ORAL HISTORY INTERVIEW WITH MARILYN TELEN
Duke University Libraries and Archives
Submitted May 27, 2021
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COLLECTION SUMMARY

This collection features an oral history Joseph conducted with Marilyn Telen on April 21, 2021. The 68-minute interview was conducted in Durham, NC. Our conversation explored Dr. Telen's path to medicine after a first career in nonfiction publishing, her relationship with mentors and research collaborators at Duke, and her thoughts on the history of women in medicine. The themes of these interviews include medical training, hematology, and academic medical research.

This document contains the following:

- Short biography of interviewee (pg. 2)
- Timecoded topic log of the interview recordings (pg. 3)
- Transcript of the interview (pg. 4-19)

The materials we are submitting also include the following separate files:

- Audio files of the interview*
    - Stereo .WAV file of the original interview audio
    - Mono .MP3 mixdown of the original interview audio for access purposes
- Photograph of the interviewee (credit: Henry Greene)
- Scan of a signed consent form

*Due to COVID-19 social distancing protocols and best practices, Joseph recorded the interview remotely via Zoom.

BIOGRAPHY

Dr. Marilyn Telen is Professor of Medicine in the Division of Hematology, and specializes in laboratory and clinical research on sickle cell disease. Born in Brooklyn, New York, Telen began a career in nonfiction publishing after college, working as Asian and Soviet Bloc editor of Collier's Encyclopedia Yearbook. After a chance conversation with a college friend, she began to think about applying her communication and analytical skills to a career in medicine. “I decided that if I went into medicine, I would feel like what I did every day was worthwhile,” she says. She returned to school to complete prerequisites at the City University of New York and Columbia University, and was admitted to New York University for medical school.

Following internship and residency training at State University of New York-Buffalo, Telen was drawn to Duke by opportunities to participate in ongoing hematology and immunology research, including in the laboratory of Dr. Wendell Ross.“I loved the hands-on part, I just found that satisfying,” she says of her decision to focus on research over clinical care. “The thing about research, it's doing puzzles, really… and I love doing puzzles.”

Dr. Telen has since become a renowned expert in blood group antigens and sickle cell disease. “I never fail to be excited about the science that I get involved in,” she says. Sometimes, this means challenging the assumptions of the scientific community: “I got to write an editorial once that was titled, something like ‘The Red Cell, Not An Inert Bag Of Hemoglobin.’” she laughs. “Showing that red cells were actually more interesting than people thought they were.”

INTERVIEW TOPIC LOG (marilyn-telen-interview-audio.wav)

00:00 Introductions and place of birth
01:18 Description of current professorship
02:24 Upbringing in Long Island; experience as second-generation American
07:50 College experience and jobs in publishing at McKinsey & Company and Crowell Collier & Macmillan
13:00 Additional pre-med coursework at City University of New York and Columbia University
18:55 Experience with medical school interviews; reflections on medical training and rotation placements at NYU
23:11 Initial interest in Pediatrics; internship interviews and starting a family
25:06 First encounters with patients with sickle cell disease; interest in benign hematology and initial discussions with Wendell Ross
26:35 Hematology course; mentors in immunology and cardiology and suggestions that Telen consider a research track
28:57 "Analytical" approach to rounds
29:51 Initial skillset and subsequent research training upon arrival at Duke; conversation with Bart Haynes about work/life balance
35:27 Work on platelets in Wendell Ross's lab and initial funding opportunities; plenary presentation at leukocyte differentiation workshop in Paris and subsequent relationship-building
43:18 Partnership with husband Henry Greene and experiences reading each others' work and "rehearsing" for job negotiations at home
46:01 Relationships working with Drs. Wendell Ross, Bart Haynes, Harvey Cohen, and Allison Ashley-Koch; reflections on ongoing multi-center study of genetic influences on sickle cell disease and friendship with Dr. Ashley-Koch
51:36 Research in monoclonal antibodies and blood group antigens and subsequent scientific discoveries into genetics
58:51 Conversations with those thinking about a career in medicine; reflections on "having it all" and "global guilt" related to work/life balance; early-career efficiencies such as buying a then-uncommon home computer
1:06:03 Reflections on career goals and trajectory

TRANSCRIPTION (marilyn-telen-interview-audio.wav)

Joseph O'Connell 0:02
The date is April 21st, 2021. My name is Joe O'Connell. And I'm interviewing Dr. Marilyn Telen for the Duke Department of Medicine and Duke Medical Center Library and Archives. So first of all, thank you Dr. Telen, for being available for this interview.

Marilyn Telen 0:30
You're certainly welcome.

JO 0:32
And I'll also mention that we are recording remotely on account of the Coronavirus pandemic, which is still affecting the way we do interviews for this project. So, the first thing I'd like to ask you is if you could tell me your full name, and when and where you were born?

MT 0:51
Sure. So, Marilyn Telen. And I was actually born in Brooklyn, New York. I didn't live there for more than a few years. And then mostly grew up in a town called Woodmere, on Long Island. Also in New York. So I guess that's where I come from.

JO 1:18
And in your current role at Duke, what is your position currently? And when you talk to people outside of your area of specialty about what you do, how do you describe it?

MT 1:35
Well, my full title, I suppose, is Wellcome Professor of Medicine in the Division of Hematology. When I talk to people outside of the field of medicine, I tell them [that] I'm a hematologist who has spent most of my career doing more research than taking care of patients, although I also take care of patients. And that my research involves a lot of stuff in the laboratory, but over the last decade or so has also involved clinical research. And over the last, probably two-plus decades, has focused mainly on sickle cell disease.

JO 2:24
And going back to New York and your early life, could you tell me a little bit about what your upbringing was like? And your family and your community, what kind of influence [did] they have on you?

MT 2:43
Well, I grew up in what then was kind of [a] new suburb of New York City. So it was maybe a mile to a mile-and-a-half from the New York City limits, which was really the border of the borough of Queens, which is the outlying borough of New York. And actually, my favorite thing about growing up there when I was relatively young, say all of elementary school, was that civilization in a way stopped with our house [laughs]. The road became a dirt road after our house. Of course, nowadays, it's fully developed with endless suburban housing complexes. But when we first moved there, everything past our house was forest. And that was the thing I

actually loved best about it. But we lived in a town with a very good school system, which was also good. My father was an optometrist, so an eye doctor. And my mother became a teacher while I was in elementary school. And I have an older sister who's four years older. So it was her job to break all the barriers as we were growing up [laughs]. And, I think other than that we had, I guess ... I'm second-generation American. So my grandparents were all immigrants. Although I prefer using the term refugees, if you want to be honest. I think there's an important difference. I think most American immigrants have been refugees more than immigrants, but in any case.

JO 4:41
So whereabouts were your grandparents from?

MT 4:45
My mother's family was from a town called Khotin in Moldova. And my father's family was from Ukraine, with very different backgrounds in some ways. Because my father's family, my grandfather and his brother, both went to gymnasium and were well educated and spoke multiple languages, before they arrived to the United States. And had traveled before they ever arrived to the United States. Their family business was there, they were fur traders. And my mother's family were -- I don't actually even know what my great grandparents did -- I think they were in some small business. I know my great grandmother sold linens out of her home. But they had probably a sixth or eighth grade education equivalent until they came to this country. And my grandmother actually went to school in this country and got probably what we would call kind of non-college prep high school diploma of some sort. So she went to school until she was about 16, I think.

JO 6:19
And you mentioned that your older sister kind of paved the way in certain respects for you. I'm curious what you mean by that?

MT 6:34
Well, because older sisters or brothers probably are the first to ask parents for permission to do things parents have never contemplated before. And every generation has to do that, whatever the latest things are. She was -- and is because she's living -- an artist, and was an artist from her teen years. And so she was adventurous, and probably a little more of the kind of beatnik generation. But New York [and] Manhattan and everything there, the Village and all this kind of stuff, was very accessible to us. We were very close to the city. So all that culture was accessible to us. I think growing up I saw about every musical that appeared on Broadway because my parents used to bring us. I had an uncle who loved opera, and he took us to the opera. And so that kind of culture of New York was a reasonable part of our lives, I guess.

JO 7:50
It's really interesting to hear, because it sounds like your cultural interests, and your cultural experiences have been very deep. And I read that you began your career actually, in non-fiction publishing.

MT 8:10

I did.

JO 8:11
So which, which makes sense for somebody who is part of the culture of New York City and interested in the arts? And I'm wondering, how did the transition in your interests come about? Or what were the things that kind of started to point you towards training as a physician, or as a scientist?

MT 8:35
Well, when I went to college, I really had no great ambition to do anything, and figured I would probably graduate and get married and raise a family. And it actually drove my mother crazy that I would say that, at the time, because she thought I needed a career. But at the time, I actually didn't think so. And then, when I graduated from college and didn't have any plans to get married, or someone to marry at that point, I figured I needed to go get a job. And I had my major was Philosophy with a kind of double major in Asian Studies. And the only work experiences I had had [were] working for a professor, like a work study student would, who was an editor I think it was at Harper & Row or Random House. One of those things. He was a Philosophy professor, so he was doing non-fiction stuff as well. And I had a summer job as a proofreader for McKinsey & Company. And those were really my work experiences, before I graduated. So I went to a number of employment agencies looking for a job. The thing that actually saved me was I didn't know how to type. I had never taken typing. And that saved me from being offered all sorts of more secretarial kind of jobs.

And so one agency sent me off to an interview with Crowell Collier & Macmillan. And they were looking for someone to work in the department that produced their Yearbooks for their Collier's Encyclopedia. And I had to take pretty extensive kind of, I guess, grammar exams. Because what they were looking for was someone who could work as an editor who would have some knowledge about the subject matter, as well as could write, and do it correctly. And they hired me to be Asian and Soviet Bloc editor of Collier's Encyclopedia Yearbook. I had studied both Chinese and Russian languages in school. So they figured I must know something [laughs]. So anyway, that was my first job out of college. And it was a lot of fun, although it quite resembled writing term papers for a living. But the good part was that it was an office full of people like me with various interests and so that was fun. But I at some point decided I wanted to look for a better paying job. It was actually quite apparent in the department I was in that it was very hard for a woman to get promoted to the next-higher position. So I went looking for another job. I wound up with a small company that produced multimedia educational materials, which were at the time film strips and workbooks and things like that. And in that job, I was kind of the editor. It wasn't half as much fun from the point of view of the people I worked with. But I had a lot of exposure to the college professors who were hired to kind of write this stuff. And I oversaw editing and production, I learned something doing it.

And then I happened to have an interaction with an old classmate from school who I had lost touch with a bit. She had actually gotten sick and dropped out of school. We got back in touch and I went to visit her. And she was telling me that she was thinking of going to PA school, which was a fairly new thing. This would be in the early 1970s, I guess. And I started thinking

about that, because actually in high school I was a math/science student, not a liberal arts student at all. We had, in my high school to be on an Honors track, you had to pick. And I did math/science. I had gotten totally burned out with math and science in high school. So I placed out of everything in college and didn't do it. So anyway, I kind of went home and started thinking about what I wanted to do. I was doing a lot of science stuff with this editing job that I had. And also the Vietnam War was winding down. And there was a lot of stuff in the press about both PA schools, and what medics coming home from Vietnam did and what programs were available to them, that they could take advantage of their on-the-job training. There were a number of medical schools that were shortening their medical school to three years. And I decided that if I went into medicine, I would feel like what I did every day was worthwhile. And I was not getting that feeling from editing. And I decided to go to medical school because to do PA school was almost as long because I wasn't a nurse or I didn't have any other experience.

So I decided I was going to go to medical school. And I quit my job and actually moved back in temporarily with my parents so I didn't have to worry about paying rent. And I went to part of the City University [of New York] system because it was cheap and it was not that far from where I lived. I tried to sign up for all the science classes I needed to be able to apply for medical school, which was everything. So I had to take biology and chemistry and organic chemistry and physics and calculus, in order to even think about applying to medical school. I had never taken any of those college level. So, I did that. But I couldn't get to speak to an advisor. I couldn't get anyone to speak to me, because they were too busy with the matriculated students. And I was just, you know, kind of a student who came in and took classes. And at the time there were so many students who wanted to be pre-med that there was a waiting list for all these classes. And I was literally kind of standing against the wall in chemistry class until enough people dropped out that I could use a lab.

So after midterms -- where I did very well, because it actually helps to be older and know what you want in life -- at that point I went to try to figure out how to talk to a pre-med advisor. And I couldn't get an appointment with one. But there was a big office with a whole bunch of the kind of advisor people in the back, and a whole bunch of secretarial people. Kind of with a gate. Literally with the gate in the front. But I was watching the one guy who I figured out was a pre-med advisor and when someone left his office, I let myself into the gate and I walked into his office. And I said, "I have all A's and you have to talk to me." [laughs] Literally, that's what I said. Because I figured, it's like an elevator speech. I have 30 seconds for him to decide whether he was gonna let me be in his office or not. So that's what I said. So he looked at me and told me to take a seat. And he said that he had never gotten a postgraduate pre-med student into medical school. He said he'd never had one that had all A's, but you know, he had never [done] it. And he said that Columbia University has a program that's very successful, and I should talk to them. Of course, the difference in cost was huge, between the City University system and Columbia. But I went to talk to them. And they said that if I did well enough after a semester they had scholarships. So I basically took most of my bank account to pay for the next semester at Columbia. And then after that I got a combination of scholarships and teaching assistant jobs, [so] that basically the rest of the year and a half cost me nothing [in] the way of tuition. So that worked out well. And, indeed, they were very successful. And I got into a whole bunch of medical schools.

JO 18:26
Wow.

MT 18:28
So that's kind of how I wound up in medical school.

JO 18:32
So you really had to be proactive about getting the attention and making your way through the City college system.

MT 18:46
Yeah, it's a public university, and it's big. And it's hard to get personal attention, anyway.

JO 18:55
What do you remember about the beginning of your training in medicine? Showing up in medical school, what was on your mind, or what are some of the things you remember?

MT 19:09
Well, I will preface it -- hopefully only a two minute thing -- and say that the interview experience was kind of novel. As it turned out, I got engaged to be married the summer before medical school. No, I mean, a year before medical school. And so I was engaged when I was interviewing. And two things happen during my interviews. One is I met a lot of people who were hostile to the idea that someone who worked as an editor now wants to go to medical school, and isn't that kind of not compatible? To which I figured out my response was that, on the contrary, I was good at communicating [laughs]. And the other thing was that almost in every school, they asked me if I intended to get married and have kids. And of course, at this point, I certainly intended to get married because I was engaged. And I took my engagement ring off for every interview I ever had. And figured out that there was actually at the time no right answer. Because if you said no, then you were some weird kind of woman who didn't want to get married. And if you said yes, then you opened yourself up to "How are you going to manage?" and "When are you going to have kids?" And all of [that] kind of stuff. So I took my engagement ring off and said, "Well, I hope to do that eventually. But I don't actually have any plans at the moment." Because that cut off the conversation. Although it was a lie, actually, I felt it was a very justified lie.

I went to NYU medical school for a number of reasons, including it was practical for my husband to wind up there. But also, it was the only place where I was interviewed by a woman who sat me down in her office, talked to me for a little while, and said, "You're going to love medical school." And that makes an impression, because I don't think anybody else ever told me that. And so medical school had the ups and downs that medical school has. And courses I loved, and courses I wish I didn't have to know. And I think the clinical training was kind of the same way. I had really great experiences on my medicine rotation. I actually had really good pediatric experiences. My surgery experience was unbelievably misogynistic. And for one of my rotations -- the head resident of my team lived in the same apartment building I lived in and we would

walk to the hospital every day together, just because we needed to arrive at the same time. And in that whole rotation, which was five or six weeks long, he never learned my name.

JO 22:30
Wow.

MT 22:31
And a lot of the women in my class had problems with the surgical department, and their experiences. And there wound up being meetings about it, and all sorts of stuff. But I had a little bit of trouble deciding between pediatrics and medicine. But what I really liked about pediatrics was actually talking to the parents. So I decided to go to medicine [laughs]. The kids were fine, but I thought it was particularly challenging and important to actually talk to the parents. Because they were the ones who needed to understand what was going on. So ultimately I decided to go into medicine,

JO 23:18
Because the part about pediatrics that interested you was more to do with the relationships and less to do with the medicine itself.

MT 23:29
Because to some extent, pediatrics is kind of, to me like veterinary medicine [laughs]. The other thing that happened in medical school was that I had our son in medical school. He was born when I was a fourth year medical student, which had its own set of experiences. As you might imagine, that wasn't a very common thing to do at the time. But I did work out [that] we got vacation in medical school. So I had, I guess, two months that I could actually really take off. So with the right timing, I managed to do it. And we had the time because they expected we would want to travel to interview for internships. And so they had worked out the schedule where you could work during the summer, and then you could take a month or two off to travel around and interview. So basically, I had the baby at the beginning of those two months and then took two months off, but interviewed during those two months. So I did a lot of flipping around [inaudible] newborn.

JO 24:46
To interviews?

MT 24:48
Well, my husband came with me and he sat in the hospital lobby with the baby while I went on interviews. But we covered a lot of space, a lot of ground. So that was medical school. And then I came to Duke for fellowship.

JO 25:06
And do you remember when you first saw a patient with sickle cell disease? Or what impression that disease made on you early on?

MT 25:19

So oddly enough, in medical school I don't remember a patient with sickle cell disease. I don't know why, but I don't. And in residency, I saw one sickle cell patient that I remember, and I may just not remember others. But this patient was amazing because it was a fairly older woman who presented with a very inflamed gallbladder and what looked like a hemolytic anemia. And when we did the tests, it turned out she had sickle cell disease that had never been diagnosed. I've had two or three patients like that in my lifetime, where they've gotten to be, you know, 50 or 60 years old before someone diagnosed it. But that's the patient I remember. But when I got to Duke, I knew that I wanted to do benign hematology and not malignant hematology, or solid tumors. And so Dr. [Wendell F.] Ross, who was division chief got me involved pretty much right away with what was going on with the sickle cell activities to do. So as soon as I got to Duke, I got involved.

JO 26:35
I think I read in your notes that you wanted to focus more on the hematology side of hematology oncology. Is that accurate?

MT 26:48
Yeah, because actually in medical school, we had a great hematology course. And what I really liked about it was that they had clinical vignettes or scenarios linked to slides that you could look at under the microscope, and really good teachers. And so just that combination made it a great course. And I was sort of sold on hematology at that point. And then as a resident, my best mentors -- one was an immunologist who convinced me that immunology was the answer to everything, which I still believe mostly [laughs] including for sickle cell disease to a great extent, as far as what the disease does to the body. And then the other mentor I had was actually a cardiologist [who] I worked with when I was in the intensive care unit. But the two of them both had the same idea for me, which is that I was going to go and do basic research. And unlike a lot of pre-med students and undergraduates today, I had absolutely no experience in research at all when I went to medical school. I had worked in an inner city emergency room, I had done a lot of clinical stuff at that point, but I had not done any research. And so on the one hand, I kind of thought they were nuts. But for some reason that I'm not sure of, I took their advice [laughs]. And I went and only looked at fellowship programs that were going to offer me good research. And the research was going to either be in hematology or immunology or some combination of those two. And Wendell Ross was really an immuno-hematologist. And so that was one reason I found Duke very attractive.

JO 28:57
Do you think there was a reason that some of your teachers thought that you would make a good researcher, do you think there was something that they recognized in you about your skill set that seemed like a fit with that path, even if you haven't done a lot of research yet?

MT 29:15
I mean, I suspect that it was the degree to which I was kind of analytic on rounds. You know, I may not have had everything memorized, but I was good at reasoning things out. And being very methodical and kind of analytic about, well, you know, what makes sense, you know, why does

this diagnosis make sense or not make sense, and stuff like that. I think that's why, because they knew I didn't have any experience.

JO 29:51
I think it was in an interview that I read with you where you were saying that you didn't know a pipette from a beaker?

MT 30:09
I didn't know a beaker from a cylinder [laughs]. That was true. When I got into the lab, that was true.

JO 30:17
So I imagine it was a pretty quick crash course to pick up some of those skills. What did you find that you needed to learn? What parts were you good at automatically, and what parts did you have to kind of work at, to get to where you needed to be?

MT 30:39
Well, there was clearly a lot to learn. But I loved the hands-on part. I just found that satisfying. The thing about research, it's doing puzzles, really. It's just a different level of doing puzzles, and I love doing puzzles. I mean, like crossword puzzles and jigsaw puzzles, it doesn't matter what type of puzzle. And so, I think I found it very satisfying, and kind of fun. I liked the atmosphere of the lab. People interacting with each other, thinking about questions to ask, how you might figure out how to answer them. The technology was a little daunting, initially. Probably, though, the other thing that was really helpful was I'm actually pretty good at math. And so all those things that I think people did, at least my kids did in junior high school, like those mixing problems, that kind of pre-algebra, mixing problems and stuff, you have to do that all the time in a lab. Every time you make a buffer or figure out a concentration of something, or how to set up an experiment with a lot of different ingredients, you have to do exactly that kind of math. And I kind of even enjoyed that.

But the other thing was that promptly with my arrival in the lab, I got pregnant with our second son. And, of course, I had one kid already. And I also realized that working in the lab was probably a more feasible thing to do for me, than being like a wholly kind of patient care kind of person. I mean, I really liked patient care. And I'd been a chief resident when I was at Buffalo where I did my residency. But trying to figure out how I was going to juggle work and two kids, the time in the lab was more by my choice. So I could go home for dinner. I could come back to the lab when the kid went to sleep. Whereas with patients, you have to be there when they need you. And it's really never predictable. Even clinics are unpredictable. And so I said, "Well, I really like this, and it seems like a more practical thing for me to do." So I just kind of threw myself into it on that basis.

And Bart Haynes, whose lab I worked in as a fellow -- I was actually his first fellow at Duke, in his lab. It didn't last very long, I think somebody else joined about six months later. But he gave me a lot of attention, partly because at that point he didn't have a big lab. There was a postdoc, so there were three of us. But my first six months he had a lot of time to give us attention, which

was exactly what I needed, because I didn't know anything to start with. But he was also very good at understanding what was practical from the point of view of work versus taking care of home, and stuff like that. And he was really helpful. And when I had son number two, and he came to visit me in the hospital room, before I went home, I remember very clearly him telling me what was important. And that I had to work hard and do a good job, but I also had to remember that it was important to take care of my family. And some things were very important, and some things I had to learn to say no to. And it was exactly the right advice at the right time, for me. And I think that the assumption is that men don't often give that kind of advice. I'm not sure if that's true or not, but at least in my case, I got that advice from him.

JO 35:27
Well, along those same lines of figuring out how to be both a researcher and have a family. I wonder if we could talk a little bit about what you mentioned before we started the interview about the absence of role models, of other women who both had families and were around you in academic medicine. What did you have to do to overcome that lack of examples, or to kind of create your own path and model where there wasn't already one for you?

MT 36:21
So the second person who helped a lot was Wendell Ross, who's the person who originally attracted me to Duke. And when I was finishing my fellowship, I had really no funding of my own. But he had put me on a grant of his to work on platelets -- which to this day, I hate working on [laughs] -- because there was some technology at that point that I knew, that he didn't know. And so he wanted me to bring that into his lab. And so he kind of gave me the back area of his lab and said, "This is your space, and you can work on your things and help me with my things and I'm glad to support you in whatever you need." And I did go ahead and write a grant, which got funded, but that had a delay of a year or so. And so, I worked in his lab. But the project that he was doing, I wasn't all that interested in. There was another project we started that turned out very well, that was kind of in his area, but it was, again, kind of a "one foot in each camp" thing. And so that was going pretty well, and I wrote a grant, which I got.

But at that point, or actually before then, toward the end of my time at Bart's lab, there was the big meeting, which was the first leukocyte differentiation workshop. And we had submitted an abstract, which was accepted for a plenary presentation. And he decided that he couldn't go. And he sent me to go to Paris to present this talk on the big stage, the plenary session, which was an amazing experience. When the session was over, I was surrounded by people wanting to talk to me about what we presented. And so I met some people there who I then kept in touch with. And so when I was in kind of the back of Wendell's lab and working with Wendell Ross, I was in touch with some of these other people, who were much older than I was, who were more like Wendell Ross's age, and colleagues of his, who gave me advice. To some extent unasked for, but they really encouraged me to set out to be independent and not kind of rely on Dr. Ross to give me projects and funding and stuff. And I took that advice, which was good advice, I think. So that kind of started me on being more independent.

And then after I got that first grant, I did go and interview for a few other jobs to see what the lay of the land was like. And I met some of the really premier hematologists in the country doing

that. And I never took any of those jobs, maybe I was offered one but anyway, I didn't go anywhere. But I somehow realized that maintaining those contacts was a good thing, and so whenever I saw these people, usually at the annual hematology meetings, I would make it a point to seek them out, have a conversation with them, and update them on what I was doing. They were always very kind, and everything. And then that meant that there were people who were, you know, chaired professor-type high-up people, who when I needed outside letters to get promoted, they knew me. They knew who I was. And so that was really, I think, helpful and I always tell junior faculty now that if you meet someone like that, for whatever reason they walk up to your poster and talk to you about it, make a point to keep those contacts. Because you want the people who are preeminent in your field to know who you are, just as a general kind of career move. I'm not quite sure how I figured all this out. But that turned out to be a good move. And I do recommend it to other people as well. I was later recruited for a job, which I ultimately was offered and didn't take, but the person who was recruiting me also became kind of a champion of my career and nominated me for committees of the American Society of Hematology, and did kind of these unasked for things that were also promoting my career. And so I was very lucky, in a lot of ways, to have these opportunities to meet people. And to have met the people who took an interest in me, and wanted to see me succeed.

JO 41:59
So even if there wasn't already a pre-established path for women in hematology who also had families, it sounds like on the strength of building relationships and connecting with other people in the field, you managed to make..

MT 42:24
I guess they thought the work I was doing was good. But in general, and especially at that point in my life, I was pretty shy, actually. So it kind of took me pushing myself to do that. But having met them in an interview context made it easier.

JO 42:48
And I have to ask you, why do you hate working with platelets?

MT 42:56
Cuz they're sticky and hard to work with [laughs]. Red cells are way more forgiving than platelets.

JO 43:05
Okay. I just had to know.

MT 43:09
That's all. Red cells are less complicated, in a way.

JO 43:18
I also asked you in the initial questions that I sent about some of your collegial relationships. And I wonder if you could tell me a little bit about some of the people that you work closely with

at Duke or some of the work partnerships that you've had that have been particularly long lived or important.

MT 43:47
Sure, so, two partnerships. One at Duke, and the other one actually being my husband, who's not at Duke and never has been. I tell people when they ask me "How did you manage with two kids?" And all this kind of stuff. And I [say], "Well, I married the right guy." And I say that for a number of reasons, partly because he always did at least half of whatever needed to be done. But partly because we managed to learn when we were fairly young, we had to be champions of each other's careers. And that included things like rehearsing negotiations. If one of us was going to go to a chair and ask for something, we actually rehearsed with each other, and talked about, "What do you want to say, or not say, or leave unsaid, or how would you respond to this question?" And that was invaluable actually. So it's nice to have a domestic situation that works, but we actually were partners in a more professional way. Which I think is really helpful.

JO 45:03
Is he also in medicine?

MT 45:05
He actually is trained as an optometrist and works in the field of low vision. And he was on faculty at UNC for about 20 years. And he runs a research and development firm that makes optical devices for the visually impaired. But, you know, he's written NIH grants, and I've written NIH grants, and we've read each other's stuff, and even though we're fields [where] we don't really understand that much about each other's stuff. But you can still tell whether something makes sense, and is it well written, and stuff like that. We supported each other in ways that were just really important. I mean, over the years at Duke, Bart was a great mentor. And we continued, less so now since his involvement in the Human Vaccine Institute, but before when he was doing other kinds of immunology, we continued to interact on and off for years and years. And Wendell, until he retired, also. And Harvey Cohen, who was Chair of Medicine twice, was someone whose advice and values I really trusted. Whatever his advice was, I was always sure that the value base of what he was saying, as well as the practicality, were right on the money for me.

And then about 20 years ago, the NIH came out with a request for proposals, or a request for applications, to look at genetic influences on single gene diseases. Which is what sickle cell is, a single gene disease. But the idea was they wanted to fund research on how other genes affected the outcomes of that disease, or any other disease that heart, lung, and blood was involved in. And so I approached [Margaret] Peggy Vance, who was head of the Center for Human Genetics at Duke at the time, and she advised me to talk to a new assistant professor named Allison Ashley-Koch who had just come from Emory, I think. Or maybe from the CDC, I forget. So we put in a proposal for a multi-center study of genetic influences on sickle cell disease, which got funded. And was, I think in many ways, the most successful of all the sickle cell programs they funded. And we have been working together now for 20 years. And that has been a wonderful collaboration. Because she's a PhD genetic epidemiologist, obviously a hematologist, with some background at this point in molecular genetics and things like that. But that collaboration, both

from a scientific point of view and a personal point of view, has been totally wonderful. And I have old friends, but I haven't had a collaboration like that with anyone else that was quite so consistent, at that level. And so that's still ongoing, and we're still writing grants together. And getting grants together, actually, since we just got one [laughs].

I think both of us have learned from each other and grown with each other. She's a full professor now. I don't remember what I was at the time, assistant or associate professor, but we've kind of grown up together in a lot of ways, and raised our kids, and all sorts of stuff like that, as well as being scientific colleagues. And so that's been a wonderful experience. One of the things I realized, now quite a while ago in science, though, is how often science will bring you in contact with people that you really like. [It will] bring you in contact with smart people, because that's who you wind up meeting in meetings and stuff like that. But the breadth of people that you meet, and the countries they come from, and the backgrounds they come from are so varied. And that in and of itself is just hugely enriching. And I have to give a shout out to Dr. [Joseph] Greenfield because in 1990, before I was an associate professor or anything, [he] supported me to go on sabbatical to learn molecular genetics. And I went and lived for six months in Paris, and worked in a lab in Paris because they were doing molecular genetics of blood group antigens, and I was working on blood group antigens at the time. Experiences like that. In 2010, I did a Fulbright and spent three months teaching clinical hematology and hematology research in Moscow. And these were languages I had studied. So that was part of the reason for doing those things. But I just find that the whole world of science, and how international it is, and how you meet people from all over and get to know people from all over, it's just incredibly enriching. Not just on the scientific level, but on the personal level.

JO 51:36
It's almost like there's a community element to being in pursuit of the same questions or knowledge. And we haven't talked a lot about the specifics of the science that you do. But when we first talked about this interview, you mentioned that there might be some stories that you have about particular studies or particular problems that you were addressing or discoveries that you might have made in your lab. Is there anything that you'd like to share along those lines, do you have a memory of a particular scientific discovery that was exciting or noteworthy for you as an experience?

MT 52:26
A lot is exciting, but I think that's because I just find it exciting [laughs]. But I'll tell you one story. So my first paper was a paper about the days when people were publishing papers characterizing the antigens that were expressed by this new thing called a monoclonal antibody, because I go back to practically the invention of monoclonal antibodies. And I was working on this in Bart Haynes' lab. And what I discovered -- so when I went into Bart Haynes' lab was he was working on T lymphocytes. And he had made a whole bunch of monoclonal antibodies, where he immunized a mouse with T lymphocytes, and then grew up all these cell lines that made antibodies. And he knew, or had discovered, that a bunch of them reacted with red cells. And I knew, because of my training, that red cells have all these blood group antigens, which at that point in time were probably the best characterized antigens of any antigen on any tissue in the human body. And it had been, you know, decades of people working with simple serology,

and shaking tubes, and no biochemistry and genetics at that point. But they had worked out a lot of genetics just on the basis of serology. And so, I had the idea that I could figure out what some of these antibodies [inaudible] by testing them against red cells where I knew what the blood group antigens on them were.

And so I did that. And I made this discovery that two of the antibodies I was looking at were not reactive normally, but were very weakly reactive with a certain kind of red cell, which itself had its genetics worked out by serology. And they were called In(Lu) red cells where In(Lu) stood for inhibitor of Lutheran antigens. And the cells [inaudible] this family of antigens called Lutheran antigens, but I then showed that the monoclonal antibodies weren't against the Lutheran antigens, they were against something else. So we gave it a name. But the genetics of it were potentially really interesting because it had already been discovered from family studies that the genetics were the dominant inhibitor, which was almost unheard of. Most negative phenotypes, if something is absent it's because you get two defective genes, not because you get a gene that then prevents something else from working, another gene from working. And we were able to show with some collaborators that what our antibody reacted to wasn't even encoded by the same chromosome as what the Lutheran antigens were, they were entirely different chromosomes.

And so a guy at Hopkins, who was one of the most famous geneticists, McKusick, had this big book on human genetics and called this gene, like the most interesting human gene. And so I thought that was really exciting. I never figured out what that gene was. And it took about probably 20 years for someone else to do it, and it was a huge undertaking. It used techniques which didn't exist when I was working on it. And it was done by someone who -- at least at one time when I was still working on blood group antigens and not so much on sickle cell disease -- was kind of a competitor, right? He was British. But when that paper came out, I wrote him this effusive letter. Because it just felt so good to see that the story was completed. It didn't even matter that I didn't do it. I hadn't been trying to do it, actually. But just to see it done. And then to understand, it turned out to be a really unique mechanism, where you get this inhibitory thing, and it was at least as fascinating after the discoveries as it was when it was still a mystery. But as you can tell from the way I talk about it, I really get off on these things, I think they're really exciting [laughs]. Lots of stuff. Since then, we showed that there's lots of signaling and red cells, and I got to write an editorial once that was titled, something like "The Red Cell, Not An Inert Bag Of Hemoglobin." Again, showing that red cells were actually more interesting than people thought they were. Anyway, I never fail to be excited about the science that I get involved in.

JO 57:47
It's really striking to me in the example that you gave, that the work that you were doing was one piece of a much larger trajectory, much longer trajectory, of the science and that you were still following that story in a way, even though it wasn't your focus. And that's so interesting. It's such an example of how people who are at different institutions or in different countries, their work is in dialogue with one another and it relates to one another. In a way that it reminds me of what you said about the community of scientists.

MT 58:38

No, it's it's true. And for me, that's one thing that made it a great experience, as a career to have that element as part of it.

JO 58:51
Well, I know we've been talking for about an hour. And there's plenty more we could talk about. But I want to be respectful of your time. Is there anything that you want to make sure that we cover in this recording before we conclude?

MT 59:14
I think the only thing would be, I've been approached at various times, by fellows, by undergraduate students, by people of all levels. And by parents, actually, asking, "Is this really a feasible thing to do, to do research, to write grants, to try to have a family and kids?" And I have actually had these conversations with parents of Duke undergraduates who have worked in my lab and gone on to get MDs and PhDs and stuff like that. I think it's clearly possible. I think success is guaranteed by hard work. I mean, it helps to be smart, or have talent, or whatever you want to call it. But I think being willing to work hard, and being willing to kind of buck the tide a little bit. I mean, it's hard to be in research if you can't take criticism ,or even rejection, because everybody in research gets those things. You know, [Robert] Bob Lefkowitz, when I asked him about a paper I was having trouble getting published, he said, "I always have the most trouble with my most innovative and important papers." And I think there's a lesson in that.

But I think, at the same time, the idea of kind of having it all, something has to give. But it's not like somebody has to give, and you have to give a lot up. It's that you have to decide where to form the boundaries. And so very early on -- and again with no women mentors, where I could say "how did you do this?" -- I had to make some of my own decisions about it. And so I said, "Okay, two months a year, I'm rounding." And when I'm rounding, there's no telling when I can get home, it's just, like, leave some dinner on the stove, but don't count on me for, you know, two months a year. But the rest of the time, I'm gonna have dinner with my kids. And sometimes I went back to work after they went to sleep. It helps to be here, and not someplace where you live an hour away, because I live maybe five or seven miles from Duke, so it's not very far. But you have to figure out how to be comfortable with drawing limits, to everything. At least for me, I don't know. Comfortable is a big word. I'm not sure I was ever that comfortable. I tell some people that what I experienced for much of my career is what I call "global guilt". Which meant that when I was working, I felt guilty I wasn't home. When I was home, I felt guilty I wasn't working. But you do have to figure out where that line is going to be. And you have to at least come to the terms, which I did, that if I couldn't do it within my requirements [of] where that line was, that it was not going to happen. That I was not going to be nonstop in the lab from eight o'clock in the morning until 10 o'clock at night. That just wasn't going to happen. And if I couldn't be successful without doing it, then I wasn't gonna succeed. But there's lots of ways to be efficient. I bought the first PC IBM ever made, for some incredible amount of money at the time, like, $2,000, so I could work at home. So, you have to figure out how to make it work for you. I think it's definitely possible, but don't assume that you can do it, you know, easily. You have to really make these decisions, whatever fits you.

JO 1:04:08

That's a really interesting example. So the computer must have made a big difference, having a PC.

MT 1:04:21
Yeah, it did. Because there weren't -- I mean, there were barely computers we could use at work when I was in the lab, in Bart Haynes' lab. There was one dedicated word processor machine, and there was no way I was going to ever get near it, except at night when the secretary wasn't using it. So we decided that we were going to buy this PC, which first of all, compared to today's machines, did practically nothing. But you know, it allowed me to do some basic statistics, and some basic writing, and it meant that I didn't have to be in the lab to do that stuff. Which was huge for me, you know?

JO 1:05:06
Maybe on some of those nights when you might have been back in the lab after dinner or something like that you were able to stay there?

MT 1:05:19
But I discovered simple things like, I could go back to the lab and get to the next incubation stage. It might take me an hour and a half, the incubation could go overnight, but would have had at minimum to have to be four hours. So there's four hours of the day that I didn't waste, because I spent an hour and a half getting that work done and putting it back to whatever temperature it needed to be and going home. So to some extent, I learned how to be efficient in a way that just worked for me.

JO 1:05:56
Well, and congratulations on all that you've achieved.

MT 1:06:03
Thank you. I never set out with a goal in mind. Like, I'm going to be, you know, a premier hematologist, or something. I just kind of set out with a much more, "what am I going to do tomorrow?" kind of goal. And it just kind of worked, I guess. But I really went into medicine, thinking that I wanted a job where when I came home at the end of the day, I would have done something I had no doubt was worth doing. And when I first was thinking about going to medical school I said, “Even if you see a patient with bronchitis, and you can tell them, 'it's just bronchitis, it's not cancer, don't worry about it.” You've done a great thing for that patient.” So I had kind of modest expectations. I just wanted something that felt more worthwhile than getting paid to write term papers, or the equivalent.

JO 1:07:19
That makes perfect sense. And you had that in-person interaction, and that concrete impact.

MT 1:07:31
And I still enjoy patients. I'm doing more clinical research than I've ever done before, in the last couple of years, and I love that. And the patients who want to be in research studies are really special people. So it's just totally pleasant. And interesting.

JO 1:08:00
Well, thank you so much for doing this interview and for sharing some of your memories and reflections. It's been really great talking to you.

MT 1:08:10
No, thank you.