Transcript of "Lessons in Storm Chasing with Jana Houser and Robin Tanamachi"

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, **Clear Skies Ahead: Conversations about Careers in Meteorology and Beyond**. I'm Kelly Savoie, and I'm here with Rex Horner, and we'll be your hosts. We're excited to give you the opportunity to step into the shoes of an expert working in weather, water, and climate sciences.

Rex Horner:

We're happy to introduce today's guests, **Jana** Houser, Associate Professor at Ohio University in Athens, Ohio, and **Robin Tanamachi**, Assistant Professor at Purdue University in West Lafayette, Indiana. Welcome Jana, and welcome Robin. Thanks very much to both of you for joining us.

Jana Houser:

Thank you so much for having us.

Robin Tanamachi:

Thank you.

Kelly:

Robin, could you tell us a bit about what sparked your interest in meteorology and how it influenced your educational path?

Robin:

Sure. So when I was growing up in Minnesota, back in the 1980s, when I was about seven years old, I happened to catch a tornado live on television as it was happening. Happened during the five o'clock news, very conveniently. So of course, everybody in the twin cities area saw that. And in the days and weeks following that event, the news channel kept replaying that video just about every excuse they could find. And at one point they brought in some external experts to discuss its significance, including Don Burgess from the National Severe Storms Laboratory. And that was the first time I had heard that you could actually make a living off of doing tornado research as a career. And so I just set myself in that direction and went for it.

Kelly:

And did you decide early on that you wanted to go to school and major in meteorology?

Robin:

Definitely. So knowing that I wanted to study tornadoes and study atmospheric science, I had the good fortune of being raised by parents who encouraged me to pursue everything no matter how crazy it sounded. And my dad is an engineer, my mother's a librarian, so I had the best of both the left and right brains going for me. And I ended up at the University of Wisconsin, Madison, where I majored in atmospheric and oceanic science. And from there went on to the University of Oklahoma, which is where I met Dr. Houser.

Rex:

And did they know you were going to literally be pursuing the weather in a truck chasing a hurricane or a tornado?

Robin:

They had a good idea about that. I think because there was this Nova special that also aired in that same year. It was 1986. And that featured the person who ended up becoming Dr. Houser's and my advisor, Dr. Howie Bluestein, and other people like Lou Wicker, who were actually out pursuing tornadoes with an instrumented device called Toto, which was basically just a weather station encased in a giant cement foot. This was the days before mobile radar was a thing. But knowing what they did, I wanted to be part of that life. And I wanted to help solve the mystery of what causes tornadoes to form. And I wanted to do it with whatever technology we had at hand.

Kelly:

And how about you Jana? Did you have an interest at a young age?

Jana:

Yeah, I too had an interest from a young age as well. Mine wasn't quite as dramatic as Robin's story. But we did a weather unit when I was in second grade and I can remember taking observations out the window of my second grade classroom with thermometers. And there was a day that it was really foggy and we had different visibility exercises that we did. And it just really sparked my interest right away. So from there, I started watching the weather channel. And again, this was back in the 1980s. So Robin and I are dating ourselves here a little bit. But it was really sciencey at that point. And I loved it. I would watch the weather channel like kids watch cartoons. So moving forward from there, I really got interested in tornadoes as well. By the time I was in fourth grade, we did a career presentation. And I did my career on being a tornado chaser and a meteorologist. So again, from a very early the age, I had a passion for weather and particularly for tornadoes.

Kelly:

And did you have guidance in high school that let you know that there were majors in atmospheric science and is that how you decided to pursue a degree?

Jana:

I did not have specific guidance through high school resources or anything like that. I do remember that the weather channel had a woman at the time named Kristen Dodd, who was a meteorologist for them. She came to town, I think I was probably a sophomore in high school, for a snow event. And we went

out, she was just like three miles down the street. My dad drove me out there. I spoke with her one on one, and she counseled me a little bit about potential educational and academic options. And Penn State was one of those options. So growing up in Eastern Pennsylvania, that was kind of a natural choice for me. So I asked her a little bit about the courses I should be taking in high school, and she recommended taking calculus and taking physics. And so I followed that guidance and went on to pursue an undergraduate education at Penn State University. And then from there went to Oklahoma, at the University of Oklahoma, to do my Masters and my PhD.

Rex:

Wow. So I've already heard a lot of opportunities that both of you have pursued, that you knew would be beneficial to securing a job in your profession, which you had a really solid idea of what that was going to be, which was tornado chasing and investigating the weather phenomena of tornadoes. So once you were in college, were there other opportunities that you found that you knew would further your focus specifically in tornadoes, which you knew was what you wanted to do?

Jana:

When I was an undergraduate at Penn State, I can remember right off the bat, my freshman year, doing a very basic intro to weather lab, where we were basically just trying to figure out what the Dew point temperature of the atmosphere was using a cup of cold ice water and a thermometer to determine at what point in time condensation started to evaporate from the cup. And as simple and mundane as that sort of sounds, I can remember just being really excited about it and taking observations and recording observations in an Excel spreadsheet, and doing something with that and making a plot. And that was right away, a pretty strong signal to me that I wanted to pursue graduate studies. So as I went forward through my undergraduate education, I had that in the back of my mind, pretty much right away.

Jana:

And the end of my junior year of undergrad, there was an opportunity to participate in a field project called Rotate, where we actually took out mobile radars and went storm chasing. And it was myself and three other Penn State students, who were my classmates. So we got an opportunity to go out and do field work firsthand both after my junior year and after my senior year. So I got really one on intimate knowledge with how field work and how storm chasing works even as an undergraduate. And that experience was fantastic.

Rex:

I can only imagine how much adrenaline or excitement you must have had going to that experience, knowing that's what you wanted and being able to achieve it firsthand so soon.

Rex:

Robin, was there a similar experience for you where you had the chance to go storm chasing in your undergrad? Or what was your opportunities that you were able to find and pursue?

Robin:

Well, I have to refer back to something that I did during high school. Which was, during high school, I had the opportunity to participated in accelerated mathematics program through the University of Minnesota and with the sort of clumsy acronym, UMTYMP, University of Minnesota Talented Youth Mathematics Program. Sorry, that's kind of a mouthful. But that allowed me to take some college

courses in mathematics and earn college credits that I was then able to transfer into the University of Wisconsin, Madison, which was the nearest college of reasonable size that had a meteorology program to where I grew up. So that allowed me to start my meteorology curriculum at UW a year earlier than most of my compatriots. So I was basically the only sophomore in a class full of juniors. And I performed pretty well, I think in a lot of those classes.

Robin:

And so as a result, I graduated a little bit early. And was offered an opportunity to take part in the IHOP 2002 field campaign, not nearly as exciting as Rotate. But it involved me sitting in a Winnebago that was converted to hold an atmospheric interferometer. And I got to babysit that instrument out in a field in the middle of west Texas for two weeks, one summer. And while I was out there, got to see the landscape, got to see the convective initiation, seeing storms forming, got to go visit the S POL radar, which was deployed out there for that experiment. And got to connect with a lot of people who ended up having very formative roles in my career, including Steve Frazier at the University of Massachusetts. So that was a great networking opportunity and also gave me a taste of the lifestyle of living down south as well.

Robin:

And as an undergraduate as well, I got to take part in University Wisconsin's version of a storm chasing course, which was then led by Dr. Greg Tripoli and that involved a one week field trip out to the planes where we met up with researchers who were out there in the field. And while we didn't see any tornadoes that week, we actually saw one, a very brief one, on the way back from that field trip. And this was in 2001 near Benson, Minnesota. We happened to catch a very brief tornado. But that was my first tornado. And I will never forget it. I have a photograph of it, and it's just a little nub of cloud with a little dirt whirl underneath it. But that was my first tornado. So I was really proud of it.

Kelly:

So it sounds like you both had some great opportunities to get involved in field work. So when you were at school in college, were those types of opportunities just presented to all students or did each of you seek them out?

Robin:

It was a mixture of both. We were both recruited to take part in certain field programs. They'd put out an announcement saying, "Hey, we're looking for X number of students to go on Y field program during this timeframe." And we could approach the PIs and interview for that. Or you could do what I did, which was approach a professor in one of my courses and say, I'm interested in doing some research work over the summer. He then connected me with somebody who connected me with the IHOP group. And that was how I got involved in that field program. So it was a combination of both. Them reaching out and me also being proactive in finding those opportunities, which I highly encourage students to do.

Kelly:

Was that a similar situation for you, Jana?

Jana:

Yeah, I'll definitely agree that my path was very similar in that regards. There was a class actually that was specifically using mobile radars to look at terrain induced precipitation in central Pennsylvania that I

opted to take prior to the experience of going out and chasing storms. And that was open to anybody who was interested in doing it. But taking that class then also made me more skilled and gave me the skillset for what they were looking for or for the Rotate project. And similarly to Robin, I really wanted to do something research related between my junior and senior year. So I approached my faculty members and said, "Hey, I would really like to do something tornado related. What do you have out there?" And they gave me a couple of different options that I could look into. And I investigated each one of those options and decided that the field experience with the Rotate project was really up my alley and exactly what I wanted to do.

Kelly:

How did you two meet up and collaborate on your storm chasing shore course?

Robin:

So those are two very separate questions because Jana and I have known each other for a very long time. I think I met Jana for the first time in the field back when you were on Rotate. But then when she joined Howie Bluestein's lab group, I was already a member. So she and I got to work together for about six years, chase together for six years, co-authored a paper together. She's a subsequent author in one of my other papers. And then after we graduated, we both went our separate directions. But both ended up in academic positions at different universities, where we both separately, independently instigated storm chasing courses at our universities. And then at AMS annual meeting in 2000, we got back together and we're talking about some of our common experiences and pitfalls and lessons that we've learned.

Robin:

And we got to talking about, do we have anything to offer the community in what we've learned from starting these courses? Because both of us were very interested in the educational benefits of it that it's not just a glorified road trip, it's actually helping students learn meteorology, helping them consolidate some of the concepts that we were learning. And we were both independently doing research that was quantifying that. So that was the germ of the idea for the short course. We proposed to teach it in 2021, of course, that got scuppered by COVID. And we eventually did end up teaching it in January 2022.

Rex:

Well, what a wonderful opportunity that there just happened to be an AMS meeting that you were able to attend and have that networking opportunity to reconnect and develop this short course. So Jana, could you give us a sneak peek or a preview of what attendees would learn by taking the course beyond just the road trip experience?

Jana:

Right. So we start at the very beginning and talk a little bit about what storm chase courses could potentially look like. There's a variety of different formats that you could go through. We talk about the various different options that exist for perhaps accommodating individuals who have some sort of disability, for example. We discuss how different universities have different programs and different administrative bodies in place. And what those administrative bodies may or may not be able to do for you. So really, how you can from the ground up, build a storm chasing course at your own institution. And then we talk about setting course goals and describing what makes a good course goal.

Jana:

For example, thinking about learning expectations and knowledge expectations for your students. Because it's one thing to just want to go out and storm chase, but you have to do this mindfully if you're doing this in a college curriculum environment. And you need to really make sure your thoughts and your experience are organized so that the students have an actual learning outcome and they're not just really out there for a vacation or a joy ride. And we also had panelists, we invited panelists in who did storm chasing experiences at their own universities. And each of them talked about differences. So we provide a breadth of different examples of how this can possibly be done. And give the audience an opportunity to really think about and be mindful of the different options, the different variations, the different ways that you can structure experiences like this.

Kelly:

So since you both have experience and expertise in severe storms and tornadoes, what are some dos and don'ts to storm chasing. Robin, I'll start with you.

Robin:

First and foremost, safety should always be the number one priority. I strongly recommend that people who have never storm chased before don't do it solo. Always find a more experienced person to chase with, at least for the first couple of times. And they can kind of show you the ropes, show you the perils of driving on wet roads, and people being distracted while driving, being distracted by devices while driving. This is another reason why I recommend people don't chase solo just because there's so many devices and so many distractions that can happen. And really, humans weren't evolved to look at a cell phone in one hand and have the other hand on the steering wheel while driving 60 miles an hour down a wet highway. That just wasn't in the evolutionary catalog. So we always recommend that people try to go out with more experienced people first, so they can find out the rhythm of it, learn to be patient, learn to fill their roles and be part of a team and work cooperatively together.

Robin:

But yeah, again, safety is always going to be first priority for everything. And that's something that our advisors really grilled into us. Was just that, there is no data set that's worth risking life and limb for.

Kelly:

What about you Jana? Were there any don'ts that you learned the hard way?

Jana:

There's never been anything catastrophic, I'll say that. The point that I like to hammer home is that doing this for educational purposes is a very different experience than doing it for the purposes of just going out AND streaming the video or collecting photographs. And even, those two goals are also different from going out with a scientific objective to collect data. So the different mechanisms involved with chasing are going to require different strategies for success. So my number one priority is, like what Robin said, is to keep my students safe and to make sure that I'm not jeopardizing their safety, that I'm not jeopardizing the potential future of my program by making a poor choice, such as driving through a hail core and getting the windows smashed out of a van, for example.

Jana:

So while you might have individuals who are going out there to collect footage and sell imagery to network TV, we're not going to chase the same way as those individuals are. And I think students initially sometimes can feel a little bit ripped off from the standpoint that we're being a little bit conservative in our decision making. But in order to justify the risk to our institutions, we need to execute our program in a safe manner.

Kelly:

I was going to say, I was thinking that, the students probably were like, "Oh, darn. I wanted some real excitement." But that comes with the price.

Rex:

Right. And you're scientists not thrill seekers. And I just want to agree with what Robin said about multitasking, not being natural for humans. I think if anything, we evolve to maybe have a rock in one hand and a stick in the other at best. But there's been lots of evidence about distracted driving. And I think that's a very important point, Robin. So for each of you, we've already heard your first weather event that's had a significant impact on you, but are there any other particular experiences that each of you might be able to share that do stand out. Robin, I'll start with you.

Robin:

Sure. And my answer may be the same as Jana's, I'm not positive. But the El Reno tornado of 2013, that was a real bellwether moment for me because I was not on a scientific mission that day. I was just chasing on my own personal recognizance. And we just barely made it out of the path of the El Reno tornado with just literally seconds to spare. There were inflow jets licking the back of our car. And I was seven pregnant at the time too. So it wasn't just me and my passengers that were in peril, it was also my unborn child. And that really caused me to pause and reevaluate the risks that I was putting myself and a person who wasn't even born yet in. So that was a lesson in that mother nature is always holding all the cards. And you can see many, many tornadoes. You can have a lot of successful chases and mother nature can still throw you a big curve ball. You have to be careful and always keep your head on a swivel.

Rex:

And Jana, is it the same experience for you?

Jana:

That definitely is one of my most memorable chasing experiences, definitely. But I will go back and I'll relive my very first tornado chasing experience, which was May 12th, 2004. So south central Kansas, the very first tornado chase I was ever on. And right off the bat, we saw a tornado in a very unexpected, initial location. And I remember hearing it. Actually, it was Howie over the radio saying, "Oh, Hey look, there's a tornado." And then, myself and the other driver, and we were like, looking out the window like, "Oh my gosh, there is a tornado." Because we had just passed Howie on the road. And then it was unexpected. But then that particular storm went on. It was a cyclic super cell to produce multiple tornadoes. And I believe my total count for the day was six or seven tornadoes. And they just kept forming and forming and forming.

Jana:

So here I am out for the very first time and this is very unusual to be going out on a storm chase and see one tornado, not to mention seven. So I can remember explicitly Dr. Yvette Richardson from Penn State looking at me and saying, "This is very atypical. Most storm chases aren't like this." But that experience was just so exciting and it really invoked such passion. And my love for tornadoes augmented a hundred fold just by seeing my first tornado and my first six tornadoes in the field on that very first storm chase.

Rex:

So I'd like to ask each of you briefly based on what Robin said about having respect for mother nature and not being able to fully predict. Naturally, you're in the business of understanding and in that manner, to an extent, predicting how tornadoes and when and why they'll form. There seems to be a respect for the fact that things are also inherently perhaps chaotic or unpredictable. Is that an element of the discourse around tornado science?

Robin:

Absolutely it is. And I think the El Reno tornado, unfortunately also took the lives of several of our colleagues who were out there doing scientific research that day. And they were some of the best and most experienced in our field. So I think the lesson that the scientific community took away from that was that again, there's no data set, no photograph, no video that's worth risking life and limb for. And that we always need to be nimble and give the tornado a respectful breadth.

Kelly:

So I wanted to ask you, being from New England, I've never experienced a tornado. And I remember going to Oklahoma City and seeing all the warning signs for the shelters. And I was super nervous about it. So I wanted to ask you, when you did your first storm chase, what was the thing of about it that made you the most nervous or scared you the most? Maybe something that you didn't expect. I'll, I'll start with you, Robin.

Robin:

Oh goodness. I guess I don't associate being nervous or anxious with my first storm chasing experience, which again was that class I took as an undergraduate in 2001 from the University of Wisconsin. So again, that was a bunch of northerners migrating south for a week to chase storms and experience life on the plains. But then again, I kind of knew what I was getting into. I knew it would be a lot of driving and a lot of not doing much and standing around in the hot sun, throwing a Frisbee around before we even got to convective initiation.

Robin:

I was in it for the intellectual stimulation and putting into practice the things that I'd learned in the classroom. So the concepts that I learned in mesoscale meteorology, Dr. Tripoli was constantly hammering on those the whole time that we were in the field. Where is the vortex stretching happening? Where's the gust front causing bear clinic vorticity generation? And so forth. So he was actively trying to get us to learn right there in the field, using the clouds and the storms that we were seeing out there in front of us. So I associate that whole trip with a feeling of wrapped fascination rather than one of anxiety or nervousness.

Kelly:

How about you, Jana?

Jana:

Yeah, so I will, again, sort of agree with what Robin was saying there in the sense that I never really felt fear from the standpoint of seeing a tornado. But what did strike me and make me nervous, the very first storm chase that I was on was towards the end of the day. It was dark. The sun had set. We were out with two radar trucks. I was in one, and then there was a second one. So we were having a mission to collect dual Doppler data. And our generator stopped working. Our generator failed. So we were now in the dark without a radar.

Jana:

And this was in the days before cell phone internet. So we were literally pretty blind as to situational awareness. We didn't know where the storm was in comparison to where we were. And we kept hearing the individuals in the other radar truck report that they were seeing spin ups all over the place. So that was probably one of the few times, I'll say my entire chasing career, that I really felt kind of nervous. Because I just didn't know what was going on. And nobody in that vehicle knew what was going on.

Jana:

So we had to kind of rely upon the individuals in the first radar truck to help navigate us out of harm's way by basically just giving them our latitude and longitude because our GPS was still working. So with that coordinate information, they were able to direct us and navigate us out away from harm's way. But that experience left me a little bit shaken, at least in the moment.

Kelly:

So what advice do the two of you have for students interested in pursuing careers in synoptic meteorology?

Robin:

Right. So for students wanting to do meteorology as a career, the one piece of advice, if I could go back in time and give myself a piece of advice as a freshman would be take more computer science. And that's what I tell students today. Take as much computer science and programming as you can stand. Preferably in Fortran 90, because that's the underlying computing language that undergirds a lot of our numerical weather prediction models, like the NAM and the HER, and the ones that storm chasers tend to consult when they're out in the field. So it behooves you to know exactly what's going on under the hood there. But even a high level programming language like Python is going to be extremely useful. It's going to allow you to dig into datasets where maybe you don't know anything about the qualities of the data sets, but you can still crack it open, find out what's inside, make informative graphics from it.

Robin:

There's a huge open source community of Python developers that are working on creating really robust meteorological packages for Python. And those skills will help you get into graduate schools someday. If you have the ability to take a dataset that you've never seen before and make an informative graphic or an informative physical inference from it, just based on your programming skills. That's something that

is going to save your future advisor a lot of training time. So I strongly recommend students learn as much computer science and computer programming as possible. It'll make them better meteorologists in the long run.

Kelly:

How about you, Jana? Do you have any tips for students?

Jana:

I think my tips I'm going to go in a slightly different direction from Robin. I would say, don't be afraid to ask questions. Ask questions at all points of your education, as an undergrad and as a grad student, as a mentor or a mentee with your advisor. I feel like I didn't take advantage of some of the expertise that was around me because I felt a little bit afraid to ask questions because it makes us feel vulnerable. We feel like, is this person going to think that I'm stupid because I'm asking this question? But now that I'm on the other side and I'm a faculty member, I welcome those questions. I want my students to be asking me questions. I want them to be engaging and to be thinking critically about what I'm teaching and about what they're learning. And even if the question is a little bit off base, it's still a learning moment. And I think students really miss out on the opportunity to gain a breadth of knowledge and experience by not asking because they're afraid.

Rex:

Thanks so much to both of you for sharing those insights into not being afraid with asking questions and getting that experience with your programming language expertise before you reach grad school. Jana, Robin, however, before we end the podcast, we do always like to switch up the direction and ask our guests a question unrelated to meteorology. I'm going to start out with one that I believe both of you are willing to answer and which I have received advanced notice, the answer will not be twister. What is your all time and favorite movie? Robin, I'll start with you.

Robin:

I'm going to cheat and give two different movie names, but they're both from the same year. And the first one is The Big Lebowski just because it's The Big Lebowski. But it's a movie I can watch over and over and over again. And I still see something new every time I watch it, which is just a sign of what multilayered brilliance it has in it. And the second one is one that I actually recommend to our students here, which is a movie called Mystery Men. And the premise is that it's set in this place called Champion City where everyone is born with a superpower, but most people get kind of lame superpowers. Like there's a guy who can control forks and stuff. But the idea is that by combining these comparatively lame superpowers, they can accomplish great things like overcoming the super villain, which is the whole plot of the movie. So it's just this perfect metaphor for real life. And plus the movie's hilarious and it has a canned tornado in it.

Rex:

That is a wonderful movie. I've seen both of those. I wasn't in the age range to watch The Big Lebowski when it came out, but I did see Mystery Men in theaters and loved it. Ben Stiller, I believe, is one of the main stars. And I think William H Macy is also in it. Jana, what is your favorite movie?

Jana:

I'm going to go to a series. I am a huge Harry Potter nerd. So I love the Harry Potter movies. And I think my favorite one is the sixth one, which is the Half-Blood Prince. Because we start learning a little bit about some of the history and some of the things that had happened before Harry was actually around. And I really like how that in enhanced the storyline a lot. But I'm just a really big sort of nerd, closet nerd, I guess you could say, with magic and wizards and fun fantastical topics such as that.

Kelly:

I absolutely love Harry Potter.

Jana:

Yes!

Kelly:

Thanks so much for joining us, Jana and Robin, and sharing your work experience with us. It's been a pleasure talking to you.

Jana:

Well, thanks so much for having us.

Robin:

Thank you. I've really enjoyed it.

Rex:

That's our show for today. Please join us next time, rain or shine. **Clear Skies Ahead: Conversations About Careers in Meteorology and Beyond** is a podcast by the American Meteorological Society. Our show is produced by Brandon Crose and edited by Peter Trepke. Technical direction is provided by Peter Killelea. Our theme music is composed and performed by Steve Savoie. And the show is hosted by Rex Horner and Kelly Savoie. You can learn more about the show online at www.ametsoc.org/clearskies. And can contact us at skypodcast@ametsoc.org if you have any feedback or would like to become a future guest.