

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
VOICES ORAL HISTORY ARCHIVES

IN PARTNERSHIP WITH
NOAA HERITAGE AND THE NATIONAL WEATHER SERVICE

AN INTERVIEW WITH DR. SIM ABERSON
FOR THE
NOAA 50th ORAL HISTORY PROJECT

INTERVIEW CONDUCTED BY
MOLLY GRAHAM

DANIA BEACH, FLORIDA
OCTOBER 15, 2021

TRANSCRIPT BY
FANTASTIC TRANSCRIPTS

Molly Graham: This is an oral history interview with Dr. Sim Aberson for the NOAA 50th Oral History Project. Today's date is Friday, October 15, 2021. The interviewer is Molly Graham. It's a remote interview with Dr. Aberson in Dania Beach, Florida, and I'm in Scarborough, Maine. Because this is a remote interview, could I have your permission to record this conversation?

Sim Aberson: Yes.

MG: Great. Well, I'd like to start at the beginning. I'm really curious about your family history. I'm wondering if you can actually first say when and where you were born, and then we'll step back from there.

SA: I was born in 1964 in the village of Herkimer, New York, which is midway between Syracuse and Albany.

MG: I was doing some research on you, and I found another Sim Aberson in that area who ran a drugstore. Was he your grandfather?

SA: That was my grandfather. Yes. I was named after both of my grandfathers. My middle name is David, and my maternal grandfather was David. I'm Jewish. In the Jewish religion, we name children after recently deceased relatives, and both my grandfathers died about a year before I was born.

MG: I'm wondering if you can tell me what you know of your family history, starting on your father's side.

SA: A little bit. My grandmother's family came over from an area of Russia just before or around the turn of the 20th century. I don't know much about where they were from or anything like that. There were very few records in that area, especially for Jewish people. I think my grandfather's side came over earlier. I've seen some records back to the 1870s, 1880s, but I don't know where they came from. Apparently, the name Aberson was a made-up name during the immigration, so it's not a family name that extends back into Europe.

MG: That makes tracking your ancestry difficult because you lose those records. Was the name changed at Ellis Island or at some other point?

SA: I don't know. It's just family lore that the name was changed. I should go back and look at the Ellis Island records. I don't know if they record previous names or anything like that. I don't necessarily think they do.

MG: Do you know if you still have family in that area, or did other folks immigrate here or to Israel?

SA: Given the Holocaust, it's unlikely. I haven't been able to trace anything.

MG: I was reading about your grandfather Sim, and it seems like he was a relative of the woman who wrote *Dumbo*. Forgive me for taking such a deep dive.

SA: Yes, that's my great-aunt. That's my great-aunt Helen, yes.

MG: Can you tell me that story?

SA: The family lore is that she saw one of her children or nieces and nephews, and one of the stories is possibly my father, when they were infants, and they had really big ears that stuck out, and that gave her the idea of writing this story. The original book was supposedly an interesting book. It was this fold-out book. Apparently, there are no copies of this book available, of the original. Not even the family has it. So it's all been lost, and then somehow Disney found the story and then bought it. She was somewhat involved with the creation of the movie but not hugely involved. She was flown out there to Hollywood to look at things, but I don't think she was intimately involved in the development of the movie.

MG: That's so interesting. What about your mother's side of the family? What do you know about their heritage?

SA: Not a huge amount. I know that her parents immigrated, and my mother was actually conceived in Europe and born in the US, so they came over a lot later, in the '20s. It was just after World War I, and the family story is that they were from the area around the Baltics, so there were a lot of different countries, and the borders kept changing, and the fronts kept going through. My grandfather ended up in all these different armies and just – “got to get out of here” – and came to the US.

MG: Your father grew up in the same area of upstate New York as well?

SA: Yes. Both sides of the family were from upstate New York. My father's side was in the Syracuse-Albany area. My mother's family ended up in the Watertown area, which is further north along the border. They were dairy farmers and fishmongers.

MG: Do you know how your parents met?

SA: No, I don't. [laughter]

MG: That's okay. I was curious because your grandfather must have been well known in the town, having a drugstore on Main Street.

SA: Yes, that would be my guess. That was all gone by the time I grew up. Then we left town when I was seven, so I really didn't have a lot of knowledge of that. I do still have first cousins in the area.

MG: Well, tell me a little bit about your life in New York up to the age of seven. What memories do you have? What was life like there?

SA: Not much. We moved when I was seven. I remember lots of snow because that was the Snowbelt. I remember the weather, and that's interesting because I became a meteorologist. Soon after moving down to Miami, I became very interested in the weather. I remember thunderstorms. I remember snowstorms and flooding events. I remember, right before we moved, Hurricane Agnes – the remnants of Hurricane Agnes came through and caused a lot of flooding, not where I was, but further south, and there were a lot of deaths. So that was something I was aware of. I remember a couple of neighbors and the neighborhood. I can go back. I know the house that we lived in and stuff like that. My grandparents are buried there and I have cousins and other family there, so I go back periodically, but I don't have huge memories of that area.

MG: Can you say a little bit more about your experience with Hurricane Agnes and what was it that was fairly significant about it?

SA: It was just that I remember there were telethons on TV. Probably, I remember it because they preempted my favorite cartoons or something like that. My parents had to explain to me why there were these telethons to raise money for the victims of Agnes and stuff like that. I remember that it was a big event in the area. It was mostly in Pennsylvania, but it was a big event, and there was a lot of activity around that.

MG: I've lived through hurricanes too, but it never manifested into an interest in hurricanes, so I'm just curious about that process with you.

SA: Yes. I don't know. I didn't become really interested in hurricanes until I moved down to Miami. When we first moved down, my grandmother had moved down here already, and we moved into her apartment until we found our own apartment. Her next-door neighbors were the same age. They were a couple, retired science teachers in the Miami Dade County schools, and so they interested me in science. Their last name was Levine, but I do not remember their first names. Since I had moved down – we moved in August, which is getting to be the height of the hurricane season. Back then, everybody had NOAA [National Oceanic and Atmospheric Administration] Weather Radio because that's how they got the weather. Now we have the internet. There's still NOAA Weather Radio, but now we have the internet, so we don't need it like that. They showed me how NOAA Weather Radio worked and how the advisories came out from the National Hurricane Center [NHC]. Back then, everybody had their own hurricane tracking map. They used to get them – the supermarkets used to hand them out, and you used to get them at City Hall, and everybody had hurricane-tracking maps. They would listen to the advisories and track them, see if they were coming near us. They taught me how to listen to the advisories and to track hurricanes. That just got me really interested, and I just became obsessed after that.

MG: What precipitated your family's move to Miami? Was it because your grandmother was down there, or did your parents change lines of work?

SA: My father was a disabled veteran from World War II, so he really didn't work. He studied pharmacy, but he was disabled, so he didn't go into that. My mother wasn't working regularly up north but did some Kosher catering periodically. At that point, my grandmother was my only

living grandparent. I don't know necessarily what precipitated the move to Miami. My brother and sister are much older than me. My sister had moved down here, I believe, earlier, so that might have been – my sister and my grandmother. I know a lot of other neighbors from Herkimer in the Jewish community moved to Miami Beach, so there was a sort of a ready community available to us.

MG: I meant to ask about that if there was a Jewish community in Herkimer.

SA: There is a synagogue that you can look up, Temple – oh, God – oh, I have to remember the name, but there is a synagogue, and it's still there, and it's still going strong – Temple Beth Joseph, a conservative synagogue. My parents and their local siblings are all listed as founding members of the congregation.

MG: What kind of congregation was it? Was it Reform or Conservative?

SA: I'm not sure if it was Reform or Conservative. I'm guessing Conservative because when we moved down here, we joined a conservative synagogue.

MG: Can you say a little bit about your Jewish practice and religion? Were you bar mitzvah-ed?

SA: Yes, I was bar mitzvah-ed. When we lived in upstate New York, in the small town, my mother kept kosher. Sense of community was in the synagogue. I do have memories of the synagogue, going to the synagogue, and stuff like that also. For some reason, when we moved to Miami Beach, which was majority Jewish at the time, my parents stopped keeping kosher. We didn't go to the synagogue as much. We still went a few times during the year. We were members of the synagogue. That sort of fell away. I'm more culturally Jewish now than religiously Jewish.

MG: I was curious just about celebrating holidays and which ones were your favorite and maybe how it was different in New York and Miami.

SA: We still celebrated the main holidays in our own way, mostly with food and stuff like that. Other celebrations didn't necessarily happen, except around the high holiday times.

MG: What do you know about your father's service in World War II?

SA: He really didn't talk about it a lot, like a lot of people. I do know that he fought in North Africa and then up the Italian peninsula. He was in Rome eventually. I don't know if he was in combat. He was a mechanic, so he did a lot of the mechanic work. He wasn't injured. There was an epidemic, apparently, of spinal meningitis that came through, and he was one of the lucky few who survived, but it debilitated him. One other thing that was interesting is, in Miami, during World War II, Miami was the place where huge numbers of soldiers trained because the weather was good, and they had all the hotels to host them and everything. So there's lots of pictures of marching and basic training all through the streets of Miami Beach at the time. He was one of the people that came through Miami on the way in and on the way out, so that might

have been another impetus to move to Miami. I know that Miami grew exponentially after the war because so many of the soldiers came through, and they liked and decided to move down.

MG: How did life change for you when you moved to Miami?

SA: I don't know. In Herkimer, we had our own community with the synagogue, and there were lots of kids. Then Miami Beach was very elderly Jewish, and so there weren't so many kids around. Except for my parents, I was probably fifty years younger than all the people that lived in my grandmother's apartment building when we moved in with her. There were a few kids around, and there was an elementary school [now the Ruth K. Broad Bay Harbor K-8] that was right there, so there were a lot of kids, but a lot of the kids were bussed in from like ten miles away because there wasn't a big enough community of children to fill that school. So yes, there weren't as many kids. I'm still somewhat of a loner, so I don't know if that developed from that or if I always was. But that was a change.

MG: I think that can happen when your siblings are so much older. You're used to being on your own and fairly resilient in entertaining yourself.

SA: Yes. My siblings were old enough that, by the time I was a few years old, they were out of the house, so I was kind of an only child, even though I have siblings.

MG: That's a very significant gap.

SA: Yes.

MG: Tell me a little bit about the schools you attended in Miami.

SA: Well, in Herkimer, I attended [Lorraine W.] Bills Elementary School. I remember a little bit of that. One of the things I remember from that is going in with my parents and maybe the rabbi and teaching the kids about the Jewish holidays, like Hanukkah around Christmas or something like that. When I moved to Miami, I went to Bay Harbor Elementary School, which now is, I think, called Ruth Broad Bay Harbor Elementary School. The school that I went to has since been torn down and rebuilt. It was an interesting school because it was sort of an experimental school, even though it was the neighborhood school. Unlike the other classes, they had first and second-grade students all together in a big room, like eighty students and a number of teachers all in the big room. Then they had dividers that they could divide. Then the third and fourth grade and fifth and sixth grade at the time was all together. One thing I remember, they had this math program called IPI [Individually Prescribed Instruction]. I forgot what it stood for, but it was basically everybody worked at their own rate, so there would be these things that you would go through, and you would take a test, and if you passed the test, you could go to the next thing. If you didn't pass the test, you had to go through these workbooks. Then after you do this work, and then you would take a post-test. If you passed that, you would go on to the next level. If not, you would keep working. It was sort of an independent study, and the teachers were there to grade and to help you when you didn't understand what was going on. I loved that. There were a couple of us who were far ahead of the rest of the class. And I finished this whole sixth-grade program by the time I was in fourth or fifth grade. A few of us did, so then they got other stuff

to teach us – more advanced math. But I really liked that, that I could work at my own rate and learn what I needed to learn, and the other students could work at their rate and learn what they needed to learn, and that I wouldn't be bored, and I got through. So, the math was successful. There was some English stuff where they were trying to teach us speed reading, and that was just a complete failure for me, the reading and everything else, but the math was a big success.

MG: Would you move up in the areas where you excelled and then keep working on the areas where you maybe didn't?

SA: Yes.

MG: Did this mean you graduated early, or did they just find more things for you to work on?

SA: They just found more things for me to do because I excelled in math, but, like I said, in English and everything, I was in the middle of the pack.

MG: Throughout your schooling, did this philosophy or approach to learning change at some point?

SA: It ended after I left the elementary school. When we went to what was then called junior high school, which at the time was seventh, eighth, and ninth grade, that was Nautilus Junior High School, which we had to be bussed to, that just became just a regular high school. One other thing with elementary school is I also got entered into the gifted program. That involved being bussed two days a week to another school, North Beach Elementary, where all the gifted kids in the area – it was mostly Miami Beach – were from six or seven different elementary schools all came together, and two days a week, we learned things in an accelerated program. I don't remember as much about that because it was less structured. I found it interesting, and that went away when I left elementary school also.

MG: The gifted program?

SA: Yes.

MG: Did that give you a sense of confidence that you were on the right track or that you were gifted in some areas?

SA: Yes, I guess so. I don't know that confidence was anything that would have crossed my mind at the time. I was young.

MG: I think you wrote somewhere that it was in high school where you really started to get opportunities in science, and that helped propel you forward.

SA: Yes.

MG: What were those opportunities?

SA: Well, I stayed in the gifted program through junior high and Miami Beach High School. In the gifted program in high school, we got to choose a topic of interest and do an independent study on that topic. Of course, the first year, I chose hurricanes, so I got to spend the entire year – we had a teacher, Josephine Chesley, guide us to make sure we were on the right track, but it was mostly independent study. Back then, in order to get things, you had to do interlibrary loans, and you did film strips, and you did movies, so I had to learn how to get movies in the mail and watch them and send them back and do all that stuff. I wrote a year-long study on hurricanes, what was known about hurricanes. At that time, I got to visit the National Hurricane Center for the first time. That was when the Hurricane Center was located on the campus of the University of Miami.

MG: Do you remember what that visit was like? Who was the director at that time?

SA: I'm guessing it was Neil Frank. I'm guessing. I can look back at the records and see who was. But I'm guessing it was Neil Frank at the time. I just remember being in a big room, and there were scientists. They talked to me and were very appreciative, but I don't remember a lot from that.

MG: What was your experience with hurricanes up to the point when you're doing this independent study?

SA: Miami, at that point, was in a hurricane drought. The last hurricane was in 1966, Hurricane Inez. Then there was nothing. There was a glancing hurricane in 1979, Hurricane David, which hit the Dominican Republic as a category five, hit the capital directly and killed thousands of people there. By the time it got to the United States, it was much weakened and stayed a minimal hurricane. But forecasts weren't very good back then, so they weren't sure what was going to happen, and there were a lot of evacuations in Miami, and we were in Miami Beach, so we had to evacuate, so we evacuated to my grandmother's house. After 1979, Hurricane David, another hurricane, didn't hit Miami for another thirteen years. That was Hurricane Andrew. It was really from '66 to '92, there were no hurricanes in Miami, and now we get them all the time. So very little actual experience with hurricanes.

MG: How did you get this opportunity to visit the Hurricane Center? How was it facilitated?

SA: It was facilitated through the gifted program. I don't remember who called, whether it was my parents or whether it was a teacher or the coordinators of the gifted program set it up, but it was coordinated through that.

MG: I think you wrote that, as a senior in high school, there was another opportunity you had in the Community Laboratory Research Program. What was that?

SA: Right. That was a program that existed, and it may still exist in some form. They took a lot of the best science students in the county, and it was a county-wide program. In Florida, the school districts are by county, so an entire county is a school district; towns can't opt out. It was an opportunity that was available to everybody, and you applied. I had fellow students in my high school; they got to go to hospitals and observe surgeries and look at data, look at how – it

was basically a program where students got to go into laboratories of all different science and engineering, whatever was available around the county and learn what it was like and get mentors and stuff like that. I ended up in what was then NOAA's National Hurricane Research Laboratory [NHRL]. That was collocated with the Hurricane Center when the Hurricane Center had moved across the street from the University of Miami campus. The lab was on one floor, and the Hurricane Center was on another floor. In my senior year in high school, I got to spend one or two hours every weekday at the Hurricane Center.

MG: What would you be doing during those one or two hours?

SA: I was doing science, and I learned – one of the things I learned is that science can be really boring and tedious at times. There was a project to – some of the history is that the Air Force and NOAA – there were the rawinsondes, the weather balloons that go up. In the 1940s – these had been around for thirty, forty years at this point – they started flying into hurricanes, but they didn't have any instrumentation on the aircraft. They realized that, instead of taking these instruments and sending them up in weather balloons, if they dropped them out of the planes, they would radio back the information to the plane, and you could get the surface pressure. That was the first way that they actually were able to measure the intensity of hurricanes. By the early 1970s, they developed a new – they called dropwindsondes – they developed a new sonde that could measure the wind and the temperature and the humidity on the way down, and that was the predecessor to – GPS [global positioning system] back then was called Omega, and so it used Omega, and it used – they were land-based, they weren't satellite-based, but it used the signals from these Omega towers to figure out where the sonde was and could calculate the wind. It couldn't do it in clouds, but there was a field experiment called GATE [GARP Atlantic Tropical Experiment] that used these sondes. Joanne Simpson was instrumental in part of that program. When that program ended, she was looking for other ideas on how to use these sondes, so she thought, well, one of the reasons that we can't forecast where a hurricane is going is because they're pushed by the environmental wind around them. But hurricanes happen over the open ocean, where we don't get these observations. So her thought was to drop these sondes using the new NOAA aircraft, the P-3s, around the storms to get the wind information to send to the models and test whether that improves the forecast. So, in order to prepare for that, they were able to do the first missions in 1982. But in 1981, I was part of this lab research program, and so they wanted to test the latest hurricane model, which was a barotropic model called SANBAR, and it was named after Fred Sanders, who was a professor at MIT [Massachusetts Institute of Technology] who came up with the idea. That was a very simple one-level model that only had wind in it. It had a grid spacing of about two hundred and fifty kilometers, so a lot different than what we have now. We wanted to test this model on all the hurricane cases in the Atlantic from 1979 through 1981. What I had to do was I had to get all of the rawinsonde data off of microfilm because back then, we couldn't save it on computers, and so I had to use the microfilm reader and print everything out. Then I had to transfer all the relevant information by hand onto paper, give that paper to a keypunch operator, and the keypunch operator would transfer the data to the keypunch cards, one line of data per card, and then she would give me back the keypunch cards, and I had to manually check each one, the keycard versus the data that I wrote down. Actually, I did it versus the microfilm data to make sure everything was correct, and we had to keep iterating until it was all correct. By the time I was done, I had hundreds of thousands of keypunch cards in my office. I still have a stack of those, so can't forget that. It sounds very

tedious, and it was very tedious, but it was also really interesting because then I got to use the computers, read the cards in, run this hurricane model, see the results, and then verify the results of the model and use that as a baseline. The year after I left this program, in Hurricane Debby, they actually were able to go out and start these experiments. And up until 1996, they were able to run this experiment sixteen times, which is not very many, but the results were good enough. I stayed involved with this program, and the results were good enough that that propelled NOAA to buy the G-IV. By that point, Omega was disappearing, and the global positioning system came online, so we worked with NCAR [National Center for Atmospheric Research] to develop the current dropwindsonde system, the GPS dropwindsonde system. Soon after the G-IV came online, I headed the program to draw the flight tracks and verify the forecasts and stuff like that. I stayed involved in that program until it was fully transitioned to operations around 2008.

MG: This seems like such an advanced role for a senior in high school to have.

SA: Yes, yes. It was a really good project for a high school student because it was tedious. I really didn't need to know the science in order to do this project. I learned the science as I went along. But the first things I learned is how computers worked and the punch cards and stuff like that. At the same time, Miami Beach High School was also the first high school, I think, in the state of Florida that had computers. By the time I got into the class – they had computers for a few years – by the time I got into the class, we had Apple computers, and so we actually learned a little bit of programming and how to use computers and stuff like that, so I was learning computers at school and in this program, which really, really helped. One thing that we did at the National Hurricane Center and in NHRL at the time is, every day, there would be a map discussion during the season. I think it was at 2:30, so I was available to go. All the Hurricane Center scientists and the forecast office scientists, and the research scientists got together, and somebody led the map discussion of the weather that was going on, not only the hurricanes but the local weather. So I was able to learn about the weather that way, just by listening in to these fifteen-minute discussions every day. That was really good.

MG: Do you remember who was there at that point?

SA: Who was at the Hurricane Center?

MG: Who was in the office? Yes.

SA: It was Neil Frank who was the director. I think there was Gil Clark and Hal Gerrish. Probably Bob Case. That was my only time there because, when I – they liked my work, apparently, so they kept hiring me over summer periods to continue the work. But by the time I came back for the summer, NHRL ceased to exist and had moved over to the AOML [Atlantic Oceanographic and Meteorological Laboratory] building on Virginia Key. I no longer had regular interaction with the Hurricane Center at that time. I remember more of all the people at the research lab than – because I'm still working with some of them – than the people at NHC at the time.

MG: That part was a little bit confusing to me. When did it transition over to become under AOML?

SA: I don't know exactly. I was very young, so I wasn't part of that. But if you go on AOML's website, there is a history of hurricane research page there, and you can read about that transfer. There were a number of labs in Miami. There was AOML. There was NHRL. And there was NHEML, the [National Hurricane] Experimental Meteorological Laboratory, which did some of the cloud-seeding experiments and stuff like that, and that lab ceased to exist. It was sort of putting all the labs together into one lab. It took a long time for the hurricane group to be fully integrated into AOML itself.

MG: Were you aware that these experiences would be building blocks in your career, or were you just doing this because you thought it was so cool?

SA: Yes. [laughter] I can't say I really thought a lot about career at that – I was still in school. I knew I wanted to be a hurricane meteorologist and that I liked that place, but I wasn't thinking long-term career or anything like that.

MG: What was that senior year like for you in terms of thinking about and applying to colleges?

SA: Well, it helped having the meteorologists around, and there were quite a few young meteorologists who had just gotten out of school, and so I could talk to them about schools, and they made recommendations. I had a really wonderful college guidance counselor, Diane Curless, through Miami Beach's College Assistance Program. She was a mother of a fellow student, and I really liked her. Back then, everything was on paper, so you would go to her office, and her office would just be wall-to-wall college brochures. It would just be indexed, and you would have to go through and see this school has meteorology; this school doesn't. Of course, a lot of schools didn't have meteorology. But it was helpful to talk to the people at NHRL at the time.

MG: Did you know folks who had attended Penn State?

SA: I'm sure I did – and Florida State – because those are the main two that I applied to. I'm sure I did. I honestly can't remember specifics.

MG: What made you choose Penn State?

SA: It was away from Miami. It was outside of Florida, so I liked the idea of that. That appealed to me.

MG: Well, tell me a little bit about your college experience, the classes you took, the professors you had.

SA: I started at the beginning of the AP [advanced placement] craze, and we had the first few AP classes that were just like four or five, but as a result of the AP classes I took and some placement tests that they gave me at Penn State, I was able to graduate in less than four years, because I got enough credits that that could go through. Most of the meteorology classes in meteorology, the first two years were started by taking science and math courses and electives

and stuff like that. They didn't start meteorology until the third year. There wasn't so much of an opportunity for me to be involved in meteorology. But the department did get the younger students who weren't taking meteorology together, and there were some opportunities. It was called the Campus Weather Service. What that was, was a lot of the local, especially rural, radio stations around the state contracted with Penn State to get radio forecasts for the local stations, and so they would do morning, midday, and evening. What they did is they paired the young students with some of the older students and grad students to create forecasts for different stations all over the state on a daily basis, and you would participate. I learned a lot about forecasting snow and stuff like that that I wouldn't have had the opportunity down in Miami. Then you would actually record the forecast, so you would call them up, and they would record them over the phone, and you would appear on the radio. We didn't receive those stations, so I never actually heard them, but it was a great program. In fact, Steve Feuer, who worked for what is now HRD [Hurricane Research Division] for a while and now works for the Department of Defense but at the Hurricane Center, he led the Campus Weather Service after I graduated, so there's a little bit of a connection there. That was one thing. Then there was a nationwide national forecasting contest for college students and professors. They gave me that opportunity, and so I joined that the first year and was able to go up to the – back then, there wasn't the internet, so we had the map rooms, and we had to learn how to read what was coming across the teletype. All the stuff that was coming across the teletype was hung on the wall. All the maps were on the wall and coming out of the fax machine, a DIFAX machine at the time. It was on this strange paper that it was sort of burned into. So, going to the map room and listening to the other students who knew what they were talking about – or at least I thought they knew what they were talking about – talking about the particular forecast that we had to do that day, I learned a lot that way too. I had quite a bit of weather knowledge before I even took some meteorology classes.

MG: Are there any professors that stand out to you during your undergraduate experience?

SA: I had a number of interesting ones, some famous ones. [Alfred] Blackadar was a famous micrometeorologist, boundary-layer meteorologist. I took one of his courses, and he'd be the first to say that he was a really boring lecturer, and he was a really boring lecturer, so I had a little trouble in that. I did take synoptic meteorology with Toby Carlson, who, before he went to Penn State, actually worked at the NHRL, and he was an expert in tropical waves and stuff like that. I got to take a meteorology course with him. Bill Frank did a lot of hurricane work and was the head of the department at the time. Michael Fritsch was there. I didn't take any courses with him undergrad, but when I became a master's student there, I was his teaching assistant. So I did learn a lot from him about meteorology, and he was a really good professor. The last course I took as an undergrad was by Hans Panofsky, who was a trailblazer in meteorology and was a retired professor. He wrote some of the seminal papers in meteorology and textbooks. He was a really great teacher, and that turned out to be the last course he ever taught because he died within a year after that. He was already, I believe, in his eighties at the time. That was very memorable because he was able to take all the stuff I'd learned in all these other classes and distill it down. All of us in the class were like, "Oh, now it makes sense." He was able to put it all together, so that was really neat.

MG: Were you focusing on tropical meteorology or meteorology in general?

SA: The meteorology department at the time really didn't have a focus like that for undergrads. I did take a tropical meteorology course, which was not so much about tropical cyclones, [but] more about tropical weather, tropical climate. It had the beginnings of El Nino and a little bit of the Madden-Julian Oscillation, convective cloud clusters, things like that, but not so much about hurricanes.

MG: What about college life, getting involved in campus activities, social life, and things like that?

SA: I was involved – the university had interest houses, which were dorms based on the college that you were in. Basically, each college had an interest house. And these were the only coed dorms – separated by floors but still coed in the same building – on campus. The Earth and Mineral Sciences [EMS] College had Irvin Hall, which was the first dorm actually built on the campus. It's still the Earth and Mineral Sciences interest house. As a result of that, we had all the meteorology plus geology, geography, mineralogy, mining – all that stuff was all in the same dorm. There were a lot of fellow students in that dorm. They did have a mixture. They did keep about a quarter of the slots for non-EMS students to make sure we were broadened in our outlook. I moved there my second term. I wasn't there my first term because they had renovated the building, and they added dorm rooms into the basement. When they added, spots opened up, and I was able to move in. That was really great because it brought me together with people that shared my interest, whereas, in my old dorm, I was in with lots of football players and things like that – you know Penn State football. It wasn't horrible most of the time, but there wasn't anything of interest to me. [laughter]

MG: Does anything else stand out about your undergraduate years?

SA: The only other thing is more personal is when I was coming out. It turned out that the – I forgot what they were called, but Irvin Hall was in an area called West Halls, I think. It was one, two, three, four, five, six – seven dorm buildings. Each complex of buildings like – it was north, east, south, west, center. They each had an adult who lived in an apartment in one of the dorms. The apartment was actually on the first floor of Irvin Hall, off to the side. They were sort of counselors, and they oversaw all the resident assistants who were trained to oversee everything and make sure – try to tamp down conflicts and help students and stuff like that. It turned out that [the RA], Robert Kuzma, was gay. This is 1982 when there weren't very many openly gay people. There were a few of us in the dorm, and then we found others in other dorms. We got together with him, and he started a support group, which eventually grew into the gay student group at Penn State, which still exists. There was a student group from '69 to '76 that went defunct, and then we rejuvenated it, and it still exists. Through happenstance, I ended up becoming a co-lead of that my senior year and during my graduate studies there. I was always in the newspaper, so everybody knew that I was gay, and that was very interesting at the time. Again, I was sort of a loner. I stayed a loner and didn't have a lot of very close friends. People were nice. There wasn't anything overt that happened. But that was a big experience through that time as well.

MG: This was taking place against the backdrop of the AIDS epidemic.

SA: Yes. We had a little bit of that. Of course, we were in a small town when that was happening. We did have a lot of AIDS education and awareness, and that was one of the main things we did on campus. But due to a lot of secrecy and stuff, we never heard during my time there that there were actual AIDS cases in the university or in the county. There were rumors, but nothing ever happened. That was definitely in the backdrop of what was going on.

MG: It sounds like you found a group to be involved in and organized with. But was there a more formal coming out, like to your parents and other friends off-campus?

SA: Yes. All that happened at the same time.

MG: What was the reception like?

SA: At the university, it was mostly good. There wasn't anything – like I said, I had no major negative – overtly negative – experiences. Now, as to how people treated me and what we now call microaggressions and all sorts – that happened, but there wasn't anything horrible. I barely ever felt unsafe being as out as I was and things like that, especially in a rural community. With my family, that went fairly well for the time. It wasn't like now. There was a period of time where it needed to be accepted. But we got there.

MG: Were you ever worried that being gay would be a barrier to some of the work you wanted to do or opportunities you wanted to have?

SA: Yes, probably somewhere in the back of my mind, but I just didn't think about it and plugged through as best I could.

MG: You stayed on at Penn State for your master's degree. Did you just continue on, or did you leave and come back?

SA: No, I continued on.

MG: What was that time like? Were you focusing your research in a particular area?

SA: There wasn't anything available to do research for tropical cyclones at the time. I ended up in a project working on trying to extend some work from the 1960s on tropical waves and why tropical waves develop. These were the Rossby waves, mixed Rossby-gravity waves, and the Kelvin waves. There's just these fundamental waves that happen to be due to the size of the earth and the rotation of the earth. If you just plug in general equations and you linearize them, these waves pop out. Then you can look at the real atmosphere, and the real atmosphere obviously doesn't behave as this simple thing because, of course, there's water, and it's not one level. There's height to the atmosphere. It gives you a good explanation of what's going on in a tropical atmosphere. The original work was done with no background flow in the atmosphere. They wanted to extend it. Obviously, there's background flow in the atmosphere. They wanted to extend it to background flow. One of the previous grad students there came up with a technique that could potentially make this possible. So I tried to do this and got some interesting

results. But when we tried to run a model using these results, it always blew up. We could never figure out why. Now I understand why it never worked, and part of it was chaos, that just very small differences in the numbers you give to the computer just makes things separate. That's what happened. It would either go in one direction or the other direction. It wouldn't keep going forward. The other thing that happened is when I graduated – a negative result is a good result because you learn, so I was able to – I got the negative result out there. I eventually got hired at what was then HRD. I wanted to publish it. We have an internal review. So I wrote it up for a journal. It went to an internal review. One of the internal reviewers was Lloyd Shapiro, who retired in the late 1990s and is still around in Germany. But he did the internal review. He took a long time. He kept coming back to me with questions and saying, "Something doesn't seem right." He wasn't a meteorologist. He was a physicist, so he really didn't know meteorology, but he knew physics. The equations are basically physics equations, and he was trying to understand this on the basis of physics. Finally, after a while, he just figured out that equation one was wrong, and that meant the whole thing was wrong. When we tried to fix the problem, it created a lot of other problems. So that never got published, but I got my master's degree and learned a lot about how easy it is to make mistakes and how negative results are still good. [laughter]

MG: Well, how did the position at HRD come up when you finished your degree? Had you been staying in touch with them all along?

SA: I was working just about every summer and over Christmas breaks. Back then, we had longer Christmas breaks than they do now. I had a few weeks over Christmas, and then I had the long summer break. I came back to HRD and kept doing some of this work for HRD. They hired me as a – I guess they call it now a casual worker, I think. I was able to get an hourly wage, which was way above the hourly wage that all my college friends were making working in McDonald's or something over the summer. I was enjoying it. That was great. I kept in touch and then was able – luckily, I was able to get the job after I graduated with my master's degree. I started out as a contractor and then became a federal employee later on.

MG: Well, tell me a little bit about how your career unfolded and the different roles you had, and the projects you worked on.

SA: After I was hired permanently, I was supposed to be fifty percent working on this project with the dropwindsondes and fifty percent working on doppler radar data. At the same time we got the dropsondes on the planes, they put doppler radars on the planes. So these were some of the first airborne doppler radars, and they had techniques to quality control the data, which involved a lot of unfolding and things like that. I can get into the radar science if you want. That first mission where we had the dropsondes was also the first mission where we had the doppler radars running. So, they hired me fifty percent for each, and I started working for Steve Lord then, who eventually left and became the head of EMC [Environmental Modeling Center] then in Camp Springs. He still works for NOAA, I believe. I actually started working full-time for him on this project. At that point, we got a little more sophisticated with the models. We transferred the SANBAR to a new model called VICBAR, which was named after Vic Ooyama, who was a fundamental researcher in tropical cyclones who worked at HRD at the time. He's a very interesting person. But he came up with a spectral technique for models, which was very

sophisticated, and we're able to take that technique and create another barotropic model and then assimilate the data into this model. I became the person who's running this model, and the information was sent to the Hurricane Center. For a couple of years back in the late '80s and early '90s, this was one of the best models for track that the National Hurricane Center had. It was a very interesting technique, and it was also an analysis technique. I was making analyses using all the data that we had and then having these analyses as the initial input for the model, and now we call this data assimilation. It was a very simple technique at the time. So, I was doing these analyses and running the model twice a day, pretty much. If the storm wasn't impacting land, I wouldn't need to be around when this happened; I could run the model later, and it really didn't make a difference. But when we were flying into the storms and the storm was due to impact the US, I would have to be running the model in real-time and running to the forecasters. I would do this at the Hurricane Center sometimes and run to the forecaster at the Hurricane Center with the actual forecast and show them, so they could see our model forecast. They had very few model forecasts at the time. Because of that, I wasn't able to fly on the P-3s for a long time. I was able to fly a few missions in 1988. Then it wasn't until the mid-90s that I was able to fly again, but that was pretty exciting.

MG: Can you talk a little bit about that? Were you anxious about those flights? What were your roles when you were on them?

SA: My initial role is trainee – just learn what's going on, on the plane. Back then, we needed a lot more people to do what computers do now, so we had to – for the radar, we had to have people changing the tapes every fifteen minutes because the tapes didn't contain a lot of data, so we had to change the tapes. We would lose data when we were changing the tapes, and we would walk off the plane with stacks of data. Otherwise, we would walk off the plane with stacks of paper. The data was on paper. To process some of the sondes, they were using slide rules and all sorts of stuff like that. It was really a learning process of how we gather data and learning how the data behaved, what the good parts of the data, the bad parts of the data, the quality control, and then taking the data, putting it in the analysis. It really helped me with these analyses. That was what I did initially.

MG: Was Hurricane Andrew an opportunity to really test out this instrumentation?

SA: Yes. Because Hurricane Andrew moved so fast, we did fly one of these missions in Hurricane Andrew. What was interesting is there's a – down here, there's a famous quote from Bob Sheets, who was then director of the Hurricane Center – on that Friday, he gave live TV interviews. On Friday, he had the satellite pictures. He said, "It's way out here, northeast to the islands, and it may turn to the west. We're not sure. But it's many days away, so enjoy your weekend." That was Friday night. Or that was Thursday night. By Friday night, we had hurricane warnings. By Saturday night, the hurricane was here. I was at the hurricane center running the model. After we transmitted the data from the plane and got it into the models, the models all agreed suddenly that the hurricane was going to come to South Florida. There was amazing agreement at that time, which we have more now, but back then, we just didn't have that. I finished running the model at like three in the morning. I just saw this and just got really frightened and called friends and woke them up and said, "This is going to be really bad. You need to go to Home Depot and get supplies now." They all hated me at the time, but they

thanked me afterward because they were able to get supplies without the madness that happened later. I lived up here in Dania Beach, which is well north. I was one of the few people in HRD that didn't have severe damage to their house. In fact, I had no damage to the house, just a couple of trees down and stuff like that. I ended up going to meetings like the AGU [American Geophysical Union] meeting and representing hurricane research because a lot of these meetings had special sessions on Hurricane Andrew and what happened. I was the only one who was available to go because everybody else was fixing their houses. That was an interesting opportunity for me as well.

MG: Can you talk more generally about the impact of Hurricane Andrew? What happened, and what unfolded? How much time did folks have between going to Home Depot that night and when the storm really hit?

SA: We had that full-day once that happened. People had a full day to get stuff and everything. But it really became mayhem because we hadn't had a hurricane in fifteen, sixteen years. People didn't know what they were doing. The news was saying this is a very strong hurricane, and it could get stronger. Of course, it turned into a category five by landfall. It was just really mayhem and really difficult at the time. When it was happening, I saw where the track was going. My understanding of a hurricane would be, if a hurricane is hitting Homestead, then the eyewall could be up in Broward County. I thought, "Oh my God, we're going to get the worst of this." I didn't realize, and they weren't talking about this at the time, that it was such a tiny hurricane that it barely affected the area where AOML is. But just a couple miles to the south was complete devastation in the town of Key Biscayne. We didn't know that at the time. When we woke up the next morning, we walked outside, and of course, there were sixteen years of tree growth that was all over the place, and it looked really horrible because the damage was all trees. It was just trees everywhere. You couldn't drive on the roads. There was no way to get out. We didn't have power. It looked really bad. But then when we finally got power back, and we saw what happened in South (Dade?), that was just really amazing.

MG: What was your role during the storm? Are you coordinating and communicating with the recon flights?

SA: At that point, we're research, so we don't do any operations. We were all in our houses. Yeah. That was it. In fact, there were a couple of people at HRD – we had a program where the old – before the 88D radars came online, the old 57s – they didn't record the data. We came up with this way to record the data, but we had to take these PDP-11 computers, which were in these boxes the size of large luggage, and we had to fly to where the 88Ds were located in the weather forecast offices and collect the data. We did have a couple of people in the Miami office; they didn't have to go anywhere, but they weren't at home. We sent people – I forgot where – maybe to Palm Beach. Then afterward, we sent people to New Orleans to gather the data there. But now, with the 88D, they actually record the data, and it's available. There were a few people in research who were doing some work, but I was just evacuated to a friend's house. Then afterward, when things started getting better, I went down to AOML, and we started working on trying to make sure everybody that worked there was okay and had food and shelter and stuff like that. I helped out with that for a while.

MG: You said you would return to flights later on in the '90s. For which hurricanes would those be?

SA: What was the –?

MG: There was Opal in 1995.

SA: Yes, it was the E storm in 1995, I think. Was that Erin? I forget what the storm was. That was the storm that – at that point, I was getting ready in 1995 to go back for my PhD. One thing that HRD and its predecessors had always done well is taking master's students and giving them the opportunity to get their PhD while working. There were a number of people who'd done that before me and a number of people who did that after me. But Bob Burpee, who was then the director of HRD, was very adamant that I should go back for my PhD. At that point, we decided that I would go back in 1995. They called it long-term training, and they paid for my housing at the University of Maryland and paid for the classwork for a year. In a year, I was able to get enough credits that I could finish my PhD. Of course, the other part of the PhD is research, and that's my job, so I could do the PhD research as my job. It helped that the university didn't have to find a spot for me as a research assistant or something like that. So I went to the University of Maryland for the year. Right before that, I was able to fly the mission. They said, "We'll let you do this." They were starting to retire that model, so I didn't need to run it anymore. After I returned, I was able to start flying on a much more regular basis.

MG: Were you living in College Park during that time?

SA: Just outside College Park, yes.

MG: You had started to say it was an active hurricane year that year, 1995.

SA: Yes, and I was up there for a lot of it.

MG: Well, I want to ask you about your PhD, but just say a little bit about – was it Hurricane Erin that you flew into?

SA: I think it was pretty uneventful, so I don't really remember. I just remember I did it. I don't remember anything particular about that flight. Let me see if it was Erin. Yes, Hurricane Erin. Yes. I remembered the name. I just really don't remember the flight particularly.

MG: What was that year like of classwork for your PhD?

SA: It was interesting because I had been in research for seven or eight years, and I was hitting my stride, so I was doing – in some ways, I was coming up with my own ideas and doing what I wanted to do. People would come to me and say, "We need this." They wouldn't tell me how to do it. I could figure out how to do it. Then I went back to school. It's like, "You will read these chapters on these days, and you will do these problems on these days, and here's your deadline." It was very different going back to that and somewhat difficult. But it was very interesting going back to school – because my other degrees were all at Penn State – and getting a very different

perspective. University of Maryland, College Park was more climate oriented at the time and less weather oriented. I was still interested in the weather. So it was interesting going back to a school like that.

MG: It sounds like you wrote your dissertation on the work you were doing at the HRD. Can you tell me about the topic or focus?

SA: Right. It was on the same thing. It was about dropsondes to improve forecasts. But by this time, we had a much more sophisticated model. We had the global models coming online. We had the GFDL [Geophysical Fluid Dynamics Laboratory] model, which was a regional model, which was higher resolution. I learned how to run those models and get the data into those models, so I could look at how those sondes impacted the forecasts. What was also really interesting is that, at that time, they started running ensemble forecasts. This came out of chaos theory, where very small changes in the initial conditions of the model can create large differences in the forecast down the road. As a result of that, they started running ensemble forecasts, where they would make reasonable changes to the initial conditions and run the model. I believe, at that time, they were doing it fifteen or twenty times. As a result, you got a wide range of possibilities of where the hurricane was going to go and how strong it was going to be. But you could also use that information based on the way these perturbations to the initial conditions were created. You could use that information to see what parts of the model space were most unstable and that, if you put the observations in – the theory was that, if you put the observations in those areas, that you could get the biggest bang for the buck because obviously we only had – at that time when we finally got the G-IV, we only had the one plane. You can only fly so much in a few hours over so much of an area, so where do you fly the plane to get the biggest impact? Are there places that, if you fly, you don't get much impact at all? In fact, by the time I published my dissertation work, I had found that, yes, there are regions where the sondes make a big positive difference, depending on how you sample these regions. There are other regions where, if you drop sonde, you get no impact at all. In fact, there are other regions that, if you drop sondes, you get a negative impact, and so you need to avoid those regions, and so that was – there's still a lot of scientists doing that work now and in other ways, and it got a lot more sophisticated. But we transitioned that to operations, and that's the system that NHC has been using ever since to tell the G-IV where to go.

MG: Do you mean with drones? Drones as a more sophisticated way of gathering that research?

SA: Well, another way of obtaining the data is with drones, but there are other techniques to look at the model data and figure out – more sophisticated, to figure out where you need to drop the sondes. Back then, it was just, okay, these areas are unstable. We don't know if it's actually going to affect the hurricane. But we chose these regions, the ones closest to the hurricane, assuming that those would be the ones that would impact the hurricane. Now, we actually have techniques that we can say, yes, dropping the sonde here is going to impact the hurricane, and we can actually look at is it going to impact the intensity of the hurricane, whereas, back then, we could only look at the track.

MG: Coming from an academic world, I know that having a PhD can mean different things for your career, so did it make a difference in your purview, your role, or position?

SA: HRD, at that point – it still is a very interesting time. I got my PhD, and except for getting a promotion, things didn't change a lot. Back then, if you didn't have your PhD, it didn't stop you from having your own projects and doing your own work. I don't know if you're familiar with Mike Black. He passed away a few years ago. He was a longtime employee of HRD. He was really good at looking at observations and figuring out what was going on in the storm. He was somebody who flew a lot. When we got the new GPS sondes, the old Omega dropwindsondes couldn't get data in – we couldn't get winds in cloud because the radio signal would be attenuated. But with the new GPS, we could. We weren't worried about only dropping in the clear air around the storm or in the eye. We could drop in the eyewall. He was the one who thought about that. They were flying Hurricane Guillermo in the East Pacific, and it was a category four hurricane, very strong. They had a bunch of sondes on the plane. He's like, "I wonder what would happen if we dropped in the eyewall." The data that we got were amazing, and we could see structures both with wind and temperature and humidity that we never saw before. It was his idea. He authored and co-authored some of the really important papers on the structure of the eyewall and using dropwindsondes to come up with this. His education – he had an undergraduate degree. We allowed people like that to go forward with their research, with their ideas, even if they didn't have the education. So having a PhD was not a prerequisite for going forward in your career in that way. It was nice to have that extra education and the few extra letters, but in HRD, at least, it didn't make a big difference. If I had left HRD, it probably would have made a big difference, but I am still here.

MG: Yes. I've found at NOAA that you don't always know someone's title. Whether they have a PhD or not doesn't seem to be overly emphasized.

SA: In some places, it is. Some places are very hierarchical. Some places aren't. It depends on where you are.

MG: Well, I'm curious how your career unfolded when you came back from Maryland. The other storm I wanted to ask you about was Georges.

SA: Georges, yeah. That was in 1998. I flew Georges. That was an interesting flight. I think that was the first time I was what we called the lead project scientist, which is the research scientist on board the plane who knows what we're going to do and has the aircraft crew working toward the goal of the particular experiment. When we fly into a system, each flight has a goal. We have an experiment, and every year since, I think, the '60s, we've had a field program plan with explanations of the individual experiments that we want to do, and those are all online and available. We still do that. It's the lead project scientist's job to guide the plane, make sure everybody's doing – all the research people on board are doing their job but also to give their expertise, say, "That looks interesting. Can we take the plane there?" – based on safety concerns, where the pilots are willing to go, etc., and make changes on the fly. If we want to study some convection, I'd have to look at the data and say, "Oh, the convection we want is over here, so we need to go over here to do what we want to do." Sometimes it's a little more complicated than others, and sometimes it was communication between the two planes, which back then was radio, and it was really difficult, so I think that was the first time that I actually did that job, and that's the top job, except for the total head of the field program plan. Georges was

1998. The head of the field program, in 1995 or 1996, became a rotating position. It used to be somebody had it sort of permanently. I rotated in in 2008 to become that, so I was the one who was in charge of compiling the whole hurricane field program plan, making sure that there were crews for each flight, tasking the aircraft, making sure there were crews, making sure we had everything available, communicating everything to all the people that were involved, and making sure everything happened and then, after the flight, making sure we got all the data and all the data was available to all the researchers and then finishing up at the end of the year and beginning the planning for next year. I did that in 2008.

MG: Remind me, who was the head of HRD during this time and just a little bit of the organizational structure?

SA: When I took over – when I started there, it was Stan Rosenthal who was the director of the lab. When we went to AOML, he kept the lab director position, but his actual title was deputy director. That was one of the reasons that HRD had trouble integrating with the rest of the lab, because it was sort of a demotion, and that mindset kept going. After he retired, Bob Burpee took over. He was the head of the field program at the time. Then he took over, and then Bob Burpee became director of the Hurricane Center. And Hugh Willoughby was the field program director. Hugh Willoughby took over as director until the early 2000s. Frank Marks was the field program director. And then, when Hugh left, Frank Marks became field program director, and he decided that the field program director should become a rotating position. So those have been the directors that I've worked under.

MG: Can you say a little bit about how your work changed in the 2000s? Something I kept reading about was IFEX [Intensity Forecasting Experiment], I-F-E-X.

SA: Yes. That was an overarching name that we put over the field program to sort of identify specific goals of the program. Yes, we created this IFEX envelope for the whole field program. That incorporated hurricane work from NESDIS [National Environmental Satellite, Data, and Information Service] and from the Hurricane Center. They all got involved in the field program as well so that more formalized things. And in the last year, IFEX became APHEX [Advancing the Prediction of Hurricanes Experiment], A-P-H-E-X, so the goals of the program changed based on what we've learned now and new needs to improve forecasts for other – before, it was the Intensity Forecasting Experiment. Now we're broadening that out to other hazards, like rainfall and things like that.

MG: That must require a lot of cross-NOAA interaction and cooperation.

SA: Yes, it always does, because we're the research arm, and the hurricane center is in the weather service, and they're the operational arm, so we have to coordinate the flights with them in case they want something from us. Sometimes they actually task the plane, and we're along for the ride. We gather the data and get – the data are obviously good for research, but we can't leave our pattern and do other stuff during these missions most of the time. In the last fifteen years or so, EMC, the Environmental Modeling Center, has gotten involved because they want the data to actually assimilate into the models instead of just looking at it on their screens. NESDIS had gotten involved because they've started looking at new instrumentation that they

may be able to put on satellites, so they test them out on the hurricane hunter aircraft. Obviously, one of the partners is AOC [Aircraft Operations Center], which is in OMAO [Office of Marine and Aviation Operations], so we're working with them as well. We don't have as much crossline office work with the Fisheries or the Ocean Service at this point. But we also work with a lot of universities – we have a lot of university partners – and with other countries. In the Atlantic, we've flown with Canadian scientists and scientists from all over the Caribbean and different countries. We work very closely. The program that we had with the G-IV, I helped transfer that to a program in Taiwan called DOTSTAR [Dropwindsonde Observations for Typhoon Surveillance near the Taiwan Region], so I worked very closely with them, and we're still working very closely with Taiwanese and Japanese and Chinese and a lot of different countries out in that area. It's been broadened now that – I haven't been directly involved, but we have a memorandum of understanding with India and other countries as well.

MG: Oh, neat. I'm always envious of where the annual meetings and conferences are because it seems like a great opportunity to travel to so many great places.

SA: Yeah. One of the things we work with is the WMO [World Meteorological Organization] because of the WMO Tropical Cyclone Programme. They have their meetings in great places, so I've gotten to go to Reunion Island because the French hurricane center is located there and have had meetings – Costa Rica and other places around the world, mostly in Europe and Asia, that I've gotten to go to.

MG: Is that something you've enjoyed, the travel part of things?

SA: Yes. I liked the travel, especially. During the field program, sometimes we have a down day, so get to explore different places that we go to. We used to fly out of Puerto Rico, so I got to do that. We fly out of St. Croix, Barbados, Bermuda. I've got to see a lot of those places, had down days there. This year, we started flying out of Aruba, so I haven't been able to get there yet, but I hear Aruba's nice. They're all really interesting places to get to visit.

MG: The other thing I wanted to ask you about was your experience of Hurricane Katrina and the 2005 hurricane season.

SA: Yes. I flew a few missions during that season. I was mostly on the ground. The main thing was working on the ground. I didn't get to fly. There was another experiment with, I believe, the NSF [National Science Foundation] called RAINEX [Hurricane Rainband and Intensity Experiment] that we were involved with. I didn't get to fly a lot during that season. Oddly enough, the main flights that I did were in a hurricane that nobody remembers called Hurricane Ophelia during the season. That was right after Katrina and right before Rita. That was actually – it turned out to be the storm that we've flown the most missions in. But one of my interests became extratropical transition, how tropical cyclones, when they reach the mid-latitudes, sometimes just peter out and sometimes develop into these very intense extratropical cyclones. They not only can have impact where they are but there's downstream and upstream impacts. A tropical cyclone over the North Atlantic undergoing transition affects the weather worldwide and, in fact, affects the ability of models to predict the weather worldwide. When these events happen, the predictability goes down. So we had a great case in Hurricane Ophelia, and that was

the time that we flew with the Canadians, and the Canadians participated in our flights and provided some of the sondes. We got to fly two missions in Hurricane Ophelia when it was off the coast of Canada, of Nova Scotia up there. That was really a good experience as well. But my experience in all the big storms in that year [was] just looking at the data after the fact.

MG: Anything else you wanted to say maybe about Katrina in particular?

SA: Not really. It was obviously very devastating. But at least up to that point, we work on the weather, not the aftermath. We did become more interested in the aftermath with Hurricane Andrew because it so deeply affected all of us. Now we are looking at a lot of the social science aspects. How do we get the message across? What's the best way to get the message across? We have a hurricane watch and a hurricane warning. Even my spouse doesn't know the difference between a hurricane watch and a hurricane warning. It just confuses people. So how do we improve the communication so that people do what they need to do and get the message? Those are really important things. I think a lot of that did start after more – in NOAA, started after Katrina.

MG: That makes me feel better about my own confusion over these things because your spouse works for AOML.

SA: Yes, not in the weather side, though.

MG: Right. Well, can you tell me a little bit about him? About Mike?

SA: He's Canadian. He started working in AOML about fifteen years ago. He works for the Cooperative Institute. He's not a NOAA employee. He works in the coral reef group there.

MG: Did you meet through work?

SA: No, actually. He got the job after – we've been together for twenty-six years, so he got the job after we'd been around. By education, he's a computer person, but he worked in Canada for the National Research Council on some astronomy projects that worked with NASA [National Aeronautics and Space Administration] and actually a little bit of weather stuff from satellites and things like that. He moved down here to be with me. In Canada, he worked for Nortel, which was a very large telecommunications company at the time. He was able to get a job working for Nortel down in Miami. They had their Latin American headquarters down here, so that worked out. Nortel started downsizing, and so he worked for various companies down here, mostly in the private sector. He was making a lot of money – there was the tech boom at the time – but just not necessarily happy doing stuff that didn't make a difference in people's lives. When he saw opportunities to work in the coral reef group as a programmer, he applied for the job, and they accepted him. It's a completely other part of our lab, so I didn't pressure or anything like that. But because he was around a lot, people knew him and knew what he was capable of and things like that.

MG: Dr. Aberson, I think we can finish today. I just have a few more questions. But I'm wondering if you'd like a five-minute break to get a drink of water or anything else.

SA: I got water. [laughter] I'm fine.

MG: The other hurricane I wanted to ask you about because you've written about it was Patricia. And even though this was just a couple of years ago, I don't remember that one at all.

SA: That was because it hit a very unpopulated area of Mexico. But it's still the strongest hurricane in the Western Hemisphere. I wasn't on any of those flights, either, but I did do a little bit of work with the data from those observations. It was very interesting.

MG: What did you write about it? What was significant?

SA: Well, not only was it the strongest storm, but it was the storm that intensified the fastest. Also, it weakened the fastest before landfall. None of the forecast models – you know, forecast models aren't good at these real extreme outliers, and so these were the extreme outliers, so there's a lot of work going into trying to figure out why it intensified so fast, why it weakened so fast before landfall, which, luckily, it did. It only made landfall as a category three, but it was also a help that it was a very sparsely populated part of Mexico and it was a very tiny storm, so there's a lot of really interesting questions that, if we can answer them for Hurricane Patricia, we can answer them for other hurricanes as well. Because we sampled it so well, and it's such an extreme case, we're looking at it.

MG: Is there anything else I'm forgetting to ask about the nature of your work, other things you do in a day?

SA: Not really. But just for the historical perspective, there's some really famous flights, only one of which I was on. I don't know if you're familiar with the Hugo flight. That was in 1989, and the P-3s went down to Barbados, and they went in at the same time. There had only been fifteen years of satellite data. That was the main way we got the intensities of the storm. They thought it was a category two hurricane. They were flying fairly low, at twenty-five hundred feet. They hit extreme turbulence, and engines went out. I think one caught on fire. The whole story about that is on wunderground.com [www.wunderground.com/hurricane/articles/hunting-hugo-part-1], so you can – because the flight director from that flight has left NOAA and founded the Weather Underground, so he has a lot of really great information there. Because of that, the plane was flying low, and it almost just went into the ocean with a lot of the scientists. And that was one of the early – in the P-3 era, one of the really early dangerous flights. They had to fly around in the eye of the storm. The whole inside of the plane was trashed. They had to throw as much stuff out of the plane as they could to lose weight and get the plane up and finally found a safe way out and landed on the ground. I was on the Hurricane Felix flight, which was a very similar storm and a very similar experience. When we were going into Hurricane Felix, I looked at the radar, and I said, that looks like Hurricane Hugo. Sure enough, it was. We were flying in at ten thousand feet. We no longer flew so low. We hit the biggest updrafts and downdrafts that we'd ever experienced in a hurricane flight. It was almost a hurricane-force updraft, and so I wrote a paper on that, on the Hurricane Felix experience. In that case, the inside of the plane was fine. We didn't have any damage to the inside of the plane, and everything was fine, but we had to abort the mission and fly back. Another experience that I

had was in Hurricane Isabel, where we were doing this experiment called CBLAST [Coupled Boundary Layers Air-Sea Transfer], which was looking at boundary-layer information to try to learn how the energy from the ocean gets into the atmosphere and the structure of the winds and the structure of the ocean, all near the surface. In order to get that, you need to fly pretty low. We were flying in clear air down to about a hundred and fifty or a hundred and seventy feet. It was really, really amazing down there, and it looked like the waves were going to hit the wings. There's a lot of video online from those days. We got a lot of really good data. We'd flown missions like this in Hurricane Fabian and Hurricane Isabel. When we were rising out of that, we got to nine hundred feet, and one of the engines caught on fire. They put it out almost immediately. Before I was even able to register that they said engine three was on fire, it was out. But then we had three engines, and we had to very – three out of the four – we had to very slowly go back to St. Croix. They had fire engines lining the runway and everything. We landed safely. Later, when they started the engines, it turned out that all of the engines were about to do that. It turned out that it was from salt getting into the engines, so now they have instruments on the plane that measure the salt and make sure that doesn't happen. In fact, the P-3s also fly in winter storms in the offseason. With our NESDIS partners, they fly. They were flying a few years later a mission off of Newfoundland. They were flying at five thousand feet, so not particularly low. They got enough salt into the engines that three engines went out. That was a very scary episode for all involved. Luckily, they were able to go – they went through a cloud, which had enough water to wipe the salt off, and they were able to start the engines and safely land. But that was probably the worst episode we've had.

MG: Was Dr. McFadden on that flight? I think he told me that story.

SA: Dr. McFadden was on, I think, the Hugo flight and the flight in the northeast, off of Canada. I don't remember if he was on the Felix flight or the Isabel flight. But he was certainly around. We can check. All the flight manifests are now online, so we can look at all of this information online.

MG: His interview is in the archive too. I got to talk to him before he retired and passed away.

SA: Yes. He was one of the people that I worked with from my start.

MG: I'm curious what the last couple of years of your work has looked like with the pandemic.

SA: It's been interesting. Most of my stuff is just sitting in a room in front of a computer, so I've learned that that room doesn't have to be my room in the office, although one of the things that does happen is we would have in-person map discussions. During the season, we have map discussions every day, so today is our last one of the season. Afterward, we would walk out of the room and discuss the weather and discuss what we're going to do. It's our way of figuring out whether we're going to fly anything if there's anything to fly. So those discussions don't happen like they used to. But otherwise, HRD has gotten spread around the country, so we were doing these – all of our map discussions have been online through GoToMeeting for like seven or eight years now, so a lot of that stuff helped us transition to the pandemic because we'd already done a lot of stuff online. But now there's no in-person. We have gotten to fly this year. I did get to fly a few missions, so that was good. There's a lot of protocols, sheltering in place

and testing, and stuff like that. But last year, we did go out with minimal crews, and we were able to make it so that we could do most of what we – a lot of what we do on the plane on the ground. Still, it helps a lot to have people on the plane to see what we're doing, but we can do a lot of stuff on the ground as well, so it's made things a lot better. When I started, we had no access to weather information. We had somebody at HRD faxing us just paper information on what's going on with the storm, and we'd all gather around the paper. Then the Weather Channel started, and we would start watching the tropical updates on the Weather Channel. Now, it's all online, so we don't have to worry about any of the stuff. Now we have an internet connection on the plane, so we can talk to the people on the plane and coordinate and do all sorts of stuff. Things have really changed a lot in that regard. It's both easier and harder to do a lot of stuff.

MG: Well, I don't know if there's a question in here, but I just think it's so remarkable that you took this early interest in hurricanes and turned it into a career that you're so clearly passionate about.

SA: Well, if you're interviewing a lot of meteorologists, you'll find out that a lot of meteorologists are like that. One thing I forgot to mention is I was in this community laboratory research program, and the year after I was in the program, HRD had another student from Dade County schools, and that was Chris Landsea. He was in the same program. He got his start the same way and had the same career progression, although he's moved over into operations now. He's just one year younger than me, and we sort of had the same thing, an interest in meteorology as a kid that went through the same programs and the same initial job, all the way through to today.

MG: It's why I like asking those background questions because it seems like people get bitten by the bug fairly early.

SA: Yes. And I've done a lot of outreach events with – the P-3 goes on the Hurricane Awareness Tours, and so when they come locally, we go out to meet people. In the afternoon, it's just the general public that can go. We talk to the general public, and so many of them say things like, "I was always just so fascinated by the weather, and I didn't know there was a job in it." Because, back then, many years ago, there weren't meteorologists on TV; there were just news people who read the weather. Now there's meteorologists on TV, and there's meteorologists everywhere. I also still teach tropical meteorology at Penn State online. A lot of the students are returning students, who are just – "I'm retired now, and I've always been so interested in the weather. I'm taking these courses because I'm interested in the weather." There's a lot of younger people too, but there's just so many people like that.

MG: Well, is there anything I've forgotten to ask you about or other stories you wanted to get onto the record?

SA: No, not really.

MG: It's not hard to do this again if we just want to have a quick call if something comes to you later on. That happens.

SA: Yes. Or if something comes to you. [laughter]

MG: Well, I really appreciate the time you spent with me today. This has been a lot of fun.

SA: Great. Thank you.

MG: I'll be in touch with all the next steps.

SA: Great.

MG: All right. Have a great weekend.

SA: Thanks. You too.

MG: Bye-bye.

-----END OF INTERVIEW-----

Reviewed by Molly Graham 1/16/2022

Reviewed by Sim Aberson 1/17/2022

Reviewed by Molly Graham 2/16/2022