

**MC.0356**

**Interviews of the Margaret MacVicar Memorial AMITA Oral History Project**

**Paula Jacobs**– Class of 1966

(interviewed by Annie Kwon)

March 23, 2009

Paula Jacobs  
Class of 1966  
3/23/2009

Kwon: I have questions for you in two parts, and one part is your experience while you were at MIT. First of all, what motivated you to come to MIT?

Jacobs: Because a friend of mine went there the year before.

Kwon: Hmmmm.

Jacobs: He sent me back a postcard, which said – there are some girls here, why don't you come?

Kwon: I see, so was that your major deciding factor?

Jacobs: No, I got in and it was the most interesting school to which I was accepted.

Kwon: How about after?

Jacobs: No, I came from rural Mississippi.

Kwon: Oh, I see.

Jacobs: It was a very unusual environment to come from.

Kwon: Right.

Jacobs: Science was the kind of thing I wanted to do, and MIT looked like it was perfect for me.

Kwon: Wow, so just going back to that time, because there were not many females in engineering, science and technology, did you have full support from your parents?

Jacobs: Yes, as much as it was—my entering class had 20 women and 900 men. My mother did not care where I went – was rather puzzled that I wanted to even go to college, much less go some place other than Mississippi State to get a good husband.

Kwon: Wow, that's definitely a different from now.

Jacobs: Yes, I know it is about 50/50 men and women now.

Kwon: Yes, and so now I'm going to ask you about academics. Who was your most favorite professor?

Jacobs: George Thomas.

Kwon: Mr. Thomas? What department was he in?

Jacobs: Calculus. He wrote the textbook we were using at the time. He probably would have no memory of me whatsoever.

Kwon: As you majored in chemistry, what was your most favorite class and your least favorite class?

Jacobs: Least favorite was "P-Chem."

Kwon: P-Chem?

Jacobs: My only "D" while I was there.

Kwon: Oh, wow. Then which class was your favorite?

Jacobs: Organic.

Kwon: Organic Chemistry?

Jacobs: Yes, all of the organic chemistry courses.

Kwon: Right, your Master's and PhD were all in Organic Chemistry so did you take any graduate classes while you were an undergraduate?

Jacobs: Sure, about half of the Chemistry classes were graduate level.

Kwon: Wow, I see.

Jacobs: Inorganic Chemistry was graduate level and a couple of the Organic Chemistry classes were graduate level, but I didn't take any graduate math courses.

Kwon: Did you have a minor or take HASS classes?

Jacobs: Psychology.

Kwon: Psychology was your minor?

Jacobs: It was not an official minor. We didn't do official minors at that time.

Kwon: I see.

Jacobs: The curriculum was much more structured than it is now. The entire first two years were scripted.

Kwon: The first two years?

Jacobs: Yes.

Kwon: Wow.

Jacobs: Unless you had advanced placed exams in your first year, you took Chemistry, unless you were an architect, that was the only exception, you took Chemistry, Physics, math, no Biology, I never had a Biology course in my life. The work I am now doing is heavily biology and medicine and related areas, but I never had any related classwork.

Kwon: Oh wow.

Jacobs: So first year at MIT, we took Chemistry, Physics, math, and then one elective and a humanities course which was specified, it was a survey course. Then same thing second term, and in the second year, Chemistry, Physics, Math. Also, we had to take a humanities course, and one added course from whatever you were choosing for your major. I didn't really get almost anything in the way of electives until my junior year, and that was considered normal. We had Saturday classes too.

Kwon: Saturday class? Currently, we just have GIRs and I think it's pretty much for freshmen year and we declare our major. Then you go and declare a major from sophomore year. Did you have a HASS concentration?

Jacobs: What?

Kwon: A HASS concentration?

Jacobs: What's that?

Kwon: We are required to take a certain number of HASS courses, which are humanities, arts, and...

Jacobs: Yes, yes, we had to take a minimum of one every term. That was my psychology concentration.

Kwon: We have to take, eight in total.

Jacobs: Eight in total? I probably took 10 or 15. Actually, it's an interesting thing because at the moment, I'm currently in the process of actually applying for another job here, but part of it includes having to get all of your transcripts.

Kwon: I see.

Jacobs: I was just looking at my transcripts, because I don't know if you still use the weird units. MIT uses the weird units system.

Kwon: Okay, we have 12 credits per class; I'm not sure what you used.

Jacobs: Most schools use only in- class hours, so a three hour class is 3 semester hours. MIT did 3 hours, and then the prep time was 6 hours, so you got nine units.

Kwon: Right.

Jacobs: They did three separate things, the lab...

Kwon: They still do that.

Jacobs: Okay. The reason I'm aware of it is because I spent this weekend translating my entire transcript into semester hours. It was a real pain because I had to get them out in the MIT units, and I had to describe them in semester hours.

Kwon: Did you mention there were 21 females in your class?

Jacobs: 20.

Kwon: 20 females in your class?

Jacobs: Yes.

Kwon: So do you think you were treated differently from the male students?

Jacobs: Oh yes of course.

Kwon: And how so?

Jacobs: About half of the faculty had no interest in seeing us there. They thought women should not be in science and some of them were pretty vocal about it.

Kwon: Wow. Did you felt you were discriminated against often?

Jacobs: Since all of us the came from the environment and times where we were, that was considered normal. I mean it just was what it was.

Kwon: How did you fight against that?

Jacobs: We had to be better than the guys, that's all, which we were. At the time I entered, they definitely had higher admissions standards for women than men, so we always had the highest grades on campus.

Kwon: Wow.

Jacobs: So we were better.

Kwon: That's interesting.

Jacobs: Currently, fewer women apply, so they have higher standard for men.

Kwon: (Laughs).

Jacobs: For admissions, MIT as a private school can do balancing, so one of the reasons I got in was because I was i from Mississippi, a definitely under-represented state.

Kwon: Right.

Jacobs: They didn't have very many people from the deep south. I also went on a full National Merit scholarship but admissions definitely was discriminatory. But it was way less like that at MIT than it would be at any other place at that time.

Kwon: Wow, that's interesting to hear.

Jacobs: MIT was much more willing to say if you can do the work, fine. Whereas, I mean at the time for example, Caltech & Harvard were still all male

Kwon: Right.

Jacobs: Rice was still all male and I guess I'm trying to think what...

Kwon: Most of the engineering schools were substantially male, and for some women who managed to get in to them it was, there was always a standard.

Jacobs: Right.

Kwon: I mean, that's what you have to do.

Jacobs: Right, yes, to be better.

Kwon: Yes, to be better.

Jacobs: To prove yourself.

Kwon: Yes.

Jacobs: It still works by the way, as it's still true, not as true as it was. In the age group I'm in, that's still partly true for me now.

Kwon: Oh.

Jacobs: Okay, that's fairly a normal thing, I would say actually in the professions to discriminate on a variety of characteristics, which change with time. It is clearly still there in the medical fields, for physician vs. non-physician. I've been in the medical area or at the edge of it since my post doc fellowships, and it was only about I'd say 15 years ago that I ever heard a physician address a Ph.D. as, "Doctor." It's now routine, but it was not done then. (At the time of this editing 2012, I am in a senior professional position that has never been held by a non-physician, since I supervise physicians-- another barrier broken.)

Kwon: Wow.

Jacobs: So that was another form of discrimination which was not gender based.

Kwon: Right.

Jacobs: It was that if you were a physicist or biologist working in the medical area, you were discriminated against, because you didn't have a M.D., so I've found most environments have some form of that kind of discrimination.

Kwon: Did it bother you?

Jacobs: It didn't bother me at all.

Kwon: You just said...

Jacobs: No, it's fine, I can take care of it. I deal with that. Being bothered does not help. Being competent does.

Kwon: So probably up on your road to success...

Jacobs: You would not have done well if you were shy.

Kwon: So the women I'm thinking of, the 20 women in your class, were they pretty bold and well spoken?

Jacobs: Most were yes. One of the girls in our class was 16 when she came. Gorgeous woman, and she left at the end of the first year and went to Harvard where she was Physics major because she couldn't take the environment at MIT.

Kwon: Oh I see. So Harvard was better for her?

Jacobs: Apparently. I wouldn't have believed it, but...

Kwon: (Laughs). Did you have to work much harder than the guys?

Jacobs: No, no. We had to work just as hard to get our grades. We had to be better to get respect, that's a different issue.

Kwon: Right.

Jacobs: The grading was fair. I don't think there was any discrimination of grading.

Kwon: Did you pull any all-nighters?

Jacobs: Oh sure.

Kwon: How frequently?

Jacobs: Not so many my first couple of years, just occasionally. But I don't know if you still have to do this, but at least when I was there in Chemistry, you had to do a thesis, a real thesis, not a project, a thesis. And when I was doing the thesis, because of what I was doing, I actually did 40 hours at a stretch.

Kwon: Wow.

Jacobs: And then I would go crash in Cheney room and sleep for 12, 15 hours, and then I would come back and do another 40 hours.

Kwon: What was your thesis about?

Jacobs: It was a carbene reaction. I can't remember exactly what I was doing, a cyclic thing, but what happened was that in order to get enough of what the product characterized, it had to be purified by gas chromatography. You could only put so much in at a time, and at that time techniques for identifying took larger quantities of material. You couldn't think of identifying something without having several milligrams. Now with the fancy mass specs and all that, you could do a lot better. In order to get several milligrams, I had to make multiple injections and collect the products.

Kwon: Oh that's always true in the Biology field and Chemistry, you start with the massive and then...

Jacobs: Yes, and it gets smaller, smaller and smaller.

Kwon: And then you are left with this tiny sample.

Jacobs: Almost nothing, yes.

Kwon: Did you study individually or in a group?

Jacobs: Individually.

Kwon: Was it much more productive?

Jacobs: Yes, well that may be personal. Some people studied in groups. I know the guys that were in fraternities tend to do that.

Kwon: Oh yes, so I'll ask about your social life.

Jacobs: And with that gender ratio, it was exceptional. With that many guys, it was very hectic, generally speaking--we did not socialize during the week, but weekends everybody was out. There were not a lot of parties, but individual dating was happening.

Kwon: Oh wow, did you join any clubs or sororities?

Jacobs: There were no sororities.

Kwon: Oh, there were no sororities?

Jacobs: I was active in the science fiction society, which is still there. I was also active in a publication that is no longer active. I was eventually the editor of it, "Tech Engineering News," which was a scientific professional publication. There was a group of us that worked together on that, so a lot of the socializing was done around the publication.

Kwon: I think currently it's the MURJ journal.

Jacobs: Probably was not that because it went, Tech Engineering News was there for, I don't know, 20, 30 years, and then it probably got dropped in the mid--I'm guessing likely in the mid 70s. "Voodoo" got dropped and then picked up again, a humor magazine – I don't know if it is still there?

Kwon: Yes.

Jacobs: It was also inactive for several years, mostly during the Vietnam War era, everybody was too busy protesting.

Kwon: Were there any sports for women?

Jacobs: Sure.

Kwon: Did you play any sports?

Jacobs: I didn't. One of my short term roommates was a fencer, and in fact a very good one, Sue Colodony. She was a class above mine. There was a fair amount of intramural

sports, but then again, I was not big on sports. We had to take PE, physical education.

Kwon: We still have to.

Jacobs: And I remember doing archery because it was kind of fun, yes. I can't remember what else I did though.

Kwon: There's pistol that is really popular now.

Jacobs: That wasn't there then

Kwon: There are many PE classes now, and you have to take 4 PE's to graduate.

Jacobs: We had to take two, and pass the swimming test.

Kwon: Oh, yes, it's still around. First thing freshmen year, during orientation week, we all had to do the swimming test.

Jacobs: Yes.

Kwon: So how strict were the rules regarding guys and girls being in each other's dorms?

Jacobs: When I came in, there was only one women's dorm, and that was that the freshmen women's dormitory over on Bay State Road by BU. That was the year they were building McCormick. And during that time women were in freshmen dormitory, and after that, they lived in apartments. They were in Bexley, which was then apartments for women, if they wanted, or they could live off campus. When they got McCormick, they made a rule that you had to live in McCormick. But they had parietal hours, unlike other colleges at the time.

Kwon: Right.

Jacobs: We did not have curfews – unlike women in all the other colleges and universities nation-wide. We had to sign out, that was all. But I did not want to live in McCormick.

Kwon: Why not?

Jacobs: I seriously didn't want to live in McCormick, so I petitioned to not do so, probably because we had to take the food service, and I didn't like the food.

Kwon: We still don't like it!

Jacobs: It was terrible, and the dean wouldn't let me out, so I rented an apartment off campus and laminated my sign out card and moved out after about six or eight

weeks. The dean finally called me and said, "You win." So I didn't have to pay for the dorm anymore (laughs). But women at that time had curfews at most schools, and they had parietal hours but in fact, many of them would not allow men in the room at all. The ones that allowed them, it was like two to four in the afternoon on Sundays with doors open or something like that. But we were much more liberal than that. I don't remember what the exact rules were because I didn't stay at the dormitory for very long.

Kwon: I'm actually moving into McCormick pretty soon, and there's still dating rooms and telephone booths. I wonder what life was like back then for a woman who was living in McCormick, and the guys had to come only in the dating rooms. But you lived off campus.

Jacobs: Yes, I lived off campus.

Kwon: So since you had to move into McCormick which was...

Jacobs: From early in my sophomore year.

Kwon: Did you have a roommate in your apartment?

Jacobs: Yes I did. At the time it was highly illegal.

Kwon: Why was it illegal?

Jacobs: Because it was a guy, and it was literally illegal. I could've been arrested at that time in Massachusetts.

Kwon: Oh I see.

Jacobs: Several of the people we knew also moved into other apartments in that complex, so that was our social life.

Kwon: I wonder because there are different dining halls. There's one at Baker house, there's one in Simmons hall, which was recently built, and the one at Next house. Were women allowed to eat at other dining halls?

Jacobs: No, no. Everybody ate at their own dining hall, and people at Baker ate at Baker; they didn't eat anywhere else, only at Baker. The only thing that was different was Walker served East Campus and Senior House, and I think Walker was the one to which other people could come.

Kwon: Right.

Jacobs: I mean, you could go, but it wasn't part of your meal plan. You had to pay or somebody had to pay for you, so no, people ate in their own dorms.

Kwon: That's definitely not the case now.

Jacobs: Now you can just go anywhere?

Kwon: Exactly, people can just go anywhere.

Jacobs: Where the food is the best, I hope.

Kwon: Baker used to be good but then recently, they say Simmons is better. While you were an undergrad did they serve all three meals?

Jacobs: Yes.

Kwon: Currently, they only serve dinners on the days you have the school the next day, so we are on our own for breakfast, lunch.

Jacobs: So what do you do? Go to a food court or something?

Kwon: There are a couple of places to eat in the student center.

Jacobs: In the student center, yes, I know.

Kwon: A lot of people just buy, or they'll just make their own food. It's kind of inconvenient though. Were there any dress codes for women?

Jacobs: No. No dress code for anybody. Though some of the fraternities had their own dress codes for dinner. But in general, definitely not.

Kwon: MIT hackers, were they around back then?

Jacobs: What?

Kwon: MIT hacker's society?

Jacobs: Of course, but it wasn't a society, it was just people.

Kwon: What was the most outrageous thing you can think of that they did while you were an undergrad?

Jacobs: I think there was the great pumpkin.

Kwon: What was the great pumpkin?

Jacobs: Well, you're familiar with the Peanuts cartoon?

Kwon: Yes.

Jacobs: So every Halloween, he awaits the great pumpkin.

Kwon: Right.

Jacobs: So what they did was, they went up on the dome. Unfortunately, this was one the cases where they violated the rules, the unwritten rules that you can't damage things. They didn't intend to but they managed to get some paint--they basically had sheets and they painted the pumpkin face, and they changed the lights. They put orange filters there so it was all orange, but some of the paint went through, and I think they had to sandblast the dome, now part of it to fix it. I won't remember that much of the specific hacks that were done when I was an undergraduate because I did live in the Boston area for 40 years and I have heard about all of them since. And in fact, about 10 years ago, one of the guys I hired was an MIT grad who was very active in the hacking. So he told, he taught me how to pick locks. Kind of nice, you have to know how to do that!

Kwon: (Laughs) They take us, the incoming class, on "orange," "tangerine tours," and they take us to the top of the dome. If you are interested during orientation, they take you on the "spelunker tours." They give us a slider and teach us how to pick locks, and it's so interesting.

Jacobs: He used those, the little metal, the metal things that come from the street sweepers, to pick the locks. By the way, we had tuition riots my first year.

Kwon: What was that about?

Jacobs: They raised the tuition, so they had to student demonstration for the tuition. You'll like this, when I came, tuition was \$1500 a year, and they had raised it to \$1700.

Kwon: Wow.

Jacobs: So there were bunch of people shouting, "1700 was damn too much!"

Kwon: 2000 dollars more.

Jacobs: No, no 200 dollars more.

Kwon: Oh 1700?

Jacobs: It was 1500.

Kwon: Oh wow!

Jacobs: And they changed it to 1700.

Kwon: 1500 to 1700?

Jacobs: Yes, yes.

Kwon: (Laughs).

Jacobs: And yes, I do have an idea what it is now. I did send one of my kids to Bowdoin in the late 90's.

Kwon: 50 grand.

Jacobs: Yes.

Kwon: But, they are pretty good with financial aid.

Jacobs: Yes, they were in my time too, in terms of loans and giving people part-time jobs and so on and so forth.

Kwon: Did you work any part-time jobs?

Jacobs: Oh God yes.

Kwon: What did you do?

Jacobs: Library work. Most of the time, I worked at the library.

Kwon: The Hayden library?

Jacobs: Hayden, yes. Initially I started stacking books, but I slowly moved into the reference department. I worked the whole time, I worked to be able to buy books.

Kwon: Textbooks are so expensive.

Jacobs: In context, think what I told you about the tuition, one of my classes required \$200 worth of books.

Kwon: Wow.

Jacobs: At that time, and since it was one of the professional Organic Chemistry classes, I had no choice. So you worked, you worked all summer. The only year I didn't work was when I was doing my thesis.

Kwon: Did you have internships?

Jacobs: No.

Kwon: So you just worked on campus?

Jacobs: Yes.

Kwon: What did you do over the summer?

Jacobs: One year I worked on the Apollo project. I don't remember what I did for the other years. I know I worked one year when I got an NSF fellowship, which paid me all of 600 bucks for the whole summer.

Kwon: Wow.

Jacobs: But again, those were cheaper times. It was a long time ago. It was useful. I don't know what I did the other years; one summer was the thesis summer so...

Kwon: Were you involved in a UROP during your school?

Jacobs: There was no UROP.

Kwon: Oh no UROP, I see. Because that got recently started?

Jacobs: No, it's not that recent. It's been around for a quiet a long time. But no UROP, we had a reading period instead.

Kwon: What was that?

Jacobs: Classes went until I think, the first or second week in January, and then you had a week or two weeks, I can't remember which, which was a British thing. During that time you prepared for your exams, so you didn't have classes. That's when people pulled out their all-nighters. They started UROP after--I'd say in the 80s there was an energy crisis. And that's when a lot of schools closed down for January because of the cost of the energy, and I think when they started coming back that's when they started UROP.

Kwon: I see, so now I have questions about your career, and I have your resume here. I didn't ask you yet how you chose Chemistry as your major.

Jacobs: I thought I wanted to be a physicist until I had my first Physics course. Now before I came to MIT, during the summer of my junior year in high school I had spent several weeks at Louisiana State University in an NSF funded science program for students, high school students. That's when I found out that Physics was not going to be for me, and when I discovered Chemistry.

Kwon: So you stuck with it?

Jacobs: I stuck with it.

Kwon: How was the male to female ratio in the Chemistry department?

Jacobs: (Laughs) Same as everywhere else.

Kwon: Were you the only Chemistry major?

Jacobs: In my class, probably, yes. I was the only in my class. I'm trying to think if there was anybody before me, the year before, the year after me. Chemistry is one of those things where, if you don't get it, if you don't really get it straight away, you can't do it.

Kwon: Right.

Jacobs: I don't think there was anybody even the year before me or after me that was in Chemistry.

Kwon: So for a long time, you were the only...

Jacobs: Yes, yes.

Kwon: Then you went ahead and did a Master's in Tufts and PhD at Northeastern. What motivated you to pursue a higher degree and move on?

Jacobs: You can't get a reasonable job, and you can't do what you want to do unless you get it. I went to Tufts. I did not like it. That's just an interesting comment. I know it's undoubtedly untrue anymore, but at that time, at least in the chemistry graduate department, it was suffering angst from the fact that they were not Harvard. And they basically said we are second-rate, and therefore the students here are second-rate. I knew I wasn't second-rate, so I didn't like that. I don't mind having to prove myself. I mind somebody assuming I am stupid.

Kwon: Right, right.

Jacobs: So I basically took the Master's and got out. I originally was in the PhD program. Then I worked for a couple of years, doing research. That's actually where I hit the weirdest discrimination.

Kwon: What was that?

Jacobs: I was working at Children's Cancer with a very good peptide chemist, because that's the area I was working in at that time. We did some nice work, and put together a publication and Hans wanted me to be the first author. He sent me up through his bureaucracy and they said absolutely not, because I didn't have a PhD. It was not discrimination because I was a female. It was discrimination because I

didn't have a doctorate. That was the point I said, okay, I will go get my doctorate. But unfortunately, when I completed it 3 years later, it was a time of high unemployment. Scientists were not as unemployed as everyone else, but it was still pretty high, and I was looking for an industrial job, not an academic job, so I did four years of post-doctorate work.

Kwon: I see you did a lot of post-doc work through research at many different places. Eventually, you went to Harvard Medical School.

Jacobs: That was one of the post-doc programs. That was a joint appointment between Harvard, Northeastern, and Peter Bent Brigham Hospital. It was s an Associate in Radiology. It was very unusual for a PhD to do that. That was normally a fellowship for an MD. Not anymore; now they can. I was in radiopharmacy, synthesizing radiopharmaceuticals, new synthetic materials for medical imaging. That was kind of fun. I think technically my paycheck probably came from Northeastern, but it was altogether a radiochemistry position. And I went back to MIT for my second postdoctoral.

Kwon: Right. It's 1975 and 1976. Did you go back because of previous professors you knew?

Jacobs: No. It was just a postdoc. I applied for the postdoc and I got it. While I was there, I had my first kid. I am not sure that's good or bad, but ... (Laughs)

Kwon: Who did you work for while you were doing your postdoc?

Jacobs: Sid Hecht. He was an obnoxious SOB. How's that? (Laughs)

Kwon: Did he give you a hard time?

Jacobs: He gave everybody a hard time. However, I have to say, he definitely had no gender prejudice whatsoever.

Kwon: What did he do?

Jacobs: He just harassed everybody.

Kwon: I see. That's unfortunate. It looks like your first major leadership experience was at Clinical Assays as a group leader in technical support?

Jacobs: Right.

Kwon: What made you transition from the research area to corporate?

Jacobs: Because that was what I had been looking for all along.

Kwon: You always wanted to do this?

Jacobs: I did not want to be an academic, because I knew I was not suited for academic research. What I am suited for is development. It's a very different thing. Research goes from whatever is in your head to something. Development takes something from research to practical. I've done development of a number of drugs, where somebody else has done the early work. I take it and clean it up, make sure you can make it the same way every time, do the pharmacology and toxicology studies, design the early clinical trials—where it's a different need, where it's making something work all the time. Research, you can make it once and you are done, accomplish it. That's your product; it's a paper. When you make a drug, your product is something you can put into a human being. You'd better be able to make it right all the time and every time. It's a very different skill set or mind set.

Kwon: So it's more practical, and you can see the people you are impacting.

Jacobs: Yes.

Kwon: I noticed in the Advanced Magnetics company you worked in, you talked a little about the iron therapy. I was wondering what that was.

Jacobs: You are familiar with iron deficiency anemia?

Kwon: Yes, I have that too.

Jacobs: It's not uncommon in young women. There are some people who are very iron deficient, for whom they cannot take normal iron. It's not absorbed or they can't get enough. And if you've ever taken oral iron for anemia, it's very unpleasant. An appropriate iron therapy for iron deficiency anemia is 200 mg, a couple of times a day. You get diarrhea, constipation, and your stomach hurts. It's nasty. Normally, for mild iron deficiency, that's okay, and you can take it. I am a regular blood donor, for example, which takes lots of iron out of you. I am not a vegetarian and I take a couple of pills a week, and that's enough to keep my iron and hemoglobin up. That's tolerable. But if I had to take two of them a day, I'd never do it. The people for whom this has the most impact are those on hemodialysis. They lose blood regularly, probably 10-20ml every dialysis if not more. As well, they don't absorb the iron from their diet. We don't know why, but they don't, so they get intravenous iron. Intravenous iron, until this one we developed, had also bad side effects. Depending on which product you are using, you can get an anaphylactic reaction, which can be life-threatening; thus, you have to give it very slowly or your blood pressure drops. It's not convenient. We developed the iron oxide drugs for magnetic resonance contrast agents. That's where I learned my inorganic chemistry. They are iron oxides, they are inverse spinel, gamma ferric oxide. Actually its magnetite, but it has been oxidized so that it's now all ferric iron with no ferrous. But that doesn't change the crystal structure, so it's magnetic, and its particle size is small enough that it won't stay magnetized. That's what you need for magnetic resonance image

contrast agent. It's something that when you are in the magnet, it aligns with the field, but when you are not in the magnet, it doesn't stay magnetized. Otherwise, the agent would clog and cause blood clots. So we developed agents for that. The last one we developed looked safe enough to be used in iron replacement therapy. There's a much a bigger market now. That's why we developed it.

Kwon: So was it successful?

Jacobs: It's still pending for the FDA. They will approve it probably this year. [It was approved in 2010.]

Kwon: Wow. Congratulations.

Jacobs: Fun stuff.

Kwon: How did you find your current job as a operational technical support contractor?

Jacobs: When I was at Advance Magnetics, one of the things I did was I got in touch with people in this program, which is the Cancer Imaging Program. And I negotiated a clinical trial agreement with them. We were a small company, so we didn't have a lot of resources. The idea was to get the NCI to do some clinical trials for us, because they had lots of money, and we didn't have much. That was in the year of 2000. I was already a little bit familiar with these people because they were cancer imaging people, and I was doing imaging. I negotiated the clinical trial agreements. Within that time I got to know the people here, and I worked very closely with one of the physicians who actually has left now. When we started doing the iron replacement therapy work, I did my duty. I joined the nephrology societies. I published in the nephrology journals, I presented in the nephrology meetings, and I was bored out of my mind. I get bored easily, if things don't change continuously. At that point, I started looking for another job. I talked to the people here. The head of the program, who had since moved on after having been here for ten years, wanted to keep me at the company because I was providing new contrast agents they wanted here. But he realized I was serious about leaving when I asked him for a reference to another job. I interviewed for another job in a small research institute. I had sent him a note saying, "Would you be a reference for me." That was the point where he said, maybe... And they didn't have any government openings at that time, but they had a relationship with SAIC, which does a lot of work for NCI. SAIC has a major contract that runs an NCI national laboratory out in Fredrick. It's like a five billion dollar contract. I mean it is huge. They provide all sorts of contractors. It's kind of like a Los Alamos Laboratory for biochemistry research. They provide everything from nurses to clinical centers to people like me. The program people here worked with the SAIC contact to see if there was an appropriate position that they could get approved. This program budgets its money in the SAIC. I run a staff of now seven but soon about twelve contractors. We are here in Bethesda. We look like we are government people, but we are not. We have to make sure that we never say that we are government. That's against the rules. So for example, I give a lot of

talks at meetings about the programs here and things like that. I have to make sure to start with the disclaimer that I am not speaking for the government. It took me quite a while to figure out how that worked too. Let me tell you it was confusing. Eventually I was offered the job with SAIC to be put in place here. I actively solicited being in this program because I wanted to work with these people.

Kwon: Wow, and you got it.

Jacobs: I am of retirement age, I mean, fundamentally. I could go build houses for habitat humanity, but this uses my expertise. I took probably a 40% pay cut. I will shortly be applying for a job in the government, as the deputy to the current head here, and I will probably take another 30% pay cut. That's why it's a retirement job. [Update: in 2009, I transitioned to a government position as a Deputy Associate Director of one of the NCI divisions, and in 2011 was promoted to Associate Director of the Division of Cancer Treatment and Diagnosis at NCI.] So I am now responsible for the Cancer Imaging Program as a government employee.

Kwon: It's something that you enjoy doing and want to continue.

Jacobs: Yes.

Kwon: So that will be the next job?

Jacobs: Next job will be as deputy to the head of this program.

Kwon: I guess as a final comment, what was the best part of MIT and the worst part of MIT, looking back at your four years?

Jacobs: Not even looking back. The best part of it coming from where I came was that I could finally talk to anyone. I spent my entire time as a child in Mississippi, where I had to constantly watch my vocabulary. I couldn't use it. People would make fun of you because you are smart. I got to MIT, and I could talk to anybody. That was worth everything. Worst? I don't know that I have a worst. It was something that I think that it was a very important part, something that ...

Kwon: Changed your life?

Jacobs: Yes. I would not recommend—I will never recommend somebody to go to MIT. I think that it's something that you have to want to do yourself. It's like taking a drink of water from a fire hose. It can be overwhelming, but it was a good experience. Good stuff. I still have friends from that time of period. Lots of them.

Kwon: Do you have a word of advice to current MIT students?

Jacobs: Enjoy it. (Laughs) That's kind of it.

Kwon: I see. Overall, how would you describe your MIT experience in one word if you had to?

Jacobs: One word? (Long pause) Fantastic.

Kwon: You truly got, I guess, the time of your life.

Jacobs: It made a difference. I would not be where I am now if it were not for that. And part of it was that basically I was taken in there. Compared, for example, to somebody from New York State, your level of preparation is wretched when you come from a place like Mississippi. It was probably the worst possible place in the union for education. When I interviewed for MIT, the interview was done locally by an MIT graduate in Mississippi. There was a kid who came to interview from a really rural area. He had to take geometry and trigonometry as correspondence courses, the modern equivalent would be on-line courses. His school did not have anyone that, could teach geometry. In high school, I was able to get calculus in my school. Not a great course, but calculus. In general, MIT cut us no slack as females, and they cut the guys no slack, and that was very good. People either liked it or hated it. I suspect that that is still true.

Kwon: IHTFP.

Jacobs: We all said that. That's very old. That probably dates back to the time of Ellen Richards, I suspect. Like what I said, I don't think I'd be here without MIT. Essentially, that told me that I could do whatever I wanted to do. I haven't looked back. Since I was in the area I would go occasionally. Of course I used the library. I go to reunions maybe once every ten years or so. I didn't bother to go until the 10<sup>th</sup> or the 15<sup>th</sup>. It's kind of interesting. The women in my class still are fairly tight together. In fact, our class secretary is one of the co-eds.

Kwon: So there are very few of you. I guess you were very close together?

Jacobs: Well, we had to be. (Laughs)

Kwon: Actually I also came from a rural area, southern Maryland, and I think I am the first one in 50 years from my school to get into MIT. For me, adjusting to MIT was really hard. It took me literally the first four years to adjust to meeting the standards.

Jacobs: Wow. Oh, yes, the standards are high.

Kwon: I've never had to study this hard in my life before.

Jacobs: One thing really interesting for both males and females coming at my time is that a lot of them had trouble with the concept that they weren't the smartest person anymore. I had no trouble with that. I took one look at and said this is wonderful. There are all sorts of smart people all around to talk to. But a lot of people had that

problem where they had always been top dog in places like Bronx High School of Science, valedictorians. That's a much harder psychological adjustment. I basically said okay, I will be doing really good if I get Ds. I think my average out of 5 was 3.8, so I basically was a high C. It was wonderful. No one in my community had a clue why I would do that. It's kind of like "Why would you want to go there?"

Kwon: Did they look down on you? Did they even know where MIT is, or what it is?

Jacobs: All they knew was it was some place up north.

Kwon: They didn't know that it was MIT?

Jacobs: No, they didn't know it was MIT. I do remember that the application was probably the most expensive \$25 I had ever spent. There was an application fee of \$25. I was pretty much on my own. I didn't go home very often, because it was too far away, and it was also very expensive. I think for the four years I was there, I probably went home twice the whole time.

Kwon: Actually what you've told me about coming from a rural area and trying to get out of the place, it seems like you wanted to get out and you wanted to see the bigger world.

Jacobs: Yes. That's one of my earliest memories as a child, wanting to leave.

Kwon: It's a very common theme around the students I've talked to at MIT.

Jacobs: And essentially what you have done is you've come into a community of ideas. I mean at the moment, a lot of your classmates are immature and all that. They are going to be world leaders in science and technology. They are your people, and that's a very nice feeling. I think we all felt that it was very international, even at that time. I will say probably a good third or more of the class were international.

Kwon: May I ask which countries?

Jacobs: All over. A fair number from Mexico, and a lot from Europe.

Kwon: Asia?

Jacobs: Asia some. More Asian Americans. Not so many directly from Asia at that time, although few from Japan. Graduate school, more so.

Kwon: Definitely. It's more international.

Jacobs: Definitely so. A lot of math majors were international. There were some Russians even in math.

Kwon: Well, math is an international language. You don't need to know English to learn math.

Jacobs: Yes. (Laughs) That's always true. It was surprisingly so. It was probably a higher percentage of Jewish people than it is now. I would say there were quite a few, and a lot that were from Bronx High School of Science. There is still probably a substantial number. And again, unlike places like Harvard, there were no quotas. I don't know if Harvard is still officially on a quota, but much of the 50s and early 60s, most of the Ivy League schools had quotas for Jewish and Asian, and essentially bans on blacks. Once they passed the quota, they wouldn't take more. MIT never had that. If you are competent, take the top. They would still do geographical distribution, which is essentially how I got in. But it was also correct. I was also a success. So that was good, although, yes, it was a lot of work. It was definitely a lot of work.

Kwon: It still is.

Jacobs: And it will stay a lot of work. And if you go on to graduate school—are you an engineer?

Kwon: Yes.

Jacobs: Are you planning on graduate school?

Kwon: Definitely.

Jacobs: It will be even more work. Actually I have to say, by the time I got to PhD, I found PhD courses trivial compare to MIT's. Again I don't know if it is still the same, but at that time in Chemistry, MIT would not take its own undergraduates into graduate school, because they felt, particularly in organic chemistry, that there were sufficient art involved that they felt fairly strongly that you should be exposed to another environment.

Kwon: They do that for Chemical Engineering. They don't take their own students.

Jacobs: Chem E did in my time, because my ex-husband was a chemical engineer. But he was in Chemistry and then went to Chemical Engineering, so I guess that's different.

Kwon: So now I guess they want you to be exposed to a new environment.

Jacobs: I think it's a good idea. I mean, because there are different cultures in different schools. And there are different approaches to things. I think it's even more so if you look at things like business schools. Sloan and Harvard business, they can be on different planets. In fact, I think they probably are. (Laughs) But chemistry is definitely different in different environments.

Kwon: So do you think that having those other experiences from outside of MIT was good?

Jacobs: Yes, it's good.

Kwon: In the end?

Jacobs: Yes, in the end. Sometimes it was not fun.

Kwon: Except Tufts.

Jacobs: Right, I didn't like it there although I did get some publications out of it, so it's okay.

Kwon: This is my last question before I go. Who was the biggest rival school for MIT? Right now it's Cal Tech.

Jacobs: It was Cal Tech then. But we knew we were better. (Laughs) And of course the local rival, it is still, and always was, and will always be Harvard. Even though there are a number of cooperative programs between the schools and all that, it doesn't matter. I mean, they are still making those standard jokes. There used to be a Stop-and-Shop on Memorial Drive, which is half-way in between. It's where the Micro Center is now. That was a Stop-and-Shop. The standard joke was that a student gets in the 10 items or less line with more than 10 items, and the cashier looks at him and says: "Are you from MIT that you can't read or are you from Harvard that you can't count?" We did those all the time.

Kwon: That's funny. There is the cross-registration program.

Jacobs: We were doing that in my time. It was not with Harvard. It was mostly with the all girls' schools.

Kwon: Wellesley?

Jacobs: Yes.

Kwon: Did you take any classes there?

Jacobs: No. I came from an all girls' school. I was totally disinterested in going to one again.

Kwon: And it is also far away.

Jacobs: It is far away.

Kwon: It's about one hour ride.

Jacobs: No, I was pretty much in MIT. I don't think I did do much of anything except go to school. It was good. Overall, I think it was one of the best things I ever did. But I had to get out of it to find that out.

Kwon: Thank you for the meeting.