

## **Transcript of “Carl Schreck, Research Scholar, North Carolina Institute for Climate Studies at North Carolina State University in Asheville, North Carolina”**

Clear Skies Ahead: Conversations about Careers in Meteorology and Beyond

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### **Kelly Savoie:**

Welcome to the American Meteorological Society's podcast series on careers in the atmospheric and related sciences. I'm Kelly Savoie. I'm here with Rex Horner and we'll be your hosts. Our podcast series will give you the opportunity to step into the shoes of an expert working in weather, water and climate sciences.

### **Rex Horner:**

We are excited to introduce today's guest, Carl Schreck, a Research Scholar with the North Carolina Institute for Climate Studies at North Carolina State University in Asheville, North Carolina. Welcome, Carl. Thanks so much for joining us.

### **Carl Schreck:**

Thank you. Great to be here.

### **Kelly:**

Carl, could you tell us a little bit about your educational background and what sparked your interest in meteorology?

### **Carl:**

Yeah, so I grew up down in Raleigh, North Carolina. When I was in high school, Hurricane Fran made landfall near Wilmington and basically went up I-40 into Raleigh. I just remember seeing the power of the storm and how strong it was. We lost power for a couple of days and we're out of school for a week. Just the power of that storm really made me want to learn more about hurricanes and meteorology in general.

### **Carl:**

So then when I went to undergraduate, I went to NC State University down in Raleigh and studied meteorology with minors in math, computer programming and music. And then I decided to go onto grad school, as a lot of folks ended up doing. I was still really interested in hurricanes and tropical meteorology, so I went up to Albany in New York, which ironically is actually a real hotbed of tropical weather, and went up there and did my masters and PhD in atmospheric science and then went into the field.

### **Rex:**

What was your first job in the field?

**Carl:**

My first job was a postdoc back here in North Carolina, again here in Asheville. It's a job that actually ended up turning into a permanent position. I was really lucky in that regard that the North Carolina Institute for Climate Studies was just starting up as a cooperative institute at what was then the National Climate Data Center. They were just kind of spinning up and it was a chance to be part of this new organization collocated with a really historic weather center.

**Rex:**

And you're still working there now?

**Carl:**

Yep. Yeah, I've been here for... It'll be 10 years this summer. I've been really lucky to be in a beautiful part of the country with a job that I really enjoy.

**Rex:**

How has the job changed since you started 10 years ago?

**Carl:**

As a postdoc, I was primarily working on projects that other people were bringing to me. As I've been around longer, I've done more writing my own grant proposals and getting to come up with my own research ideas more and more. Sometimes, I tell people that in the research environment, the folks with PhDs ask the questions and the folks with master's are the ones that actually do the work and tend to answer them. The longer I've been here, the more I've kind of gotten into that asking the questions and maybe not doing as much of the hands-on answering them as I used to.

**Kelly:**

Getting back to your degrees, I know there's obviously a lot of math and science classes that you have to take but now that you're in your career, are there any other courses or skills you'd recommend to students who are just starting out in school who maybe want to become research meteorologists?

**Carl:**

I mean, I definitely can't underestimate how important the math and computer programming is. For a lot of folks like me, there were only a handful of extra courses on top of what was required anyway for a meteorology degree to get me a minor in both fields, both math and computer programming. If I had to do over again, I might actually double major in one of those just because the skills are so valuable and just lay the groundwork for almost any STEM field these days.

**Carl:**

But the other thing that, since I've been here in Asheville, I've picked up that has been really helpful has been project management skills because especially as a PhD kind of leading the research efforts, a lot of what I do is organizing projects and managing them, whether it's for myself or for other colleagues that are on a grant that I get. Those project management skills, that's not something that you really get anywhere in a traditional meteorology degree or coursework, so it's been really valuable to be able to pick those up over the years.

**Kelly:**

It's almost something that you can do outside of your degree. I think they have lots of programs where you can get certificates in project management. That probably would be really helpful.

**Carl:**

Exactly, and that's how it's come about here, is that NCDC, or now NCI, the National Centers for Environmental Information, have had course offerings or internal trainings on project management and program management and things like that. And yeah, like you say, if you take enough of them, you can get up to a certification. That's probably beyond what I would need, but at least having that base level understanding of it is really useful.

**Rex:**

Are there any other opportunities while you're in school or out of school that you pursued that have proven to be beneficial over the course of your job in your field?

**Carl:**

I think one of the biggest things when I was in school was the research experiences for undergraduates, or REUs. I got to actually do two of them, one during the summer between my sophomore and junior year, which is earlier than I think most folks get into it, and then a second one between my junior and senior year. Those were really valuable both for being able to see whether I liked research and what research was all about, but it also started building my network and even led to my first publication. So that's just a really valuable opportunity. Any type of internship like that, it's really valuable both for experience and understanding what you want to do and also for that network building.

**Rex:**

What sort of research did you do on these programs?

**Carl:**

So the first summer, I went up to University of Maryland and worked on analyzing numerical model simulations of hurricanes to try to see how the eye wall was different between a sheared storm and a storm that wasn't sheared. And then the one between my junior and senior year, it was at NC State and it was looking at how climate variability impacts rainfall over East Africa. That one ended up being... At the time, I thought I was going to be more interested in hurricanes. But as my career progressed, the more the large-scale meteorology like that and climate signals has ended up being a much bigger part of my career. I didn't realize it at the time, but that was the project that ended up being probably the most useful for my whole career.

**Rex:**

And you said one of those led to you being part of a publication team for your first paper. Was that a given going into that research experience, or did you kind of have to seize a moment or take an extra step to join the writing team as part of that REU?

**Carl:**

Yeah, it definitely wasn't a given or wasn't a plan going into it but at the end of the summer for... This was the one at NC State. At the end of the summer, we realized that the results were really interesting

and valuable, and we decided that it was worth pursuing and developing it into a full publication. I was able to continue the REU during the school year while I was working on my coursework, and you kind of finalize the figures for the publication. It was kind of one of those opportunities that just kind of fell in my lap, but it was really great.

**Kelly:**

While you were in school, did you know right away that you wanted to do research? Did you have an idea of where research meteorologists worked and which sectors hired them? For our listeners who are maybe just starting school and are really interested in meteorology and possibly doing research, could you give us a little idea of where people would work or where they would get hired if they pursued that?

**Carl:**

Yeah, so I definitely did not go into it expecting to do research. I think like so many people, I went into it expecting to either do the weather service or TV. But as I got a little bit further into my studies, I started to realize the kind of hours that both of those jobs require. Weather service is shift work and midnights and weekends. TV, it's also evenings and odd hours as well. I really wanted more of a nine-to-five position and research lends itself really well to that, and also just discovering through the REU programs that I really loved it. So it was kind of a surprise to me, but it was... I'm really glad that it worked out that way.

**Carl:**

As far as where those types of jobs are, they tend to be primarily either at universities or government labs, for the most part. Even through grad school, I wasn't so much aware of the government labs because as you're going through grad school, you're at a university, you're working under an advisor who's a professor, and so there's this kind of assumption that you'll probably become a professor as well. It turns out that that's not really where the most job opportunities are these days. Because if you think about it, a professor will have perhaps a dozen or more PhDs that they produce over the course of their career. But when they retire, there's only going to be one PhD that replaces them so it's really hard to get those professor jobs, and the universities just aren't growing that much anymore.

**Carl:**

It turns out there's a lot of opportunities in government labs and even more now in the private sector where increasingly, a lot of firms in all sorts of fields including from energy trading to agricultural interests are all really interested in having the latest and greatest research and understanding what's going on. I think going forward, that's really where a lot of the job opportunities are going to be, are in the private sector and not in the kind of traditional fields that we might expect.

**Rex:**

I was just about to ask what you felt the future of the job market was like. It sounds you're saying it is energy, it is agriculture and perhaps some other areas in the private sector that you predict and maybe you... Do you have any colleagues that have worked in those sectors and have any experience? What new responsibilities are they encountering, or what new experiences are they going through in those sectors that might be helpful for others to understand?

**Carl:**

That was one of the really big surprises to me at the end of my graduate school time was... My main research was on the Madden-Julian oscillation or the MJO, which is kind of the main subseasonal signal in the tropics. I always thought it was a little bit of an academic problem that certainly your average TV meteorologist isn't going to know what the MJO is, probably.

**Carl:**

But it turns out, as I was finishing up my studies, I was learning that a lot of folks in the energy sector and ag sector as well were actually tracking the MJO. The reason was that the MJO is... Like I said, it's one of the dominant factors in the tropics. The divergent circulations associated with the MJO affect the jet stream, and that affects the temperatures here in the US a few weeks later. Those temperature changes can affect natural gas demand, so that can actually really have an impact on natural gas markets.

**Carl:**

There was this whole chain of information that I was totally unaware of going through my coursework. I think that's where a lot of the research is right now, is trying to harness some of the research and attach it to some of these private sector interests, especially energy and agricultural interests where both cases, a lot of traders have access to the model, the numerical model forecasts now, but anything that you can do to provide information or value or just a slight bit of skill above and beyond the model forecast can actually be really, really valuable to these traders.

**Kelly:**

It sounds like when you enter college and you wanted a degree in meteorology, there's a whole bunch of different fields and markets that people probably aren't even aware of. But hopefully, they're starting to understand that there are jobs outside of the traditional just National Weather Service and broadcast meteorology. It definitely will be helpful for students to get jobs once they graduate if they have a little bit more of a broader idea of what's out there.

**Carl:**

Yeah, exactly. A lot of the financial firms, hedge funds and so forth, are making probably billions of dollars or trades on natural gas futures or agricultural futures. If you can give them a 0.01% edge with some weather information, that can actually be really valuable to them.

**Kelly:**

As far as your job goes as a researcher at a university, what's your typical day on the job like?

**Carl:**

Typically, it's either a lot of writing or a lot of programming. Going into it, I loved doing computer programming and making graphics and things like that. Those are the fun days when I get to really dig down and work on the programming. But so much of my job is really just writing and communicating as well both with collaborators in Asheville, but also elsewhere the country or around the world, having to write journal articles or different reports on the state of the climate. So really, written communication is just so valuable and such a big part of what I do. It's something that I never really would've thought of going through school.

**Kelly:**

Are there courses for technical writing? I mean, when you say you do a lot of writing, is there a specific format that you have to follow as a researcher where it's certain way to cite things and it would be helpful for students to have a technical writing course?

**Carl:**

I don't think I actually took a technical writing course per se, but I know those do exist and it would be very, very valuable because writing is hard enough on its own and scientific writing is a whole other beast.

**Kelly:**

I can just imagine.

**Carl:**

Yeah, just learning how to have the right kind of tone and trying to be as precise as possible, but not overstate things. It really is an art form to learn.

**Rex:**

Would you say the programming is what you like most about your job, or is there some other aspect that you maybe didn't get to in your typical day that is indeed what is the most rewarding part?

**Carl:**

Yeah, the programming is definitely one of the biggest things. It's just really gratifying when I've got a problem and I'm trying to figure it out and I'm working all day on it and finally, I get it to work the way I want it to work. That's a really great moment. The other thing I really, really love is working with collaborators in the private sector and elsewhere to get real world applications of the research. It's fascinating to learn more about the atmosphere and why it works the way it does and even to forecast it, but it's so much more gratifying when we're able to figure out a way that it actually can impact people's lives. I really love trying to be kind of the intermediary between the hard science and the end users and try to kind of translate back and forth between the two sides.

**Kelly:**

On the flip side, what's the most challenging thing about your job?

**Carl:**

Probably time management, and that gets back to the kind of program management we were talking about earlier. Especially when you're early in your career, every project sounds really fun and exciting. It doesn't take long to realize that you've taken on 20 different projects that you don't have time to actually complete. So it's really hard learning how to prioritize those and figure out what are going to be the most valuable projects and the most fun to do. Just kind of figuring out what to do next and how to manage all the time is really hard.

**Rex:**

Are there any career paths you wish you might've done differently, or other alternatives that maybe won't fit in your career, but are still enticing or things that you think about from time to time? Or are there directions in the future that you're interested in going that you've been mulling over?

**Carl:**

Yeah, so I think the biggest one is... I mean, I'm certainly couldn't be happier with the way things worked out. I'm in a place that I love and in a job that I love. But I think a postdoc is a really unique opportunity both academically and in life, too. You're going to go somewhere for just a year or two, maybe three at the most, in most cases. It's really an opportunity to A, try a different part of the field, do research that's totally unrelated to anything you've done before, but also B, it's a chance to go live somewhere you've never lived before for just a couple of years, knowing that it's not permanent.

**Carl:**

I had a few friends that after they finished grad school in Albany, they went and did their postdocs in Australia knowing that "Hey, it's just going to be a couple of years and then I can go back and live closer to my family again." I took a little bit of a safer route coming back to North Carolina but certainly, I think that's a great opportunity for folks that they can go try something out for a few years and then go back to their comfort zone.

**Rex:**

It's a good insight.

**Kelly:**

During your career, is there something really exciting that happened to you that you want to talk about? Maybe you traveled somewhere, or a certain type of research that you did that you thought, "Wow, this is awesome. I'm so glad I'm doing this for work."

**Carl:**

I think one of the most fun things I got to do was right after I finished grad school when I was a postdoc. I was working with some of the folks at the Climate Prediction Center, helping to provide forecast support for a failed campaign, the Dynamics of the MJO or DYNAMO field campaign, out over the Indian Ocean. It certainly would have been even more exciting and fun to actually go there and launch the weather balloons or watch the radars, but still doing the forecast support, getting to be part of this big field campaign, and then going to some of the campaign meetings in Hawaii a couple of years afterwards and just meeting a lot of other young scientists that had actually been in the field and are making those relationships and still friends and colleagues with a lot of them today, it just was a really exciting experience and has turned into a lot of really fun projects down the road.

**Rex:**

Tell you what, I do have one extra question for you. On a fun note, I'd like to ask what your favorite book might be.

**Carl:**

My all-time favorite book is The Martian. I was actually ahead of the game on this. I read it well before it became a movie. Part of why I enjoyed it, I've always been a science fiction fan, but I really enjoyed seeing the science fiction that was a little bit more plausible. No transporters or anything like that from Star Trek. But also, I was reading it while I was here in Asheville. Even though I work for NC State University, we're located at NOAA's National Centers for Environmental Information. It's a government

lab. It was really fun reading *The Martian* and seeing the NASA bureaucracy and so much of it was so relatable and so realistic. It was fun from both sides of it.

**Rex:**

That's great.

**Kelly:**

Well, thanks so much for joining us, Carl, and sharing your work experiences with us.

**Carl:**

Thank you. It was a lot of fun.

**Kelly:**

Well, that's our show for today. Please join us next time, rain or shine.