American Philosophical Society
oral history transcript
Claire Parkinson
session 1
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Anna Doel:

Today is June 8th, 2023. I'm Anna Doel talking with Claire Parkinson at the American Philosophical Society. Claire, what is your current academic status?

Claire Parkinson:

That's a little strange because ‘academic’ to me sounds like a university or a college, whereas I'm at NASA Goddard Space Flight Center. My current status is I'm emeritus there. I retired just on December 31st of 2022; so, half a year ago.

Anna Doel:

How do you define the discipline and the subfield that you work in? What kind of scientist are you?

Claire Parkinson:

I’m a climate scientist. I use satellite data to look at the Earth in particular. My specialty is sea ice in the Arctic and the Antarctic. So, I don't know whether the ‘discipline’ would be cryosphere, which is the study of ice, or whether the discipline would be remote sensing, because both are involved.

Anna Doel:

Which is interesting in itself. When were you born?

Claire Parkinson:

I was born in March of 1948.

Anna Doel:

Where did you grow up?

Claire Parkinson:

I grew up on Long Island, which is in the state of New York, until I was in seventh grade, and at that point my family moved to central Vermont, specifically Montpelier, Vermont. So that's where I went to junior high school and high school. To me, those were very important years; so I often think of myself as being from Vermont, but my first 12 years were on Long Island.

Anna Doel:

Could you tell me a little bit about your parents?

Claire Parkinson:

Sure. My parents, they're both deceased now, but they were certainly wonderful parents. My mother devoted herself to her family, and she did have jobs as a secretary part-time at points, but certainly her family came first. She had been born in 1918, so during the First World War. Both my parents experienced the Second World War sort of as prime in their lives, and that ended up being influential for me too, because my father was extremely strong in terms of recognizing what had happened in Germany in the 1930s and 1940s. His feelings were extremely strong that you've got to take the moral right course and not just follow along with the crowd; and that certainly had an impact on me. My father was very intellectual, although he didn't go to college. He went to college one day and dropped out the first day, but he was very intellectual. He read a lot, and he's the person whom I most liked talking with just about all sorts of subjects. We would talk about history, economics, politics. He wasn't a scientist, so we didn't spend much time talking about science, but sometimes we did.

My mother did go to college, but it was a community college, a two-year college. And before she got married, she did have a job in a bank. So those are some things about my parents. They were both very influential to me, and I definitely feel that I was very lucky to live in a stable household because I know that many other people don't have a stable household.

Anna Doel:

What did your father do? What was his profession?

Claire Parkinson:

Well, he was independent. He was definitely an independent person. He was a business consultant; so that's what he did, but very definitely independent. He would not have wanted to be in a job with a supervisor, definitely not.

Anna Doel:

Do you have siblings?

Claire Parkinson:

Yes. I have a sister Jean who's a year older, and a brother William, who's four years younger than I am.

Anna Doel:

What were some of your interests as a child?

Claire Parkinson:

As a child, I loved math. That would be my strongest interest. I loved the precision of math. I loved the simplicity. I loved the beauty. I loved the power of math. I mean, it was just so appealing to me, like with algebra when you've got complicated-sounding word problems and the simple change to putting in appropriate symbolism allows you to solve the problem so easily. And just the importance of appropriate symbolism. Math, I loved it. In eighth grade, my teacher allowed me to go at my own pace, and so I ended up finishing all high school math in eighth grade, and I could have done way more, but each time I would finish a book, then I'd have this

long wait before the test came for me to take, and then another long wait until the next book came.

I still regard spring vacation of my eighth grade as the most exciting week of my life. What happened then was I had finished Algebra one and plain geometry and solid geometry, and then there was this long wait before I got the Algebra two book, and the teacher gave me the Algebra two book on Friday, the day before spring break started. And I was so excited to get this book. And the entire spring break, morning, afternoon, and evening, I was going through the book and I finished the entire year's course of Algebra two in that nine days, a week and a weekend. And it was just so exciting to me. My mother was like, "You're on vacation. Don't you want to go out and play with your friends?" I said, "No, no, no." It was just so exciting to me.

Anyway, math was overwhelmingly my central interest; except I always did feel religion was more important. My parents were both Christians, my father Catholic, my mother Protestant, and it was my mother who took us to Sunday school and church. I grew up Protestant, and I always, as a child, found the story of Jesus to be just so appealing. I mean, it is just wonderfully appealing to me, the message that He had. I always regarded religion as more important; but in terms of what I spent my time on, I was a very serious student. I worked really hard in all my courses, and I would tend to do all my other courses first and then get to the math after, because I would always have that to be looking forward to.

And sports, I liked sports. It was very disappointing to me that my sister and I could not participate in things we would have liked to, because of being girls. At that time, girls could not play... You could not be in little league, girls could not. In high school, we weren't allowed to play on a single team. There were no girl teams for basketball. That's what Jean and I both would have liked to play, basketball; but it just wasn't allowed at that time. The boys had basketball teams, football, baseball, skiing; girls couldn't be on any of them. It was definitely disappointing that we couldn't. The one sport we could be on, which was not a high school sport, it was just in the summertime, it was swimming. And we both did swimming, and both did really well in it, for central Vermont, where the swimming season was about seven weeks. When we were competing against others from central Vermont, we did really well; but if we ever had to compete against people who swam year-round, I mean, we were just wiped out.

Anna Doel:

How old were you when you discovered math? Do you remember?

Claire Parkinson:

I was very good at things like putting puzzles together pre-kindergarten. Some adults had little three-dimensional puzzles – it might be an elephant or something else, but it'd be a three-dimensional wooden puzzle – and they would pull it apart, and they really couldn't figure out how to put it together again. And I would get there and very quickly I'd figure out how to put it together again. And so that was always something that it was clear that the adults were impressed with. And that was important to me because there were other things where I was clearly below average.

The two main things where I was clearly weaker than most children would be, first, pronunciation. I couldn't pronounce words right, or a lot of words I wasn't pronouncing right. And I ended up having seven years of speech therapy, once a week, seven years, and I hated it. Like in school, I would have to get up and leave the class to go to this speech therapy. Nobody

else in my class had to go to speech therapy. I hated that, and it certainly made me feel inferior to others. It was very nice to have something, like putting the puzzles together, that made me feel like, well, I'm not inferior at everything.

The other prominent weakness that I had that showed up very early in my life, within the first couple of weeks after birth, is that I'd pass out and have seizures, sometimes grand mal seizures. And that, fortunately doesn't happen a lot, but when it does happen, it's traumatic. I mean, it's really bad when it does happen, but fortunately it doesn't happen a lot.

Anna Doel:

Were you diagnosed as a baby?

Claire Parkinson:

I don't know; I'm really not sure. I did see a letter back a few years ago, after my mother's death, when we were going through her stuff. I saw a letter that she had written to the doctor who delivered me, asking if there had been any problem with the delivery, because there was clearly a problem with the seizure-type activity. And his reply was that there hadn't been a problem. So I'm not sure how soon anything was diagnosed.

Anna Doel:

Was there a way to manage your condition when you were a child?

Claire Parkinson:

They put me on Dilantin, which is the common drug for epilepsy. But I ended up passing out more rather than less, so they took me off. And I am very glad that they took me off because I'm very hesitant about drugs. I just feel that I would prefer not to be on drugs if I can avoid being on drugs.

Anna Doel:

Did you have friends in school?

Claire Parkinson:

Yes, I've always had friends. I've never had what people often think of as girls having one really close friend where you talk about absolutely everything with each other. I've never had that kind of single person friendship, but I feel I've always been a friendly person. But I've never been a social person. I make the distinction in terms of, like, with my colleagues or in school with other classmates, I'm friendly with everybody, but I really don't tend to go to parties or go out with people. So I'm friendly, but I'm not social.

Anna Doel:

Did you like to read as a child?

Claire Parkinson:

I did. And in fact, in contrast to many people, who laugh at some of the standard books for children, I loved learning how to read; and there my mother was wonderful, because she would

sit and help teach me and my sister and brother how to read and was incredibly patient. I loved getting to read and learning how to read. So, yes, I read. One of the types of things that I liked reading would be biographies. And I definitely did like reading. But I've never been a fast reader, and I think that's partly because of math being such a central focus of mine. With math, you have to read it really carefully; you can't skip a sentence, in general. And so I think that's why, or part of the reason why, I've never been a fast reader. Some people can read a 200-page book in an hour; I mean, there's just no way that I have that ability.

Anna Doel:

What were your interactions with the grownup world as a child? Did you meet your parents' friends? Did you go places as a family? Visit people?

Claire Parkinson:

My mother would take us on vacations once in a while. Usually, my father did not come because he was somebody who really was concentrated on his work. But my mother would take us on vacations sometimes. And we did visit her family, which lived in Illinois, and sometimes that was really nice. Her aunt had a summer home right close to a lake, and it was very enjoyable, sometimes that visit would be very enjoyable.

When we were still living on Long Island, every Saturday we would tend to go out to my father's parents' house because they were living fairly close by. And so we would go out there to visit them. And they had a large property; they had chickens and grapes and various other things that they grew, and it was always nice to go see them. But they both, I think they both died in the 1950s, so that would be when I was still young.

Anna Doel:

Was there an expectation in your family that you would go to college?

Claire Parkinson:

I think, yes. I think both my parents, although they had not, either one of them, had a four-year college education, I think they did expect all three of us to go to college. So, yes, I think there was that expectation. There was never pressure, but I think there was that expectation.

Anna Doel:

What kind of schools did you go to?

Claire Parkinson:

I went to public schools up until college.

Anna Doel:

Big, small?

Claire Parkinson:

My high school graduating class was roughly 185. I don't know if that would be considered medium, maybe.

Anna Doel:

Yeah, probably.

Claire Parkinson:

Okay. Yeah, I think throughout it would be the medium level schools that I was in.

Anna Doel:

Was there anything memorable about your school time that we haven't talked about?

Claire Parkinson:

Well, yes, in terms of high school in particular. I was certainly very much moved by the Civil Rights Movement and very, very much in favor of it. When we were living on Long Island, once in a while we would go into New York City and I would see signs in front of a water fountain saying, "For whites only." And this was just horrifying to me. Even as a little kid, I mean, I would not drink out of that water fountain if it said, “for whites only”. I would say, "I'm going to wait till I get home. I'm not drinking out of that water fountain if other people aren't allowed to." So the Civil Rights Movement was really meaningful to me, hugely meaningful to me. And so I did participate in small actions in support of civil rights.

I guess my first protest actually was back in, I think it was fourth grade, and it wasn't really civil rights. At that time, and this was in the 1950s, there would be air raid drills, supposedly to protect us from a nuclear attack. And what we as little kids were supposed to do was hide under our desks.

Anna Doel:

Did you do the duck and cover routines?

Claire Parkinson:

We were just told to hide under our desks. And that seemed so absurd to me. I mean, hiding under your desk to save you from a nuclear attack? So I refused to hide under my desk, and that was sort of my first protest. But later I became involved in more things regarding civil rights. But I was never a vocal leader. I was never somebody up giving speeches, and I think that's partly because of my speech problem as a younger child, which has always made me a little more reluctant to speak up than if I hadn't had that problem, I think.

There was a teacher, Ted Seaver, from our high school who went down to Mississippi in a project called the “Vermont in Mississippi” project. He went down to Mississippi during his summer vacation to help out in support of civil rights. I think he was teaching black kids – and central Vermont at that time was highly conservative, very different from today. It was highly, highly conservative – and he got criticized for that. So I passed out “Support Ted Seaver” stickers at the high school, and this got me in a little bit of trouble. And then, well, there was a Memorial Day assembly -- and I certainly respect people who go into the military, but I was not a supporter of the Vietnam War -- and so we had this Memorial Day speech, and I was sitting through most of it, but the speaker ended up making what I just thought was too extreme a comment. He said, "If people don't like what the US government is doing, they should just move to Canada"; and at that point, I thought, this has just gone too far. I mean, he had said several things up until that point,

but I just felt: In the United States, if we don't agree with the government, we're supposed to try to improve the government. There are supposed to be mechanisms for trying to improve and not just tell us to go off to Canada. So I just quietly stood up and walked out. I didn't say anything. I didn't swing my arms around or anything. I just quietly stood up and walked out. Well, this ended up in the newspapers the next day because I had walked out, and as I walked out -- and I had been sitting right up toward the front -- as I walked out, with my head down and just quietly walking out, this teacher Ted Seaver, he was sitting in the back right next to the aisle, he stood up when I got to his point, he stood up and he walked out with me. And then he simply said to me, "If you get in trouble for this, just let me know." And he had never been my teacher. So, I mean, I was surprised and pleased that he would say that. But anyway, it did end up in the papers the next day that the two of us had walked out on this assembly.

And then graduation: As I said, I was a very studious kid, and so I did very well in school. And so at graduation, I was one of the two valedictorians to give speeches, and the school board didn't want me doing that. I mean, they had wanted to kick me out of school prior to that, or some members, but the problem was: how can you kick a kid out of school when they're a straight A student and have never broken a single rule? I mean, never a single rule. I only know about the school board because one of my friend's father was on the school board, and so I sort of heard the information from her. But, anyway, they did allow me to give this speech, but the headline in the paper the next day included “Planned walkout fails to materialize”. Apparently, people were planning on walking out when I got up to speak. So, as I said, it was a very conservative community at that time.

Anna Doel:

What was it that Ted Seaver taught?

Claire Parkinson:

He taught English.

Anna Doel:

How integrated were your schools?

Claire Parkinson:

Oh, we had almost an entirely white population, and that was true of Montpelier in general. There were two blacks in the high school, or maybe three, and they were outstanding people, so, like, one of them was president of his class. And so we didn't have a racial problem, because there were so few blacks and the blacks that were around were just outstanding people. So, fortunately, we didn't have a racial problem in the school.

Anna Doel:

I'm going to pause a recording for a little bit and then we'll move on to college life.

Claire Parkinson:

Okay.

Anna Doel:

How did you know which college you wanted to go to?

Claire Parkinson:

My mother took me down to the Boston area to look at three different colleges. One was MIT, one was Radcliffe, which was the girls' part of Harvard, and the other was Wellesley. And we went to Harvard first, I think, and the interviewer there was just so non-personable. I mean, she was so harsh, and that just turned me and my mother off. Then we went to MIT, and at MIT they were really nice. Everything sounded really good, except one huge problem, which was they were just building their dormitory for women and they said that for the first two years it's going to be really tight and you're going to have to be living in a room with like five girls together. And that was really bad.

And then we went to Wellesley right after that interview at MIT. And so one of the first things I asked at Wellesley was: "How many people will I have to share a room with?" And they said, "Well, there are two choices, one is that you have a room of your own and the other is that you're sharing with one other person. And you get to put your preference down, and they cost the same either way. And most people get what their preference is because a lot of people do want to have a roommate and a lot of people don't, and so in most years it works out." And that was one of the prime reasons why I ended going to Wellesley, because it was like, "Oh, I get my own room."

Anna Doel:

Why was it important to you to have your own room?

Claire Parkinson:

Well, five people in a room was just too much. For me, I was certainly willing to accept a roommate, but I felt like, "Hey, if I've got an option, I want to be by myself, because then it's just so much easier for getting homework done, which is certainly a prime thing for me." And it's just the ease of being able to go to bed when you want, get up when you want, not have to worry about turning the light on when somebody's still sleeping, not having to worry about what time to do various things. So for me, that was a huge plus that at Wellesley I was able to have my own room, which I ended up having all four years, I was able to have a single.

Anna Doel:

Back at home did you share a room with your sister ever?

Claire Parkinson:

No. We each always got our own rooms, so that was nice also.

Anna Doel:

Yes. I bet it was.

Claire Parkinson:

Yes, yes.

Anna Doel:

Did you know what you wanted to major in?

Claire Parkinson:

There was absolutely, there was absolutely no question at all but that I was going to major in math. I mean, definitely, math always was what I was going to major in. Yep.

Anna Doel:

What was your college life like?

Claire Parkinson:

Well, it continued like high school in terms of I was very studious, spent most of my time studying, going to my classes, doing my homework, although at Wellesley I was able to participate in sports in a way that wasn't possible in high school, because obviously at Wellesley they allowed girls to do things, Wellesley being all female at that time. I was on both the basketball team and the swimming team at Wellesley. But this was prior to Wellesley having national collegiate level teams. So I was on the college basketball team and the college swimming team, but it wasn't a big formal deal. In fact, I ended up being captain of the basketball team in my junior year. But, like at the beginning of the year, we would make contact with some other women's colleges in the area and schedule when we would have a basketball game against them. So it was that kind of thing. They didn't even keep track of how many points individual people made. I mean, it was all just the score for the team, which was definitely in the Wellesley spirit of things in terms of its being more about the team than about the individual. But I did get to be on my college basketball team. I would have loved being on my high school basketball team too, but I was glad that I was able to in college.

When I got to Wellesley, I had been forewarned by the principal of my high school, who said: "Wellesley's probably not a good choice for you, because they're not going to like all your protests," things like that. I got to Wellesley thinking, "Well, likely I'm going to be kicked out within the first few weeks because I'll walk out of an assembly or something like that." And I get to Wellesley, and it didn't take long before I realized that my little minor protests were so minor versus what other people were doing. And also, my ability to articulate anything was so much less than other Wellesley students. They were so far above me in terms of being able to give speeches and things like that. So it was a very different situation than in high school, when I was kind of the one person in the school who was really making these little protests on various things, whereas at Wellesley, there were so many people, so much more skilled than I was. But anyway, I was a minor player in some of the events.

And then right before, a couple of weeks before graduation at Wellesley, there was a protest in Boston that I went to and participated in. Everything was coordinated with the police, so we were informed, the police were informed, and the protest had a little over a hundred people who were going to be in the street blocking an area, and the police were going to come, which they did, and tell us to leave. And the ones who left, no problem, that was good; but anybody who didn't leave was going to be arrested. And so I got arrested and then we were fined $20, but we could spend 20 days in jail instead of paying the $20.

My feeling was, "Well, I'm not going to give the government that I'm opposing $20, so I'm going to take the jail sentence." So I went to jail for 20 days, and it ended up that I got out on a Wednesday and the Saturday before was when the Wellesley graduation was. So I missed my graduation, which ended up hitting newspapers around the world that a Wellesley College student had missed her graduation because of being in jail. And people actually went through the history records to find out that this was the first time this had ever happened and that even at the height of the women's suffrage movement earlier in the century, no Wellesley student had missed graduation because of being in jail. So that got a surprising amount of publicity at that point. But I had gotten to the point where I felt like, "I've got to do something," and yet I didn't feel capable enough to give speeches.

So when this silent protest opportunity came along, I just felt this is something that I can do, especially since it's silent and I'm not articulate enough to speak, so I'll just do that. And indeed, in one of the Boston papers the day after graduation, one of them had some comment about … Well, it was an article about the Wellesley graduation, and it had some comment about the most articulate person or something like that – I wish I could remember exactly what the comment was, but somehow it was saying that I, by being in jail that day, was making the strongest statement and that other Wellesley graduates were also protesting the war and supporting civil rights in various ways during the graduation, but that by silently being in jail, I ended up the most... I'm forgetting whether they actually used the word “articulate”, but whatever word they used, I was thinking, "Oh, if only they knew how non-articulate I am." Anyway, that was that.

Anna Doel:

What was the protest about?

Claire Parkinson:

This was actually a protest about the draft, and we were blocking entrance to the Boston Army Base. And that's why when the police said “get out of the way”, most of the people did. It was about 20 of us who stayed, and most of those 20 just paid the $20 fine, but I think it was three of us who went to jail. And the others, well, one got out within 24 hours, just couldn't take it. And the other one got out three days later. So I was the only one who stayed more than three days. And that was one thing that came out in the articles; because I had done 16 days of the 20-day jail sentence, they said “for $4 she could have attended her graduation”. My personality is such that, "No; I’ve agreed to spend 20 days, I’m going to spend the 20 days. That’s it.”

Anna Doel:

How did those 20 days feel?

Claire Parkinson:

Well, they were striking to me in terms of I was suddenly in a community that I had never been close to or part of. Throughout my life I’ve always been naïve about one thing or another, and one thing that my naivety really showed up was: Among the people in the female part of the jail, there were prostitutes, and I was absolutely stunned that there still existed prostitutes in the United States. So that was the key thing that I was going to tell my sister when I got out. I was so surprised. I thought prostitutes might have been in the Wild West back a hundred years ago, but

surely there aren’t prostitutes in the United States anymore. I mean, that was my thought at the time.

And so when I got out of jail and I told my sister, she looked at me and she said, "How could you not know? How could you not know that?" Well, so I quickly learned that this was common knowledge that there still were prostitutes. But anyway, so that was different.

Fortunately, I had a cell of my own, so that was fortunate. I had been forewarned that in jail, a lot of the other inmates are not going to like protestors, that protestors tend to be disliked by others. And I was forewarned, "Don't get into a situation where you're alone." And every day there would be an option of going out into the courtyard, and I never went out. I stayed in. I was very careful. And ...

Well, a few days before getting out, there was a riot; and it was apparently, maybe the only time, but certainly apparently the biggest riot in the women's portion of this jail, the Charles Street Jail. And so I'm there, fortunately safely in my cell, which was locked; but this riot was going on. And then one of the rioters was yelling, "Where's that protestor?", referring of course to me. And I'm there just scared. I mean, I was just really scared at that point. And she's yelling, "Where's that protester? Where's that protestor? Here's something to protest about!" So I was just quiet, scared, sitting on my bunk in the jail cell. And then the male guards came in and one by one went down the cells, apparently stripping the females that were doing the rioting, to get rid of any potentially damaging things. They get to my cell and I'm just sitting there, just petrified.

And fortunately, one of the female guards who had been there throughout the entire time, fortunately she was with them, the male guards, and she said, "She hasn't done anything." So they passed by my cell. But I was just glad because I was scared at that point; I was definitely scared at that point. In general I was not scared at all in jail. So in general there was no problem. But after that rioting that day, then when everybody was back locked up again, the conversation was on things like, "Nobody's going to get out of here now. We're all going to be in here. They're not going to allow anybody out." And I'm thinking at that point, I'm supposed to get out in four days, and I'm thinking, "What if I don't?" All along I had recognized it's 20 days, I can take it for 20 days. But then suddenly I'm thinking, "What if I don't get out at the end of the 20 days? And then what if I do something that gets me into more trouble? What if I never get out?"

So then I did start worrying more; but up until then, I was not worried. I just figured, hey, 20 days, that's such a minor inconvenience versus all the men of my generation at that time were having to deal with this issue of the draft and whether to participate in a war that they were opposed to. Some were opposed, some weren't opposed. Some went willingly to Vietnam, but others were opposed. I just felt like it was so unfair that just because I was female, I didn't have to suffer having to make this terrible choice that so many men of my age were having to make at that time. So my feeling on the jail was, I mean 20 days is like nothing compared to what they're having to deal with. So that's why I felt that 20 days in jail was no big deal.

Anna Doel:

Were your parents notified about your sentence?

Claire Parkinson:

Yes, they were notified. I'm forgetting the details there. I'm forgetting whether I was actually allowed one phone call, which would have been to them. Or whether I wrote a note to somebody

who was getting out and asked them to relay this information. But my parents did find out. My suspicion would be that my father was proud of me. My suspicion would be that my mother was concerned, very concerned. But then that day after the Wellesley graduation, so that Sunday, my mother was reading the newspaper she got, I think it was the Boston Globe. So she's at home in central Vermont, reading the newspaper, and right on the front page, there's this article about me being in jail.

And, incredibly, the article was positive -- any other time I had protested the article was never positive -- but this time the article was positive, about this young woman who, on the basis of principle, was sitting in a jail cell when she could be at Wellesley College receiving her Wellesley diploma. And so the article was very positive. So by the time I got home on Wednesday after getting out, my mother was very proud of me too. So both my mother and my father ended up proud of me.

And then decades later, after my father had died but my mother was still alive, decades later, there was an event at the Vermont Historical Society about the Ted Seaver case. And they asked me to be on a panel because I was the one student at Montpelier High School who was vocally supporting Ted Seaver. So they asked me to be on this panel, and I was very glad to be on it. It was a Martin Luther King Day event at the Vermont Historical Society, and my mother went with me to that. And it was really nice because she told me how proud she was of the protests that I had done, even though at the time of the protests, she was not so keen. My father was keen, my mother was not so keen; so it was really nice for me when she went to that event and told me how proud she was that I had done those types of things.

Anna Doel:

When you graduated from college, did you have a plan for what would happen next?

Claire Parkinson:

No. I did not have a good plan anyway. I wanted to go into the Peace Corps. I applied to the Peace Corps and got rejected. And I totally understand why in terms of... well, first of all, I had a jail record, so that's certainly not going to help in any application. But I really think the more important thing was that I was so shy at the time. Any question that they would ask during the interview, I would just answer the specific question, I wouldn't elaborate. And the Peace Corps needs people who are to take more initiative. I was disappointed, but I understood why they rejected me. So anyway, that's what I was planning, but that didn't work out. And then I tried to get a job; I applied several places and kept getting rejected. And again, the jail sentence does not help in applying for a job. So I kept getting rejected.

Finally, in November, I got a part-time job. It was never as much as even halftime, but I got a part-time job with a woman who had a grant through which she was helping delinquent teenage boys in Burlington, Vermont. And so I got this job with her, helping delinquent teenage boys. And, as I said, it was never full-time. It was never even as much as halftime, but at least it was something. I spent a large part of the rest of my time in the University of Vermont library.

And I decided I wanted to go to Antarctica. This was partly because of the Antarctic Treaty, which preserves the entire continent of Antarctica for peaceful purposes only. This was incredibly appealing to me; and it was an international agreement. So this was incredibly appealing. And I liked cold weather. Cold weather always invigorated me. Now being older, cold weather sort of cracks up my hands and my feet, and it's not as pleasant as it was. But back then,

cold weather I just really liked because it was invigorating. So I figured Antarctica sounds like the right place, I want to go to Antarctica. So in the library, I read up on how to get to Antarctica, and the place that kept coming up was the Institute of Polar Studies at Ohio State University. And seeing that they were sending people to Antarctica every year, I thought, "Okay, I'm going to write to them." So I wrote to them asking if I could participate, if I could be some kind of an assistant on their expeditions to Antarctica. And I gave them my background, and they wrote back and they said, "Sure, just become a graduate student here at Ohio State," which had not been my plan.

My plan had not been to become a graduate student. I just wanted to go to Antarctica. But the grant for helping out delinquent teenage boys was running out, and I had no other options. So I decided, "Okay, become a graduate student," which is what my math advisor at Wellesley had always wanted; I mean, she did not understand why I didn't go to graduate school immediately after college. But I didn't because, much as I loved math, the Civil Rights Movement and the Vietnam War made me aware that I just could not go into a field where I would likely become so divorced from the real world. And so, intellectually I still love math, but I felt like I just couldn't go into it when these important things are happening in the world, and I just can't spend my life dealing with the wonderful symbols and theory of math. Anyway, I became a graduate student at Ohio State. One of the professors there, Terry Hughes, realized that my purpose of becoming a graduate student was to get to Antarctica. He wonderfully allowed me to be a member of his expedition that he was leading to Antarctica, which started in December of '73. I unfortunately passed out during the physical for this. The National Science Foundation sent me a letter saying that I was rejected on the basis of the physical. I accepted that. I was extremely disappointed, but I accepted that I blew it. That's how I felt. I just felt like I totally blew it.

The next day – at that time, we did not have internet, so you got your letters by mail – so I got the letter one day, and then the next day when I went to Ohio State, I explained to Terry Hughes, the leader of the expedition, that I had been rejected. He said, "Why?" He said, "Can I read the letter?" I said, "Yeah, sure." He read the letter and he said, "Claire, you are not being rejected because you passed out during the physical. You're being rejected because you're a female." I said, "Well, this is interesting." He said, "Do you still want to go?" I said, "Yeah, of course I still want to go." He fought for me. He fought to get me on his expedition, and I've been grateful to him ever since, because, as I said, I was just going to accept this rejection. I've accepted so many other rejections in life that it's just one more. But Terry fought for me.

It turned out that, at least according to Terry... This was according to Terry, and I don't know if this is for sure the case, but according to Terry, it was the first time that NSF allowed a female on an expedition that also had men. They had funded in 1969 an expedition of four females, but they had specifically said to the leader of that expedition, who was Lois Jones, they had said to her, "We'll let you go, but it's got to be an all-female team. You cannot have men on your team." NSF was clearly concerned about mixing genders on an Antarctic expedition. Anyway, I was very grateful to Terry for fighting for me and succeeding.

Anna Doel:

If you don't mind me asking, your condition, was it a real concern for you?

Claire Parkinson:

No. Well, I hated passing out because normally when I passed out, when I came to I would be in just excruciating pain. People sometimes say, "Oh, epilepsy, it might look strange with the flailing around of the arms and the legs, but it's not hurting the person." The flailing around of the arms and legs never hurt. That was never a problem. But whatever happens inside my brain, it's just excruciatingly painful, more pain than I have ever experienced with any other injury that's happened to me.

Most of the time when I pass out, I am in excruciating pain. I have had a few cases when I've passed out and it's been just almost nothing, it's just pass out and come to. But most of the time when I pass out, when I come to it is excruciatingly painful, so much so that when I was a little kid, I remember one time, roughly third grade, when I came to my immediate thought was begging God to just let me die rather than having to go through this again. At that time, I had no concept of suicide. I didn't know I could have ended my life myself. Anyway, it's excruciatingly painful. But, as I said, it's very rare that it happens to me, fortunately. But when it does happen, it's a big deal. But anyway, I wasn't concerned.

Anna Doel:

You felt like you could do it even with your condition?

Claire Parkinson:

Yes.

Anna Doel:

You could be a polar researcher.

Claire Parkinson:

Yes. I definitely felt so. Now, another answer sort of related would be the issue of driving. I do have a license, but I've never had a car. Back when I drove a few times, one time -- and basically my feeling was I know that I'm perfectly okay on a given day and I don't have to worry about passing out -- but one time I was driving along a street and there was construction going on, and there were evenly spaced blocks, and the sunlight was coming through them in a way such that it was flickering, and...

Anna Doel:

Creating a stroboscopic effect?

Claire Parkinson:

Yes. I'm going through this and I'm realizing I'm very likely about to have a seizure. I was very scared because it was a busy road. I just felt like, "I've got to get off the street. I've got to get off." And as soon as I could, I pulled out into a parking lot. And since that day, I don't think I've ever driven again except in my mother's car in Vermont - or almost never driven again - on streets that are not crowded. And that's in part because of my feeling: What if I ended up having a seizure and killing somebody? My concern was more what happens if I kill somebody because I wasn't willing not to drive, rather than being concerned that I might die myself. It was more my concern that I did not want to end up killing other people.

Anna Doel:

Could you say a little bit about your first expedition to Antarctica?

Claire Parkinson:

Sure. We went down to... We flew down to Ushuaia, which is at the southern tip of South America, in Argentina, and then from there we took a ship, which is actually an NSF, National Science Foundation vessel called the *Hero*. It's a small ship. We get to the place where all the ships are docked, and there are these huge ships, and then there's this little ship, the *Hero*. Terry and the others say to me, "Claire, that's the ship we're on," and they point to this little ship, and I'm thinking, "How naive do they think I am? Surely I don't believe that." But that was the ship. That time they weren't joking.

So we get on this ship to Antarctica, and unfortunately I have a problem with motion sickness, which is unfortunate. But anyway, we're on this ship to Antarctica. We left at midnight, and it's very, very cool. We leave at midnight, and the townspeople are out there waving goodbye to us. We had been there for like a week before. They're waving goodbye, and I'm thinking, "This is so cool, so cool, so cool."

After a little way, the ship gets in line with another ship and one guy jumps over and I'm thinking, "What is going on here?" because they hadn't forewarned us that this was all going to take place. But it ended up that for some short distance, we were in Chilean waters rather than Argentine waters, and while in Chilean waters, it had to be a Chilean pilot or captain or something that had to be on the ship.

Anyway, that was kind of bizarre. So we're going down, and after a little while, since it was midnight, we all went into our rooms to sleep. I wake up in the morning and I'm thinking, "This is so fantastic. Antarctic explorer; this is so exciting, so exciting." I'm lying there in bed thinking about how super exciting this all is. Everything's fine until I decide, "Okay, I'm going to get up, go brush my teeth."

And as soon as I moved my head to get up, I was violently ill from seasickness. People sometimes say motion sickness is just psychological. Well, this was surely proof that it wasn't, because I was lying there so excited about being an Antarctic explorer and just this initial movement of my head and I'm just violently sick.

Anyway, that lasted for the first day. It turned out every member of our team was sick. This was not unique to me, that's for sure. Everybody was sick. Then the next couple of days were much better. We finally got to Antarctica a few days later. It was so neat as soon as we started seeing the icebergs floating around in the water. It's very scenic along the Antarctic Peninsula, which is where we were; it's very scenic, mountains with snow cover and icebergs floating in the water.

We go down; we get there. Our site was on Deception Island, which is an island right off the coast of the continent. The study we were doing - again, it was Terry Hughes who was leading the expedition - the study we were doing was to measure ice flow into a volcanic crater. The volcano had erupted a few years earlier, and the ice was flowing back into it. When it erupted, of course the ice went, in the eruption, into the air. So ice was flowing back into this crater, and we were measuring that. It was kind of like a pilot program for the much bigger, much more important, extremely important issue of the stability of the West Antarctic Ice Sheet.

Terry was hoping to come up with information that would help in the measurement of ice flows that could be applied then to the stability of the West Antarctic Ice Sheet, which is hugely

important because if the West Antarctic Ice Sheet isn't stable, that means the ice there could flow into the ocean, causing sea level rise around the world. So the stability of the West Antarctic Ice Sheet was a main topic for Terry, and certainly really important.

Anyway, we were measuring ice flow, and we were staying at an Argentine station there. There had been three stations on Deception Island, one British, one Chilean, one Argentine. The Chilean and British ones, I think they were both destroyed with this eruption that had occurred a few years earlier. It was just the Argentine one that was remaining.

Now, in Antarctica, partly because of the Antarctic Treaty, it's so wonderful, the international aspect of it. The Argentine station certainly was willing to have an American team there. So that was great. We did live in a building, a small building, no electricity, no running water. If we needed water, we would have to go out, and there was a well, so we'd go out and there's a bucket and you get the water from the well. So, things were primitive in some ways, but much less so than people who are in tents on some other locations in the Antarctic.

Each day we would take a little Zodiac; our team would get into a little Zodiac and go across the water and get to the volcano site. This was an adventure. Each day also, part of the rule was we had to make contact with a ship in the area, and so we had to make radio contact. Sometimes that would take over an hour just to make that contact, because it was not simple to do. But then at the volcano area, we were surveying sticks to see how far they had moved. So we were doing surveying.

There were certainly no problems in terms of having a mixed gender team. Terry told me that, "Well, Claire, the one thing we've had to adjust to is we've cleaned up our language." I didn't insist on that. Certainly I wasn't insisting on anything. I was so pleased to get to go, and I wasn't insisting on anything; but I was very pleased, because I really don't like hearing people swearing or making sexist jokes or anything like that. So I was very pleased that they cleaned up their language, but that was not at my request or anything, because I was just so pleased to get to be on the expedition.

Anyway, our job was measuring the ice flows. But Deception Island also has a lot of penguins. Thousands, thousands of penguins. That was cool to get to see all those penguins.

Then when we came back, we got free passage on the *Lindblad Explorer*, which is a tourist ship. This was all pre-arranged beforehand, the issue being that we would give talks to the tourists and get free passage. Well, coming back on the *Lindblad Explorer*, what a plus, versus going on the *Hero*, because these tourist ships have so much more stability because they are clearly trying not to have all their passengers get as sick as we got going down on the *Hero*. Coming back on the *Lindblad Explorer* was really nice because the seasickness was so much less.

Anna Doel:

Were you the only woman in that expedition?

Claire Parkinson:

Yes, I was the only woman on our team, and I was the only woman on the ship going down. The ship coming back, the tourist ship, had lots of women. I was the only woman on the island, Deception Island. But another plus of going back on the *Lindblad Explorer* is we stopped at several of the other bases along the way, like Bellingshausen base, the Russian base we stopped at. We stopped at several other bases going back. That was just a huge extra bonus.

Anna Doel:

What did you learn there?

Claire Parkinson:

Well, we certainly saw different things, in terms of different bases. The Russian base, Bellingshausen base, was definitely upper scale. They had a pool table, and they also had pictures of Lenin. They had painted walls. The Bellingshausen station struck me as the upper-class station. But anyway, it was cool to get to see the differences and the different stations.

At the station that we were at, the Argentine station, they did have one recreational thing, which was a ping pong table, which was great. They all spoke Spanish, we all spoke English. We didn't understand each other's languages; but we would be playing ping pong and we would each be keeping score, one in Spanish, one in English, and all of a sudden somebody would think they had won the game and the other side said “No”, because the score was not being kept exactly the same way. But anyway, that was very cool.

Anna Doel:

What happened after you came back to Ohio State?

Claire Parkinson:

After I came back, we analyzed the data and got a couple of papers out. At that point I was finishing up my master's degree, which I successfully did. But then I was trying to think of what to do for a dissertation topic. I really wasn't sure.

An individual, his name was Warren Washington, came to Ohio State to give a talk on computer modeling of the atmosphere. I went to the talk; and I didn’t know much at all about computer modeling of anything, much less the atmosphere. Computers were very new at that time.

So I went to this talk, and I was just stunned by the types of things that people were able to get out of computer modeling. It was so impressive to me that, despite being incredibly shy, for the first time in my life I went up to the speaker afterwards.

I went up to Warren Washington after, and I said, "This was really interesting. How would a person get involved in this type of work?" He said, "Well, what are you interested in?" and I said, "Well, I'm here at the Institute of Polar Studies here at Ohio State. I'm interested in ice and the polar regions." He said, "Well, what would you think about modeling sea ice?" and I said, "That would be fantastic. Yeah, that would be great." He said, "Well, let me see if I can arrange to have you come to NCAR," which stands for National Center for Atmospheric Research and is in Boulder, Colorado.

He said, "Let me see if I can arrange to have you come to NCAR this summer and start working on modeling sea ice." I said, "This would be super." So I go to NCAR for the summer. This was 1975. I go to NCAR for the summer, and by the end of the summer, Warren and I and my advisor at Ohio State, whose name is John Rayner, the three of us all agreed that developing a model of sea ice, a computer model of sea ice, would be a fantastic dissertation topic.

And so at the end of the summer, I then wrote a proposal to NSF to be able to spend two more years at NCAR -- not starting right away, because I had to go back to Ohio State and finish my

coursework -- but I wrote a proposal to NSF to spend more time at NCAR to develop this sea ice model. It took a few months, but NSF did accept the proposal.

And so I finished up my coursework at Ohio State, and then in June of 1976, I moved to Boulder and spent the next two years at NCAR working on the sea ice model and writing my dissertation. That's how my dissertation came about.

Anna Doel:

When you were working on your dissertation, how many other women were working in your field? Did you know any women who were working on similar things?

Claire Parkinson:

No; but then there weren't many men working on this either. Now I found out after, after developing the model, I found out that there was a man at the Cold Regions Research and Engineering Laboratory, CRREL, in New Hampshire, who was also developing a sea ice model that incorporated both thermodynamics and dynamics of the ice; but I didn't know that while I was actually developing it. His name was Bill Hibler. His model was different than mine. He had more details on the ice dynamics, but he was looking at a smaller area. I had a model that was for both the Arctic and the Antarctic and for the whole sea ice cover of both the Arctic and the Antarctic. He had a model that was for a portion of the Antarctic, and it had more details on the dynamics, which means the motions of the ice. So the models were different, but I don't think he had a female working with him. At NCAR, there was another woman, Louise Morrison, who was there for a part of the time. She was there that first summer that I was there, and she was involved somewhat.

Anna Doel:

For developing your sea ice model, did you need some professional knowledge in geophysics? Did you have to take classes in physics and geophysics or oceanography?

Claire Parkinson:

At that time, it was more learn-on-your-own.

Anna Doel:

Yeah, I was wondering about that.

Claire Parkinson:

Yes. It was very much learn-on-your-own, and that's what I did.

At that time, of course, computers were not at the level that they are today. At that time, there were only a few locations where anybody could be developing computer models, NCAR being one of the U.S. prime locations. Of course, the computer was much larger spatially. I had to do the coding on punch cards. I would have boxes of punched cards. I would have to take these boxes of punched cards with my model downstairs to the computer people and hand them in. Then they would run the cards through the computer. You really didn't want to make a mistake, because then they run this whole thing through, you've got to debug it, and then you've got to get

the cards together again. Definitely, it wasn't as easy as it is now to correct a mistake. But, yes, the process was definitely more cumbersome.

Anna Doel:

What was your model going to reveal?

Claire Parkinson:

Well, the model was to simply simulate the annual cycle of sea ice in the Arctic and the Antarctic, and in a way that it could be put in with a climate model that was simulating the atmosphere and oceans. It was simply meant to simulate what's happening with the sea ice. Now, when I got the results out after the model was running and I started comparing them with pictures of what the ice does actually look like, in the Arctic case things were coming out pretty good. It was roughly the right amount of ice in the summer and in the winter, so it was looking pretty good. In the Antarctic case, I was getting way too much ice, and it was quite clear I was getting way too much ice. Fortunately, at that time there was an oceanographer from Columbia University's Lamont-Doherty Observatory who was taking a sabbatical or such and was visiting NCAR.

Anna Doel:

What's his name?

Claire Parkinson:

His name is Arnold Gordon. And so, I had met him, and I thought, "I'm going to ask Arnold if he has any ideas here." Well, he sure did. I explained the problem that I was getting way too much ice in the Antarctic, and he said, "What ocean heat flux are you using?" And that would be the flux of heat from the ocean up to the ice. And so I told him, and it was about two watts per meter square. And he said, "Oh, that's your problem."

And I explained that the only resource I had happened to be a paper from Norbert Untersteiner and his colleagues, and it was an Arctic study, and they gave a value for the ocean heat flux, and so I was using that value for both hemispheres. So that's where the problem was. I was using a value that was appropriate for the Arctic. That's why the Arctic answers came out looking good. But the value for the Arctic was just not the right value for the Antarctic.

So Arnold said, "Ah, increase it to 25, from two to 25." I said, "Okay." I increased it to 25 and suddenly everything looked quite within reason. So that's a case of tuning a model based on information that you know the results are not coming out right and you figure out what could be causing it, and then how to adjust. And I just lucked out by Arnold being so knowledgeable about heat fluxes in the Southern Ocean that he was able to just give me an answer right away, 25.

And so that was a big plus, that Arnold was able to help so easily. It only took less than five minutes of his time to make a huge help.

Anna Doel:

That’s amazing.

Claire Parkinson:

Yeah.

Anna Doel:

How did your research at NCAR take you all the way to NASA?

Claire Parkinson:

Okay. Good. Another good question. Okay. So, when I was done developing the model and almost done finishing writing the dissertation, there was a conference in Seattle about Arctic sea ice. A lot of people from the University of Washington in Seattle were doing studies on the ice, where they would go out to the ice and they would take measurements; lots of work going on from the University of Washington. So they had a conference, it was in September of 1977.

So I went to this conference and I gave a talk on the sea ice model. And at the break after the talk, Jay Zwally, who's a scientist at NASA Goddard Space Flight Center, came up to me and said, "Do you have plans for what you're going to do after you graduate?" And I said, "I've been so busy working on this dissertation that, no, I don't have plans yet." And he said, "Well, what would you think about working at NASA?"

And there is no way I had ever dreamed that high of being able to work at NASA. I mean NASA just stood out to me so phenomenally. Like in the 1960s, when so many problems were going on with segregation and the Vietnam War, so many problems, but NASA stood out with the Mercury Program, Gemini Program, Apollo Program, and then with the first landing on the Moon in 1969, when they put down a plaque that said, "We came in peace for all mankind."

I mean NASA to me was just so far beyond any hopes that I would have had. So it obviously became my first choice, just beyond anything else. So I applied to NASA, and the application process takes many months in terms of a decision, before a decision comes out. It was many months before I got a job offer, but as soon as I got a job offer, I mean, it was just clear now that I was going to say yes. There was no question.

I ended up finishing up everything at NCAR, and I finished up the two years at NCAR, and then started the NASA job July, well, technically July 2nd of 1978. July 2nd's a Sunday. The week at NASA, it's Sunday to Saturday. So technically, it was July 2nd. So my first day at work would be Monday, July 3rd, which was kind of cool, because it meant my second day was a holiday, which was helpful, because I had been working at NCAR up through Friday, June 30th. And in fact, I had my apartment in Boulder, the lease ended June 30th.

And then my apartment in Greenbelt, Maryland, which is where NASA Goddard Space Flight is, my apartment lease started July 1st. I really had no place to be that night. I just took a night flight. So I was on the plane that night, and then the moving van with my stuff, I think they came on... I don't know, somehow July 4th, that second day, I could move my stuff into my apartment. I don't know whether the moving van arrived on July 4th or whether it arrived on July 3rd. But anyway, it was very convenient that I had that day that I could just move things in.

Anna Doel:

What did you think of Greenbelt?

Claire Parkinson:

Well, basically, at first all I knew was my apartment and Goddard.

Anna Doel:

Across the highway?

Claire Parkinson:

Yes. So basically, I would go from my apartment to Goddard, come back, and then the grocery store. I didn't know much about Greenbelt at the time. By now, having lived in Greenbelt for 45 years, by now I know a lot about Greenbelt, and I certainly like Greenbelt.

Anna Doel:

Do you enjoy it?

Claire Parkinson:

Yes. Greenbelt was created in the 1930s during the Franklin Roosevelt administration as part of the New Deal. I think there were three Greenbelt communities or such around the country. And so, it's got an historical aspect to it. Like Eleanor Roosevelt, the first lady, she came out to Greenbelt several times to make sure things were going right. The high school is named after her; it's Eleanor Roosevelt High School.

There's a lot of interesting history in Greenbelt. But there are also sad aspects, which included, as it was being built, a lot of the workers were non-white, but only whites could live there. There were sad aspects. But, overall, I like Greenbelt a lot. Greenbelt now is predominantly, well, majority Black. It's majority Black. I live in a townhouse complex that's a very good mixture of Blacks, whites, Asians, a very, very good mixture. I assume it's majority Black. I don't actually have the numbers, but certainly in terms of the people I see, it seems to be majority Black. And I very much like living in a mixed community versus the pretty-much all-white communities that I grew up in, in the 1950s and '60s. I feel that there's more tolerance, there's more acceptance of different people. I just very much like living in a mixed community.

Anna Doel:

Your job at NASA, what did it involve? What did they expect of you?

Claire Parkinson:

Okay. When I first got to NASA—this is another instance of my being naive—when I first got to NASA, what I was expecting was I'll get there, they'll give me a list of tasks to do, and I'll diligently do them. I mean that was my expectation. I did not realize that, no, a scientist is supposed to decide herself what to do and do it. So that part was surprising to me.

And at that point, I realized that part of the reason that I got hired was because they really did want my sea ice model, which was great, except all the boxes of the punch cards were still at NCAR because I had not brought them with me. They were still at NCAR. I had to have them shipped to Greenbelt, which took a while, although most of the while that it took was sitting in the Goddard mail room misplaced. It was months that they misplaced these cards. Anyway, part of the work was to continue with the modeling.

But within a week or so of getting to Goddard, I was part of Jay Zwally's team for using the satellite data to look at the sea ice cover, and this was very exciting to me. Goddard and NASA knew that NASA satellites were sending down lots and lots of data that needed scientists to analyze and determine what's really being revealed about the Earth system from these data. And so Goddard was hiring people to look at clouds, precipitation, sea surface temperature, vegetation, land ice, sea ice, all sorts of things. So they were hiring a lot of people to take these new data from satellites and figure out what of value there could be.

And so I was in the group looking at sea ice. And we were quite aware that if we wanted to get a good record of sea ice, we really couldn't just use visible data, the type of data that your eyes see, because if a satellite's up there and there's a cloud in the way, you're not going to get your sea ice data if you're using visible data. And also, the sea ice in the Arctic goes right up to the North Pole, where it's dark six months of the year. So if you were using just visible data, throughout the entire winter you wouldn't be getting your data. So we knew that the visible data wouldn't be the best for us.

So we were using an instrument that had been launched in December of 1972 and had gotten a four-year record, 1973 to '76, of passive microwave data. And what that means is: instead of visible, it's using microwaves like a microwave oven has. So it's just a different part of the electromagnetic spectrum that it's using. And what 'passive' means is: it wasn't sending a signal down and receiving something, like a laser would or a radar would. Instead, it was just passively receiving the data coming up.

Now the reason that the passive microwave data were so valuable to us is that with a good choice of wavelengths in the microwave, some of these microwaves will go straight through clouds. This was hugely important. So we can see through clouds with the microwave data; hugely, hugely important.

Another thing is that the microwave data, in contrast to the visible data, the microwave data are coming from within the Earth system itself, not being reflected sunlight. They're coming from the Earth system itself, so therefore it didn't matter if it was nighttime or daytime, because it didn't matter if there was any sunlight.

So those two factors, the fact that you can get your data irrespective of whether there's a cloud cover and you can get your data irrespective of whether it's light or dark out, were huge factors. The other gigantic factor is that sea ice emits very differently in the microwave from water. And so, because they emit very differently, when you get your data you can easily distinguish "this is sea ice", "this is water".

So for those reasons, the passive microwave data ended up being really the route that we took for trying to get a record. And this instrument that we were using, it was on the Nimbus 5 satellite, and it was not sent up specifically for sea ice at all. It was sent up to get passive microwave imagery around the globe, and different groups were looking at, "Hey, is it of value for ocean temperature? Is it of value for sea ice? Is it of value for snow cover?" I mean different groups were looking at it, and we were certainly able to determine this is really valuable for sea ice.

Sea ice ended up, because of those three factors, ended up being a really good variable to look at from passive microwave data. We spent a lot of years on that four-year data set. And we started with the Antarctic, because it was an easier case than the Arctic. The Arctic has more different types of sea ice than the Antarctic. And it was an easier case, so we started with the Antarctic. And Jay Zwally was leading the effort; and the group of us -- and there were six of us involved --

we came out with a book in 1983, an atlas of Antarctic sea ice from the satellite passive microwave data. This was a huge achievement to have taken this satellite dataset and figured out how valuable it would be and get the Arctic results from this four-year—I mean the Antarctic results—from this four-year dataset.

So, when we were done with that, we decided to do the same thing for the Arctic, a little bit more difficult, but by now we had some methods worked out by working on the Antarctic book. And so I took the lead on the Arctic case. It was mostly the same people. Jay was still involved. Joey Comiso was still involved. And so, we then created a corresponding book for the Arctic, and that came out in 1987.

So, all those years, which would be the first nine years of my work at NASA, all those years, a central focus was on just a four-year dataset. But that shows how far we've come. I mean now it's so much easier to handle the data. The computers are so much better. The methods have been established. And so now it would not take nine years to handle a four-year data set; so huge progress in the meantime. And that progress is progress from all sorts of people, engineers making better instruments, all sorts of people are involved in the progress.

Anna Doel:

Did your work with these data and subsequent work require any field work, any expeditions?

Claire Parkinson:

Well, it didn't require field work, but the field work is cool to get to do. And I did go. In 1981 I went on an expedition to the Bering Sea, which is between Alaska and Siberia. I went on an expedition to the Bering Sea in actually a NOAA ship, the *Surveyor*. We were measuring the sea ice there, and that was cool, because once the ship got to the sea ice area, we got out onto the sea ice and could walk around and go from one sea ice floe to another.

We were putting down radar receivers that we would then track from the ship. And it was so cool to be out on the sea ice and doing this. So I did do that, and that was very, very cool to get to do that. Later, in 1999, I actually got to go to the North Pole, and that was very cool to get to do that. We took some measurements of ice thickness at the North Pole. That trip included a while at Resolute Bay, which is a small Canadian town at 75 degrees north. And that was cool. We did all sorts of testing of equipment there, and we did webcasts from the school there. And it was very interesting, just the contrast between a small community at 75 degrees north versus what any of us were familiar with in general.

The Resolute Bay community is predominantly Inuit, almost entirely Inuit, and 205 people total population. 205 people and no other communities anywhere close. The Canadian government would send a doctor in once a month and a dentist once a month, and just the whole lifestyle is different. But if somebody got really sick and needed to go to a hospital, the Canadian government would get them to a hospital, would fly them to a hospital.

It was just entirely different. And we did have a chance to talk with the kids and with the adults, and that was just very interesting, just the difference in lifestyles. Another aspect: we were there in April of 1999, and the first day we got there, there was this one little kid, I would estimate maybe about 11 years old, and he sort of hung out with us for the whole day; and that was fine, we were keen on that.

And it got to be like 10:30 at night. And I said to this kid, I said, "Don't you have to go home, go to bed?" And he said, "Oh, no, we sleep in the wintertime, when it's dark." And I was, "What? Well, you've got to sleep in the summertime too." And I asked the principal of the school the next day. We were in the school to do some webcasts, and I relayed this conversation to the principal, and the principal said, "Oh yeah, you know, it's dark for months; when the Sun finally comes out, we let the kids stay up. They're in the streets in the middle of the night." Now, with only 205 people, everybody knows each other. It's much safer to be in the middle of the street in the middle of the night. But it was just so different. I mean it is just so different. But while we were there was also the time, I think it was maybe the Columbine murders, but it was some school murders in the United States, and that contrast sort of came out as we were talking to these Inuit children, when we asked them if they like their lifestyle and living in Resolute Bay. And it was so clear that they do like it. And when they see things like these murders going on in other schools, hey, there's a good reason to like living exactly where they were living.

Anna Doel:

I'm curious, the way you described your first expedition to Antarctica, which was, you were the only woman on the ship, the only woman on the team, the only woman on the island, was that a little bit of a metaphor for your career as well? How did it feel to be the only woman?

Claire Parkinson:

Throughout my career at NASA, in most of my meetings I've been the only woman. Now, in the last roughly 10 years, we have a lot of women in our lab; now it's like half-and-half male versus female. So a huge, huge difference. But most of my collaborations have been exclusively with males, and I haven't minded that at all. I've just basically been glad to be able to be a part, and whether it's males I'm working with or females, really hasn't mattered, except I do realize that sometimes it's frustrating that with me and with other women, there are sometimes assumptions that the woman's not worth listening to. So, like, a common occurrence, especially early on, more so than now, but a common occurrence would be I or another woman, you say something in a meeting, you bring up an idea, a suggestion, and it's totally ignored. And then a few minutes later, some man in the room brings up the same suggestion and everybody's saying, "Oh, what a great idea." It's like, "I just said that." So that's frustrating. And I definitely feel that although it's much less likely to happen now, it does still sometimes happen.

Anna Doel:

I'm curious, what's been your exposure to the concept and the practice of geoengineering?

Claire Parkinson:

Okay. In the 1990s, I did hear various things about people suggesting that we could solve the climate problem of increased warming by doing various geoengineering efforts, one in particular being to pour aerosols into the upper atmosphere to reflect the sunlight and not allow it to get down to the surface. This is sometimes described as an artificial volcano. In 1991, when Mount Pinatubo erupted, which was a big eruption, climate scientists pretty quickly said, "Temperatures aren't going to rise as much in the next year as they would have if this hadn't erupted." And indeed, the temperature rise was not as much as had been predicted before the eruption.

And so that was clear evidence that a volcano pouring all this stuff into the upper atmosphere does end up reducing the warming in the lower atmosphere. In the 1990s, when I heard the geoengineering concept, I thought, "This is so absurd to think we're going to pour this stuff into the upper atmosphere to try to solve the fact that we've poured too much of other things into the atmosphere; now we're going to pour something else in?" I felt this is too absurd to even think about, as surely nobody's going to want to do this. I sort of tossed it off at the time. Then in 2006, an article came out by Paul Crutzen, who is a Nobel Prize winner in chemistry. And he wasn't advocating this geoengineering, but he was giving it some substance by being a Nobel Prize winner who was taking this seriously.

And so I read this article by him and I immediately realized that this is something that people are going to start maybe actually deciding to do. At that point, I decided I'm not going to just keep ignoring it anymore. Now, an individual, George Demko from Dartmouth, a professor at Dartmouth, had a book series that he was doing, and for the previous couple of years, he had called me every once in a while, asking me to write a book in his series and that book would be on ice. And I kept saying no. I said, "I've already written books on ice. I do not want to write another book on ice." After this article came out by Paul Crutzen on this geoengineering concept, the next day after I read the article -- the article probably came out earlier -- but the day after I read it, I called this guy George Demko back and I said, "George, I still don't want to write a book on ice, but what would you think of my writing a book on a different topic?"

And so he asked me what, and I explained to him my concerns about geoengineering and that I would like to write a book that would cover the history of climate change and would explain different concepts of geoengineering and why some of them are dangerous, and that I would also include details about climate models and the fact that they're not perfect and our predictions could be wrong, and just don't pour more stuff into the atmosphere to try to solve what we've already poured into it. He was immediately enthusiastic about the possibility of this book, and so he said, "Write a proposal, and I'll send it to the publisher." And within a week, I had written a proposal for this book, sent it to George Demko, and he sent it on to the publisher. They decided to go forward with having this book done.

And I wrote a book on climate change, history of climate change, the various reasons for being concerned. I'm definitely in the mainstream in terms of definitely being concerned about what we're doing to the climate, but I feel that some of the proposed solutions could lead to even more problems. And so, on geoengineering, the solutions proposed that I particularly don't like are the ones that insert more into either the atmosphere or the oceans. Another proposed solution has been to insert more iron, for iron fertilization, into the oceans.

I don't like the proposed solutions that insert even more into either the atmosphere or the oceans, but I do think that some proposed geoengineering schemes do make a lot more sense. We know we've poured a lot of carbon dioxide into the atmosphere. So I think taking some of it out might make sense. Now, when people speak of that, they generally speak of “carbon capture and storage”, so you take it out and then you store it. And the problems come with the storage aspect in terms of where are you going to put all this. And there are ideas out there; but my feeling is it would be much more valuable to have “carbon capture and use”. Use the carbon for something of value somehow. And not only would that make more sense, not taking up storage space, but it also could make it an economic plus. If people can figure out a good use for the carbon that economically can make companies money, then they might be able to solve this. And I know there are ideas out there.

Now, another type of geoengineering scheme that I don't like at all would be, like, put a huge cover over the entire Sahara Desert and have it be reflective. Well, the Sahara Desert, already a desert area, is reflective anyway, so you put the cover on it, it's not going to be that much more reflective. But worse than that is, there are ecosystems that you would be totally destroying. And then other people have suggested putting a huge cover over a large area of the Pacific Ocean. Now that doesn't have the same problem in terms of the reflection contrast that the Sahara Desert does, because the Sahara Desert already is very reflective whereas the ocean's not very reflective. And so therefore, if you put a cover over the Pacific that's a very reflective cover, that would indeed reduce the heat staying in the Earth system, but it would destroy the ocean ecosystem. It would be a terrible, terrible thing to do.

So there are a number of schemes like that that I am very much opposed to. But the thought of trying to do something to counteract what we've done so far is positive. You've just got to think of the right thing. And in addition to the carbon capture and use – hopefully, rather than storage – but in addition to that, there'd be things like painting roofs white in areas that get too hot. You paint your roof white and it could be a big advantage to you in terms of reducing your air conditioning costs; get the sunlight reflected.

So there are some geoengineering schemes that I feel are viable. Of course, painting roofs white would be... You'd have to paint an awful lot white, but I mean that would be like an individual person could make life more comfortable for him or herself, not requiring the air conditioning, and it would be helpful to the environment. So there are some things like that that would be positive.

Anna Doel:

Claire, teaching and mentoring others, have they been part of your professional life?

Claire Parkinson:

They have definitely been part in terms of outreach, and in recent years in terms of mentoring young scientists at Goddard. Definitely I've given a lot of talks, and that's included to some groups that actually come to Goddard. Goddard is a place where a lot of groups come right to Goddard, which is a big plus for me in terms of not having to travel to get to them. And among the groups that come to Goddard are groups of teachers, and getting to talk with groups of teachers has a multiplying effect in terms of the value. And groups of students come. And I also give talks to the general public.

So, all those levels, students, teachers, general public, I have given a lot of talks. And I've been very pleased that usually I get very good responses in terms of people liking the fact that I really make an effort to try to explain things and make them understandable, whereas some scientists are more aimed in a talk at explaining their contribution to the science and showing that this is complicated. I'm all with showing that it's complicated, but it's how it's done in terms of, if I'm giving a talk, I am trying to get the audience to understand something, rather than to get the audience to say, "Oh, she knows so much." I mean, my aim is to get the audience to understand rather than to just learn that I've done a certain bit of research. So, anyway, I've been pleased that the audiences tend to appreciate that.

And I've also been pleased that when I talk about the climate change issue, the audiences tend to really like the fact that I make it quite clear that, although I'm in the mainstream—I feel that there are real concerns, legitimate concerns about what we've been doing to the climate—at the

same time, I feel that some of the skeptics have been mistreated in terms of I feel that some of the scientists who are not in the mainstream do have legitimate data to back up some of what they say, and I feel that it is really unfortunate when they get denounced as idiots or some other word that's just not appropriate at all.

My feeling is very much that the models that are giving us the predictions about the damage that we're doing that could be coming with the climate changes, those models are state-of-the-art models that are so much better than the early models back decades ago, but they're not perfect. They don't come close to the full complexity of the Earth system; and they could be wrong, the predictions could be wrong. So I end up with the same bottom line that the more extreme people have, the bottom line being that we should do as much as we can to limit our emissions to the atmosphere and the oceans. So I come up with the same bottom line, but I come up with it on the basis of: I don't know for sure what will happen if we continue along the route we are on, but the best models we have, although they're imperfect, they are the best we have, and the best we have are telling us we'll be in real trouble if we continue along the route that we're on now. So, therefore, we surely should not ignore the best models that we have.

I end up with the same conclusion, i.e., restrict emissions. But I don't do it in the context of, if we don't reduce emissions, everything's going to be a total disaster. I've never come up with that kind of statement. And I think it's a mistake when scientists do come up with that kind of statement because I think that's part of why this has become such a polarized issue, which is really unfortunate because it means not as much is being done to correct it as might have been the case if people hadn't come up with the more extremes and ended up just polarizing people.

Anna Doel:

Feel free to ignore this next question. We can move on to another one. Has your relationship with religion changed over the course of your life?

Claire Parkinson:

Yes. As a child I was very much believing, especially the New Testament, but very much a believer. When I got to college, I took a course in biblical history and I thought this course was going to just make me more knowledgeable about the Bible, which it did, but I did not have any anticipation that it would reveal to me so many contradictions in the Bible.

It doesn't mean that I don't still believe. I certainly still feel very strongly regarding Christ and regarding that what he was preaching was the way I want to live my life too. But in terms of organized religion, I no longer am going to church every Sunday. At Wellesley, I still was; in fact, I was one of the very few Wellesley students at that time who was going to... there was a sermon almost every morning, I think six days a week, maybe every day except Saturday. It was just short on Monday through Friday. But that's the way I would start right before my classes, I would go to this sermon, whereas I'm not doing that anymore, that kind of thing.

And on organized religion, so much has come out in recent years that is so sad, like the molesting by Catholic priests, and just so much has been so sad.

Anna Doel:

Who is in your inner circle? With whom do you keep in touch on a regular basis?

Claire Parkinson:

Well, let's see. Now, well, the person I would most like to keep in touch with on a regular basis would be my father, who's deceased. So he's the one I would most like to be in touch with. There are so many topics that have come up in the decades since he died that I would so much like to be talking with him about. But now, the people that I keep in touch with most now, well, my sister, my brother and his wife, and then my niece, who is the daughter of my brother and his wife, my niece and her husband and their three kids. So those would be the family members that I keep in touch with.

And then in terms of more of the professional life, keeping in touch with people, Warren Washington, the person who got me into computer modeling, I've kept in touch with him throughout these past four, five decades. And in fact, he and I wrote a book together on climate modeling that came out in the mid-1980s and then a second edition that came out in the early 2000s. So we wrote a book together and we've kept in touch; so lots of phone calls with Warren.

And then at Goddard, Dorothy Hall is a colleague who… her main work has been on snow cover rather than sea ice, so we don't have collaborative studies, but we do talk a lot. She's now moved to Florida, but we still keep in touch by phone. I keep in touch with Dorothy a lot. And then there are various other people. Mary Cleave worked at Goddard as a project manager and she was also an astronaut. Mary and I are good friends and we keep in touch. So I do have quite a few people that I keep in touch with; but at my age, I'm now 75, at my age, a lot of people that I would be keeping in touch with have died. Like George Demko, the one who got me to write the book on climate change, I was keeping in touch with him until he died.

And certainly at Goddard, I still keep in touch with the people there. We haven't talked about the Aqua spacecraft yet, but that's a huge part of my last 30 years. I do certainly keep in touch with those people, and I see them.

Anna Doel:

Could you say more about that group?

Claire Parkinson:

Yeah. So in the late 1980s and early 1990s, NASA was trying to come up with a new Earth observing program, and they came up with the EOS program, the Earth Observing System, and it was going to have three flagship missions. One was called EOS AM, one was called EOS PM, and the other was called EOS-CHEM for chemistry. And those have now changed names, so what had been EOS AM became Terra, what had been EOS PM became Aqua, and what had been EOS-CHEM became Aura. So Terra, Aqua, and Aura. So NASA was coming up with this idea of an Earth Observing System with three flagship missions and then smaller missions.

They needed to get project scientists for each of these, and I was asked if I would be Project Scientist for the Aqua mission. Now, I was naive about what this would involve, to say the least. I was naive about what this would involve, but they needed somebody, and I said yes. I basically have said yes to most things that NASA asks me to do, so I said yes, I would be Project Scientist for the Aqua mission. This was spring of 1993, and this did immediately have me involved with engineers in a way that I hadn't been before, because before I was just using satellite data, I wasn't in the stage of developing a mission. So it immediately got me involved with engineers. And one thing about that that was very positive for me was: In the group -- and I'll refer to it as

Aqua, even though it was still called EOS PM for several years thereafter -- so in the group for Aqua, the engineers were wonderfully united in terms of we were all working toward a goal, and we all had the same goal, which was to complete the development of the satellite and the instruments, get it launched, and get good data out. So this was very positive. And so I worked with the management and engineering people up until the launch, which was in 2002. It was nine years of developing this effort before we ever got any data. So it was nine years before the launch, and then we launched on May 4th of 2002. And that's very exciting. The launch is very exciting.

The last three-hour countdown of the launch, they're pouring in the final 10,011 gallons of highly refined kerosene fuels. They pour this in and then after that gets poured in, then they pour in liquid oxygen at very, very cold temperatures, so it's boiling off and so they keep pouring more in because, I mean, all this is planned. Everything's planned really carefully. And then the last few seconds before launch is very, very exciting. We launched from Vandenberg Air Force Base, and it was at 2:55 in the morning Vandenberg time. I was inside until the last few minutes before the launch, because we were doing a webcast to anybody who wanted to listen, and so we were doing a webcast from inside. But then a few minutes before it was going to launch, we all walked outside to actually see the launch.

And the launch is just spectacular, and this is 2:55 in the morning, so it's dark, and all of a sudden you see this rocket go up, and it's just amazing. And then, after the rocket goes up, then all of a sudden the sound wave hits you, and it's like, "Whoa!" The delay between when the rocket goes up and the sound wave hits you is definitely something to remember.

And then, after the rocket launches, the first stage of the rocket drops off into the Pacific Ocean. That's why all the launches are done either on the East Coast or the West Coast, next to the ocean, so that the stuff comes down into the ocean instead of onto the land.

The first stage of the rocket gets the satellite up, and then there's a second stage of the rocket, much, much smaller, and that pushes Aqua forward, south across the Pacific Ocean, then across Antarctica, and then north to Africa. And NASA has a tracking station, the Malindi tracking station, in Kenya. So it was at that point, in view of the Malindi tracking station, that the second stage of the rocket dropped off. And so at that point -- which was 59 minutes 30 seconds after launch -- at that point, Aqua is a real satellite, on its own going around the Earth.

And then, 12 and a half minutes later, while it's over northern Europe in view of the Svalbard tracking station, then the solar array came out. And the solar array is very long. It couldn't be in the rocket pulled out to its operating state, so it had to be sort of like an accordion. And so, it gets pulled out at this time, one hour and 12 minutes after launch.

Prior to the launch I was told, "Claire, so many people are so excited with the launch itself. You should not get excited until the solar array comes out, because as soon as the solar array comes out, if it's functioning, then you've got power to the spacecraft, and you can work on fixing whatever else. But if the solar array doesn't come out, your mission's over. I mean, that's it." And so at that point, it was terrific. And by that point I was inside at the mission operations area of Vandenberg, and it's at that point that the work of the mission operations people at Vandenberg ends and that the operation of the spacecraft is then in the hands of Goddard, NASA Goddard. So it was at that point that their job was over. And it was so cool for me as the Project Scientist to get to be the one thanking everybody in the mission operations at Vandenberg for getting our satellite safely launched.

So the launch is a very exciting experience, and it fortunately worked. And the timing of a launch is always dependent on what orbit you want to get into. In the case of Aqua, the spacecraft goes north over the equator at a little after 1:30 in the afternoon, which necessarily means that when it's coming down south, it's 1:30 in the morning. And when it comes around again, the Earth has spun roughly 25 degrees of longitude. And the Earth has spun, so when Aqua comes up again, it's still 1:30 in the afternoon, it's just over to the west. Aqua's up at an altitude of 705 kilometers, and at that altitude it takes 98.8 minutes to get once around the Earth.

So Aqua has been up since 2002. We've orbited the Earth by now well over a hundred thousand times, collecting data with six main instruments. Four of them are still working, even though the mission had a design life of only six years. That basically means if you don't get data for the six years, it's not a successful mission. You definitely hope to extend well beyond six years. We did not expect to extend to 20 years, and by now it's been 20 years. The fact that we didn't expect to extend that long is quite clear, because we're running out of fuel.

The mission will be ending in a few years, partly because of the fuel. There are also other reasons involved, but partly because of the fuel. The mission has been very, very successful. Many hundreds of people use the data from Aqua. It gets all sorts of information about the Earth's atmosphere, oceans, land, vegetation, sea ice, land ice; so all sorts of information about all sorts of things. It shows wildfires really well, and this makes it really important for the U.S. Forest Service. And the data from Aqua are also being used by the weather service for weather forecasting.

When the big oil spill occurred in the Gulf of Mexico, the Deepwater Horizon oil spill, people looked at the Aqua data to see if it would show up. Certainly, we hadn't anticipated that prior to launch. We weren't thinking about oil spills. But it sure showed up; I mean, it showed up really prominently. And so, some things have been a surprise, like that.

Other things we were anticipating. We were certainly anticipating use in weather forecasting. We were anticipating that it would be good for seeing fires. Some things were anticipated, other things were surprises, but definitely very successful.

Up until launch, a lot of engineers were involved, because of having to manage the construction of the instruments, most of which were contracted out to companies; but still, at Goddard you had to have people overseeing everything, including the spacecraft itself, it's called the bus, on which all the instruments are placed. But after the launch, and then after the first 120 days of the checkout period, when everything is checked out one by one by one, then all those engineers and managers go off to other jobs, because their job on Aqua is done.

And so, since 2002, the people I'm working with now in terms of the Aqua mission would be more the people in Mission Operations. And so it's a whole different set of people, and they operate the satellites. They are actually sending the signals up to the spacecraft and getting the data down and distributing it out to where it needs to go. The prime person there is Bill Guit. He's the Mission Director for Aqua, whereas I'm the Project Scientist for Aqua. Bill Guit, he's stayed ever since 2002 also. So Bill and I have definitely worked a lot on Aqua.

And then, I had a few deputies, and the last one, Lazaros Oreopoulos, he started about 10 years ago as my deputy, and he's just been terrific. And so when I announced back last August that I was going to retire at the end of the year, I sent a message to Goddard Management explaining that "I know this is not my decision to make, I just want to let you know that there is one person who would be a hundred percent qualified to take over as Aqua Project Scientist if he's available

and if it ends up that you select him, and that's Lazaros Oreopoulos." Then I explained that "he's been a terrific deputy, and he's kept up on everything going on. He would just be a hundred percent qualified."

They do have to put jobs like that out. They have to make an announcement, and people get to apply if they want. Fortunately, Lazaros did apply, and fortunately they did select him. I was thrilled with that, because it's so nice after working on a project for a long time to know that it's being handed over to somebody who's really good. So that was terrific that Lazaros is now the Project Scientist for Aqua. And another aspect of that that I find really good is the fact that he was such a good deputy for 10 years, it's so nice that on his resume it can show that he did become the Project Scientist later. So for all those reasons, I was extremely pleased.

Anna Doel:

And on that wonderful note, maybe you would want to wrap up our session today, unless you want to say something else.

Claire Parkinson:

Yeah. Well, we haven't really talked about the sea ice results at all.

Anna Doel:

We haven't. Yes. What would you like to add to that?

Claire Parkinson:

Well, I'd like to add that early on we were just trying to see what the satellite data were able to show us about sea ice. But by the time we got that figured out, that the passive microwave data were really good – by the time that we wrote those two books in the 1980s – then we actually had a longer record available, because the Nimbus 7 satellite was launched in 1978, and so we already had a record that was almost nine years long, which is a lot longer than the four-year record we'd been dealing with.

And so it became more reasonable to start looking at changes in the sea ice cover. So in 1989, a colleague Don Cavalieri and I wrote a paper, and we showed in that paper a little bit of a decrease in the Arctic sea ice. Just a little, but it was enough to make me realize we really should keep up this record, because if the Arctic sea ice is decreasing, this is clearly right in line with global warming predictions.

We went through the complicated procedure of matching data sets, because that Nimbus 7 data set -- close to nine years long -- it did end in 1987, and by that time, however, the Department of Defense had a satellite with a passive microwave instrument on it. So, the Nimbus 5 and Nimbus 7 were both NASA satellites, and we wanted to use the Department of Defense satellite data to continue this record of passive microwave, but we had to match the data sets.

It's not as easy as it might seem, because the instruments are slightly different. There are differences there, so it took some effort. But in 1999, we came out with a paper, a group of us at Goddard. I was the leader but there were several others involved. And we showed a decrease that by that time was more substantial than what Don and I had shown in 1989. We showed a significant decrease in the Arctic sea ice area.

The University of Washington that same year, 1999, came out with a paper that used submarine data to look at the thickness of the ice, and they showed that the Arctic ice had been thinning. Now this was really great that these two papers both came out at roughly the same time, with the Goddard group showing the areal extent of the ice decreasing and the University of Washington group using the submarine data to show that the ice was thinning. This was very powerful. The two really helped solidify the results of each other. And from that point on, sea ice has become a topic of much greater both scientific and general public knowledge than when I started in the 1970s, when it was a very obscure topic at that time, very obscure.

But after 1999, the fact that it had become clear that the Arctic sea ice was losing extent, found through the satellite data, and losing thickness, found through the submarine data, and the fact that a lot of people by that time were concerned with global warming, sea ice became more like a poster child for climate change, with all the polar bears forlorn sitting on little ice floes. And by that time also, people had computers on their desks. Data centers had all our data. People could use the data so much more easily than in the seventies, when computers were nowhere near the same quality, or speed, or capacity to hold the data.

And so groups from all over now are doing sea ice studies. Universities all over the place have people working on sea ice studies. So that was a huge change. And the Arctic, since 1999 the decreases in the Arctic sea ice have not only continued, but even sped up. There's a lot of change from one year to another, what we call inter-annual variability. There's a lot of that, but the overall trend in the Arctic sea ice cover is just so clearly downward. So this is a very strong point for people studying climate change, because it's such a clear record of something that is in line with warming.

The Antarctic studies don't show the same type, same sequence at all. The Antarctic case -- and we use the exact same methods, we use the same data sets, the same satellites, the same instruments for the Arctic and for the Antarctic -- in the Antarctic case, the sea ice cover from the late seventies till 2014 was slowly increasing instead of decreasing. Now, as a climate scientist, this didn't shock me. I mean: I expected a decrease, but I also realized that the Earth system is big, and not everything is going to go in the same direction. Like, the majority of glaciers might be retreating, but some glaciers are going to be increasing instead. So, I just felt like the Antarctic is going to get warmer, and eventually the sea ice cover will decrease.

Well, it turned out that from 2014 to 2017, there was a huge decrease in the Antarctic sea ice, way, way faster than anything that had happened in the Arctic. The Arctic decreases were just much slower but more consistent. And so in 2019, I published a paper that showed this whole sequence. And that paper ended up getting a lot of press coverage at that time, because of the interest of a lot of people by that time in terms of what's going on with the sea ice. The Arctic sea ice had always been a key point for people in the mainstream to point to in terms of what's happening to the climate, but the Antarctic case, a lot of the skeptics had pointed to the Antarctic case and had pointed out that the Antarctic sea ice is increasing, and they, in some cases, seemed to feel that canceled out the Arctic. It didn't really, in terms of the global picture, because the decreases in the Arctic were far more than the increases in the Antarctic. But anyway, this huge change came in the period from 2014 to 2017, when there was this big drop in the Antarctic. And then it rebounded a little bit, and then it went down again. So definitely Antarctic sea ice cover is now showing decreases since 2014.

Anna Doel:

Is this a point in favor of long-term observations, and a steady, long-term record for data?

Claire Parkinson:

Yes. We at Goddard have always pointed out the importance of the long-term record, because the climate system is variable, things do go up and down, and if you don't have a long-term record, you just can't know whether something's just inter-annual variability or not.

Anna Doel:

Thank you so much, Claire.

Claire Parkinson:

Well, thank you. We didn't say anything about the history of science, but maybe you don't want to.

Anna Doel:

I don't know. What would you like to discuss in the history of science?

Claire Parkinson:

Okay. While I was in college, I was puzzled by how did people figure out that the Earth is going around the Sun? That was puzzling to me. I had known since I was a very small child that the Earth is going around the Sun, not vice versa, and I certainly accepted that. I certainly believed it; but it was very puzzling to me how did they ever figure that out? I mean, it's not obvious. It looks like the Sun is going around us rather than vice versa.

So I ended up spending some time in my summer vacation after my junior year in college, some time at the MIT library, looking up, trying to figure this out. How did they figure this out that the Earth is going around the Sun? And I was able to my satisfaction to understand how they could have figured this out by looking at the planets against the star background and all. And by the time that I had sorted this out to my satisfaction, I was also looking at other history of science books. And I realized, this is fascinating. How do people figure out things? How do they figure out what's the composition of the Sun? I mean, how do you figure out what gases are there when you obviously can't take a sample?

So I got interested in the history of science. And then, I was looking -- a few years later -- I was looking for a book that would give a chronology of what was figured out when, and how did they figure it out. And I couldn't find anything. So I ended up, a lot of my spare time for the next 13 years, coming up with this book, writing it myself since I couldn't find it. So I wrote a book on the history of science, sort of a chronological book.

And history of science is still just tremendously fascinating to me, how people come up with solutions, and how if some things are wrong and you correct them, that's part of the scientific process. The scientific process does not end up with a final goal of knowing everything, but it's a process through which we gain more understanding. And part of that gaining in understanding is finding flaws in a theory that's accepted and then correcting it, or revising it.

Like with Newton. Newton was just amazing to come up with the theory of gravitation, but then there were some problems that it didn't solve everything. And then Einstein comes up with his theory of relativity that matches some observations better than Newton. And that's the way

science works. And that's part of the reason why on the climate change issue, I am not one who's going to go out and condemn the skeptics. Science works through doing the best you can with the observations and the theories that you've got, but then when something doesn't match, you try to correct it.

Anyway, so history of science is fascinating to me, and I hope in my retirement I can spend more time on that. I did write a paper on paradigm transitions in math, because they have been discussed a lot in science, about how the community has an understanding of something and then you get a so-called scientific revolution and that understanding adjusts to a different understanding.

Anna Doel:

This is based on Thomas Kuhn's ideas?

Claire Parkinson:

Yes, yes. And I applied it to math, and I thought that it applied pretty well in terms of, like, in the 1800s, the theory of Euclidean geometry -- which had always been thought to be the geometry -- it was realized that, well, there could be other geometries, not just Euclidean geometry. And so other geometries were created. And then, shortly after that, people realized that with algebras, everybody thought algebras had to certainly be commutative, meaning A plus B equals B plus A, and then people came up with cases where algebras are not commutative. They came up with non-commutative algebras. I really like this framework of recognizing that something that seems very, very well-based and widely accepted does sometimes get changed.

Anna Doel:

I hope you will pursue this interest. That would be absolutely wonderful.

Claire Parkinson:

Oh, thank you.

Anna Doel:

Thank you so much for the conversation.

Claire Parkinson:

Thank you.

Anna Doel:

I'm going to stop the recording.

Anna Doel:

Today is August 29th, 2023. I'm Anna Doel, talking with Claire Parkinson online. Our session today is about people in your life, Claire. However you want to structure it, it would be great, I'm sure.

Claire Parkinson:

Okay, people in my life. The two most important would be my parents, and both of them are now deceased. My father's the person that I most liked talking with. In terms of anybody in my entire life, he's the one that I most enjoyed conversations with, and we would talk about all sorts of things. My mother was hugely impactful to me too. My parents were very different, and I can see in myself aspects of both of them for sure. Very much so. In terms of my being a very hard worker, dedicated and all, that is similar to my father. In terms of my caring for people, that's very similar to my mother. So both of them were hugely, hugely important to me.

I do have a sister and a brother, and they are both still alive, fortunately. I do keep up with them, and that's been wonderful. My sister's name is Jean, my brother's name is William. And they are very important for me to be keeping up with. My brother is married; his wife's name is Anne, and I'm close with Anne also. And they have five kids, all of whom are adults now.

One of them, Jen, is living close enough to me that I actually get to see her once in a while. Her husband is Tim, and he's wonderful also. And they have three kids, Joshua, Anna, and Julia. It's been wonderful that they are close enough that once in a while I get to see them and do things with them; so that's been great.

As I mentioned earlier, I'm not really a social person. So most of my continuing contacts, other than family, are more related to the work aspect. In graduate school, my advisor was John Rayner, and I do still keep up with him. My two closest friends from graduate school, whom I've kept up with ever since, are Ellen Mosley-Thompson and her husband, Lonnie Thompson.

And those two, it's been fantastic for me to be keeping up with them all these decades because they do wonderful work with ice cores. They get ice cores from around the globe, Ellen mostly from Greenland and Antarctica—the polar regions, and Lonnie mostly from high mountains in the mid-latitudes and tropics. Their work has been phenomenal, and it's just been so cool for me to be friends with them for all these years. So that's been terrific.

Now in terms of when I was in graduate school and I worked at NCAR, the National Center for Atmospheric Research, of the two people from there that I've kept up with, one is Warren Washington, who is the person who got me there. He and I have talked almost every week for the past almost 50 years by now. So he and I have kept in touch for sure; and I mentioned earlier that he and I wrote a book together, two editions of a book. During those periods, those years when we were writing the book, we were in touch almost daily. So Warren and I have definitely kept in touch.

The other person from NCAR was actually a visiting scientist there at the time. He wasn't employed at NCAR, he was employed at the University of Illinois. And that's John Walsh, who is now at the University of Alaska Fairbanks. John also works in the polar regions, especially the Arctic, and does both atmosphere and sea ice work. It's been great to be in touch with him too. When he and I were both at NCAR, he got me into running. He's a real runner, so we would run and talk about sea ice and the Arctic and science, and that was really very positive. In fact, he got me to run a sequence of races that ended in the first marathon I ever ran. That was the Mile High Marathon in Denver in 1978. John and I have kept in touch also.

And then in terms of people from the townhouse complex where I live, there's one person, Stephen Leatherman, and his wife Debbie. Stephen used to work at the University of Maryland. He now works at Florida International University. He's a beach expert. And that's another collaboration that's been really fruitful, as I was able to help him with some satellite imagery that he used, and he has spoken at Goddard.

He is, in fact, known as Dr. Beach, and he puts out a list of top beaches every year. This often gets a lot of publicity, but in addition to the publicity, it has enabled him to really make a difference, because a lot of communities really want to be on his top-beaches list and he's got all sorts of criteria: You've got to have a clean beach; you don't want cigarette butts all over the place; things like that.

I really think he has been able to make a difference with this top-beaches list, which came about in a quirky way, way back in 1989, when he was still living in the same townhouse complex that I'm still in. He got called and asked for some of his favorite beaches, and he just tossed off a number of them. He was rushing to get to a plane, headed to China. So he just rattled off a few really good beaches. And he gets back after the China trip and he sees that this has blown up. It got presented as top beaches, instead of just a number of beaches that he liked.

He took it well. I would have been horrified, but Stephen wisely took it as, "Hey, this is a way to get people's interest." So that's how it all started for him to then start doing a more serious identification of top beaches, based on all sorts of criteria of water quality and sand quality and all sorts of things. So anyway, it's great to still be in touch with Stephen and his wife Debbie.

Another person that has really been cool for me to be in touch with is Larry Bergreen, who is an author who lives in New York City. Larry and I met at an event called the Renaissance Weekend, which is a big several-day event at New Year's. You get placed on various panels. There are hundreds of panels that are going on, and you get placed wherever the organizers want to place you, depending on what your expertise is.

One of the panels I was placed on had a huge audience. It was in a ballroom, and it was huge because of the five panelists: two were scientists—I was one of the scientists—but the other three were all astronauts. They were Jim Lovell, Walt Cunningham, and Charlie Bolden. So you've got these three astronauts, famous astronauts, and so a huge audience. So that was cool. It was cool to get to meet these famous astronauts, and it was cool to be on a panel with them.

However, the panel that was most influential to me was instead a very small panel where there was almost no audience at all. But that's where I met Larry Bergreen. It was a very eclectic panel. Larry was talking about Al Capone, whom he had just written a biography of; I was talking about Arctic sea ice; and there was almost no audience, but there were a few other speakers. Larry and I started talking, and he said it was shocking to him that somebody actually

studied Arctic sea ice. He said that it wouldn't have occurred to him that anybody studied Arctic sea ice. This was way back in the 1990s, so a lot of people might have had that sense at that time.

So we got to talking about that. And Larry had been very interested in NASA; so I invited him to Goddard Space Flight Center and introduced him to a lot of people. One person in particular I introduced him to was a good friend and colleague of mine, Jim Garvin, who's extremely talkative and very, very informative about lots of things, including the Mars program. This ended up resulting in Larry writing a book about the NASA Mars program, highlighting Jim Garvin.

Larry's written lots of biographies, including of Christopher Columbus and Magellan and Irving Berlin and Louis Armstrong, wonderful biographies that Larry has written. It's been really nice for me to have contact with a real author. I've written several books, but I am not a professional author in the way that Larry Bergreen is. So it's been great for me to be friends with Larry.

More on the scientific side: of my other contacts from Goddard who are no longer at Goddard, one of the key ones is Michael King. Michael King was the senior project scientist for all of the Earth Observing System program, and Aqua is one of the key satellites in that program. So he and I worked a lot together because of those two roles. And he and I also ended up being the first two editors of a major book on satellite observations. He and I have worked closely together in those roles, and I always really enjoyed working with Michael when he was at Goddard because he shares my desire to have things be precise and worded correctly; so we worked well together. I'm very glad that I'm still in touch with Michael and his wife Diana.

Another person from Goddard would be Vince Salomonson, who was my first supervisor when I arrived at Goddard, and later he was the science team leader for the MODIS instrument, which is one of the instruments on Aqua. And so he and I have had several relationships in terms of he was my supervisor for several years and then he was the team leader of MODIS. It's been really nice to still be in touch with Vince also.

Another person is Torry Johnson. Torry and I connect largely on the diversity issue. Torry and I are both extremely concerned about diversity issues. Torry has an interesting background. He came to Goddard working more in the financial aspect, but then he moved into management. He is now at NASA Headquarters and working on diversity issues, managing programs for minority universities, connections with NASA, and things like that. It's been wonderful to continue to have conversations with Torry, who is equally interested in the importance of diversity in all sorts of ways. So Torry is another person I'm really pleased to still be in touch with.

Among others is Anne Thompson, who is an atmospheric chemist here at Goddard. She and I talk both about science and about other things. Another is Mike Comberiate, who led the 1999 expedition to the North Pole that I was the lead scientist on. And Dorothy Hall and Mary Cleave I already mentioned in our earlier interview.

Then in terms of the people who are still here at Goddard, I still see lots of people who are still here, so I really don't want to go through all those names; but of the ones that I have already mentioned to you, I'm certainly still in touch with Lazaros Oreopoulos, who succeeded me as the Aqua Project Scientist. I'm certainly still in touch with Bill Guit, who's the Aqua Mission Director. And Steve Graham was the Aqua outreach coordinator for decades; Steve and I are still very much in touch.

And then others that I've known in other roles at Goddard, like senior fellows roles and things like that, I'm still in touch with Paul Newman and Moses Adoko and Ralph Kahn. Lots of people

at Goddard I'm still in touch with, like Linette. Yeah, lots of people at Goddard I'm still in touch with, because I'm still here.

Anna Doel:

I have a question. Even going back to your parents and your childhood, what do you like to do with the people you are friends with? You mentioned running with John Walsh.

Claire Parkinson:

I was on the swimming team, and so was my sister, and we both liked that. In fact, my sister Jean became the coach of the swimming team. So swimming was certainly important. When I was a young child, when we were still living on Long Island, the things I would enjoy doing would be basketball, riding our bicycles, sledding in the wintertime, wandering around in the woods. At that time, kids wandered around in the woods. Times are so different now. We would just be expected to be home by a certain time, and we would be home by that certain time. And the kids could just wander in a way that is no longer as safe. So those types of things I did. I never played with dolls. That was never something I did. It would be more sports type things. And puzzles, as I mentioned earlier, putting puzzles together, and board games and card games.

Jean and I and our parents would play bridge sometimes after dinner. It would usually be my father and myself against my mother and my sister, and I enjoyed doing that. The other thing that my father and I did after dinner was we would play ping pong, and I definitely enjoyed playing ping pong with my father. That was a cool thing to do for the 20 minutes after dinner. So that, I definitely liked that.

Anna Doel:

How do you keep in touch with friends?

Claire Parkinson:

Phone, email, although I prefer the phone. I'm too overloaded with emails, so when emails come in, it's more like a chore to have to respond, whereas a phone call is more something that's enjoyable.

Anna Doel:

Do your siblings live far away from you?

Claire Parkinson:

My sister lives in Colorado, so quite far away. My brother still lives in Vermont, so not as far away, but in terms of my getting there, since I don't have a car, in either case it would be a plane ride. So I very rarely see either of them, because they're not keen on traveling either, so it's mainly phone calls and letters and emails.

Anna Doel:

Could you tell me a little bit more about this Renaissance Weekend? I've never heard of it. It sounds like a really interesting event.

Claire Parkinson:

It's huge. I would guess a couple of thousand people each year, especially at the New Year's event. It's in Charleston, South Carolina. It became huge in the 1990s because two of the people who routinely went were Hillary Rodham Clinton and Bill Clinton. When Bill Clinton was President of the United States, it became the place to be at New Year's. They had been going to the Renaissance Weekend for years before, but when they were in the White House, it became really big time.

It started in the 1980s with just a small group. The people who started it, it was just done in their house, and it was just a small group, but it quickly grew much larger.

Anna Doel:

Do you know if it's still ongoing?

Claire Parkinson:

The people who started it are Linda and Phil Lader. It's definitely still ongoing. In the 1990s, it just became gigantic. Many hundreds of people, lots of panels, and the panels were on all sorts of themes. Some would be science, some would be things like building houses for needy people. Just all sorts of topics. Because it became so popular, instead of just New Year's they started having, and still do have, several Renaissance Weekends throughout the year. The New Year's one tends to still be in Charleston, which is where the Laders live, but the others tend to be in other attractive locations.

It's several days long, with many panels going on at the same time. You send in a writeup of the various things that you're interested in and expertise that you have. And then the organizers schedule who's on what panel when. And they've got a wonderful children's program also, so that parents can bring their children and the children can be engaged in a wonderful children's program. I spoke several times at the children's program, like with a slideshow about my trip to Antarctica. That was cool to get to do that.

Anna Doel:

Claire, I'm not sure that I'm correct in this observation, but when you were talking about your friends, it seemed to me that you have more friends who are men than women friends. Is that correct?

Claire Parkinson:

Well, that is because the scientific community that I'm in is so dominated by men. That's just the way that is. It was especially true in my early years in the scientific community. Now, if I look down the hall that I'm on right now, there are lots of females, and lots of females that I very much enjoy talking with. Linette Boisvert, Rachel Tilling, Chelsea Parker, Kelly Brunt, Angela Bliss, Susan Raphael, Ronnette Barnes, Debbie Brasel, lots of women now. So I am definitely in touch with lots of women. I think the fact that the earlier contacts were largely men is simply an issue of the scientific community being so dominated by men.

Another person that I haven't mentioned, as she's deceased now, but my advisor at Wellesley was Alice Schafer, and I did keep in touch with her while she was still alive. She died several years ago.

Anna Doel:

What kind of person was she?

Claire Parkinson:

She was a math professor at Wellesley and very much a professor. But she also was concerned about issues beyond just math. And in fact, when I was in jail for the protests that I mentioned…

Anna Doel:

The 20-day detention?

Claire Parkinson:

Yes. Of the two visitors I had, one was my sister Jean and the other was Alice Schafer, my advisor from Wellesley. Her husband was a professor at MIT, and when I got in jail, he told her, "You've got to go in there and get her out. You can't let your advisee sit in a jail cell." She came with the intention of bailing me out. And I said, "Absolutely no. There's no way I'm getting bailed out." We did meet a few times later, because after she retired from Wellesley, she got a job in the DC area, at Marymount University. So we met for dinner with a few other former Wellesley students of hers a few times. One thing she did point out several times was the jail sentence and the visit. She was definitely interested in those aspects too.

Anna Doel:

It makes perfect sense to me what you say about making friends with men when you were younger, just because most of the people who were around you were men, which is how the scientific community worked back then. And, yes, I'm glad that you see change these days.

Claire Parkinson:

Yes, I am very glad too. Now, by contrast, Wellesley is all female. So in my college years, it was all females. And several of those have become very prominent. In fact, one of my friends at Wellesley was Hillary Clinton, Hillary Rodham at that time. So when I was at the Renaissance Weekend, it was great to get to talk with Hillary a few times there. Hillary and I have kept in touch a little bit, but not a whole lot. I'm not a politician type and she's not a scientist, but we've kept in touch a little bit. But anyway, she was a great friend in college.

And actually, her career has made a difference to me in that as I've seen everything she's gone through and survived, it really has made me think about my own reluctance to speak to the press and things like that, reluctance because I don't want to be misquoted and I don't want to say something that I'm going to have to retract. When I see what she's gone through, I realize that anything that I might say that might not be quite right, the amount of attention it's going to get is so minuscule compared to what Hillary has had to go through. So that has mattered to me in terms of my feeling "Okay, I can take the little bit that I need to take," knowing that Hillary has to take so many orders of magnitude more and somehow gets through it all.

Anna Doel:

Yeah. I don't know if this question will make sense to you, and it's okay if it doesn't. I have a dear friend who is a geophysicist. And he has this category of people that he relates to. He can say about somebody, a dear friend and colleague, "Oh, this person is one of my favorite people," by which my friend means not that he plays favorites, but that he admires this person to an extent that we can say, "Oh, I wish I could be like this, but I'll never be like this, but I just have this person in my life and I can enjoy interacting with them." Does that category make sense to you at all?

Claire Parkinson:

It makes sense that some people have categories like that. I personally don't. I am well aware that I have strengths and weaknesses, and I'm well aware that everybody else has strengths and weaknesses. So I appreciate the strengths that other people have, but at the same time, I don't regard anybody as someone to put on a pedestal, because I know that we all have flaws.

Anna Doel: Oh, sure.

Claire Parkinson:

And we all have strengths. When I think of people that I admire, some of them would not be people that would necessarily be considered strong people. It might be somebody who has Down's Syndrome and does amazingly well despite the Down's Syndrome. For instance, I find the Special Olympics highlights to be just fantastic. So many of the children and adults in Special Olympics have achieved so much despite having mental disabilities, but they get beyond that. And in some cases it's just amazing to me how well they can get up and speak to huge audiences and do so articulately, eloquently. Those are people that I certainly admire just as much as I admire the people who might be regarded as more intelligent or such. There are many aspects to intelligence, and the IQ intelligence is not always the most important one.

Anna Doel:

Could you speak a little bit about your involvement with professional organizations? I know you're on committees at the APS, for example.

Claire Parkinson:

Yes. The professional organizations that are open to almost anybody and that I'm in would be ones like the American Meteorological Society, the triple-A S [AAAS], which is the American Association for the Advancement of Science, and the AGU, which is the American Geophysical Union. And those I've definitely been involved with since early in my career. I've been on committees for them; I've never run for an office in any of those, but I have served on committees.

Then there's another category, where you have to get elected to be a member, and the American Philosophical Society is one of those. Others that I'm a member of are the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences. In each of those cases, each of those four cases, I have been on committees. The American Philosophical Society in particular, I really feel that the committee I'm on is very meaningful. It used to be the Committee on Library, now it covers both Library and Museum.

The reason I got on that committee was because in my orientation session when I first got elected, the Librarian at that time spoke, and he described an effort that was, at that time, somewhat new at the American Philosophical Society, which was to return some of the belongings of the American Philosophical Society to the Native Americans whose ancestors were the people these belongings had come from.

The American Philosophical Society has a very interesting history. One of its presidents was Thomas Jefferson, who was president at the same time that he was President of the United States. And Thomas Jefferson sent the Lewis and Clark expedition across the country to survey and find out about this huge area that was the United States, which was a very young country at that time. And so, when the Lewis and Clark expedition came back with all sorts of items from Native American communities across the country, a lot of those ended up in the American Philosophical Society, which made sense.

To me, it was very meaningful that the American Philosophical Society was aware that some of these maybe really did belong in the Native American communities. So they've had a wonderful program to return some of these items, but working with the current Native Americans. And in many cases, it turned out that the Native Americans realize that they themselves don't have as good an ability to preserve these as the American Philosophical Society does. Working together, they've come up with ways for the Native Americans to get what they want, which is often copies of what the American Philosophical Society has, so that they get good copies, but the preservation aspect remains with the American Philosophical Society. I've been really pleased with that.

And I've been pleased with the fact that these other organizations also do all sorts of good things. The American Academy of Arts and Sciences puts out lots of readable documents on important issues, diversity being a key one, and they put out really good publications on that.

And the National Academy of Sciences and National Academy of Engineering, both were established to advise the government on issues of science and engineering, and they advise on all sorts of issues and do very good things. At the National Academy of Engineering, they have a wonderful program called Engineer Girl. It started out, I think, for middle school students, but then it expanded so that now it’s for high school girls also. So they have this wonderful program to encourage girls to recognize the importance of engineering and consider engineering as a viable career.

All these organizations I am very honored to be a member of, and I think they do great things. But one aspect is a little troublesome to me, which is that I have never been a club type person. In fact, in one of the first meetings I attended at the National Academy of Engineering, one of the people there said to me, "Isn't this cool to be a member of this club?" And immediately it bothered me, knowing that I'm not a club type person, I'm not an elitist. I'm honored to be a member, but I do have doubts about whether this is really appropriate for my personality type, to be a member of a club that's kind of elitist. So I do have a problem there.

In fact, just earlier this month I was in a meeting where we were trying to prioritize which people to support getting elected next year to one of these academies. I took it very seriously because it's a huge honor when people get elected, so I definitely take it seriously to try to nominate really good, deserving people and to try to support the other nominations that are really good too. I really want to do a good job, in terms of my voice helping to select new people into these academies.

But at the same time, I'm thinking, "This is just not appropriate for me," When I was a kid, I was never a club member, and the thought of being in a meeting concerning "Whom are we going to let into our prestigious club?" is troublesome to me. And yet, I'm trying to respect the organizations, which I really think are good organizations doing great things, and I'm trying to respect that. But at the same time, I'm thinking, "This is just not me, being in a club that's so restrictive."

Once when I was on a plane in the 1980s, I was in first class for some peculiar reason. And I just hated being in first class. I didn't want anybody to see me. Never again have I sat in first class, as it's just not me. So I do have this mixed feeling about these organizations, while I really do feel that each of them is doing wonderful things.

Anna Doel:

Claire, do you enjoy reading for fun, not for work?

Claire Parkinson:

I read a variety of magazine type things. I read a lot about sports, and I certainly like reading about accomplished people in whatever field. So I like reading about artists, scientists, athletes. Any accomplished person, I could be very interested in his or her life story. And certainly people who've been involved in diversity type issues. Martin Luther King was a huge personality for me in the 1960s, and I admired him so much. I still do.

So I read a lot about all sorts of nonfiction things. I don't read much fiction. I do read some fiction, but usually I'm reading nonfiction, although it's on all sorts of topics. It's certainly not restricted just to science; it's sports, people, diversity issues, environmental justice issues, hugely important, environmental justice.

Anna Doel:

I remember you mentioning an interest in history as well and the history of science.

Claire Parkinson:

Yes, definitely.

Anna Doel:

And biographies?

Claire Parkinson:

I am definitely interested in how ideas have evolved. And I think it's partly my interest in the history of science and also my background in math and my inclination toward math that make me less definitive in my statements about climate change than some of my climate change colleagues. Some of them will be absolutely firm that the climate is going in a certain direction, headed for a disaster. I'm much less definitive about that.

I personally think that more progress would have been made if people had taken a calmer attitude. My basic thrust has been: I am not sure what will happen to the climate if we continue with the greenhouse gas emissions and other things that we're doing; I'm not positive, but the

best models we have say that we're headed for really tough times if we don't back off on our emissions; and my feeling is very strong that we shouldn't ignore the best models that we have.

So I end up with the same bottom line of: We should be reducing emissions. But I end up with it not by saying I'm certain what will happen if we don't, but by saying that the best models we have, which are imperfect, are saying that we are headed for really tough times, and therefore we should cut back. And I just feel that that's a better way of stating it. Many times when I give talks, people come up to me afterwards and they say that for the first time they finally really get it, and that it was because of the way that it was presented, instead of being presented as though the speaker is absolutely certain about the future.

Many of us realize that, in every field, predictions don't always come out the way that was expected. Look at politics: Most polls said that Hillary was going to beat Donald Trump, and then that didn't happen. Look at economics: People in the 1920s were thinking the stock market was going to keep going up and up and up, and then it crashed. I think in all sorts of ways, we can't be sure about what the future's going to be and it's best to admit that.

And the connection there with the history of science is simply that so many mainstream thoughts in the history of science get overturned. Before Copernicus, it was very mainstream to think the Sun was going around the Earth. That was mainstream science at the time. And yet decades later, that was overturned. And by now, very, very few people still believe the Sun's going around the Earth instead of the Earth going around the Sun.

And the same thing with Newton's theory of gravitation, which is a tremendous, wonderful theory and still holds under a huge range of conditions; but it was superseded by Einstein later. So the history of science does give the very strong case that science is a process where you're improving the understanding of the world around us, and this process does not have an end point. The improvements hopefully will keep coming, and therefore the current science is not necessarily what's going to be deemed the best decades or centuries from now.

Anna Doel:

Claire, is there something we haven't discussed that you would like to comment on today?

Claire Parkinson:

There are so many things, but I guess “no” in terms of a particular topic. But just to make a closing comment, I would say that it really has been a tremendous privilege for me to be able to work at NASA Goddard Space Flight Center for over 40 years. NASA has provided me with such incredible opportunities to make a difference. It's given me the opportunity to do my science. It's given me the opportunity to be involved in the Aqua mission, which has helped thousands, probably millions of people in terms of everything that Aqua has been able to do. So it has been a huge privilege for me to be able to work at NASA, and I am so grateful to the organization for giving me these opportunities.

I feel that I have worked incredibly hard to justify their faith in me. And I'm very pleased to have been able to make the contributions that I've made. I'm very pleased to have been involved early on in the satellite data analysis business. But at the same time, I'm very pleased to hand that off now to people who have skills that I don't have, with new tools that I'm just not as familiar with, like machine learning and artificial intelligence. So I am hugely pleased both with what I was

able to do and also with passing it on to people who are now more capable with the new tools that are available.

I think my attention going forward will be more on the diversity type issues and the climate change discussion issues. I would love to figure out how I can get through to more people about toning down the polarization in the climate change discussions. I tried to do that with my 2010 book, but I realize that that book was not written in a way that would get a large audience. It was too dense in terms of facts and not a large-audience type book. I hope maybe I can figure out how better to make some contribution in that area.

Anna Doel:

Thank you so much, Claire. I'm going to stop the recording now.

Claire Parkinson:

Okay, great.