

**Kelly**

Welcome to the American Meteorological Society's podcast series on careers in the atmospheric and related sciences. I'm Kelly Savoie and I'm here with Jason Emmanuel, and we will 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.

**Jason**

We're excited to introduce today's guest, Elizabeth Austin, a forensic meteorologist and CEO of Weather Extreme in Lake Tahoe, Nevada. Welcome, Elizabeth. Thanks so much for joining us.

**Elizabeth**

Thanks for having me.

**Kelly**

Elizabeth, when did you decide you wanted to be a meteorologist?

**Elizabeth**

I knew I wanted to be some kind of scientist. I just wasn't sure what kind. And then as a freshman at UCLA, I was looking through the catalog of courses and reading just the course descriptions. And I came upon the atmospheric sciences department and started reading the descriptions, and I thought, *Oh my God, I never knew this existed*, and walked right over to the department and introduced myself and that was it.

**Jason**

So after undergrad, majoring in atmospheric sciences, what else did you do like educationally? What was your educational background?

**Elizabeth**

I then got my master's in atmospheric physics from University of Nevada–Reno through the Desert Research Institute. So working there and taking my courses at UNR, which was great experience because I got practical experience at a research institute while working on my degree

and my master's thesis. And then I stayed on and got my PhD in atmospheric physics there also. And so that was really, really a great experience

**Jason**

What did you get to do at the research institute?

**Elizabeth**

All kinds of great stuff. A lot of fieldwork, which I like. Did a lot of mountain meteorology, snow science, that sort of work, all over at different labs, mountaintop labs. And, and then of course, you know, your usual working up weather data on a computer and that sort of thing too. But it was great. Got experience doing all kinds of hands-on-type practical experience, and then a lot of learning about all kinds of neat scientific instruments they actually designed and developed there and calibrating them. And it was really a terrific experience.

**Kelly**

What other courses beyond the typical required math and science do you think would be most helpful to individuals who wanted to eventually have a career in forensic meteorology?

**Elizabeth**

Well, if—unless they're working for a large organization and as a forensic meteorologist, I would recommend business courses because you're essentially running your own company. Even if it's a small business and it's a handful of you, having business courses is, I think, a requirement. And also I think courses in public speaking would also be good because the testimony aspect of a forensic meteorologist—you know, you think about the research and the great science that goes into it, but there—it's multifaceted. It's not just the science. You know, once you get to the point you give a deposition, that can be rather technical and scientific. But then you get into the in the trial testimony, and that's a whole other ball game. That is more of being able to take very complicated—sometimes, not always, but sometimes—scientific research and facts and model results and everything and breaking it down so that a jury can understand, understand it and present it in a, in a manner where, you know, kind of a beginning, middle, and an end, where they get what you did. And that is a skill in and of itself.

**Jason**

Yeah, so it sounds like developing those communication skills were just very critical. Were there any other opportunities you pursued that you knew would be beneficial to securing a job in your profession?

**Elizabeth**

Just giving a lot of presentations. And I kind of was self-taught. I wrote my own business plan at first, when I first started the company over 25 years ago now, it's hard to believe. And actually there are a lot of resources. I did talk to the SBA, the Small Business Association, because I was looking into getting some help through SBA, but I decided just to do it on my own. But the man who helped me through the SBA program, he drove all the way up from Reno up to the lake—or actually from Sacramento to Lake Tahoe once a week to meet with me and help me put my business plan together. And so I think now there are many, many more resources available than over 25 years ago. But that helped me a great deal and helped me focus on exactly what I wanted to do and how.

**Kelly**

So when you when you graduated, did you know right away that you wanted to start your own business, or did you have a few different jobs in the field before moving onto that?

**Elizabeth**

Well, I knew I wanted to start my own business, but I did have some jobs before I did that because you just can't snap your fingers and the phone doesn't ring off the hook just because all of a sudden you start your own business. So I taught at Sierra Nevada College, which is a four-year private college in Incline Village, Nevada, Tahoe. And so I taught there. And it's just a teaching institution, not a research institution, so there was no conflict. In fact, they liked professors there having practical experience. So I was able to work three-quarters time there and a quarter time on my business, and then slowly I worked it to where it was 50-50 and then finally I was able to to leave Sierra Nevada College and just do the business 100% of the time. And I did that just because of the—well, a lot of things. You know, you need, you need to pay for food

and everything. And also I was able to maintain my health insurance through the college teaching there for a while until I had enough financial stability with the company and enough clientele where I thought, *Okay, I'm going to launch now*, and transitioned over. It was still—it's still difficult, that timeframe and when to do it, but it worked out.

**Kelly**

What types of courses did you teach there?

**Elizabeth**

I taught snow science and avalanche control, snowmaking, all the physics courses, calculus, meteorology, climatology, oh boy, GIS.

**Kelly**

Oh, wow!

**Elizabeth**

Yeah, a whole slew. It's, it's a very interesting campus. It's great. And so I was in the science department, but I also, interestingly enough, taught a lot of courses that were co-courses between the business department and the science department, like snowmaking and snow science and avalanche control, because they have a very well-known ski business management major there. And so it was really, it was really a great experience.

**Jason**

Wow, so for listeners who may not be familiar, could you just describe what a forensic meteorologist does and where one works?

**Elizabeth**

Sure. Technically, forensic meteorology means reconstructing weather for litigation purposes, but people now use the term for all kinds of forens—reconstruction of meteorological, climatological, hydrological events. And so it means looking back at past events and reconstructing what happened atmospheric-wise. And I say atmospheric-wise because the variety

of cases is really, is really astounding. And people don't realize how much of an impact the atmosphere can have on, on litigation, especially, for example, you may get some basic ones—you know, hurricanes, tornadoes, and all that kind of stuff. But lighting conditions. For example, I worked a double-murder death penalty case where lighting conditions—there was an eyewitness and so that claimed that he saw the murderer go into the house and brutally murder this older couple. And so lighting conditions were critical. So it's really interesting how it can come in and, and play a role. Or sometimes I'm just hired to show that weather really wasn't an issue. That it was—I was actually hired on that Alaska Airlines crash coming from Mexico up to, I think it was Cabo up to San Francisco. Remember the jackscrew was getting looser and looser? It was over the Pacific Coast. And they were trying to troubleshoot it and troubleshoot it, and finally they crashed into the ocean. Well I worked on that case, just to show that the weather was clear and beautiful and not a factor.

### **Kelly**

So you talked about some of your cases. Do you have an unusual case or one of your favorite ones that you've worked on?

### **Elizabeth**

There are so many cases. Probably the ones that affect me the most are the ones that have to do with children. Those are the most difficult for me, just because of the nature of a child being injured or killed, and a lot of times it's something that could have been prevented or avoided. But I must say there was—I've worked a number of parasailing cases, but there was one case, the Amber White case, and that one was particularly gratifying because after that case was over they passed the White-Miskell Act, which is a parasailing act in the state of Florida. It has all kinds of stringent rules and regulations regarding weather. And so before that—I think now there are only two or three states in the whole United States that actually have laws regarding parasailing, but Florida is one of them and that's because of this accident I worked on.

### **Kelly**

So for listeners who aren't familiar with what happened, what were the circumstances that surrounded that case?

**Elizabeth**

Well, there were these two teenage sisters, Amber and Crystal White, and they were going—they were on vacation. Their mom wasn't there, but other family members were there. But they really wanted to go parasailing, so they were calling their mom and saying, "Please, please." She wasn't there, so I don't know if circumstances would change if she were there because the skies were darkening and the winds were kicking up when they wanted to go out. I have photographs and video, of course, from the case, and you can see as they're walking out to the boat, you could see how dark it is. It was in Pompano Beach, Florida, out over the ocean. And so they start their parasailing ride and the winds pick up and pick up and pick up and finally they're dangling. The winds are blowing them over the beach and then over the roof line of some hotels.

**Kelly**

Yikes.

**Elizabeth**

And they're just dangling there and they want to be pulled back in and they're scared. And so one of them's yelling down, "Pull us in! Pull us in!" But the problem is, once you—the wind speeds hit a particular speed and get higher, the winch no longer works. You can't get pulled back in. So you're basically trapped.

**Jason**

Oh man.

**Elizabeth**

I know. And so the lines ended up snapping, and it drug the two girls—oh, it was terrible—across the roof of the hotel and then in through some trees in the courtyard, and they were both left dangling over the courtyard and unfortunately one of them had a broken neck. They took them to the hospital and then she later died, the one sister, Amber. So it, it, there were—there were so many red flags that day with thunderstorms coming in, and there were National Weather Service watches and warnings that day. And so now the new laws have to do

with—boats have to have the capability to access weather data on the boat. They have to, of course, you know, check the weather and everything. There were certain—I don't remember the criteria of the wind speeds, but if the winds get to a certain speed, it's prohibited. So there are all kinds of laws now.

**Kelly**

Hm, well that's definitely an interesting case. I hadn't heard of that, and now I don't want to go parasailing. So what—what level of education is required for getting a job as a forensic meteorologist? Do you need to have a PhD, or can someone, you know, start in at a more entry level?

**Elizabeth**

You don't need a PhD. You can start at a—well, one needs experience and/or recognition. Those are the two things that will get your foot in the door. And by that I mean recognition—there are a lot of TV meteorologists that have the recognition, and so some attorneys like that. But you do, you do need a certain level of experience, that being said, you know, as a meteorologist, even if you're on air. And, you know, so you really don't need a PhD. However, I must say, when you get a little bit more into the rarefied-type cases—like the major disasters and the major airline crashes, hurricanes, that sort of thing—the attorneys will weed through, and they actually end up always almost picking a PhD because they want to be able to say “Dr.” on the stand. It has a lot of weight for the jurors. So, so that's kind of the overall picture.

**Kelly**

And I know that you're a Certified Consulting Meteorologist, so has that credential helped in your line of work?

**Elizabeth**

It has! In fact, interestingly, when I first—I think it was '97 when I earned my CCM—it really wasn't that known then. And now I've actually seen either, either attorneys or actually other projects since our company is not just forensic meteorology. We work on all kinds of other stuff. Some of the projects we bid on, they actually will state in the bid that there must be at least one

Certified Consulting Meteorologist on staff.

**Kelly**

Oh wow, that's good.

**Elizabeth**

Yeah! I know, I know. So it is getting more recognition. The other thing I just do want to add is it also is a great opportunity for meteorologists, hydrologists, oceanographers, everyone, CCMs, to get together as a community. If you have any concerns, questions, issues, you can bring it to the CCM community, and if it's something a little bit delicate, you just bring it to the CCM Board.

**Kelly**

Right. Well, it's good to know that that credential is helpful. And would you recommend that someone go for the CCM if they, if they were planning on working as forensic meteorologists?

**Elizabeth**

Yes. Even though recently there was a—there was a meteorologist that told me working on a case that the attorney told her he didn't think it was needed. But I think, all around, it's an important—getting your CCM credential. And not just if you're going to do forensics, but if, especially if you start your own weather company or work in a small company, it really helps because you have this whole other—First of all, you have the certification, but you have this whole other group of colleagues that, that it really will help you, help you with starting your business, any questions you have. It's a great community.

**Kelly**

So it's a great network to have. I mean, that alone is worth pursuing it, I would think.

**Elizabeth**

Definitely. And it also keeps you on the ball in terms of what's, you know, going to the conferences and, and what's going on new either instrument-wise, or algorithm-wise, or

data-wise, or, you know. It's just—it's really, it's really great. It keeps one involved, I've found.

**Jason**

So Elizabeth, what advice can you give about starting your own business?

**Elizabeth**

I would say it's not going to be easy. Be ready to be on call 24-7, especially at the beginning. You're going to be—well, if it's a one-man band at first, you're the janitor, you're the accountant, you're the expert. You're kind of the everything. It's a lot of work, a lot of sleepless nights, but it's, it's worth it. It's a kind of a catch-22 because it can be so difficult at the beginning and getting your health insurance and that sort of thing. However, once you get established in the field, it really is a wonderful lifestyle. Like I—I could never work for anyone else again. I've been working for myself for over 25 years now, and, and it's just, it's, it's really great. The freedom you have. I mean, you still have a lot of pressure, and, and I'm constantly—even on vacation, which I maybe had one or two—it's, you know, you still kind of have to check things, check on things. But now, you know, our company, we have 12–13 people now, so it makes my life a lot easier. And I find it extremely rewarding and enjoyable.

**Jason**

Right, so would you say that level of independence is what you like most about your job, or is there something else that you think you like better?

**Elizabeth**

Well, I like the level of independence. I also like the fact that now—not at the beginning, but now—I can pick and choose what I want to work on: what projects, what forensic cases, you know, not just desperate where I have to take anything. And that also makes things very enjoyable.

**Jason**

Right.

**Kelly**

So now how did you get to that point? So you said that you worked with someone from the Small Business Association. That's how you got started, right? You contacted them and they helped you with your plan?

**Elizabeth**

Well, they helped with the business plan—this one man, he was very nice. But I ended up not pursuing any kind of SBA loans or assistance or anything, so I then went off on my own. So I had the business plan. I didn't use it for anything. But it really help me solidify what I wanted to do, what I wanted to focus on. And I would recommend anyone, even if you're not going to pursue any kind of financing or loans or anything, just to write one because it forces you to put on paper and get a game plan together for your company and your business, even if it's just a sole proprietor at first and then you become an LLC or corporation or whatever you may do. I just find it very helpful, to put it on paper.

**Jason**

So you mentioned that you enjoy the freedom of being able to select different cases. What draws you to a certain case?

**Elizabeth**

Well, first of all, it has to be in my area of expertise. We have four or five experts here, and depending upon what the case is, they're not all in my quiver so they'll go to someone else here, and I'll send it over to one of the other experts that I feel can do a much better job. But I really like mountain weather, anything to deal with skiing, ski resorts, plane crashes. I work a ton of plane crashes all over the globe. And so those are the, and also sometimes—oh, a lot of fire cases. And sometimes when I get a call, the case may not even be something that's a huge case, but the weather sounds so interesting surrounding it that I just can't resist it. So I'll take it.

**Kelly**

So what's the most challenging thing about your job? Or what do you like least about it?

**Elizabeth**

Probably the accounting and bookkeeping. We have help with that, which is good. But I still, you know, it's, it's hard to let go of everything. I still monitor and oversee some stuff, but over the past few years I have let that go to other people. And that's, that's helped a lot because I really didn't like that it took away from the stuff I liked doing, which was, you know, weather and research and all that. So.

**Jason**

So it sounds like being the CEO, you have to keep a lot of plates spinning up in the air, but does your job allow for a good work-life balance?

**Elizabeth**

It does. It really does. And I like that part of it. And yeah, and so now, you know, I have—my husband is an aviation guy and so he's involved in the company. And my brother is our graphics expert and has been forever, of his own right, MFA from Carnegie Mellon. And so, you know, it's nice being surrounded by family too, and that makes it—you know, and then we have a bunch of others too. But we're all like a family. So it's, we keep it small, and we all work well together. And it's also great having a team. I have to say, I look back and I realize now how if I were to give advice to someone starting out on their own, I might suggest that they partner with someone because it sure does help to have at least one other person to help you with things and bounce things off of each other [if you] can't figure something out because you kind of have to be a jack of all trades, especially at the beginning. You know, do your own graphics. Do your own reports. Do your own animations and it's hard modeling. And so this way, if you can surround yourself with a team of very qualified people in their own right at what they do, you get a much better product.

**Kelly**

And how do you market yourself? Like how do you—how do people know to contact you? What are some of the things that you've done?

**Elizabeth**

You know, with us, it's word of mouth. We just have always—you know, once you have a few successes, especially if you get a high-profile case or two, pretty much that's going to set you off to where you're just going to—the phone going to start ringing off the hook.

**Kelly**

Yeah, especially if you focus a lot in certain areas, I'm sure people just know you by name.

**Elizabeth**

That's true. That's very true. Right.

**Kelly**

So what—what professional development opportunities do you pursue to keep current?

**Elizabeth**

Well I go to all the AMS Annual Meetings and then a lot of other tradeshows, which may sound strange, but they're a little tangent to things like NBAA, National Business Aviation something or other [National Business Aviation Association], forgot the full acronym. And we go, a group of us go to Cine Gear, which is, you know, all the new kind of video editing cameras because we do a lot of that sort of stuff too and now with all the drone work. So we go to a lot of different types of tradeshows and conferences. And then I do a lot of speaking, invited talks at different conferences. Some of them are quite interesting. Some will be law conferences and some will be ski resort conferences, so I get to attend all kinds of other, other talks I never would've—you know, conferences I wouldn't go to if I had been invited to give a talk. So I do that and then of course reading all the journals and magazines and that sort of thing.

**Kelly**

So you mentioned the videos and, you know, photography, so explain to us like, you know, in a general sense, when you get a call and you take a case, like what are the steps that you take as a forensic meteorologist to start the case?

**Elizabeth**

Okay, it's going to depend greatly on the case and the extent, like the size of the case. Is it, you know, slip and fall? Then that would be just gathering the data. For example, let's say it's at a shopping center. And gathering the—calculating the lighting conditions, gathering all of the, you know, satellite data, the Doppler radar, the surface obs, and any other, you know, soundings, and all that data around there. And then, you know, just looking at what happened. And then write a report usually, give a deposition, and go to trial. Now that's one end of the spectrum. The other end of the spectrum would be, you know, an airliner goes down and, well, like Air France, you know, in the Atlantic Ocean. Well, that's a whole different kettle of fish because now you're going to have a lot more freedom to analyze and research and run models and put together beautiful graphics and animations reconstructing what happened. You work with a lot of other experts. A lot of times the experts we all meet together. So it will be, for example, a piloting expert, an FAA expert, a medical doctor talking about the different—it's, it's terrible—but who died where, who, you know, that sort of thing. And the forensic accountant, and, you know, a forensic meteorologist and usually a metallurgist. And so we all sit around a table, and we all give a little presentation of what we found. I find this fascinating because once we start piecing things together, a lot of times there's that a-ha moment of like *a-ha*! Once we all talk and we realize what happened and the events all kind of fall into place. And so yeah, that's the other end of the spectrum.

**Kelly**

It's very detailed. So I'm assuming that some of these cases, like, you know, a plane crash, would take a few months. Is that right?

**Elizabeth**

Oh, years!

**Kelly**

Years? Whoa.

**Elizabeth**

[laughing] Oh, no. They go on for years. Yeah.

**Kelly**

Interesting.

**Jason**

So let's say hypothetically you were looking to hire a forensic meteorologist for your company. What are some must-haves you would look for on a résumé?

**Elizabeth**

Experience and/or recognition or both. They like that. And, you know, this sounds, this is going to sound strange, but a photograph. They want to see what you look like. Attorneys, they're going to be putting you on the stand. They want to know how you present. And that's a huge part of forensic meteorology. Huge. And, you know, when I first started out, I would even get comments sometimes. I'd be in the Midwest or something, and they'd say, "Okay, not very much jewelry, not very much makeup. We're in a very conservative district. Blah blah blah." And a lot of other CCMs I've spoken, they've, they've all had the same experience. Men and women. And there was one CCM—I don't remember who it was. But just last year, we are all talking about this, and he said the attorney actually told him to go out and buy a different suit.

**Jason**

Oh man.

**Elizabeth**

And didn't pay for it!

**Kelly**

Oh, jeez.

**Elizabeth**

I know, I know. So you gotta get ready. You gotta have thick skin because it's not easy dealing with attorneys.

**Kelly**

And you have to have really good presentation skills, I would imagine.

**Elizabeth**

Yes. And not let them get under your skin when the other side is trying to make you look bad, which is—they are. They are going to try and make you look bad. They're going to dig deep. They're going to look into everything that you've written, all the past testimony you've given. They're going to look at your Facebook page.

**Kelly**

I was just going to say that. You don't want to have anything bad on Facebook!

**Elizabeth**

Nope. You better just be careful.

**Kelly**

We always asked our guests one last fun question at the end of each podcast. What is your all-time favorite book?

**Elizabeth**

You know, I'm glad you asked that because the answer would've been different about three-quarters of a year ago. But I recently read *The Order of Time* by Carlo Rovelli, and for me it was, it was basically life-changing. It's one of the top handful of books that I've ever read. It's not that long. But boy, it's—I thought it was amazing. So that's the book.

**Kelly**

Can you give us a little idea what it's about, even if it's just a general description?

**Elizabeth**

Yeah. It's all about time and how time is basically fictional, kind of what a lot of scientists and we've all been reading about. But the level we live at in terms of where we are on the planet and our, you know, how humans are made, and day-to-day life, time is an element of our life. But really, time is a figment of our imagination and it doesn't really exist. And you think about like a waterfall flowing or listening to music and the flow of time. We think of the flow of time. Well, when I first started reading the book, I think right toward the beginning he puts in the equation where, you know, entropy can't be, you know, less than zero. And he puts one equation in the book. That's it. And that's the only one. After I read that, he said this is completely false. This, this equation isn't true, which is one of the first equations we get in atmospheric science. I had to put the book down for two weeks. I couldn't read it. It was so disturbing! Then I finally—actually I was going back to an AMS Executive Committee meeting, and I brought the book with me on the plane. So I'm trapped on the plane. So I pick it up, I open it, and I read all the rest of it cover to cover. And it was fabulous.

**Kelly**

I'll have to put that on my list.

**Elizabeth**

Definitely!

**Kelly**

Sounds great.

**Jason**

Well, thanks so much for taking the time to talk to us today, Elizabeth.

**Elizabeth**

Sure!

**Jason**

And for sharing your experiences as a forensic meteorologist.

**Elizabeth**

Thank you for having me. I appreciate it. Thank you.

**Jason**

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