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oral history transcript
Karen Keskulla Uhlenbeck
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Anna Doel:

Today is April 10th, 2023, and I, Anna Doel, am talking with Karen Keskulla Uhlenbeck at the Institute for Advanced Study at Princeton. Karen, what's your current academic position?

Karen Uhlenbeck:

Well, I'm a professor emeritus from the University of Texas in Austin, and I have a ... Let's see. What's my full title? It's Distinguished Visiting Professor at the Institute for Advanced Study.

Anna Doel:

What does that entail? What do you do?

Karen Uhlenbeck:

Well, it's an honorary position. It has no salary. I do have a little bit of travel money for some things I can spend, which I don't spend. Basically, my unofficial position is that I'm the senior woman here, and I arrange for the women visitors here to have lunches and any other activities they want to have. And mostly, on the other hand, I don't do anything. I just arranged for one of them to do it. But I do come to two or three seminars a week, and I am still active in research.

Anna Doel:

What are you focusing on currently on your own work?

Karen Uhlenbeck:

Oh, I see. Well, a former student of mine came to me with a question about doing some analysis in a problem in geometric topology, and it has to do with measuring distances between spaces with a certain norm. The topologist was William Thurston, who was, by the way, my head TA during the Vietnam War when I was an instructor at Berkeley in my first postdoc position. But anyway, he developed a theory, and a former student of mine came to me, and we've written ... We're on our third paper. It's a very interesting development. I have studied the calculus variations, which involves PDE [Partial Differential Equation] and this problem is at the limit of calculus variations problem involving PDE [Partial Differential Equation]. It's not the sort of problem that people have looked at before and so I've found it's very interesting and very different. I don't think I'd still be doing research at 80 if I hadn't found such an interesting problem. New problem too anyway.

Anna Doel:

Let's go all the way to the beginning. I know that you were born on August 24th in 1942. Is that correct?

Karen Uhlenbeck:

That's correct.

Anna Doel:

Where did you grow up?

Karen Uhlenbeck:

I was born in Ohio, in Cleveland. My father was an engineer, and during the war, they moved the aircraft industry. He worked in the aluminum industry and then during the war, they moved the aircraft industry inland, and my father was moved during the war to Ohio, and immediately after the war in 1945, we came back. So I don't remember much about Ohio, but I grew up in New Jersey about an hour north of here.

Anna Doel:

So you're from here? You're local.

Karen Uhlenbeck:

Yes. I'm from here.

Anna Doel:

What else can you tell me about your parents?

Karen Uhlenbeck:

Well, my father was an engineer, and my mother was an artist. My mother, when she got married, was teaching. In fact, my mother started studying at the Art Students League. She started in the late 1920s, and she realized that this was not a way to earn a living and so she switched to the City University of New York where she did get an art degree, but she also got a degree which allowed her to teach and so she taught high school art. But when she got married, she stopped teaching. That's the way it was. In fact, I've read recently that in some cases you *had* to stop teaching. A woman had to stop teaching when she got married. I don't know whether my mother had to or whether she just stopped teaching.

And of course, it was not for a number of years that any children were born because this was in the depths of the Depression, and the Depression overshadowed my childhood. My parents had both gone into college, but they got out of college in 1932, and the only job my father could get was in the gold mines of California. He had a degree from MIT [Massachusetts Institute of Technology], but the only job he could get was in the gold mines of California.

So, the Depression overshadowed my childhood. My parents, to their dying day, were worried about money, even though they were quite comfortably off by the end. My mother was a housewife primarily and then she did end up having four children, but she painted on Thursdays. I still remember. It was washing on Mondays, ironing on Tuesdays, maybe ... I forget. Cleaning on Wednesdays, but painting on Thursdays and shopping on Fridays or something like that. She had it very much regimented.

In fact, when I was growing up, the people that I remember from my childhood ... My mother was one of 12 children, and she had an extensive family, and I remember her brothers and sisters very well, but I also remember her artist friends, who were not “standard bourgeois families” in Northern New Jersey. Many of them were of European descent. They did not have standard lives. I was introduced to some counterculture during my childhood through my mother's artist friends. Let me see. I could talk about my parents for a long time, but-

Anna Doel:

Oh, this is really interesting. This is a window into a life that we don't know as much as we would like to. Like the post-depression years, and how families coped with that.

Karen Uhlenbeck:

Yeah.

Anna Doel:

And I also find it very interesting that your mother kept up her connection to art. Did she teach her children painting?

Karen Uhlenbeck:

Well, I seem to remember that she tried to teach us to paint. I still remember frustration because she was so good at it, and we weren't so good at it. But she did. In particular, I do remember she had us sculpting and plasticine and things like that, which I think I liked better than the paintings. But I remember mostly a frustration with not feeling very good at it so I was not particularly interested in learning about art from my mother. She did teach me perspective. I remember that. I was interested in it. I understood immediately what it meant and it didn't puzzle me or anything. It wasn't something like she showed it to me and I was overwhelmed or something. I was fascinated by it, and I did learn a lot about art. When I get a nice set of pencils and I see the names, things like Prussian blue and Cadmium yellow and so forth, I learned all those names from my mother's paints when I was a little girl.

Anna Doel:

Did she tell you anything about art history? Did she take you to museums?

Karen Uhlenbeck:

Oh, yes. I'm sure I went to museums. Oh, yes, yes, yes. In fact, I'd gone to museums my whole life. I've always assumed that was one of the things that you did with life. And also, I remember being taken to concerts.

Karen Uhlenbeck:

I remember vividly going once to a symphony concert with my father. I don't remember. I must have been about 10 or 11 or something and my mother didn't want to, couldn't go, or maybe she ... Maybe she was pregnant with one of my younger sisters or something. And I remember going

to concerts. And so I always figured that this was the kind of thing you did when you grew up, is go to concerts and museums.

Karen Uhlenbeck:

And our house was full of books. By the time I had graduated, I had read every book in the house three times, except there's some caveats there, because I know I read the *Modern Library* version of Sigmund Freud's whatever it is and that. But I remember that *Swan's Way* (by) Proust did totally mystify me. I read it when I was in my 20s but as a kid, I couldn't make head or tail of *Swan's Way*. That was ... I was surrounded by those sorts of things when I was growing up.

Anna Doel:

What kind of books did your parents keep in the house?

Karen Uhlenbeck:

Well, a lot of classics. *Ibsen's Place* ... Gosh. I would say just a lot of classics. A lot of *Modern Library* books. There was this special volumes of them put out. I think it was a special effort to bring the classics into the American home or something and the *Modern Library* editions of things. No, I can't remember too many. My father, when I was in high school, started bringing books home from the library on astrophysics. I remember vividly Fred Hoyle's *Frontiers of Astronomy*, and I started reading them, and he never talked to me about them, but somehow or other, maybe I picked them up or something. And I started reading science through the fact that my father had brought some books home. But he never talked to me. We never talked about it. I find that very surprising that he didn't talk to me about my interests or anything.

Anna Doel:

Do you know why he brought those books home from the library? Was he interested in reading them?

Karen Uhlenbeck:

Oh, yeah. I'm not sure. My father was a little bit depressed his whole life.

Karen Uhlenbeck:

He had trouble with his back, and I guess he worried about money. And when I was 10, my youngest sister was born and she was badly handicapped, physically, and this was a monetary strain on the family. When I was a little girl, I remember my father singing when washing the dishes on Sunday evening or something. But later on in life, I remember him mostly as being a bit dour and physically uncomfortable.

Anna Doel:

Could you tell me a little bit about your siblings?

Anna Doel:

Are you the oldest?

Karen Uhlenbeck:

I'm the oldest and I had a brother that was two years younger, and then a sister that's seven and a half years younger, and another sister; the handicapped one, was 10 and a half years younger. The youngest sibling was badly handicapped and my mother was very concentrated on getting her functional.

Anna Doel:

What was the medical issue?

Karen Uhlenbeck:

Well, she was born with a handicap. I remember the word “arthrogryposis” from my childhood. And I've looked it up and I think that was what we were told. So she did a lot of physical therapy, and my mother got her through school and got her through college and so forth. But she had a hard life, and she died fairly young.

And my next sister, who was fairly close to her ... Neither my brother nor my sister seemed to do very well in life. In fact, we talk about our childhoods and I actually remember my childhood as quite happy! I don't have too many bad memories. But they remember life as much harder than I do.

Karen Uhlenbeck:

My brother in particular had trouble keeping a job. Well, actually, he has a very checkered career. For example, I think ... I forget. He's interested in music, and he also has a divinity degree so, he struggled a lot to find himself.

Anna Doel:

Did your family belong to any religious congregation?

Karen Uhlenbeck:

Yes. I remember my mother's father was a Methodist minister who died when she was very young. I remember being taken to the Methodist Sunday school when I was very young. But just about the time I entered high school or something, my mother discovered the Unitarian Church and so she started going to the Unitarian Church in Plainfield. My father didn't have any interest in that. In fact, I have interesting memories of church as a high school student. In fact, I go again to the Unitarian Church, although there were like 50 years in between when I didn't have any church affiliation at all.

Anna Doel:

Could you maybe comment on this stereotype; and I will bring up more stereotypes as we go along; that scientists typically do not engage with religion or do not have faith?

Karen Uhlenbeck:

Oh, well, I mean, I'm sorry that I can't remember, but the Unitarian Church I belong to here, I've been talking to one of the older members and he was citing the list of scientists from Princeton and the Institute and so forth had actually belonged to the Unitarian Church. I know John Wheeler was one name that I remember, because I actually knew John Wheeler. And so-

Anna Doel:

Oh, you did?

Karen Uhlenbeck:

Yeah. He was at Texas, or he went to Texas [University of Texas Austin] for a period of time where I was a professor. In fact, I know several Jewish mathematicians, maybe mostly from the point of view of their children, but who are actually actively engaged in Jewish practices. It's kind of interesting. I think you're right. I think that very few scientists are engaged in religion. I think most of them don't understand religion at all.

Anna Doel:

How does this work for you?

Karen Uhlenbeck:

Well, it is where you can get with a group of like-minded people. The modern liberal religions, there's a technically a great deal of difference between the formal faith of Unitarian Universalists and say Episcopalian or Presbyterian or something more congregational. But in fact, the liberal religions are very much involved in active social change and community support. I don't think they're very effective, but they understand very much the need for community support, for the need for a whole host of things. All the “woke things” that people scorn. It's actually a group of people who really want to do things better in life. It's very nice to belong to such a group.

It's very different. If you come to the scientific community they all have the same beliefs, but they never do anything about anything. They don't even make any effort to bring Americans who have no access to education. They don't even really spend time bringing mathematics to the masses. They follow their own thing and they think this is all a good thing, but they rarely do anything about it. Well, at least as far as the church, it's very minor and so forth, but the church generally has people in it who actually want to do something about things. As I said, in some sense, the opinions are no different, but it's a question of whether you're going to make any personal sacrifices for it.

Anna Doel:

As in sacrifice, a little bit of your time and energy?

Karen Uhlenbeck:

Yeah. Right. I really think we spend a lot of time sacrificing time and energy towards bringing on the next group of mathematicians but if there are no Americans that are actually well-trained enough to become mathematicians, then we take them from China, and from Israel and from all

these kinds of places, and we nurture them and bring them along and we have a next generation of scientists. But the picture of the broader scheme of things, there's no group effort, so to speak.

And it's not that I'm in the church. I'm in fact too old to be very energetic or do very much but it's nice being with a group of people who spend a certain amount of their time trying to make a difference.

Anna Doel:

Of course.

Karen Uhlenbeck:

We collect food for the food pantry, we donate at church every time. Every Sunday we actually share our plate with some worthy group of people and so forth. And it's nice to belong to a group of people who actually are making a commitment to this. It's not that, as I said, scientists don't do this, but it's other directed. It's directed towards the science community from the point of view of science, not towards, say, making science accessible, or bringing other people into science, or making people assure that people have enough to eat so they can actually study, so they can actually learn, so they can do mathematics. There's a long chain here, and I can't believe the fact that we have people who go hungry in the United States, and that in the United States, the main cause of deaths to children is gunshots. And at least when I go to church, I'm with a group of people who are very aware of this.

Anna Doel:

Thinking back to your childhood and your own experience with having access to things.

Karen Uhlenbeck:

Oh, yes.

Anna Doel:

How old were you when you started using a library on your own?

Karen Uhlenbeck:

Well, as soon as I was allowed to, but I didn't have transportation, so we would go to the library every Monday night or something, and then I'd stay up the next three nights reading all my books. The thing is that it was a family thing that we went to the library and got as many books as we could. And that was-

Anna Doel:

Which town were you living in then?

Karen Uhlenbeck:

We lived in West Millington, and the library we went to was one on the little corner in Basking Ridge opposite the church. Library night was a big thing for everybody in my family.

Anna Doel:

What are your memories of going to school? What do you remember? Grade school, middle school?

Karen Uhlenbeck:

I don't know.

Anna Doel:

Were you interested in going to school or did you have to-

Karen Uhlenbeck:

I liked everything I did! but I don't remember being very interested in any of my subjects in school. I was interested in things I found in the library, and I was interested in making things. My parents weren't big on spending money to buy hobby equipment so I would carve things out of wood that I found around the house and so forth. But I don't remember school as being interesting, actually. That's-

Anna Doel:

Would it be more accurate to say that you were more excited about learning things and knowing things than going to school, per se?

Karen Uhlenbeck:

Yes. Yes, yes, yes. I was definitely. I thought that I wanted to know things I wanted, and I also had a picture of a great life out there in which all these people, like scientists and literary people and artists and so forth, were out there and living in a Bohemian intellectual life. And I always had this something to look forward to and take part in. So I read a lot. I read a lot of biographies. I actually read all the books on science in the little library we had. There wasn't very much.

Anna Doel:

Anything inspiring?

Karen Uhlenbeck:

Well, as I said, I do. I remember Fred Hoyle's *Frontiers of Astronomy*, and I also remember other women mentioning that particular book. And George Gamow's *One, Two, Three ... Infinity*. These were striking discoveries to me. I loved the imagery. And I didn't like mathematics because when you read such books, what mathematics was is these stupid logical problems about ... They talk about logical problems about if somebody ... What does it say? Everything someone says is a lie. What does it mean when that person says, "I am telling a lie?" Some stupid quandary like that. I actually thought they were kind of stupid. So that's what I associated mathematics with. But I was fascinated by what I could understand. The quantum mechanics. I was fascinated by cosmology. And well, that was-

Anna Doel:

Were these concepts taught in your school?

Karen Uhlenbeck:
Oh, no.

Anna Doel:
That's what you learned from books?

Karen Uhlenbeck:
I learned from books, yeah. Right.

Anna Doel:
Did you have any friends in school?

Karen Uhlenbeck:
I had lots of friends, but I was quite old before I had any intellectual friendships. Quite old. College for sure. I was very struck by that. I had friends...

Anna Doel:
It is interesting.

Karen Uhlenbeck:
It was just nobody to share these kinds of interests with.

Anna Doel:
So when you were in high school, how did you navigate starting college, applying to places? How did you make your decisions?

Karen Uhlenbeck:
Well, for financial reasons, mostly. I remember I really liked the idea of going to Cornell, and my father had gone to MIT [Massachusetts Institute of Technology] and I applied to the University of Michigan, partly, I think because it was a good school that was not expensive, and we had relatives in Michigan. So when it came to decide where to go, my parents didn't really put pressure on me, but it was clear-

Anna Doel:
They did?

Karen Uhlenbeck:
They didn't really put pressure on me but it was clear to me that for financial reasons, I would go to the University of Michigan. It was much less expensive and the weight of all the saving money that I'd lived through my whole life, I just couldn't go to a more expensive college.

Anna Doel:

But did your parents expect you to go to college?

Karen Uhlenbeck:

Yes, they expected me to go. They expected all their children to go to college, and they expected us to be able to make a living. It was purely for financial reasons. I don't think they had a concept of any social issues involved, even though they really were more intellectual and didn't fit in very well with the community that we lived in. They were kind of scornful of bettering yourself and their whole point of view was money.

Anna Doel:

You said one of the reasons why you chose Michigan was because you had relatives there?

Karen Uhlenbeck:

Yeah.

Anna Doel:

How did that matter?

Karen Uhlenbeck:

Well, I guess people didn't fly everywhere, and one didn't fly everywhere for holidays and things. I guess the feeling was, is there was somebody that could help if there was problems. I don't think it mattered to me. I think that was more the perspective of my parents.

Anna Doel:

Did you find it helpful to have family nearby when you were in college?

Karen Uhlenbeck:

Not particularly. I did go there. It was nice to have a place to go Thanksgiving and I guess I usually went home for Christmas. But Thanksgiving and then Easter and so forth. So I went there for holidays and I had a cousin that was my age, in the same grade; but I never became very friendly with my cousins. I don't know why. I just didn't. So I didn't find it very helpful, but I didn't find it negative in any way either.

Anna Doel:

So how was college for you?

Karen Uhlenbeck:

It was great!

Anna Doel:

What did you major in?

Karen Uhlenbeck:

I started majoring in physics. The main thing that I have identified, which I really think is important to my success is Sputnik [Sputnik 1 satellite]. Because Sputnik went up in 1957, I started college in 1960. By then we were woefully behind in science, same as we are now. But I mean that's not here nor there. Now, we just take immigrants. Woefully behind in science. Did you ever wonder why so many of the government scientists are actually maybe first generation immigrants?

Anna Doel:

Yeah, I think we both know the backstory of that.

Karen Uhlenbeck:

Yeah. Yeah.

Anna Doel:

Yeah.

Karen Uhlenbeck:

Well, I mean, it's tough to get there, and they are people who hung in there. I mean, they had the right background and hung in there. Anyway, so there were programs in place. My parents hadn't sent me to orientation in the summer, but somehow or other, I arrived a week... Maybe I arrived a little earlier or something? And I managed to take the exams to get in the honors college. And I got in the honors college. I have the distinct memory that my chemistry exam to get in the honors college was the same as my final chemistry exam in high school. Also, I remember I had taken four years of Latin, and so I passed out of the language requirement by passing out of Latin. But anyway, I got in the Honors college, not by the standard route, by kind of somehow managing to take the exams and get in.

I was in an honors math class, that was very... It started from not assuming you know anything, but it was very advanced. I mean, there were 80 students in it, and after two years there were 15. So the attrition rate was tremendous. But the point is there were these very good courses available to me. I still remember that one of my most vivid memories was going to the TA help session and he showed us how to take derivatives by taking limits before the professor did. And I remember being so excited. I remember you're just *allowed* to do that, meaning it was just the fact that there was sort of freedom in what you were *allowed* to. You could do all this stuff in math. You were *allowed* to do all this stuff. Well, I mean, it's still clear to me you're *allowed* to do these things, right? It's not like you have to think in a certain way or that...

Anna Doel:

Follow a certain algorithm.

Karen Uhlenbeck:

The point is something people will say, "Well, they make you do that that way." And I thought, geez, that's a great idea, you can do that, right? And I still have. When you see a new concept,

you can either react and say, "Oh, this is stupid. Why are they making me do this?" Or you can say, "Hey, that's great! Maybe I can do it. Maybe I can do it too."

And so I can see that people could have two reactions to these kinds of ideas. And most of the things that really excited me were mathematical ideas. It did seem to be much more when you took a physics or chemistry course that you were actually really supposed to toe the line and do it the way they said to do it. It wasn't that they were introducing you to a concept that you could make your own and make useful. And so mathematics was clearly, to me, something that you could make your own. You didn't have to memorize it, you didn't have to do it the way they said. They would give you an idea and you could actually use it. And I've never had that reaction to... especially physics. I actually spent quite a bit of time doing physics, and it always seemed to me that you were supposed to do it the way they said. It was never "Here's an idea and what can you do with it?"

Anna Doel:

So was it around that time that you started drifting towards mathematics?

Karen Uhlenbeck:

That's right. It was. In fact, my story is that in high school, I remembered distinctly, the last year I signed up for a French class and honors math, in which I think they were doing calculus. But I hated... I thought the French class was stupid. I don't know, it was just stupid.

Anna Doel:

Was it again about making students learn the rules and follow them?

Karen Uhlenbeck:

No, there seemed to be no content to it. Everything took forever. There was no liveliness. There was no interest. There was very little you learned. I'm sure they teach languages better now. They only began to have language labs when I was takin German in college. So you actually would listen to something rather than learn it from a book and so forth. So I went back to Latin, which was at the same time as honors math. So I took Latin. For sure I took Latin instead of honors math.

Now, Latin was interesting because it was hard. You have to say. I don't think any other classes in high school. You really had to work at Latin. And also there was an excitement about learning things that people did 2,000 years a... I mean, I still have this feeling. It just was the excitement of just knowing this was really what adults did, was learn about and know about Latin and learn all this stuff. So there was a little bit of the culture of learning Latin, which was intriguing to me. And I think I probably read enough by now to know that a lot of people had studied Latin. Latin was something that school kids did in generations before me, so I felt sort of at one with some group of people by learning Latin. So anyway, so I wasn't interested in math, but I learned enough calculus that I could pass whatever thing they asked me. I mean, I could integrate x^m or something like that, which is probably all that I would've learned to do in honors math in high school, anyway. It didn't hold me back at all.

Karen Uhlenbeck:

And actually, the story about how I got involved in math, also. So I was enamored of the mathematical ideas I met in my freshman honors math course, but I also had the luck. I was somehow in Ann Arbor during a holiday. I don't even remember which one. And I was doing what I was doing, I was at an art museum. And I still remember I was in front of this great big abstract painting, and I bumped into some guy who turned out to be a math professor. He asked me if I liked the painting, and I said, "No." It was this big abstraction. And my mother did a lot of landscape painting, anyways, so it wasn't the style of art that I had liked from my childhood. But anyway, so he took me under his wing, and I think I ended up grading linear algebra without ever having taken it. By the time I was a sophomore, he had me in a graduate algebra class. So I was sort of discovered. So instead of busing dishes to earn spending money, I was grading papers.

Now, I think that was an error in my education. If I have to do it again, I keep busing dishes, because grading papers is by far the worst job that anybody's ever had. You must know this. I mean, you've graded your share of papers. So anyway, I was discovered, and by a sophomore I was taking... And I didn't understand that class, and I didn't know the canonical form for matrices, so I didn't know the basic example. Three years later, or two years later, when I came to take my prelims in graduate school, somehow or other what I had missed, hadn't understood when I was a sophomore, I actually understood when I was a graduate student. I mean, the learning is just not linear.

Anna Doel:

It's not.

Karen Uhlenbeck:

It's not at all linear. And then my junior year I spent in Munich. I had a boyfriend who was a math graduate student. He was a Pole [Polish]. Somehow he would become an American citizen by serving in the military. Anyway, so he was the one who urged me. He thought I needed some European education. So he wanted me to go on a junior year. He found a junior year abroad program and said, "Why don't you try this?" And so I went on a junior year abroad program, which didn't cost my parents much more than going to Michigan, which didn't cost them much anyway.

Anna Doel:

How much German did you speak by then?

Karen Uhlenbeck:

I had two years of German in college, and I was terrible. I'm terrible at languages. I don't really have it ear. I actually read better, but I did learn.. by the time I spent a year in Germany, my German was pretty good. I mean, not great. So I had a wonderful time in Germany.

Anna Doel:

So what kind of time did you have? What did you do?

Karen Uhlenbeck:

Well, first of all, it was romantic. I remember walking in the English Garden and reading Thomas Mann, who also walked in the Englischer Garten.

Anna Doel:

Kind of being immersed in the German culture.

Karen Uhlenbeck:

I learned to ski. I learned to go to opera. And you got student discounts for everything, so I went to opera. I really enjoyed German theater, the classical theater of Goethe and Lessing. And I also saw a completely different kind of education because you got these formal German polished lectures. And I had been listening to people who had walked in and pulled their notes out of their backpack and their pants pocket and kind of mumble around the board in small classes, and those were big lectures. I also remembered that there were a couple other math majors in the program who were abysmally prepared compared to me. Actually, one of the things I discovered, there were people from colleges all over the country. And I've discovered and insisted that I was getting a very good education, which was actually comforting. I realized at that time that there were several people from Princeton in the program, for example, so I was getting a good education. So I enjoyed my time in Germany, in Munich.

Anna Doel:

In Munich. I'm curious, when you were in college, were you noticing any gender dynamics?

Karen Uhlenbeck:

Well, there were no women.

Anna Doel:

Were you the only woman? I don't know.

Karen Uhlenbeck:

How could there be any gender dynamics?

Anna Doel:

Well, were you the only woman in your classes at Michigan?

Karen Uhlenbeck:

No. No, no, no. In fact, I mean...

Anna Doel:

Was it any different in Germany?

Karen Uhlenbeck:

Oh, I don't remember any women in Germany. I mean, I was in a program that had a lot of women in it because... American program. But I also went to classes at the university. I don't remember any women at all. I didn't even meet any women students. I met male students, and I remember dating one for a while, but I don't remember any German students.

Karen Uhlenbeck:

In fact, I don't remember any gender dynamics. I mean, there were other women in my classes, and I don't recall as it being... Well, it was different. For instance, I babysat for my math professors. At least three of them. I don't think it was the same as women and men. But I always wonder, it's one of the things... It's a generation of people that, really, they aren't there to ask anymore, but what did they think of the women?

Now, so what about the women students? Well, they found there, and somehow or other, at that age, I don't know how... [Speaking to Anna Doel] Well, look, you're in a field in which if you were realistic, you probably wouldn't be there. You're just in very entranced by what you're doing. You like history of science. You were intrigued by it. And so do you really think about what's going to happen in 20 years? I mean, you do, but does it stop you? As students anyway, especially as undergraduate students, we didn't think too much about the future. And my mother didn't care because she figured I could always teach. My mother was the only one that it mattered. My father was very interested in my brother becoming an engineer. My father had no interest in what I did. But my mother was perfectly happy because I could always teach. But I wonder what my professors thought.

Karen Uhlenbeck:

Why did they encourage me?

Anna Doel:

They seemed to support you.

Karen Uhlenbeck:

Yeah. No, they did. They did. They supported me.

Anna Doel:

Did they encourage you to think about the future at all?

Karen Uhlenbeck:

No. Well, no. None of my professors ever said I shouldn't go graduate school. No, no, no [not], as an undergraduate. But of course at this point, so 1963, that's the *Feminine Mystique* [Referencing the novel by Betty Friedan]. So by the time I started college, women's lib[liberation] had hit, or was hitting. I mean, I read, of course, these things, and I didn't want to have anything to do with it. I wanted to do math. It's kind of like I don't want mess with this stuff. So in all the decisions I made, the undercurrent of the fact that it wasn't so easy to have a career in mathematics was definitely there.

I chose to go to NYU [New York University], which had a very good reputation for women. I mean, there was a man named Lipman Bers who was a professor there. And Lipman Bers had many women graduate students. In fact, a whole generation of women graduate students. He wasn't there by the time I got. But the Courant Institute [Courant Institute of Mathematical Sciences, New York University] had a very good reputation for women students. And then when I married my college boyfriend, and moved to Boston, I didn't even apply to Harvard or MIT [Massachusetts Institute of Technology] . I mean, I just knew what it would be like. I always think that Sputnik was luck, but the fact is that in some sense, women's lib was luck. But the fact that I also knew that I didn't want to fight it. I mean, it was very distasteful to me to actually sort of have to go out there and battle my ways through. So I chose Brandeis [University].

My thesis advisor... The first time I went in to talk to him, he said, "Well, I think women should really stay at home and raise children." And now, but that's what people thought. I also think that I hear people who find that destroys them somehow. Well, it's what people thought. It's what everybody thought. So why should I get all upset? But then I started working with him, and I never heard any more of it. I mean, I heard plenty of it, but I mean, I never heard any more of it from anybody at Brandeis [University]except the secretaries, and that's another issue.

Anna Doel:

I read in one of your interviews that you had an NSF [National Science Foundation] fellowship.

Karen Uhlenbeck:

Yes. Right.

Anna Doel:

For graduate school. How did this come about?

Karen Uhlenbeck:

Well, I guess my professors told me to apply.

Anna Doel:

And you applied?

Karen Uhlenbeck:

I applied.

Anna Doel:

For an NSF [National Science Foundation] fellowship?

Karen Uhlenbeck:

Yeah.

Anna Doel:

In mathematics?

Karen Uhlenbeck:
In mathematics.

Anna Doel:
Do you know the success rates of those fellowships back then?

Karen Uhlenbeck:
No.

Anna Doel:
What were your chances?

Karen Uhlenbeck:
I don't know.

Anna Doel:
Because it's amazing, I have to say, that you won it. It's not that they gave them out to everyone.

Karen Uhlenbeck:
No, but I mean, I was presumably the best student that year. The Michigan Math Department had a good reputation. So the answer is it probably wasn't that... I mean, Princeton didn't take women. You don't really think that Harvard... I mean, I somehow don't feel I would've gotten treatment at Radcliffe [College] the way I got treated at Mich- I mean, this is the western states. They admitted women into all the western colleges, the University of Texas, University of Michigan, California, all those places. They admitted women from ground zero. When I was applying to college, Rutgers was the state university, and there was Douglas College, which was a woman's college. So the attitude towards women on the East Coast has always been very different.

When I meet women who spent their lives in the East Coast, wrestling with boardrooms and stuff like that, and I realize I've been in the open spaces of the West, I realize that there's just a different attitude. So the answer was is there probably weren't very many. The fact is they might have actually refused to give it to me because I was a woman, but they didn't. Okay. And I think that other than that, I apparently had a pretty good chance. I mean, I don't know.

Anna Doel:
What did graduate school give you?

Karen Uhlenbeck:
Well, I learned my profession. But again, I did learn it mostly by reading on my own. I did go to courses, but my thesis advisor suggested I read things, and I read them, and it was like being

given presents. I'd open it and it was a new idea and a new theory. And I still have sort of excitements remembering learning what interpolation theory was, and then figuring out how to use it.

Of course, I went to at least one course at Harvard, and I went to Colloquium at Harvard. And I was in a really hot subject of global analysis. And for a while anyway, we were going Monday nights to MIT [Massachusetts Institute of Technology] for a two, or three hour seminar on global analysis that was intended by people from all the colleges. So I had a good time, I mean, I had a good education.

Anna Doel:

Who would you consider to be your mentors, if anyone?

Karen Uhlenbeck:

Yeah, that's kind of hard.

Anna Doel:

Being such an autodidact. Did you need people to guide you?

Karen Uhlenbeck:

Well, when people ask me, I say, well, in fact, I did have a woman professor Cathleen Morawetz in NYU. I had her, a semester of complex analysis. And I have to say, it's kind of interesting, first of all, she was actually relatively junior at the time, because she's not that much older than I am. And she was in more applied fields, which there was still a lot of negative attitude (towards), and the purer people thought not so much of the applied fields. She wasn't nearly as good a teacher is the person that I'd taken the first semester for complex analysis from. And I remember being critical of her hair, and her clothes, and all this stuff, and sort of the real arrogance, I mean...

Anna Doel:

Of young people?

Karen Uhlenbeck:

Which at some point when I was closer to her age, I recognized the arrogance. I really thought, “If Cathleen Morawetz can do it, maybe I can too!” kind of thing. So it ended up being an important, but I mean, it's interesting my reaction. I mean, it was actually an important figure in my life because she was very successful and she did very well. And I do, at the time, when I recognized this, she also had four high school aged kids at home or something. She was pretty amazing, and I recognized this.

I ended up, I did get a mentor, but I was quite more advanced. I met Lesley Sibner, who was somewhat older. Also had a degree from Courant Institute [Courant Institute of Mathematical Sciences, New York University] and was a real New Yorker. She'd been an actress before she started doing math. And she was really a remarkable woman. She was the first time that I actually had a mentor who actually criticized my clothes, and my hair, and my mathematics and so forth.

Anna Doel:

Could we talk a little bit about the clothes and the hair?

Karen Uhlenbeck:

Yeah.

Anna Doel:

I'm really curious, and you don't have to answer this, but what was it about Morawetz that you were so critical of at student age you? What didn't you like about her way of dressing or?

Karen Uhlenbeck:

Well, she wasn't very polished. I don't think her hair was always combed. I mean, she probably dressed like women professors mostly do or something, but it wasn't something that I wanted to be.

Anna Doel:

That's exactly what I'm wondering.

Karen Uhlenbeck:

Yeah.

Anna Doel:

What kind of image did you have of yourself?

Karen Uhlenbeck:

Probably not... My mother was actually not very clothes... I mean, my mother was an artist, so she had a completely different view of everything. So I was uncomfortable about hair... And my mother cut my hair to save money, and she wasn't very good at it, so I felt awkward and clumsy all the time. By the time I got to graduate school... It took me many years before I got out of it, so to speak, of really always being worried about how I looked. Basically, I wasn't taught to look well by my mother, and I sort of felt uncertain about it for many years. But of course, it's sort of like you worry about your clothes until you get up to give the talk, and by then the math takes over and you don't have to worry about that anymore.

Anna Doel:

I was just wondering if it had anything to do with a comment that you made in an interview when you were talking about people's imperfections and how they shouldn't prevent people from becoming successful.

Karen Uhlenbeck:

Oh, right. Sure.

Anna Doel:

Yeah. Are these connected? Like the way you look, the way you want to look in public? Is that what you're referring to about imperfections or is it something else?

Karen Uhlenbeck:

Well, actually, I guess I'm thinking about more serious things, but I mean, that would be kind of superficial cases. But I mean, no, yeah, well, certainly, but we all have imperfections.

Anna Doel:

On a deeper level, what do you mean by imperfections? More serious things than looks.

Karen Uhlenbeck:

Oh, physical illness. Well, I mean personal imperfections, blind spots. Well, and I'm even thinking about people who can't learn to speak in public. There are many. In fact, by the time you get to be old, you recognize that many of us have real blind spots and real inabilities to do certain things and real sources of nerves, which somehow a lot of the imperfections may even become more evident when you're my age. And so you suddenly realize that it's not a question of imperfections preventing you, that we're all very imperfect. And so anybody who is thinking they can't do something because of something.

And actually, speaking of that, I was talking to some math majors at Princeton yesterday who had not been at the top of the class, and had not gone on in mathematics, and I was sort of saying that places like Princeton didn't really bother with them, they only treated the people who were at the top of the class. This was agreed upon, but then they said they were really remarkable people. It was amazing to get to know them. That comment struck me, and I thought, yeah, but that doesn't mean that you couldn't have done math as well as them. I mean, just the assumption that because these were such smart students that they would actually be able to do research math better than someone who isn't so sharp. But I mean, some of the fastest thinkers in the world are mathematicians, and some of the slowest people and thinkers in the world are mathematicians.

Anna Doel:

Oh, that's amazing. Yeah.

Karen Uhlenbeck:

So the judgment immediately that their professors, of course, added to this, but I also wanted to say, "But that doesn't mean you couldn't have been a good mathematician." I mean, so that's ... When I'm talking about imperfections, I mean we're all very imperfect. And so if you have ... I mean, I don't know when I said that. I think I was really thinking of very serious things, not just the fact that you're awkward about your clothes or your hair or something like that.

Anna Doel:

Well, I'm really glad we're talking about it now.

Karen Uhlenbeck:

I see. Yeah.

Anna Doel:

So, after you finished graduate school, you were full of energy and felt like you could do anything?

Karen Uhlenbeck:

Yeah, sure.

Anna Doel:

So, what happened then?

Karen Uhlenbeck:

Well, my husband got a job. By that my first husband got a job at ... Yeah. I should add, I had another advantage. I married the son of a very well-known physicist, Uhlenbeck. My name is my name from my first husband. His father was an academic and a very famous physicist. And I actually got a lot of insight into how academia works by marrying into an academic family. I think if you're an academic brat, you don't recognize how valuable all the information you get from about academia is. But I recognized it when I married into it and I got this different view of from the inside of what ... I mean, and all the infighting and all the ...

Anna Doel:

Oh, absolutely.

Karen Uhlenbeck:

Difficulties. And of course it was at that point there were just no jobs in physics. So this very famous physicist, he'd struggle to get any sort of ... Well, I mean you know about no jobs, but he'd struggle to get any position at all for his PhD students. I mean, it just wasn't anything. And of course, that's still almost true in physics. I mean, there are a lot of postdocs, but it's very hard to ... I mean, there are lots more need for math professors, math teachers, than there are for physics teachers.

So anyway, my first husband got a Miller Fellowship at Berkeley [University of California, Berkeley]. So we decided to go. And it's interesting. I mean, it really ... I didn't know what was going to happen, but I didn't know what was going to ... I didn't know how I got where I got, so I didn't worry about it too much. But in the end, I was made an offer of a instructorship.

And so I spent two years at Berkeley [University of California, Berkeley] during the Vietnam War with all sorts of politics. And it was a very exciting time. And as I said, everything that could happen to you, everything that could be said to a woman was said at that time. You never knew who was worse, your supporters or your detractors! I mean, I really wish some of the supporters would recognize that, that somehow or other supporting someone because they're a woman, is not a really good idea. You might support them because they're a good mathematician, but there is a difference. Anyway. But I learned more mathematics, and more physics, and physics, and that was ... And I survived the politics.

Anna Doel:

Were you involved in any sort of protests?

Karen Uhlenbeck:

No. First of all, I had already decided against fighting the world's battles. And so, I had no ... But my husband was more politically reactionary, somewhat. I mean, he was ... Mathematicians were actually ... Tended to be more liberal and more ... Many of the mathematicians were actively involved in the demonstrations and leading the demonstrations and stuff. But the chemistry department was actually much less politically active. And so he was not in favor. But I wasn't against it. I wasn't against it. I mean, I've always been able to see two sides of it because I really thought about ... What about the National Guard? The kids in the National Guard that were out there. The other side. They were just kids, too. And the soldiers in Vietnam. I mean, I guess I always had seen two sides to things. So, I'm not inclined to become ... Throw myself at something. It's just not me. I mean, it's not the way I act. Anyway.

Anna Doel:

So after two years at Berkeley [University of California, Berkeley], you faced the challenge that we tend to face at this point, finding a job?

Karen Uhlenbeck:

Right, right.

Karen Uhlenbeck:

Yeah.

Anna Doel:

And I know from your previous comments that the first job, the first faculty position that you got at Urbana-Champaign [University of Illinois] was not quite to your liking.

Karen Uhlenbeck:

Right.

Anna Doel:

You have strong feelings about that, right?

Karen Uhlenbeck:

Yeah, I do have ...

Anna Doel:

Could you tell me more?

Karen Uhlenbeck:

Right. Well, first of all, I should say that a lot of places not only didn't hire me, they told me they wouldn't hire me because I was a woman. Gratuitously. Just thinking back on there, it was interesting because they didn't have to ... It's competitive enough, right? They could just ignore the application. But no. They had to tell my thesis advisor that I should go ... It made my thesis advisor furious, but there was this ... I shouldn't go there. I should know my place, and go teach at a woman's college or something. And so they hired ... They [University of Illinois] actually made me an offer.

And my husband, I think, decided that we would go there. So, I mean, he really decided it. It's interesting because I thought of this a long time. The point is my husband was actually pretty self-confident. He didn't have to go to the best school. And also, Urbana-Champaign [University of Illinois] was actually very good in his subject, as well. I've noticed several Nobel Prizes from the people that he knew as senior professors there. So, he chose, but also he was self ... He didn't have to go to the best place. I mean, he was perfectly happy to go to a place where he thought he could do well, and he thought he could do well. Right? I've thought of that a lot, because when I see men who have to take a job at, say, the Institute for Advanced Study, the hell with their wives, right? I mean to me, I realized immediately that this is insecurity.

I mean, my big hero is Steven Weinberg, who took his Nobel Prize away from Harvard and went to the University of Texas, because his wife had a chaired position in the law school there. And it was one of the reasons I went to Texas, and he was there. And I was going to say, "This is the kind of arrogance that you actually need to support women." And I do have to say that my first husband definitely had that kind of arrogance. I mean, bless his heart. I mean, he did very well. He's done very well. So, I'm not ...

No, but I didn't like Urbana-Champaign [University of Illinois]. And frankly, it was expected that I'd be a faculty wife, even though he was in a different department. And I hated that. And I don't think faculty wife positions are very nice. I don't think they're nice. I still don't think they're nice. I mean, there are wives that have professorships, and their husband has a professorship, and that's fine. But I don't think faculty wife position ... I think they're very onerous. I mean, there must be faculty wives in all areas of the world, in mathematics. I mean, outside of mathematics, and outside of academia. But I really felt hemmed in. It was a much more closed environment than I'd grown up in. My mother was an artist. She didn't eat in the faculty club ... Have to eat in the faculty club. And she didn't have to entertain the ...

Anna Doel:

Am I correct in understanding that it had a lot to do with keeping up appearances somehow? The environment at Urbana-Champaign [University of Illinois]?

Karen Uhlenbeck:

I don't know. I mean, the other wives all had ... Were all teaching calculus, and whether they did research or not didn't matter. That was not part of their ... And so I really stood out, in the sense of being really ... I really was on the frontier, at this point. I mean, I'd been protected. Well, I hadn't been protected at Berkeley [University of California, Berkeley]. But I mean, all hell was breaking loose. There was nothing personal about ... I mean, it was just the opposite, in fact. Everything was everywhere. But you get to a place like Champaign-Urbana [University of Illinois], and people give parties and the other wives are teaching.

I remember the wife of one of my colleagues was an artist, and she kept her maiden name, and the math secretaries kept changing it on her mailbox. It was like she was not allowed to keep her maiden name. This strikes me as ... And it's not that people were personally antagonistic. I mean, in fact, I still remember sitting at the lunch table and talking about gardening with one of the older professors. It was great. I was a gardener. And I met ... So it wasn't personally unamicable but it was just, I still think that I don't want to be a faculty wife.

Anna Doel:

What did you want to be?

Karen Uhlenbeck:

Well, I didn't know.

Karen Uhlenbeck:

I didn't know. Right. I didn't know.

Anna Doel:

How did you figure that out?

Karen Uhlenbeck:

By leaving.

Anna Doel:

Uh-huh. How did that come about?

Karen Uhlenbeck:

Well, I met some other guy and decided I liked him better than my husband, and I left. I mean, it wasn't very nice, and I have very ... I think it was one of the worst things I've ever done. But I saved myself. I mean, I don't know. Maybe if I had stayed there, it would've worked itself out. You know? Maybe ...

Anna Doel:

Really don't know.

Karen Uhlenbeck:

But I don't think I would have been ... Well, and I'd already actually started ... I mean, I was doing good mathematics. I met ... Well, postdoc came from Berkeley [University of California, Berkeley], who was in the geometry group. I'd been in a different group, so I didn't even know. And he told me some new ideas and we wrote a paper together, which is still quoted as one of the main things that I did. So, it wasn't that my math had stopped or anything. And I had a big garden, and all this ... but I don't ...

Anna Doel:

So, sounds like there were several reasons to maybe leave that kind of life behind. And you met this other person. Was he also an academic?

Karen Uhlenbeck:

Yes. Yes. He's a mathematician. I'm still with him. So ...

Anna Doel:

And it sounds like on the one hand, Urbana [University of Illinois, Champaign-Urbana], provided you with a research environment, but at the same time no. You wanted something else.

Karen Uhlenbeck:

Yeah, I wanted something else. I'm not the kind of person that ... It just doesn't interest me to try to change things. Right? I just think, you know, you can think ... Lots of people tell me, "Well, I put in the first ... I did this and this and this for the women in these things. I did this, and this, and this and this." Or I got them to pay attention to me. But I just wasn't interested in revising the situation.

So, I moved to Chicago. And I had a temporary position at Northwestern [University], which was where my husband[1] [Olke C. Uhlenbeck] was a professor. And then I got ... One of the women from University of Illinois in Chicago recruited me, Susan Friedlander. She did recruit me. I mean, it was her idea, and she got everybody else on board. And then it was just living in Chicago. And I had four, feisty, female colleagues. Let's see, three of which were older than I ... The three which were older than I am. Several of them were quite senior. Two of them ... One of them was…

Anna Doel:

Could you name them, please?

Karen Uhlenbeck:

Sure. Louise Hay, Vera Pless, Bhama Srinivasan, and Susan Friedlander. So, they're all people that are remembered. I mean, Louise Hay ... The undergrad ... One of the AWM fellowships is named after Louise Hay, for example.

Well, anyway, that was ... And it was a commuting school, no math parties. I liked being in the city. I took the Chicago Northwestern down, and it was a change from Urbana-Champaign [University of Illinois]. And of course, I was in the same place as the University of Chicago. So, I actually did go to seminars there. And at this time, I had my first PhD student from Urbana-Champaign [University of Illinois], actually. And then I had two students from Northwestern [University].

And I didn't get any students from the University of Illinois in Chicago because they didn't really have a graduate program that was ... They had a graduate program, but the courses were extremely basic. And so I was actually doing fairly sophisticated mathematics that I had actually

[1] Olke C. Uhlenbeck, Karen Uhlenbeck's husband from 1965-1976.

spent three years learning. And I didn't feel I could feel like actually bringing students up through that myself. So, I was ... And then at that point I started getting recognition. I mean, I spent a year here at the Institute for Advanced Study. And I remember I was this ... The first year of MSRI [Mathematical Science Research Institute], I was the senior researcher. My first such position. But I was ... Well, I started getting recognition. So anyway.

Anna Doel:

Did Texas come after that?

Karen Uhlenbeck:

No. University of Chicago. Would you mind ...

Anna Doel:

Would you like to take a break?

Karen Uhlenbeck:

I'd like to take a break. I'd like to eat lunch with ... Could we eat lunch with my husband?

Anna Doel:

Absolutely. I'm going to stop the recording now.

Karen Uhlenbeck:

Yeah, right.

Anna Doel:

Okay. We're back on record. And I think it would make sense to keep the chronology a little bit for now.

Karen Uhlenbeck:

Okay. Sure.

Anna Doel:

And talk about Texas.

Karen Uhlenbeck:

Oh, okay. We'll talk about the University of Chicago because ...

Anna Doel:

Yes.

Karen Uhlenbeck:

That was probably ... So, I was actually quite happy at the University of Illinois in Chicago. But I had had a few graduate students from Northwestern [University], and I was actually interested in having graduate students. And so I was very open to the University of Chicago, when they made me an offer. I didn't have to move. I didn't have to ... The commute was worse, but I lived in Northwestern where Bob[2] [Robert "Bob" Williams] had a job. So, I accepted there. And well, I think the University of Chicago was going through a difficult time at that time. So, I say that in retrospect because ... I mean one of the real motivations for moving was the fact that several of ... There were several younger people. They were actually both a little bit younger than I was, but there were several ... Jerry Bona and Peter Jones, whom I became ... They were very nice to me, and friendly. And I was sort of ... And they both left.

I mean, I'm not even sure exactly why, but I think I can guess. And several other people left at the time. And the department was actually quite dysfunctional. I could see that. I just didn't understand why Felix Browder was chairman, and why nobody said boo, and all these problems were happening. And I had great graduate students. I can't remember how many I actually had at that time. I had six students or seven students. And in a few years, six students in the few years I was there. And it was great working with them, and so forth.

But it was uncomfortable. And it was only when I started thinking about this for the purposes of writing my background ... What happened to me, that I realized that I had never actually met another woman professor at the University of Chicago. And it didn't occur to me to do anything about it. Nobody suggested it, I mean, there were none in the math department. I found myself trying to help the women graduate students. And that was ... I really was totally ... My hands were completely tied. I couldn't really do anything about it. And I mean, there'd be women students who were struggling academically, and hanging in there, and fighting it. And I would discover that there was no faculty member in the subject they wanted to study who would take them. I mean, this is a complicated issue, but it's really not a good idea for a faculty member who doesn't want to take a student to take it. I mean, it's a recipe for disaster for the student. So, let's not talk about ... And facing the reality of coping with that.

I mean, later on when happened at Texas, I had the prestige and ... I would just send them somewhere else, and they would inevitably do better, do fine. Because students get in a bad place in the department. And very often they can go into another department and somehow or other, everything is much easier. It could be worse too, but you know it's not going to get better. Once they've gotten and broiled into a bad situation in a department, it's very hard for ... To undo that. I mean, you can say it's bad or good, but it's bad or you should do something about it. You shouldn't let this happen. But effectively, student can then go somewhere else and do fine, or even change subjects to do fine. I mean, it's not one solution, but you have to change it. And I couldn't do anything for the graduate student ... The women students at Chicago [University of Chicago].

Everybody was ... And I do remember that they would let people go who were quite good. The thing that happened that actually completely turned me off was is that ... I knew, of course many young people, young mathematicians, who would be good assistant professors or somewhat. And at some point they decided to hire someone on the grounds that somebody at ... Some senior big shot at the Institute for Advanced Study, liked talking to this person. I mean, it's just going ... Just

[2] Robert "Bob" Williams, Karen Uhlenbeck's husband.

the all boy system. This friend of ... This big shot tells us, and so we'll take him. I mean, it just turned me off so much, that incident. That this is the way you hire.

And anyway, there was another motivation, and that wasn't ... By now, I was fairly well established. And there was this ... A figure, ST Yau [Shing Tung Yau], who was a tremendous force in mathematics. And I actually was older than he was, but I was trained in exactly the kind of mathematics that he started ... That he actually made use of, and started collecting people doing. And I became one of his group of researchers around him. And he decided that his wife had a job in San Diego, and he decided to move. He had been a faculty member here. And he moved to San Diego. I guess he wanted to be near his boys, his kids. So, he tried to collect people at the University of California in San Diego. And he actually was doing quite well.

And I visited there for a winter term. And I took surfing lessons. And the ski slopes were just around the corner. And I decided that I don't much like California, but I could take this. But then things ... So this was a grand scheme to ... And it was exactly the sort of thing I like, anyway. But then things fell apart, politically. I mean it's a long story. And that's another story. But at this point, I had already ... I had started thinking about moving. And actually, at this point there was a big motion. I mean everybody else ... Yau [Shing Tung Yau] went to Harvard. Rick [Richard Schoen] and Leon [Leon Simon] went to Stanford. And Richard Hamilton went to Hawaii, where the surfing was better.

I mean, it was an eclectic bunch of very good mathematicians. I still think it was inevitable that under the circumstances ... In fact, we all expect Yau [Shing Tung Yau] to get in trouble at Harvard. But he never did. I mean, he still has grand schemes. I think his grand schemes are now putting Chinese mathematics on the map.

But anyway. But I had thought about moving, and then the University of Texas had been given a lot of money by ... And they were actually looking to hire senior mathematicians in fancy positions with a lot of money. And several people visit. Yau had visited there. I mean, they had a lot of people visit. It was a high profile thing. And so they made me, and actually Rick Schoen, a joint offer. And Rick [Richard Schoen] went to Stanford instead. But I decided to go to Texas. Well, I mean there were a lot of things positive about Texas. First of all, I told you the story about Weinberg [Steven Weinberg]. And I was very interested in physics, so I was really pleased that there was a very active physics department. And Bob [Robert “Bob” Williams] was actually interested in the knot theorists in the department, and the person that ran a lab in physics doing dynamical studies of fluids. And so it was sort of interesting. Bob had family in Texas. And I guess I was always a little adventuresome.

So, we went to Texas and it was great. It was really a very special time in Texas. Ann Richards was Governor. And so democrat. I mean, it was ... There've not been any democrats since. But anyway. And I mean there were all these grand women. Barbara Jordan. There's still a statue of Barbara Jordan, who was a black congressman from Texas, in the airport in Austin. And there was this great columnist, Molly Ivins. I mean, it was a time in which the women's voice was very big. And it was actually an exciting time to move to Texas. Well, I could tell a lot of Texas stories.

Anna Doel:

Could you tell one?

Karen Uhlenbeck:

Oh, well, the only one that comes to mind right now is that Hightower [Jim Hightower], who was a very liberal friend of the governors. I mean, his slogan that said that I always remember is "The only thing in the middle of road is yellow stripes and dead armadillos." And our first computer was named Fireant. And I had all sorts of money, which everybody ... All the other mathematicians just hire other mathematicians. But I would invest in computers. I sent students to art shows, art conferences. First thing I did was I founded a woman's lunch group in which all the women scientists and engineers had lunch once a month. I wasn't going to make the same mistake twice, that is not talking to any of the other women.

And the women engineers were something else, too. I, they were ... Anyway. So, I went to Texas and then I hired Dan Freed, who I'd written a book with. And he and I had ... Dan is 15 years younger than I am. And he had all sorts of projects all the time for ... We founded, we helped found the Park City Math Institute. We started things like Saturday Morning Math. Actually, he also taught me about BackRoads. So, Bob [Robert "Bob" Williams] and I started biking all over the world. I mean, we used to go camping in Big Bend, so it was ... We had a lovely house in the hill country. Modern, all glass, cork floors, bookshelves. So, I still have fond memories of Texas. And the math department did very well. Did very well.

Anna Doel:

And it sounds like since Chicago, you had become interested in teaching, as well as doing your own research?

Karen Uhlenbeck:

Well, I think mathematicians are always interested in teaching.

Anna Doel:

Why?

Karen Uhlenbeck:

It's natural to the formalism. I mean, you want to tell other people about it. And unfortunately there's an unfortunate side to this because the way the mathematician brain tends to work is to develop the subject and not to pay too much attention to the students. But still, they like to develop the subject. So there's something natural about mathematics that goes with explaining it. I mean, I don't think any mathematicians would disagree with this. I mean, I think it's different if you do something physical and you build something and you see the product or you actually have experiments and you actually have it come out, but it's all in your head. And so you want to let the... But I mean, at some point, I actually started paying attention to the students, and actually the involvement in the Park City Math Institute helped that too because the Park City Math Institute had researchers, graduate students, undergraduate students and high school teachers that were supposed to somehow interact.

But through them, I actually met some high school teachers, and I actually learned a lot of things about teaching, which are just obvious to any high school teacher, but which were, we have our heads in the clouds and we don't think about it. So I started incorporating things like having

students work together on projects, just trying to do things a little differently. Again, I don't ever revise, I just change a little bit. I started having my students do projects, and it was really interesting to see how letting students take ownership of something was so much more rewarding for them. So they could choose a project on anything. It was ODE, so a lot of them did applications, but they could also do an extra bit of theory if they wanted to and something.

But letting them choose and then watching them develop, take ownership of it, made me realize how little I knew about teaching. So I can't say that, I mean, I've never really found, most mathematicians like to teach graduate courses in which they lay out the subject. And I find the lack of audience participation among graduate students, actually deadly. I'd much rather have freshmen who actually pay attention. But I can't say I've ever been particularly, I mean, all my students say I'm tireless, I'm energetic, I'm pleasant, I'm nice, I'm enthusiastic, and they all appreciate that. But I'm not very good at explaining things. So, I mean, I recognize this.

Anna Doel:

How many students have you advised through graduate school?

Karen Uhlenbeck:

Graduate school, somewhere around 18 or so. I had a lot, I mean I had a whole bunch at the University of... But once I got to Texas, again, the numbers of students that had the preparation to work for me was less. Also, for a while I was kind of doing physics stuff. That didn't seem to attract very many students, but anyway.

Anna Doel:

Did you find advising rewarding in any way?

Karen Uhlenbeck:

Oh yeah. I loved advising students.

Anna Doel:

What do you love about it?

Karen Uhlenbeck:

Well, it's a great way to get to know someone.

Anna Doel:

Yeah.

Karen Uhlenbeck:

I mean, working with somebody is the same way. It's really the best way to get to know somebody. I mean, you get to know your students, they get to know you. But you have also a very, it's got boundaries. So it's sort of a very safe relationship. I mean, I would always tell my

students, I want you, you don't have to actually present anything or do anything. I want you to at least have a question when you come in next week. That's all I expect.

Anna Doel:

Talking about working with others, how collaborative collegial is your work?

Karen Uhlenbeck:

It was, in the beginning not at all. But now, slowly over the years, it became more and more collaborative. And now I wouldn't finish a project if I didn't have somebody who I was working with.

Anna Doel:

In which ways is this helpful? Can you pin it down?

Karen Uhlenbeck:

Well, I'm not driven to publish it and talk about it. I'm driven to figure it out. But then there's a whole lot of other steps. And also having somebody else, I mean, having somebody else to talk to about it. Actually, when you're driven to figure it out, you go too straight. And if you have somebody to talk about it, they sidetrack you and they derail you a little bit. But that's exactly what you need, because just going straight generally goes, it means you go until you hit a brick wall and then you sit banging your head against a brick wall.

Whereas what you need is to be distracted and you need to be moved around the brick wall, or you need to be asked a completely different question and go off in another direction. But I mean, I have at least one other very nice project that I finished when I first came here. I mean, it's actually quite a nice paper. It was something one of my students did, and we wrote a little paper about it and I thought the harder case we could never do. And then later on I realized how to do the harder case. Okay. And unfortunately, the student isn't, I mean, the student seems to have basically forgot his, I tried to get the student interested and I couldn't really get him interested because I figured that way I would actually publish it. So it's sitting there. I still think it's a very nice project, but I don't have the discipline to write it up.

Anna Doel:

So we've been talking around this question that I have. I would like to ask it now. There's a stereotype about mathematicians that the only things they need to get their work done are, well, a pencil, some paper, a desk, and a quiet space. And there have been cases in history when a mathematician would do better imprisoned because they had things to occupy themselves with. I guess my question is, do you know how your brain works? And also what is your process for work?

Karen Uhlenbeck:

I see.

Anna Doel:

Do you have routines? Do you need to get ready somehow? What helps you think and how do you do your thinking?

Karen Uhlenbeck:

Well, I know a little bit about how my brain works, now, finally, because I started playing Spelling Bee. This is kind of this New York Times puzzle that something like 20% of your audience will know exactly what it is or something. And it's very absorbent and absorbing. I like to spend an hour or so doing it. But I can watch my brain. First of all, I know that it's a good idea to stop and do something else and come back to it. And then suddenly some new words that you didn't think of before will come. And somehow or other, this I told you before, going straight at a subject and hitting is just like hitting a brick wall. So you need actually your mind to be distracted so that it doesn't keep going in the same direction. It needs to be distracted a certain amount.

And also I'm thinking, I'm working, I'm thinking very hard about a problem right now, which I've been kind of thinking about off and on for a couple months. I do notice that when I have some... I'm supposed to also be revising the last draft of our third paper. And I noticed that I'll think about this problem really hard when I really feel what I ought to do is be revising my third the draft of my third paper. So I noticed that I get motivated to do it if there's something else that I don't want to do, then I'm doing. But I also noticed that I get stale. And it will be true that at some point I'm going to say, you haven't had any new ideas about this in three or four weeks. Why don't you just let it go and you can come back to it again some other time. And at some point you might solve it or you might not solve it. I have a whole bunch of problems like that.

The first one was one, several, one of them, two of them, one which I've still not solved. I've learned in graduate school. Another one that I learned in graduate school, I actually worked at this way off and on over a period of four or five years. I met someone who gave me a reference. And I read the reference, and I solved the problem. But the point is I kept at it for a long time, but I also got some new input on it. The thing is the single-mindedness for me is easy. I mean, it's like getting up in the morning and spending an hour doing Spelling Bee. You don't have to worry about the rest of life. And it doesn't matter, even if you have a headache or you're hurt or something's wrong, you can still spend an hour doing Spelling Bee.

So sitting down and spending an hour thinking about one of my favorite problems is the easiest thing to do. The trouble is that there is more. You have to structure this so that you actually make this profitable. I find myself teasing myself trying to figure out how to make my mind profitable instead of just doing Spelling Bee all morning.

Anna Doel:

We'll need to take a quick break. The recorder wants a battery change.

Karen Uhlenbeck:

Okay.

When I was younger, I had all sorts of things that I did; I garden, I cooked. I never had the feeling that stopping and doing them would actually, I never wanted to spend more time thinking than I did. And I guess teaching. Well, I don't know. I didn't think, now I think about it a lot

because my life is so much smaller. I don't get a high from exercising anymore or anything like that. And I don't really have to do anything. But on the other hand, if I don't have some intellectual activity, then I feel like I'm not living, I'm not worth anything. So I think much more about how to actually get myself to do something than I consider creative. And I don't feel like I have an infinite amount of time left. So it's become much more valuable to use my time properly.

And I don't know if I've answered the question for myself, of exactly how I should live, that I can think well. I mean it's clear that I can't do it all the time, that I have to... I spend way too much time looking at my phone, reading the New York Times on my phone and kind of thing. I sympathize with people who do have trouble. I mean many of my younger friends are dealing with their adolescent children on the phone and they're right that it's bad. But I understand why the adolescent kids don't want to do anything profitable in life, but play with their phones. So I find myself in that same situation and with many fewer opportunities to distract myself. I'm not going to go out and work in the garden for a couple hours because going out in the garden working for 10 minutes exhausts me. And then I don't even feel like doing math when I come back in.

Anna Doel:

You mentioned that you liked walking.

Karen Uhlenbeck:

Yeah, it's very good. Walking is excellent for thinking. Yes.

Anna Doel:

So that works.

Karen Uhlenbeck:

Yeah. And I still walk, I try to walk an hour every day. I'm afraid to count steps because I am capable of becoming anal about it. I really, I want it to be a little more natural than that. But lots of my friends count steps. It seems to be... It's interesting because you're interviewing me because I'm a famous mathematician, but the older I get, the more I feel like everything in me is actually just part of the way humans are. So counting steps, I mean, there's a whole lot of things that we get into, watching too much TV and so forth. We're all kind of programmed the same way.I don't find, for instance, I'm sure that my ability to think abstractly is just a sort of an extreme of the human desire for pattern formation somehow or other.

In order to survive as a species, we are interested in pattern formation because we have to, well, it's in effect efficient way to get along in life is to have patterns and to seek them out and to find new ones and so forth. I don't feel like I'm sort of, the older I get, the more I feel like I'm like everybody else, only just with a different twist. Whereas when I was young, I was sure I was somehow a really completely different, exceptional, weird, unlike everybody, and so forth. So I couldn't imagine... On the other hand, I still have trouble. I mean most of my friends are women mathematicians. So clearly I find it easier to stick with people with my, the same experiences in life, even though I see the commonality between all of us, among all of us.

Anna Doel:

I have two questions in connection with that. Your statement about women mathematicians. One is, I've seen it mentioned that you put an effort towards helping women mathematicians in the field. I was curious about how you do that and what kind of change are you helping to bring about? And my other question was about friends, but we can talk about that later.

Karen Uhlenbeck:

Well, I'm not even sure that the younger women mathematicians need anything from me.

Anna Doel:

Okay.

Karen Uhlenbeck:

That's the first thing, because I mean... And I'm not sure that when I was young, I would've responded to someone like me. So in fact, I don't try to tell other women, younger women what to do. I mean, on the other hand, I'm senior and I have a certain amount of abilities to get things done and to make things happen. And I would like to be here if, since bad things happen to everybody and I want to be here as someone, I would like to be someone that would actually be helpful in situations.

So if people ask me questions, I always answer them. And when something turns out to be a success, like the Women in Math program at the Institute for Advanced Study, you do it; and if it's a success, you keep doing it. And if it isn't a success... And one thing is that most of what I've done is by watching what the women's ideas of what they need themselves are and trying to respond to it. I mean, this idea of going in that you know how to solve the problem is crazy. Among other things, I'm 80 years old and these young women are in their twenties and thirties.

I have no idea of their life circumstances. Absolutely none. The 50 years of difference in experiences is insurmountable. I mean, they have no idea of what my life is like either. I do kind of remember that it's kind of useful to try to pass on to younger people what it might like to be older, because it's kind of useful information of what you think about. In other words, it's more useful for me to tell them how I feel than to tell them how they ought to feel.

Anna Doel:

That makes perfect sense. Yeah.

Karen Uhlenbeck:

But no, the truth of the matter is that I don't really know. I try to do things and if it looks like it's working, I try to make it go. And if it looks like it's not working, I try to let it go. And it's touchy. You don't always know. Theory and practice are very different.

But when we started the Women in Math program, it was really before there was much out there about, this was in the early nineties and mentoring and all this stuff was not such big stuff. And we had no idea what we were doing. I still keep on, and we did have some problems in which we fixed. I mean, when something went wrong, we tried to fix it. And I mean, we have some real

disasters too, but I'm always pleased to note that what we think was disasters is not always as bad as we thought it was. That one is ultrasensitive to these things. But it's interesting because I would think being told how to run something and then going and running it would not be very interesting at all. Whereas if you're faced with a situation, there's not as many women coming into mathematics as we expected, which we all realized in the 1990s.

Right after, in the ‘80s and ‘70s and ‘80s , they started hiring women. So math departments all started having women. But by the nineties, we were recognizing that there weren't any new women coming through. It was kind of stopped up. And at this point, not only we realized it, but the NSF realized it and the people who were watching things realized it. Then I got active in founding the institute here for Women in Math. But I also have to say, and first thing I did was got my collaborator to do it with me. I didn't try to do it by myself.

Anna Doel:

So when you say we about the Women in Math program, who do you mean?

Karen Uhlenbeck:

I mean, Chuu-Lian Terngand myself. We were doing it together. And I mean all the people that I tried to get help to. The staff.

Anna Doel:

Yeah.

Karen Uhlenbeck:

The staff were very important in the beginning. I mean, we had Anne Humes who had been, she had been something in the tennis, local tennis organization. And she explained exactly what we had to do. For example, nobody else does this, but she made us write thank you letters to all the lecturers, which is not a customary thing done in mathematics. But we dutifully wrote thank you letters to the lecturers. So when I say we, I really mean that the people, all the people involved. Because I've never thought it as something I did. I've always thought it was something we did.

Anna Doel:

Karen, who are your friends?

Karen Uhlenbeck:

Well, mostly other women mathematicians. Yeah.

Anna Doel:

Have you been friends with them for a long time?

Karen Uhlenbeck:

30 years.

Anna Doel:

Where did you meet them?

Karen Uhlenbeck:

Well, one of my best friends is my collaborator, long-term for many years. She was actually another student of my thesis advisor [Richard Palais] behind me, six years behind me, or seven years behind me. She's actually now his wife. She's Chinese and she grew up in Taiwan. But we have many shared experiences like our brother, you can go right through it, our brother-in-law died, our parents died. It's through the same thing. Neither of us have children either. So that's also... She's a big gardener. It's interesting that I feel very close to her even though she grew up in Taiwan and I grew up in New Jersey.

Anna Doel:

Would you mind saying her name?

Karen Uhlenbeck:

Oh, Chuu-Lian Terng. No, I don't mind saying her name.

Anna Doel:

Thank you. Is she here as well?

Karen Uhlenbeck:

She's in California.

Anna Doel:

How do you keep in touch?

Karen Uhlenbeck:

We talk. I see her a couple of times a year. I mean, we talk regularly on the phone and email.

Anna Doel:

You've mentioned that you used to travel more than you do now.

Karen Uhlenbeck:

Oh yeah.

Anna Doel:

Yeah. Mostly for work? To meetings?

Karen Uhlenbeck:

No, in fact, instead of traveling for work, other people go to math conferences in the summer…

Anna Doel:

Yeah.

Karen Uhlenbeck:

I used to go, well, I mean for a while I was sort of going to math, we would spend a month in the Aspen Center for Physics, a month in Park City and then a month in Montana where my husband had collaborators. But as at times other people go to math conferences in the summer and we would go out to Montana and hike. And then for a while we were going bicycling with back roads. That is, we would go, I've been all over the world actually bicycling in the winter and mostly in the winter months here. I've been to Chile, Argentina, Costa Rica, Thailand, Hawaii, Provence and so forth. So I think unlike many of my fellow mathematicians... And we would go camping in Big Bend every winter when we lived in Texas. Unlike many of my collaborators who travel to go to math conferences, I actually did a lot of traveling to bicycle.

Anna Doel:

That sounds amazing.

Karen Uhlenbeck:

Well, I don't know. It's a choice.

Anna Doel:

Yeah. In 2019, you received an Abel Prize.

Karen Uhlenbeck:

Right.

Anna Doel:

So what does this award mean to you?

Karen Uhlenbeck:

Well, first of all, it got me my position here, so that's good. I It made a lot of difference to other women in mathematics. I mean, I understand that because it just proved something, right. I really felt that it didn't mean personally that much to me. Okay. I mean, I don't feel particularly special. And part of it's political, because I know people who very well deserve a prize like that and don't get it for political reasons. So, once you know how the inner workings go, you realize that it's not a significant thing that says, “I'm better than people who didn't get it” or anything like that. But it does mean a lot to the community. I felt that, I mean, it's nice to know that other people appreciate your life too, but it's much more important that *you* appreciate your life and your work.

Anna Doel:

I think that's a wonderful note to maybe finish on.

Karen Uhlenbeck:
Oh good, good.

Anna Doel:
I'm going to stop the recording.