set up inside. Have you guys worked anywhere with a set up? Who's in charge of it? Do you think doing it outside is possible with heaters?

yael_wexler

I've asked someone else to talk about their supplies as I've never done long research projects. I do live in Alaska, though, and have purchased a lot of high-quality cold-weather gear; it makes a difference.

Aquaculture is hard due to limited resources, but I could see it being an interesting idea for some Native communities if there was a way to prevent freezing. However, there would need to be a ton of financial and logistical support that doesn't exist right now. There's a whole department of folks who look food security, hydroponics, test all kinds of plants, etc., at the University of Alaska Fairbanks and University of the Arctic, though; I'd check with them. -Alex

I'm scale where green is the best yellow is okay red is critical danger level how close are we to causing at unchangable (grammar) environment in the arctic regions

Retrx1234

Thanks for your question! I would say we are "red"- critical danger and are on the verge of causing irreversible harm to Arctic Regions, for a couple reasons. Global warming is amplified in the Arctic due to the high angle of incoming radiation from the sun and a positive feedback loop created from sea ice and its albedo. When there is less sea ice during the summer, the dark water locally warms air, causing more ice to melt. This past summer was the lowest recorded extent of sea ice, and it is projected to keep diminishing. The Arctic is undergoing changes that may not be recoverable unless we can slow down global warming. -Liz

Thanks for doing this AMA, and helping to bring climate awareness to the forefront.

These seem like increasingly relevant and urgent questions in your field, as polar scientists :

How cold is it, really, and how long can you tread water?

How do you feel about the growing opinion that the only legitimate imaginary fauna concern near the north pole, at least, is horse sized ducks?

Do you think that the relatively poor swimming ability and large surface area to mass ratio of duck sized horses effectively counts them out as a legitimate aggressor in the modern polar climate?

exosequitur

Normal ground level temperatures can drop to -50°C for multiple days and have been seen to spike to lower temperatures (–89.2 °C on record in Antartica in 1983). An average day in the spring, you can get temperatures of -5°C. For example, to is -24°C in Resolute Bay, Nunavut. As for treading water, that depends on the person, but you will hit hypothermia within 5-7 minutes of being in the water, no matter who you are. On the topic of duck sized horses, you should read further on Beringia, where the Yukon horse, Equus lambei, played a prominent role in the ecosystem for a few thousand years. Their swimming ability did not play a role in their extinction, nor in their foraging habits, though they were smaller than your average modern horse. As for horse-sized ducks, you should look in to more tropical latitudes for that information, as the majority of polar birds are not quite that big. - Sam Darling

Aja Ellis,

Have you or anyone you know found aliens in Antarctica? Be honest, you can trust us.

beardicorn

I can neither confirm or deny this.

-Aja

Aja Ellis,

Have you or anyone you know found aliens in Antarctica? Be honest, you can trust us.

beardicorn

http://www.express.co.uk/news/weird/751403/Giant-staircase-Antarctic-aliens-UFO-landing-site-pyramid-conspiracy-theorists

https://www.thesun.co.uk/news/2701963/antarctic-ufo-hunters-spot-alien-ship-hidden-a-cave-near-the-south-pole/

http://exopolitics.org/visit-to-antarctica-confirms-discovery-of-flash-frozen-alien-civilization/

No, but really, this is the closest to alien life you'll find.... http://nypost.com/2016/12/30/explore-the-alien-world-living-under-antarctica/

Have you ever hugged a penguin?

Pachifan80

As cuddly and squishy as they look, penguins are covered by the Antarctic Treaty - no touching or approaching wildlife on the continent. Although, that doesn't stop the penguins from coming up and saying hello. They are very friendly! -Aja Ellis

Have you ever hugged a penguin?

Pachifan80

I've had the opportunity to, but I never have hugged a penguin because they don't want to be hugged. That being said, I have pet previously domesticated penguins (both when I worked as a zookeeper and for nu-releasable animals in rehabilitation situations). While I wouldn't hurt a penguin, it's not a good idea for wild animals to associate larger potential predators with things like being pet as it could hurt them. Some chicks (and a few adults) are quite curious in the wild and will come right up to you, though. -Alex Thornton

Hi thanks so much for doing this. Im an environment science major, just a bachelor's though, and I have two questions. First one is general and that is would you recommend a master's degree to anyone in this field? And two, have you noticed any peculiar migrations from polar species that may be a result of climate change?

juju317

Hi juju317, I think that if you want to really dig into a particular topic, the way to do it is through a master's degree. Any education is a good thing and can expose you to even more opportunities. As for the migration patterns, there are several examples of different animals, including caribou, whales, and birds, that have adjust either the timing or the path of migration. In relation to climate change in particular, I can think of the example of adjust whale migration patterns due to changing water temperatures and sea ice that affect what time of year they head north and how long they stay. - Sam

Do you believe that "Climate change/Greenhouse effect/Polar melting" is a reputable hypothesis ?

TheMythof_Feminism

If you mean that climate change leads to polar melting, then yes it really is a reputable hypothesis. In fact, there is a phenomenon called Polar Amplification of climate change which leads to the impacts of climate change in the Arctic and Antarctic being more drastic. -Sara Strey

Do you believe that "Climate change/Greenhouse effect/Polar melting" is a reputable hypothesis ?

TheMythof_Feminism

You might also looking into something called the North Atlantic Conveyor, which will show you how polar melting affects the thermohaline (a fancy word for temperature and saltiness) circulation of the global oceans, which impacts things like El Nino and hurricane frequencies. -Sam

Why is studying life in the poles more interesting than in other regions (tundra, rainforest, ocean)?

Lukalumi

The poles are another extreme environment, so there are many different organisms that have adapted to extreme cold conditions. This can be really interesting, especially if we think about how cold space is and how we can take adaptations from organisms and modify them to help us live in other extreme environments. There is even a crater on Devon Island in the Canadian archipelago that is used to simulate Mars, and is where they test the rovers and such that were sent. - Sam

Hi, I was a chemistry student at U of M and I applied for the master's program and I was denied because my gpa was just below the threshold for applications. Luckily, I got a job as a lab tech doing Arctic contaminates.

Any advice about moving forward? Should I get more experience with research or apply again? I'm good with lab work and dedication, but I was never great in thr class room.

Also, were any of you at Arctic Change this past December?

Mr_Ritchy

If you really want this, I say give it a go (as long as you don't sacrifice more than you are willing are able). I personally think one of the most important things you can look for in a graduate program is an advisor who will actually mentor you, open their network to you, and support you. There are certainly better advisors/educators than others, and academic prowess is not always a great indicator. If you have a faculty member on board, you're far more likely to get into any program - either because they have money or they'll fight for you to get funding through an internal process during application reviews.

Some professors care only about the GPA and others don't give it much thought. My current advisor says that she can be selective enough to ask for a 3.0 GPA, but it's not a strict disqualifier. Similarly, she thinks getting 60% on the quantitative GRE section is just fine, but says she knows people who routinely take as low as 40%. Some schools themselves have a hard limit for the lowest percentage. That being said, if your GPA is really low, you may consider completing a post-bacc program or a one-year professional degree somewhere to give yourself a GPA boost or to demonstrate a pattern of improvement.

In the end, you have to look at your application as a whole. If you have lower grades, did they improve or were they getting worse over time? Have you had any significant life experiences or career/academic opportunities to help fill in gaps? It sounds like you've tried to be proactive. When I was rejected from schools, I'd always request a short call with the head of the applications review committee or an admissions advisor; when they were willing, I typically knew they were serious about me as a candidate and they provided solid advice for what to do before I re-applied. (For PhD applications, I know a lot of labs also want to see that you've been published and, ideally, have gotten

some sort of funding.) A lot of it is being in the right place at the right time, so the more flexible you are, the more likely you will be able to find the right MS opportunity.

I was not at Arctic Change, but other APECS members were. :)

All the best - and good luck! -Alex Thornton

How are changes in the Arctic affecting Aboriginal peoples in the far north?

grownasslady

There are a number of ways that Indigenous peoples have been affected in the Arctic. Receding sea ice means that subsistence hunting is much harder and more dangerous. People have to go farther for hunting and depend on ice thickness for safe travel, which makes things very difficult for communities that depend on subsistence. In parts of Alaska, communities are having real issues with coastal erosion, where pieces of the land are destabilizing and falling into the ocean. Then, of course, there are issues of expanded resource extraction interests and the geopolitics of colonialism. There are great resources being produced by the Inuit Circumpolar Council and other permanent observers participating in Arctic Council activities. - Sam

How do you deal with the long days without sunlight? I wouldn't be surprised if it caused a*bipolar* personality.

Sorry for the pun, but it is a serious question.

SjettepetJR

It can be a bit tough. I live in Fairbanks, Alaska, and it's pretty extreme. (I talked a little about thishere.) Mental health is also an ongoing area of research. -Alex Thornton

Any evidence in if geomagnetic reversal can happen in our lifetime and how that will affect the living organisms?

SwedishSanta

This is not my area of expertise, but I'll try to answer. The poles flip all the time (geologically speaking) and are overdue to flip again, but overdue doesn't mean a lot when we're talking about a human's lifetime; it could happen anytime in the next 2,000 years. I've heard that it is drifting by as much as 10 miles each year. Here's a good article about how a flip would impact us

Is there any need in your organization, or others like it, for computer and electrical engineers? Perhaps a robotics expert or systems engineering position?

jhawk2018

APECS actually only has two paid employees (just one before this year!). We don't hire researchers ourselves, but you can check our jobs board. If I had known what I know now, I would have become an engineer so I could do more work with techs. I've seen a few talented engineers get hired by top oceanography labs with zero marine science knowledge. It's possible! -Alex Thornton

Is there any evidence that the north and south poles have flipped in the past?

animalshavefeelings

I answered a little bit about this here. I'm in ocean sciences, so I know we've got a solid record in the ocean's crust.

How do you guys overcome your circadian rhythm problems?

stockyscholar

I have a sun lamp and an alarm clock that mimics the sunrise. :)

I have a PhD in astrophysics. How can I join you ?

sloan_wall

You can join APECS here: http://www.apecs.is/get-involved/join-apecs

We sent out lots of opportunities to members, but you can also check our jobs board: http://www.apecs.is/career-resources/job-board.html

Is there really a significant effect of humans or Earth or is it part of some normal cycle on Earth? And we just haven't figured it out yet? Just like the poles switching.

indianguyyy

There is a normal cycle, but we have deviated way away from what is normal in that cycle. Humans absolutely have an impact and are fundamentally changing Earth.

I think it would be fascinating to live in Antarctica. I'm not much of a scientist, all I have is a general degree in Chemistry, but are there any jobs (of any description, not science necessarily) available there, and how would one get them? Any specific citizenship requirements? Thanks for your help.

mynameissixwordslong

Most people go through a national or university program, which generally don't have too many citizenship requirements. If you don't have an advanced degree, your chances of making it down as a researcher are slim - but there are jobs at bases if you want to just get there. For the US, Raytheon hires lots of personnel, but you can also check on the national program's job site.

As a Energy Engineering undergraduate student, I am curious. Is there any study regarding energy generation?

Chock00

Yup!

How much time have you spent at Monroe station or other arctic stations? Have you stayed there over

winter? Or do you just interpret the data gathered by others without ever setting foot in actual Arctic?

_TheGreatCornholio

I personally work in collaboration with Native Alaskan subsistence users to collect my sample, so I work in the lab mostly. I live in Fairbanks, Alaska, though, which can be pretty extreme.

-Alex Thornton

I have a Bachelors degree in Environmental Science. I have become a licensed Registered Environmental Health Specialist. Finding employment has been difficult, especially doing research. I have dreamed of doing work in polar regions, but been limited with my options thus far. How plausible would it be for me to get involved in actual fieldwork through your organization? This seems to be exactly what I've been looking for and I am incredibly enthusiastic. I don't need money, I need experience.

smg990

APECS doesn't do fieldwork, but we have a jobs board:http://www.apecs.is/career-resources/job-board.html

Please don't volunteer to work for free, though, because it actually hurts the field and makes it even harder to find paid employment. It's a vicious cycle that hurts everyone. Here's a relevant article talking about this in my field.

Do you plan on involving Inuit or other Indigeous groups in this research? Do you believe they are stakeholders in the land and could provide useful traditional knowledge on this research? Do you believe scientific and traditional knowledge can be balanced?

Abbadee

I work with Native Alaskan subsistence users for my research. They are absolutely stakeholders and we work with both individuals as well as groups like the Eskimo Walrus Commission. Last summer I taught highschoolers who come from subsistence communities about this research and they got to do their own research projects through the Rural Alaska Honors Institute. Part of what I'm doing is actually trying to quantitatively confirm what Native people have been saying for generations. Traditional Knowledge should be a component of most (if not all) Arctic research, I believe. -Alex Thornton

Do you get cold in the polar regions?

JuicyMango7

It feels like a nice spring day here in Fairbanks at 22F/-6C! But yes, I get very cold. -Alex