Hi Reddit! My name is Mallory Hinks, a newly minted atmospheric chemistry Ph.D. from University of California, Irvine. Ask me anything about atmospheric aerosols or communicating science as a graduate student!

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

[1]Affiliation not available

April 17, 2023

Abstract

ACS AMA Hi Reddit! My name is Mallory Hinks. I recently defended my Ph.D. in Atmospheric Chemistry at University of California, Irvine. For the last 5 years as a graduate student, I have worked for Professor Sergey Nizkorodov (http://aerosol.chem.uci.edu/). My work has been focused on understanding the effects of environmental conditions on the chemical and physical properties of atmospheric aerosols and how they interact with sunlight in the atmosphere. If you want a little more background, here is a video about aerosols and my research to give you a basic overview: https://youtu.be/F-UW8oMiNng While in graduate school, I developed a passion for science communication. I entered and won multiple science communication competitions including the UCI Grad Slam competition and the ACS ChemChamps competition. Following those experiences, I expanded my extracurricular activities to include more science communication opportunities. As a Science Communication Fellow for the Loh Down on Science radio show (http://www.lohdownonscience.org/), I wrote scripts for 90 second radio segments that aired on NPR. As a Communication Consultant for the UCI Graduate Resource Center, I advised students on their presentations in one-on-one meetings. I hope that I can help inspire scientists at all levels to develop an interest in science communication! I'm looking forward to answering your questions about atmospheric chemistry, science communication or about life as a graduate student! I will be back at 12:00p EDT (9a PDT, 4p UTC) to start answering your questions. EDIT: Thank you for all of your questions! This was harder than I thought it would be! I've got to sign off now!

the WINNOWER

REDDIT

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AMERCHEMSOCIETYAMA R/SCIENCE

ACS AMA

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READ REVIEWS

WRITE A REVIEW

CORRESPONDENCE:

DATE RECEIVED:
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DOI:
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AmerChemSocietyAMA , r/Science , Hi Reddit! My name is Mallory Hinks, a newly minted atmospheric chemistry Ph.D. from University of California, Irvine. Ask me

Can you talk a bit more about your scriptwriting process for NPR and other radio programs? How did you go about making sure they were understandable without losing accuracy? Was a lot of simplification needed? How did you pick what information to include and what to leave out in a 90-second spot?

Lastly, if you could give one piece of advice about communicating scientific knowledge, what would it be?

rslake

For the Loh Down on Science, there is a group of about 10-15 writers. We each write a draft of a script (usually around 185 words) based on a recent publication. Then we go through a peer editing process. This helps us make sure that the script is understandable and is actually entertaining. I really try to make sure that I understand the main point of the paper before starting the script writing process and then just focus on communicating that idea to the audience.

anything about atmospheric aerosols or communicating science as a graduate student!, *The Winnower* 4:e149615.52280 , 2017 , DOI: 10.15200/winn.149615.52280

The amount of simplification needed really depends on what topic we are writing about. Some topics are much easier for a general audience to understand and those tend to be easiest to write about in 90 seconds. Some topics require too much background, and I've learned that those types of topics just won't work for a 90 second format.

My piece of advice for communicating science it to think about your topic and figure out why is it important. Then think about why THAT is important. Then take a third step back and ask yourself, why is THAT important. Hopefully then you can see your topic from a laypersons point of view and communicate it more effectively.

How did you get into public communication of science? Did you just call up the local radio show? Did they find you? Were there auditions or something? Also, how much time did you usually spend putting together a 90 second radio show? What kinds of things did you think about in communicating potentially difficult and abstract subjects to the general public?

Most importantly, what did your advisor and department think about your activities? I have heard sometimes science communicators can be met with an attitude of "you should be doing science, not wasting your time", which I understand, even if I think it is a bad attitude for people to have. Have you been met with any of that?

cowgod42

I'm afraid this story isn't that exciting. Sandra Tsing Loh (host of Loh Down on Science) teaches a science communication class at UCI. She picks people from that class to become Science Communication Fellows for the show.

For each 90 second radio segment I usually spend about 5 hours or so working on reading the paper of interest, writing, and editing. I find that communicating difficult subjects is easiest if you can figure out a metaphor that the audience can follow.

I was lucky! My advisor and department were very supportive of my activities. I know that some advisors do have that attitude, but I haven't experienced it. I'm hoping that as more people get involved in science communication and become more visible, then the culture of grad school can slowly start to change.

What are your thoughts on the idea of a man-made stratoshield to fight global warming?

Tokugawa

Great question! This is one I get a lot. I am, in general, against trying to put man-made aerosols into the atmosphere on purpose to combat climate change. The reason for that is there is still so much that we don't understand about aerosols. I'm worried that doing so, even with the best of intentions, will have unexpected consequences in the future.

Do you think we need greater presence in scientific communication to promote more accurate interpretations of ongoing studies? Or is the problem of misrepresenting information by many media outlets not significantly related to the information not being accessible?

mr-bujick

Absolutely! I think that the more the public sees scientists publicly speaking about their work, the more they will realize that scientists are people too and start to trust science more.

What is the worst effect found to be caused by aerosols? (From your point of view / your discovery)

lightsoaring

Breathing in aerosols can have negative health effects, especially for the respiratory system. From my point of view this is the worst effect, but it is not something that I have studied.

Congratulations on your achievements! I'm also undergoing a PhD (plant genetics) and have seriously noticed the disparity between the communities understanding of science and what science actually is.

What do you think the best thing we, as future/current scientists, can do? Are there jobs dedicated solely to this type of education, or is it usually a "hobby" undertaken by researchers? Do you find people are more sceptical or accepting of your field of science?

Is there one question that people always ask you when they find out your expertise? (Eg as soon as I say I'm a plant geneticist they ask me whether I'm pro-GMO)

Does your field rely on "publish or perish"?Was there ever a time when you completely wanted to give up research and pursue a different area of science (such as education)? I'm going through it now and would love the encouragement!

Pokedoob

There is definitely a disparity between science and what people think science is. I think this is because scientists, in general, don't try to communicate their work to non-scientists. I think scientists should be more vocal - tell people what you are working on and why you are so interested in it.

There are careers in science communication, but I'm not well versed in how to get those careers. But, I believe that science communication is something that all scientists should be involved with. The more that non-scientists hear about science and research, the better!

Oh! I always get asked about chem trails. The first time I got asked about them I was very confused because I had no idea what the person was talking about.

Is Ozone not a concern anymore? Why is it no longer a hot topic?

Seankps

Ozone (in the stratosphere) is no longer a hot topic, because international regulations have eliminated the use of CFCs. Since CFCs are not being used anymore the ozone layer is not being destroyed anymore, in fact, it has almost recovered.

EDIT: I was going too fast through these questions and I misspoke. The ozone layer is not almost recovered. I meant to say that it is slowly recovering.

Congratulations on your PhD!

Do you think it's too late for humanity to save our planet? I hear a lot about how much irreversible damage is being done to the environment, and that policies need to be set ASAP to change our behaviors. Yet it seems as thought not a whole lot is changing — especially in industrializing countries.

Also: Zot zot.

FromOuterSuburbia

I really hope that it is not too late for us to save the planet. We need to make some big changes as soon as possible, but I think we can still do it. China, for instance, seems to be going big into renewable energy, which will help a lot! But all countries need to do their part - including the US.

Do you have any insight on UC Irvine's selection of professors in climate science? Has there been some sort of effort to build climate science as a worldwide specialty of UC Irvine's, after F Sherwood Rowland? Are your professors his old grad students?

Happy_Bridge

There has definitely a huge effort to build up climate science at UCI! When I started grad school in 2012 there were about 4 professors in atmospheric chemistry. Today there are closer to 10 professor in atmospheric chemistry! And yes, one of my professors was one of his old grad students!

Is PM 2.5 from farming dust and wood smoke an area of your expertise? I'm not sure if it falls under the aerosol umbrella. It's hard for me to make sense of farmers and people trying to stay warm (I live near Fairbanks, AK) getting hammered for farming and burning wood. My question to you is - how bad is PM 2.5 on the body? All the information I hear, fits the agenda of the source of the information.

blazer243

PM 2.5 is made up of all sorts of aerosols, including farming dust and wood smoke! I don't specifically study health effects of aerosols, but it is a really hot topic of research right now. I can tell you that PM 2.5 is worse for your body than larger aerosols (PM 10) because the larger aerosols get filtered out of the air before making it deep into your lungs (yay nose hairs!). PM 2.5 can penetrate farther into your lungs.

From my understanding of the literature on aerosol health effects, long-term exposure to PM 2.5 has been linked to increase the risk for lung cancer, cardiovascular disease and a decrease in overall life expectancy.

It probably also depends on the TYPE of PM 2.5. For instance, farming dust is made up of very different compounds than wood smoke. Wood smoke contains byproducts of incomplete combustion, which can be carcinogenic.

As a hydrologist and climate scientist myself, I am always trying to improve on how I talk about my work with non-scientists. What do you think is the most common communication mistake that scientists make when talking to friends, family, strangers or politicians?

Thanks for being here Mallory and congrats on the new job!

Shawna

hydrologista

I think the most common mistake is using a lot of scientific jargon. Also assuming that the audience knows more than it does. There is no harm in explaining a little background before getting to the main point.

Thanks Shawna!

Congratulations Mallory!

Currently an undergrad at UCI - super happy to see an Eater make it to my feed that*isn't* from r/UCI. Can't wait to see what else you will be able to achieve in the near future.

soundslikegranola

Thank you! Zot zot zot! lol

This might be a little too broad but what are your plans for the future?

ShinyTyrone

I will be moving to Washington D.C. to work as a Congressional Science Fellow! Essentially I will be a science advisor to a US senator or representative.

You're the perfect person to answer this question.

Chem trails: For real or BS?

I've always said that it's an impossible conspiracy theory because of the innumerable variables involved.

Thanks!

iShoot40

To be honest, I'm not very well versed in the chem trails conspiracy. My personal opinion is that it is BS. From my understanding, people who believe in chem trails think that the government is using them to poison/control the population. However, aerosols sprayed from planes would not be an effective method to deliver any sort of chemical to the masses reliably. Aerosols in the stratosphere (where planes fly) can stay there for years before coming back down to the ground. It would be a VERY long term plan.

Congrats on your Ph.D.! I'm an undergraduate working in an analytical chemistry lab (in liquid chromatography) and I have the goal of going to graduate school for chemistry as well! When I look at programs, they group analytical and atmospheric chemistry together, so I was wondering what type of instrumentation does this field use and if you have any tips for graduate school?

zuridog1

Good luck with your research and applying for grad school! There is a lot of overlap between analytical and atmospheric chemistry because they do use a lot of the same instrumentation. The difference is really what you use the instrumentation to study.

In my research, I have used two types of mass spectrometry (an aerosol mass spectrometer and a proton transfer reaction mass spectrometer), a scanning mobility particle sizer (which gives us information about aerosol sizes and concentrations), and I have even used HPLC. I also use a LOT of UV-vis to study optical properties of aerosols. Other instrumentation that is frequently used in atmospheric chemistry includes GC to do gas phase analysis of atmospheric pollutants. Another grad student in my lab has even used NMR. So we use all sorts of instrumentation (I'm probably missing a

bunch)!

My tips for graduate school are to get involved! Most of the opportunities that I've had in grad school have come from just getting out there and trying new things (like science communication). You can join clubs that you might be interested in, or if you are interested in something that isn't a club, then you can start your own club. I, and a few other grad students, started a science policy group at UCI, which has been really fun to watch go from a group of 5 people to a club with 50 members. Doing extracurricular activities has helped me so much in job interviews because it gave me something to talk about besides research. If they ask if I have experience leading a group, then I have a few stories to tell, which I wouldn't have if I JUST did research.

A member of my family believes that the depletion of the ozone layer was not caused by CFCs, and that its restoration is the result of natural processes.

Could you either give me some hot dinner-table rebuttals, or barring that, tell me why the issue may not be so cut-and-dry as I think it is?

nitr0smash

I'm running out of time, so I will try giving you my most succinct explanation for the destruction of the ozone layer! When CFCs get into the stratosphere and past the ozone layer, they are suddenly exposed to higher energy UV light, which breaks down the CFC molecule and releases a chlorine radical. That chlorine radical interrupts the natural ozone cycle that keeps the ozone layer intact. When that cycle gets interrupted the ozone layer gets thinner and thinner.

Hey Mallory, thanks for doing this AMA! Any advice for a fellow woman in science navigating her graduate program? Imposter syndrome is real and it's something I struggle with in my graduate studies and in worrying about submitting proposals.

bonanzax

I struggled/still struggle with imposter syndrome too. I think there were two main things that I did that helped a little. I joined a club here at UCI for women in chemistry, which helped establish a small support group of people that were feeling the same way as me. But I think what helped me the most was to find something I was passionate about outside of research. Getting started in science communication really helped build my confidence. And since it was separate from research work, when I wasn't happy how things were going in the lab, I still had little science communication projects to work on and make me feel like I was doing something worthwhile. I hope that mostly answers your question!

I'm taking Chemical Engineering now. What would be your best points of advise for what I might expect?

Klysta96

I have actually never taken a chemical engineering class, but my advice is to form a study group. I think I would have really struggled with some of my classes if I didn't have my study group to work through problems with. I hope that helps! Good luck with your class!

What can us PhD students and other graduate students do to communicate our research in a more effective manner?

catsandcheetos

I think the biggest thing is to be understanding of where your audience is coming from. If you think about what they know or don't know and you actually care about them understanding you, it will really help you figure out how to phrase things more effectively.

Has there been an increase or decrease in the dreaded "holes in the ozone" in the past few years since production of CFC's and PCB's has decreased?

rancidjelly

Since we eliminated CFCs, the ozone layer has slowly been recovering!