Transcript for "Cliff Jacobs, owner of Clifford A. Jacobs Consulting, in Arlington, Virginia"

Clear Skies Ahead: Conversations About Careers in Meteorology and Beyond

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Kelly Savoie:

Hello, Clear Skies Ahead listeners. This is Kelly Savoie, and I'm hoping you can take a moment of your time to rate and review our show wherever you listen to podcasts. We have produced over 60 episodes, and you can help us reach even more individuals that will benefit from the diverse experiences shared by our guests. Thanks so much for listening, and I hope you enjoy this new episode.

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 Emma Collins. 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.

Emma Collins:

We're happy to introduce today's guest, Cliff Jacobs, owner of Clifford A. Jacobs Consulting in Arlington, Virginia. Welcome, Cliff. Thanks so much for joining us today.

Cliff Jacobs:

Well, thank you very much for having me. I'm sure we're going to have a fun conversation today.

Kelly Savoie:

Absolutely. Cliff, when did you become interested in meteorology? And how did it influence your educational path?

Cliff Jacobs:

Well, I'm going to throw a monkey wrench into that. I actually never really became interested in meteorology early on. I knew in high school I wanted to be an oceanographer. And I did a number of things that got me toward that thing. But the reason I said that is because way back when, shortly after the Bronze Age ended, I'm an old guy, there was an environmental movement. And Rachel Carson published a book called The Sea Around Us, and I was fascinated by that.

And then also at the same time, Jacques Cousteau had come out with his Aqua-Lung and various movies that he had made about the sea around us. And The Silent World was a big thing. These things influenced me. We had TV back then, just barely had it, but Lloyd Bridges had a show called Sea Hunt, so I really got interested in that. And I knew I wanted to be an oceanographer. And however, I really didn't have quite an idea what that actually meant.

And so this, as a small diversion, I would say this is an interesting topic. When I listen to your podcast, people early in their careers say, "I'm at point A, and I want to go to point B. And I think I know what point B is. And I think it's going to be a pretty straightforward process." When you listen to your podcast, you, number one, identify a lot of point Bs. It is just [inaudible 00:03:06]. And rarely is it a straight line. That's something that you can take away among many other things from your podcast.

I figured out I wanted to be an oceanographer, and then I actually got involved in what was called the Aqua-Lung at the time. Because it was just barely coming on the market for what we call scuba diving now. And I formed my own company, and I would give lessons. And at that time, there wasn't much information about underwater diving for the consumers, for the regular public so I sent off to the printing office, the government printing office, and they sent me the Navy diving manual, which was several inches thick. And that's how I learned about oceanography and the body and how you actually supposed to do the scuba diving.

And we taught lessons. I wasn't old enough to drive, so there was an adult who was also interested. And we would rent the pool at YMCA, and I would go teach the classes on how you use the scuba equipment. It was pretty primitive equipment.

And when I reflect back, I was a 15, 16-year-old guy, did not have any sense of risk and some of the things I did like diving in quarries under ice to 200 feet. Anyway, I don't think it's the same brain I have today. But that's how I set the stage. But I also knew that there was the future in education. And that's where I wanted to go, an educational route. But I got immersed in the field in the sense that I was under water and diving at the time.

Kelly Savoie:

That's incredible. I can't believe you taught yourself how to scuba dive and then taught others. And that was risky. And I think it's really cool you actually took that upon yourself at such a young age to do. Did you end up going to school to study oceanography? What happened next?

Cliff Jacobs:

Yes. Well, that's the interesting part. In 1960 when I was looking to go to school, there were only five schools in the United States that taught oceanography. And they were all graduate level degrees, so you had to get a degree in something like physics, biology, geology, chemistry, or mathematics. I got my undergraduate degree in mathematics.

The schools I was accepted to that I remember were Texas A&M and the University of Hawaii. Then there were several other schools. MIT, Woods hole and places like that. And I think University of Washington had a school. I said to my mother, "I'm going to go to Hawaii." She said, "No, you're not. I'll never see you again." In 1960, people didn't move around as much.

I wound up going to Texas A&M and I didn't really know what I was doing in a sense. I looked at the brochures. It was too far away to visit the campus. And then when I got there, here's this 18-year-old kid who grew up in northern New Jersey in the New York City area, and suddenly he goes to Texas. It's seven day a week ROGC. I marched the three meals a day. You had to eat at attention. Hazing was something... I found out almost immediately that the Civil War was still going on. They would ask me, "Is damn Yankee one or two words?" I said, "Two." Into the cold shower I would go.

Kelly Savoie:

[Laughs] oh man.

Cliff Jacobs:

I got my undergraduate degree. I spent two years in the ROTC. I got a learning experience that I had and was more about the people and the culture. And yeah, I got mathematics too, as I got a degree in that. After I got my degree at A&M, I continued at A&M for my masters in physical oceanography. And I was planning to go all the way for my PhD, but in 1967, they still had the draft then, so I was called for a

physical. And I passed everything, and I figured, uh-oh. It was not part of my plan, the straight line between A and B. The draft came along. And of course the United States was having conflicts in Southeast Asia at that time, Vietnam and other places.

And I said, "Okay, what can I do to not be drafted and go into the military that was legal?" And one of the things you can do was change your classification. The high classification means the most eligible was 1A. I found a job. I said, "I got to go get a job. I'm going to interrupt my plans for going to get my PhD." I started looking around for a job, and I got a job at Travelers Research Center in Hartford, Connecticut. And they were doing defense related research. They were, for example, examining clear air turbulence for the Air Force. I took that job, and my classification got lowered to 2A.

I never was called, thank God. I would've gone if I had to go, but... This was an interesting segue into Travelers Research Center. Now, mostly this is the forgotten organization in atmospheric sciences, but the travelers insurance company supported this research center with very substantial funds back in the '60s. I've forgotten how much, but... And it was founded by Tom Malone, big names in atmospheric sciences, Bob White, who was the future head of the National Weather Service. The Weather Bureau at that time was also there. And then we had a number of people that were early creators in the field: Barry Salzman and climate model. I even worked with G.D. Robinson who happened to be one of the forecasters on D-Day.

I did my time there at Travelers. And I was a researcher. I got funding from the National Science Foundation. I did administrative duties. And then in 1984, I had the opportunity to go to NSF, and I did. I had colleagues there that identified a position. And I went to the National Science Foundation and the Division of Atmospheric Sciences in 1984.

Kelly Savoie:

That sounds like an interesting change in your goal, which caught you off guard, I'm sure. But it sounds like you knew how to navigate it, so I'm glad you were able to change your classification so you didn't have to go.

Cliff Jacobs:

I was fine. And also, I gave a paper at a recent AMS meeting about Travelers Research Center, and there's a video link there, as well as my early career that back in my... When you asked me about my goals, at a local high school I also had an opportunity to participate in Career Day trying to get the students in the seventh and eighth grade interested in going into science. And I made a video about that and recount some of the things we said here.

But what I got at Travelers was a wonderful state of mentors. And one of my mentors said, "You really need to go on for your PhD." To make a long story short, it took me eight years when I was working full time. I had to drive to New York City because NYU was where I went for my PhD. After eight years, I finally got my PhD. And when I look back on it now, I said, "I'm not sure how I did that." I was raising a family at that time, working full time. They gave me the time off, but you had to make it up. But I finally got my PhD in oceanography. Not the straight line, right?

Kelly Savoie:

Right. But you got it.

Cliff Jacobs:

All right.

Emma Collins:

I'm sure there's many more events in between your PhD and today, but I do want to ask, what does a day as a consultant with a focus on geosciences and cyber infrastructure look like? How did you get that cyber infrastructure involved as well?

Cliff Jacobs:

Okay. Well, first of all, I don't do a lot of consulting work. I'm retired. I took that. But what I do do is serve on advisory panels from time to time and try to bring my experience over many years to the young investigators who are trying to navigate very difficult situations. And also, I sometimes read proposals before they're submitted to NSF and give them some comments: "I don't think you made this point. I am not sure what you're saying here," or some things like that. Of course, when you're at the National Science Foundation, you have read a lot of proposals over time so you do have a pretty good sense. And so that's the kind of stuff I do in consulting is just use my experience to help people that don't quite have that experience yet and point out to them what they're doing.

But the cyber infrastructure part that you asked about, well, it was actually a natural thing because atmospheric scientists have been very, very good about using cyber infrastructure, computers and everything. And so when I was the program officer for the National Center for Atmospheric Research, NCAR, they have supercomputers to provide the entire community. And they purchased supercomputers on a regular basis. Code is an important part, developing different codes. And also within the National Science Foundation, there was various parts of geosciences that was using computer codes and cyber infrastructure. And a little later on, we might be able to talk a little bit more about that.

Kelly Savoie:

Yeah. I wanted to ask you, you've worked at the National Science Foundation for a long time, 30 years, what was your role there? What were your duties?

Cliff Jacobs:

Well, I guess, first of all, I worked there for 30 years. And I worked in the Division of Atmospheric Sciences for about 25 of those years. And I provided oversight to NCAR. That was one of my primary responsibilities. But also, I worked with Polar Programs. I worked with the computer directorate using some of my skills there. I did a variety of tasks, both scientific and some administrative tasks.

And the thing about the National Science Foundation is that, as you know, they support almost all science in the United States except medical research. You sit in this very privileged position at that institution. The very best researchers come in and they talk to you from all fields. When you're in the Science Foundation, see lectures on this and that, and you get a chance to experience all that. It was a wonderful organization to work for. And it's fairly small. It's only 1,300, 1,400 people, so it really is a very collegial atmosphere. That's the backdrop of that.

But to answer your question about what did I do there? I think the challenge I had at the very highest level was to sustain the extraordinary success atmospheric sciences has had. And when I say that, I mean this from the point of view there's a lot of ways you can measure success; but I'll give you two examples of that. When you look from a scientific point of view, you have this extraordinary example of science with respect to, say, climate models. Decades ago, we figured out what was going to happen when we put certain gasses in the atmosphere. And for the most part, they've been pretty right. And that's a pretty big scientific breakthrough. And that didn't come easily. The atmospheric sciences and related sciences have helped that. That's one example of an extraordinary success of the discipline.

The other one is... I'll pick a few examples. There's just countless examples. There used to be people would lose their lives from a horrible thing called wind shear at the airport. There hasn't been any loss in life, and that's the result of the work that atmospheric sciences have done in a number of agencies to be able to actually predict that and make sure that the passengers and the pilots, everybody remains safe. And then of course, there's weather forecasting. It's greatly, greatly improved over time. The agencies like NOAA have this responsibility for protecting life and property, and they do an excellent job. The success of forecasting models has been part of that. That's one example of trying to protect that extraordinary success the discipline has had.

But there's another way I can actually talk about that too, and that is in the financial side of it. From the narrow aspect of, say, something like the National Science Foundation, which supports all these disciplines, when you look at the size of the atmospheric science budget relative to the budgets of other divisions within the National Science Foundation, it's relatively large. It's really large. If you use a metric, for example, well, how big is the university contingent in atmospheric sciences? Is 4,000 universities, and they have many, many departments, atmospheric Sciences has maybe 130, but their budget is very, very large. That's another example of success, that I would call success in atmospheric sciences. And of course, NCAR has been part of that. And that's a whole other story about the vision that the early founders of atmospheric science have had.

There's one more point I wanted to make here that I contribute to their extraordinary success, and that is it's been multiple modes of support that have led to their success. And within the National Science Foundation, if you take that, you'd say the foundation basically has let 1,000 flowers bloom; lots of grants, research stuff. That's one mode of support. Then you have small centers that get support, and then you have these large centers like NCAR. And that's the multiple modes of support are so important.

And then when you look across the entire government, you see that you have agencies that are getting support for that, such as NOAA and NASA, EPA, USGS, DOE. They all have significant atmospheric sciences program, and they've all contributed to the success. And so I wanted to give you that high level thing that maybe some of your listeners don't realize how successful the science has been and how it's actually come about.

But there were a number of other challenges within the National Science Foundation that was always important to remember. You keep the balance of the university community is very important to the contribution they're going to make, have made and will make in the future to atmospheric sciences. But you also have this visionary idea that was set up back in the 1960s, which is NCAR... And UCAR is the governing body. And they all have to work together, and so one of the things I did when I was at the National Science Foundation is make sure that these large centers which receive block funding, make sure that they remember they're supposed to serve the university community. And it's worked out really very, very well because the NCAR turns out to be an intellectual hub for the entire community. And there's so many workshops that go on there. This is a paradigm that I think has been very, very successful. You don't see it in many other disciplines.

Emma Collins:

Not to keep harping on your time at the NSF, but as you said, it's been very expansive. You did mention, I believe, in your resume to us that you were part of the US Antarctic program. Can you talk a little bit about what it was like to work in the South Pole?

Cliff Jacobs:

Well, let me tell you how I got involved in the program. And I didn't do any research down there, but I had other reasons to be there. My colleagues down the hall in Polar Programs always struggle with logistics. Part of the logistics is accurate weather forecasting. This is a very hazardous region to do science in, and so weather forecasting can be very, very important. And it was clear to a number of people that the forecasting models that are used for mid-latitudes that do a pretty good job weren't quite working as well in that polar climate for a variety of reasons. And so we got together, my friends in the Polar Program, the university community, and said, "Let's see if we can invest in improving weather forecasting for Antarctica."

And that effort is still going on today. Twice a day, NCAR runs an experimental forecast for Antarctica called AMPS. And you can go online and look at that forecast. The people who are tasked with actually forecasting for Antarctica do use that as one of the tools. And I must say that over the years, I think we have probably saved some lives by having improved forecasts. For example, somebody's sick and you have to get them out and the weather could turn very bad very quickly, and things like that that are important, or field programs that have to be prepared for very bad weather coming in. That's the first time I got involved with it.

The second time, I also was deciding on how we would pick the next contractor for Antarctica. And Antarctica has a contractor that handles all the logistics support for the science community. And I was involved in that process. Both times that I was involved in that, I got a chance to go to Antarctica and experience on the ground what it was like. I've given a talk on this several times, and I made a video on the experience of what the science has done down there and what was my personal experience on that. You can refer to that link some other time in your description.

Kelly Savoie:

No, that would be great. Yeah.

Cliff Jacobs:

Yeah. It's about a 50-minute lecture. Most people don't realize, for example, Antarctica is as large as the United States and Mexico combined. Who would ever think? They put it on the bottom of the globe. You never turn the thing over to look at it. But that also creates these huge logistics problems. When you want to do science all over there in this very hazardous climate, you have to fly people all over the place. And for example, when I was there, there's seven flights a day from McMurdo to the pole with ski-clipped aircraft. And the whole enterprise at the South Pole is a lot of science being done there. But it's also very expensive to do all that. We tried to get that right and get the forecasting. There's more information in the video on all that.

Kelly Savoie:

What's the average temperature there?

Cliff Jacobs:

Well, in the summer it gets balmy. When I was there the last time, it was -30 below with the wind chill.

Emma Collins:

And that's balmy?

Kelly Savoie:

Was that in the summer?

Cliff Jacobs:

Yeah. One time I was there, it was 60 below with the wind chill.

Emma Collins:

Oh, my gosh.

Cliff Jacobs:

And the other thing you don't realize about the South Pole is their pressure altitude is about 11,200 feet, so you're gasping a little bit for breath, particularly when you come up from McMurdo at sea level and a few hours later you're at 11,000 feet. It is not uncommon that people will need oxygen and have to be put on the plane and sent back down.

Kelly Savoie:

Geez, I didn't even realize that.

Cliff Jacobs:

Yeah. Well, it's high because there's that much ice. It's a very dry continent. And most people wouldn't realize how dry it is. But if it never melts and it snows for a million years or 25 million years, you actually get a lot of snow and ice building up. Anyway, that stuff is in the video. It's a wonderful experience. I'd go back anytime I could. And I'm still involved in that Antarctic program on the sidelines a little bit.

Kelly Savoie:

Looking back at your career, is there anything in particular that you wish you had done differently, a different path you had gone or maybe a class you wish you would've taken once you started working and felt like, oh, I wish I would've learned this?

Cliff Jacobs:

Well, that's a really interesting question. Reflecting on it, I would say absolutely not. I've been extraordinarily blessed in what's happened to me. Some of that's obviously luck and others is just maybe how you approach the whole thing. But I'd say no, there wasn't anything that was really extraordinary that I would've done differently. There's a lot of circumstances that are external and you have to respond to them like the draft, right?

Kelly Savoie:

Right.

Cliff Jacobs:

But you make the best of what the circumstances are. I wouldn't do that at all. There is something that I would bring up back with NCAR. It's a funny story that was answering the question of challenges I had when I was at the National Science Foundation. And I don't even think this story qualifies as even a footnote in history, but it impressed me because of what went on.

The backstory here is that NCAR about every three or four years buys a new supercomputer to support the atmospheric sciences community. And they do their due diligence. They take atmospheric codes that are likely to be run by the community or are run by the community, and they try it on various computer systems that are available to figure out what's the best one to buy. Back in the '90s, early '90s I think, they came to me and said, "We want you to know we're doing our tests, and it looks like two Japanese supercomputers are really quite ahead of anything the Americans are producing. I wanted to let you know." And I said, "Oh, that's interesting." I notified all the management right up to Neil Lane, the director.

And we had a meeting. NCAR came in and gave their briefing. And the general counsel was sitting there next to me and asked, "What about dumping?" And I'm saying to myself, "Dumping? What's dumping?" They gave some story, "Oh yeah, we got this guy in there." And at the end of the meeting, the general counsel said to me, "I don't have a warm and cozy feeling about this." And I'm figuring, uh-oh, something's going on here that is way out of my league.

Make a long story short, the intelligence community, the CIA, NSA got wind of the fact that NCAR being an open lab might buy a foreign supercomputer. And so sent CIA sent guys out there for five days going over all the data that NCAR had collected and trying to find out some flaw. And NSA was out there trying to find some flaw. They couldn't find any flaw. And of course, this was an embarrassment to them. The Japanese truly had produced a piece of technology that caught them completely off guard.

And so things were going down here. We knew we were way in over our head, and we had no way of getting out because we could tell NCAR, who had spent a lot of money doing the tests and trying to do the procurement, saying, "Oh, we forgot to tell you, no foreign supercomputers." They would be upset, and they might even sue the foundation. And at the same time, we knew that politically this had taken a horrible turn.

And one of the highlights of my career was when it became political, a congressman from the state that produced computers actually got a resolution in the House of Representatives passed to say that I and the administrative officer who would approve that purchase should not be paid. That was my recognition by the House of Representatives, that I shouldn't be paid.

In the end, a dumping suit was launched by a local manufacturer, a US manufacturer, and they put some kind of tariff on it and the whole thing went away. But it was such an interesting experience in which I was so out of my league. I didn't know what to do. NSF is such a small agency. We're going up against the security agencies and all that. It was one of those downward spirals, and you didn't know how to extract yourself when you knew you're way over your head.

Kelly Savoie:

How did they even find out? How did it get so out there what was happening that they caught wind of it?

Cliff Jacobs:

Well, NCAR's a very open facility. It's not behind the walls. It's not a Los Alamos. And so they shared this data and quickly spread through the community being anti-scientific. There was nothing secret about it. And nobody required them to be secret. They wanted to share it with their community, say, "Oh, atmospheric sciences, here's the kind of stuff we're finding. It's really an interesting supercomputer, and it would run your codes much, much faster." That kind of stuff. But it got out there. And as I said, it's not even qualifies as a footnote in history, but it was one of those experiences you have at a company or a job that you always remember because it was so almost surrealistic. This is not what I signed up for.

Kelly Savoie:

What does dumping mean?

Cliff Jacobs:

Okay, you're asking the same question I asked decades ago. It means that basically a foreign company is producing a product and selling it way below its cost in the United States. To protect the American manufacturers, they put a tariff on it. And I think in this case, when the Department of Commerce did their due diligence, said it was 450% of the dumping fee. That means the company who sold the computer would have to pay 450% for this. Obviously they went through their thing. But that's what dumping... This is one of those areas where that's not what I signed up for. What is this? This is so out of my league. Okay.

Emma Collins:

For what you did sign up for, do you have any advice or tips for students and early career professionals?

Cliff Jacobs:

Yeah, I think the thing that I would say is very important is thank you for agreeing to be part of this or wanting to be part of this enterprise we call atmospheric sciences and related sciences because there's very few people in the world that are doing this. And so if you want to participate in this, we're really happy you do it.

I always thought that remaining flexible was good, and try to always understand the other person's point of view. I try to think about when people are speaking what the concepts they are saying. Not necessarily the words but what concepts are they trying to portray in their discussion with me or others? and focus on that high level. That's the kind of things that I learned from it.

And I think the thing that I always try to remember is, I learned from my mistakes. I learned far more from my mistakes than any successes I ever had. When things don't go your way, stop and take a little bit of time to think about, well, what went wrong? What did I learn from this? Because then you won't do it again. And it's something that is well worth thinking about.

I don't know if I have basically other things to say. It's one of those things that these people are absolutely valued resource that are young here. They're investing in themselves for desired outcome for them and for the entire atmospheric sciences community. That's the advice. They should remember that, they really are doing something that's very special. Very few people are doing it.

Kelly Savoie:

We're so grateful for everything you've told us about your career. However, before you go, we always ask our guests one last fun question at the end of our show. I'd like to ask what is your favorite hobby?

Cliff Jacobs:

Oh, my hobby is my YouTube channel. And I started maybe 10 years ago. And I've used the skills we've learned as scientists. You see something that you find interesting and you figure, well, that's interesting. How am I going to tell that story? I challenge myself when I see something like... I live in the Washington, DC area, so there's just countless things that are really, really interesting, whether it's been museums or various kind of monuments or facilities; I find them interesting. I might be walking and I see this big tower. It's a Netherlands carillon. What's the story behind that? Well, it was given to the United States by

the Netherlands after World War II. And it's got a whole bunch of bells in it, and it actually plays music. What's the story behind that? Can you make a video on that as one example?

And so I go ahead and take all the video and do the editing and write the script and do the voiceover, and I put those on my channel. And I have about 80 videos on things that I just find interesting. I don't know if anybody else finds them interesting, but surprisingly, I have about 175,000 views on my channel.

Emma Collins:

Wow. Congrats.

Cliff Jacobs:

I don't know why. That's all the videos. But whatever I do, sometimes something I put a lot of time in, I think this is really interesting, I don't get that many views. Others, I just don't know necessarily what's going to be interesting so I really focus on myself. I never appear on the video, I always just voiceover. And it's a challenge to be able to see if you can use your skills to convey a message. Just like scientists try to do; they use their skills in various ways to convey a story that they think is compelling. And that's what I'm trying to do on my YouTube channel.

Emma Collins:

It's a really nice sentiment. I really like that. Well, thanks so much for joining us, Cliff, and for sharing your work experiences with us.

Cliff Jacobs:

Thank you so much for having me. I hope that you found this interesting and your people that listen to your podcast find there's some kernel of interest in all of what I said.

Kelly Savoie:

I'm sure they will. Well, 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 edited by Johnny Lay. Technical direction is provided by Peter Kilalay. Our theme music is composed and performed by Steve Savoy. And the show is hosted by Emma Collins and Kelly Savoie. You can learn more about the show online at www.ametsoc.org/clearskies. And you can contact us at skypodcast@ametsoc.org if you have any feedback or would like to become a future guest.