

Interviews of the Margaret MacVicar Memorial AMITA Oral History Project, MC 356
Massachusetts Institute of Technology, Institute Archives and Distinctive Collections

Barbara Adams – class of 1961

Interviewed by Maggie Chen, class of 2022

July 27, 2020

Margaret MacVicar Memorial AMITA Oral History Project

Barbara Adams (SB Physics and SM Mathematics 1961) was interviewed by phone on July 27, 2020 by Maggie Chen (SB Brain and Cognitive Sciences 2022), a few months into the course of the COVID-19 pandemic. Ms. Adams was at her home in Rolling Hills Estates, California, and Ms. Chen was at her family's home in Maryland.

Adams grew up in Queens, New York, and was fascinated by books, physics and astronomy from a young age. While growing up, however, she had to overcome several obstacles—including a long commute—to attend the Bronx High School of Science, the only public exam high school in New York City focused on math and science that then admitted female students.

At MIT, Adams felt under financial pressure to graduate, and earned both her bachelor's and master's degrees—in physics and mathematics, respectively—at the age of 18. She later taught at Brown University and began a PhD in Astrophysics at Harvard University.

For several decades after dropping her graduate studies, Adams was a systems engineer at leading aerospace companies based in Virginia, Massachusetts and Southern California where the work cultures were decidedly male-oriented, including Raytheon, TRW, Boeing and Northrop Grumman. Her work involved performing orbital analysis for spacecraft, including rockets and satellites. In addition, she evaluated atmospheric and nuclear effects, and performed systems optimization for other defense system-related programs.

CHEN: We're very happy to have you participate in this oral history project. Thank you for taking the time to do it—even if it has to be long distance.

ADAMS: I'm glad to.

I hate to say this, but my 60th reunion is next year—I graduated in the class of '61. I'm wondering if they're going to have reunions or anything else then [given the pandemic]. Who knows?

CHEN: Right.

ADAMS: It's a really strange time.

CHEN: Yes. For students like me, it's a real transition from being in lecture halls to being online all the time and having to actively search out people to see if they're available—and then accommodating everyone's time zones. It's a new thing.

ADAMS: I know. It's disquieting for everyone, I think. Do you live in a women's dorm?

CHEN: Yes. Actually, I lived in McCormick Hall.

ADAMS: I see.

CHEN: I've heard that you knew Mrs. McCormick. I wanted to ask you about her.

[Katharine Dexter McCormick '04, one of the first women to earn a biology degree at MIT, was a pioneer for women's rights who helped achieve the ratification of the 19th Amendment granting women the right to vote. A philanthropist, she donated funds that were key to the development of the birth control pill. She also donated funds for construction during the 1960s of McCormick Hall, an all-women's dorm that enabled MIT to admit many more women undergraduates than it had previously, when the only options for women students were for a small number to live in a brownstone-turned-dorm at 120 Bay State Road in Boston and at Bexley Hall.]

ADAMS: She was a fabulous person, just amazingly sharp. I really liked her. In those early days, the incoming freshman from out of town had a dorm which Mrs. McCormick had donated, but it was a converted brownstone, basically, a private home. It was at 120 Bay State Road, in Boston. She used to send her Rolls-Royce over and invite coeds to tea. I did that a couple of times. Also, she was really an interesting and feisty woman.

A lot of the women I knew were conservative, and had gone to Catholic schools. I was from Queens, in New York, which was a bit different. I fit beautifully with my [MIT] Big Sister Sue Schur [Susan E. Schur, SB and SM Materials Science and Engineering '60], for sure, but not that well with my class. And very few [women] from the class graduated.

CHEN: Really?

ADAMS: Yes, the dropout rates amongst coeds at that time I think were quite a bit higher than for the guys. The class that I started with, which was the class of '62, I don't know how many graduated, but it was way less than half, I'm quite sure. And that was, I think, true of '61, as well.

I have that impression because there were a lot of pressures-- Well, you know, it's Tech. There were a lot of pressures, period. But I think there were more on the girls for a lot of reasons. First, there was the schlep from 120 Bay State Road. I mean, it's a long, cold walk in the winter! [LAUGHS]

CHEN: Right. It's far from campus.

ADAMS: That whole setup was not optimal.

I don't know if they still have it, the Margaret Cheney Room [a gathering place and refuge for women students, located in 3-310], over at the Institute. It had a kitchen, and study rooms, and a bedroom with several beds, and so on. During finals, it was very well-populated by girls, both commuters and students living at 120 Bay State—just the time going back and forth to 120 Bay State starts to count a lot. I suspect it was a very different environment than it is currently.

CHEN: Yes, it sounds like it definitely is different now.

ADAMS: And coeds were-- I don't know how to put this: there was a stigma on coeds. They were not just girls, they were "coeds." [LAUGHS] And there was an animosity underneath there.

There's a picture of Mrs. McCormick and a bunch of the guys in a laboratory, and it's remarkable, for several reasons. One is, they're all dressed up. Apparently, people in those days dressed to go to college. The men were all wearing suits and white shirts. And she has a very fancy dress on, and a hat.

CHEN: I think I know what picture you're talking about. It's actually the first picture you see when you enter McCormick Hall. [LAUGHS]

ADAMS: Is that right?

CHEN: Yes—I've looked at it a couple times. She's wearing a really big hat. I think she's in the chemistry lab.

ADAMS: Yes, and it was in a lab. Right. I think that if you look at the guys looking at her, there is an underlying animosity there—as it was from many of the men when I was at Tech.

There would be freshman mixers—when they were bidding fraternities and all this, they'd have these freshmen mixers. They'd invite people from Simmons and Wellesley and so on because there were so few women [students at MIT]. This is true—I'm not making it up! Some guy would come up and ask me to dance. We'd start dancing, and he'd say, "Well, are you at Simmons or Wellesley?" And I'd say, "I'm at Tech, just like you," and he'd disappear.

CHEN: Oh, my gosh!

ADAMS: No, really. It was amazing. Well, hell, I didn't need them anyway. There was Harvard down the road and I could get a date there. [LAUGHS] There was really a stigma to being a coed [at Tech].

And at Tech Show '59, an annual musical show, there was a song called "My Mother is a Tech Coed." They must have it somewhere. [SINGS] "But in calculus, she was well-read. The lady with a pointed head," et cetera. [LAUGHS] It was really strange. There really was an underlying animosity toward coeds.

I come from New York, and New Yorkers are more or less accepting: "You're a girl. You're a boy. You're Black. You're white. You're yellow. Who cares?" Well, the attitudes I encountered in Cambridge were very alien to me. I didn't like that sort of thing, but it was definitely there. A lot of guys really resented coeds. Why? I don't know.

CHEN: Was that true of just your classmates? Or was it also professors--

ADAMS: It was mostly the undergraduates; graduate students were not as bad. And I did not find any open anti-female stuff amongst the professors. There were some really miserable professors, who were kind of anti-everything, though!

CHEN: Oh, OK. [LAUGHS]

ADAMS: I'm serious. I mean, this was physics. A professor named Kerman [Arthur Kerman, a distinguished physicist known for his contributions to the theory of structure of nuclei and theory of nuclear reactions; directed MIT's Laboratory for Nuclear Science and Center for Theoretical Physics] was teaching classical mechanics—the Hamiltonian Formalism and so on. It was a required course for seniors, and it was required of incoming graduate students if they hadn't had it in their undergraduate classes.

This was in a big lecture hall, about 50/50 seniors and graduate students. Kerman clearly did not want to teach. A lot of these guys just want to do research. They don't like to teach—it's considered a nasty chore. Well, I made a big mistake, a big mistake. In graduate school, I told my advisor that I actually liked teaching, and he let me know that that made me some kind of underling, a lower lifeform. He said, quote, "Teaching is a cross we must bear to do research in a good institution of higher learning."

CHEN: Oh, my. [LAUGHS]

ADAMS: He actually said that.

CHEN: Wow.

ADAMS: That attitude was pervasive, and Kerman was the poster child. Now, it happened that I was taking nine courses that semester. [LAUGHS]

CHEN: Nine courses? Oh, my.

ADAMS: Well, I did a lot of that. In those days, if you were a full-time student, as long as you did your required courses, you could take as much as you could fit in and tolerate. My advisor would always say, "OK, if you get in trouble, drop some." [BOTH LAUGH]

So it didn't matter that much to me. But Kerman, he hated teaching. It was very clear. He gave two exams: a mid-term, and a killer final. We're talking a class with several hundred people in it.

CHEN: Right.

ADAMS: Not that it's burned in my mind, but it's burned in my mind. He gave two A's, four B's, flunked 40 people, and divided the rest between C's and D's.

CHEN: Oh!

ADAMS: I don't remember what I got, but it wasn't an A or a B. I didn't care. [LAUGHS] I was too busy to care, and it didn't count that much for me because I was taking nine courses that semester.

However—however—as things were set up then, many of the physics seniors were taking only that, and their thesis. Thesis was required of physics undergraduates. And you don't get a grade in thesis that semester, which meant that he flunked out a large number of physics seniors and graduate students, because the graduate students are required to get at least B's.

CHEN: Wow.

ADAMS: This really happened. It was so bad that Nat Frank [Nathaniel Herman Frank, SB Electrochemical Engineering 1923, SCD Physics 1927; Chair of MIT's Physics Department 1952-1962; specialized in theoretical physics and metallic conduction], who was then the head of the Department of Physics, went to him and said, "Look, why don't you at least give a conditional exam?" He fought with Kerman until April, at which point Kerman finally relented. On the makeup exam, he flunked a bunch, maybe half or a third, also. But not that many stayed around to take it. A lot of people simply left the Institute.

He just hated teaching, and it was one of the most outrageous things that happened. It wasn't girls; he hated all the undergraduates, and probably the graduate students too.

After Tech, I went to Brown, which was a stupid mistake on my part. I don't know why I didn't want to stay at MIT! I was involved with a guy at Tech, and you couldn't apply to Harvard in those days—you had to apply to Radcliffe if you were a girl. The only school that admitted me with no financial aid was Radcliffe! Brown and NYU

offered me fellowships. Stanford offered me an assistantship. But Radcliffe—I wrote them a really nasty “I’m-not-coming” letter. I would have been happy with an assistantship; I didn’t mind working!

Anyway, I have this thing about what I know and what I don't know, and I knew that classical mechanics course. There was no way I shouldn't have gotten at least a B. Brown said, “Well, you have to have at least a B in these courses, so you have to take that over here.” It was the same thing there, so I made a little deal with myself: “I will not do anything except what is required. I will not read the text, because I know that text, and I will take only the exams and the final, and I will see how that comes out.” I did, and it was a B. I knew the course!

CHEN: That's very discouraging to students.

Is it true that you were just 18 when you graduated from MIT?

ADAMS: Yes, I was.

CHEN: Was the experience with the mechanics class one of the reasons you worked so hard and graduated early?

ADAMS: It contributed, but the drive was to get a degree and be able to work, but there were several reasons, including financial. I had a scholarship, but that didn't pay for room, board and books. I went to see the Dean of Financial Aid with my parents freshman year. The interview was to talk about student loans, and he sat back in his chair and said, “Well, we don't give loans to women undergraduates. We know that they will just get married, and the man and the woman will both have loans, and we know which loans get paid back. So we just don't give loans to women students, period. End of story.”

CHEN: Wow.

ADAMS: I worked the whole time I was at Tech. Freshman year, I did typing and filing for Chaplain Bloy, the Episcopal chaplain at MIT. A nice man. I really liked him. The trouble with that job is that I had to walk over to the area where the chapel is. That's where the office was, and that was extra time. Everything came down to time.

In any case, I did that for a semester and then did filing and typing—and shelved books—for the engineering library, since it was on campus and didn't involve a long walk. The salaries were always the same: \$1.25 an hour. But around that time I discovered that the guys were having lab jobs, and they were getting \$2.50 an hour, so I went to apply for a lab job. The fellow who was in charge of the laboratory jobs said, “We don't give laboratory jobs to women undergraduates. We're afraid they'll just hurt themselves, so we just don't do it. End of story.” [LAUGHS]

CHEN: Gosh!

ADAMS: Yes. "We don't give lab jobs to women students."

But then I got really lucky. I was taking some advanced math courses because I had placed out of calculus and all that. It's one of the reasons why I could get a master's degree when I left Tech.

Anyway, there was a graduate student in one of my math courses who was a teaching assistant in another course. He was very impressed with me, and one day he said, "You know, Barbara, I have been offered another part-time job at Harvard, and I can't take it because I don't have the time. You could do that." And I said, "Well, what is it?" He said, "Hilda von Mises is a math professor at Harvard." She was writing a new calculus text and needed somebody to do the problem set solutions and some light editing. He said, "I'll take you down to meet her, because I think you can do that." She hired me, and I was making \$3.60 an hour. That was triple the rate at my other jobs. She was a nice person; I liked her and really appreciated the opportunity.

[Hilda Geiringer von Mises, an Austrian mathematician who was the first woman to teach applied mathematics at a German university; an assistant to and then-wife of prominent mathematician Richard von Mises; made important contributions to mathematical theories of plasticity and probability genetics, and co-developed the slip-line theory; Jewish, she fled Vienna on the brink of WWII; once in the U.S., headed the Mathematics Department at Wheaton College and was a Research Fellow in Mathematics at Harvard University.]

CHEN: That's so much more!

ADAMS: Yes, exactly. I could do the work back at Tech and just bring her the material, which was wonderful. I did that for close to a year.

CHEN: You mentioned being able to place out of some math classes at MIT. I was wondering: were you always good at STEM-related subjects?

ADAMS: Yes. I was very bookish. I was a super nerd. I lived in the library. We used to do book reports in elementary school, and there was one month I'd read 30 books.

There was an amazingly disparate gap between my views and those of my parents, and likes and dislikes. My parents were what I would call party people: they always wanted to go and bar-hop and dance, and my father was a good athlete. Neither of them graduated from high school—but neither did I, so I followed in their footsteps, sort of. I never actually graduated from Bronx Science, even though I got admitted to MIT! In fact, my parents received a "truancy" letter from the New York State Board

of Education when I was a freshman, even though the people at Bronx Science knew I was at MIT.

CHEN: Were you interested in any particular subjects as a young student?

ADAMS: Yes: astronomy. I was reading Baker's astronomy book ["Astronomy," by Robert H. Baker, published circa 1950] in elementary school.

CHEN: That's cool.

ADAMS: I still have it.

I was really interested in the sciences, particularly the hard sciences, so-called. Particularly physics. And I was valedictorian of my junior high. I just had to go to Bronx Science, one of New York's special entrance-exam high schools.

I lived in Queens, very near Kennedy Airport, in Far Rockaway. The day I graduated from junior high, they opened the subway to Far Rockaway. You could get on the subway, which was running on Long Island Railroad track, down the Rockaway Peninsula, across Jamaica Bay, down, going underground, into Brooklyn and then up through Manhattan, and then up into the Bronx. That ride, if you make all the connections right, took about an hour and a half.

CHEN: Wow. That's a long--

ADAMS: Yes. That's a long commute for high school. I would rather have gone to Brooklyn Tech, which was just across the bay, or even Peter Stuyvesant, which was in Manhattan, but neither admitted girls. The only science high school that would admit girls was Bronx Science. So that's how I got to Bronx Science.

I was totally chagrined years later, when I found out that Richard Feynman [SB Physics '39; celebrated for his world-renowned lectures and his contributions to quantum electrodynamics] who was a Nobel Prize winner and a very famous and influential physicist, had gone to Far Rockaway High School. [LAUGHS]

CHEN: Oh, OK.

ADAMS: Bronx Science was an interesting place, because it was unbelievably competitive. It was much worse than Tech. I was valedictorian of my junior high, and my junior high had about 1,000 graduates. It was not a small junior high school at all.

CHEN: That sounds pretty large.

ADAMS: Well, New York schools were pretty large. Anyway, I was used to being head of the class. And the first semester at Bronx Science, my grade point average was 92.3. I was 203rd in the class!

CHEN: Wow. It was that competitive, then.

ADAMS: It was that competitive! I clawed my way up. By the time I left Bronx Science, my average was at 94.6, and at that, I was [only] 84th in my class. Bronx Science was a very particular, very neurotic place.

I was very anxious to get into a position where I had some credentials that would let me make a living, because my parents were very hand-to-mouth. We were constantly evicted because my father didn't like to pay bills. I flipped the other way—completely the other way. I had no patience for that kind of stuff. So again, I was driven to get into a position where I would be employable. And, as I think I mentioned, while I was an undergraduate at Tech they told me, "We don't give lab jobs to women students." I couldn't believe it. That kind of thing is still there, it's just hidden more, a lot more. I think a lot of discrimination has gone underground, instead of being up-front. If they say "We don't admit women," you don't bother applying again and again and again. It's interesting that there's still a lot of prejudice. There's no question in my mind about that.

Harking back to the election before the current one, when Hillary [Clinton] was duking it out with Obama in the primaries, I was working at the Air Force base as a contractor. There was this young captain—a nice guy, very bright, very helpful—in a conversation with his buddies, all guys, about the election. I remember him saying, "Well, yes, a Black guy? Sure, why not? But a woman? No. This country is just not ready for a woman president." What kind of crap is that? What does that mean? Anyway, it's out there, and it's going to be really hard to make real progress. This country seems to be particularly odd that way. England, Germany, New Zealand, Israel and even some Third World countries--

CHEN: Have had women leaders.

ADAMS: It's nuts, but it's very much here.

I remember talking to one gal that's an attorney. She said, "My field is really bad for women." Well, if you've seen that movie about Ruth Bader Ginsburg [On the Basis of Sex]—it's very obvious. But, she said, "Yours is worse." The aerospace industry is just getting to be a better place for some women now, but it's been unbelievable.

One of my aerospace jobs was in Falls Church, Virginia. I worked for a really good guy. We're still friends. He's an MIT alum. In fact, that's how I got there: he pulled my resume out of the MIT alumni files. Anyway, he got promoted to department head,

so there was an opening for the section head. And he said to me, "You're the obvious person to take that job, but I'm not going to appoint you, because the guys aren't going to work for you."

And I knew he was right. That sentiment was definitely there. Most of these guys were from the South. I could feel it. I could feel it every day. My boss said, "I'm going to promote you in parallel. You'll be on my staff, but I'm going to give the section to someone else." But I was more qualified.

CHEN: That's really unfortunate, but it's interesting that being an MIT alum helped you in your career. Did you manage people in the job you mention, or in the other aerospace engineering jobs you had? If so, did the male employees you manage treat you differently than managers who were male?

ADAMS: Yes, I had 'line'—or supervisory—jobs at both Rockwell and Hughes [Hughes Aircraft Company], and project management roles at Northrop Grumman.

I think there's always a difference in the way you're treated. Whether it's conscious or not, there's always a difference.

I fly. I have a pilot's license. And in 1977, I took a club plane out of Hanscom Air Force Base in Bedford [Massachusetts] out here to Los Angeles, with a lot of stops, of course. I was at Raytheon at that time, and one of the guys who was also at Raytheon was also a pilot, and came with me most of the way. He had business in Chicago, or someplace like that. I had flown into Minneapolis, and he flew over commercially, and we went together out here, and then back to Boston.

On the way back he said, "Have you noticed that when I talk to ATC and you talk to ATC, to air traffic control, we're treated differently?" And I said, "Oh, yes, I know." And he said, "Sometimes it's better for you. Sometimes it's better for me, but it's always different." And I said, "Yes, I know." It's an underlying thing in our society.

There was a very tragic accident in Washington, at Dulles airport. It happened to involve the instructor I had checked out with at one of the clubs at Dulles, Shirley Chatfield. I heard it on the radio. I was on my way to a meeting in Crystal City, a Navy meeting, and I was in tears. You hear something on the radio, and everybody's got their mind set.

The previous night had been really, really bad weather—stormy, severe rain and all of that. And small planes at Dulles in that weather, well, just the kind of situation where there are accidents. The announcer said, "The pilot and sole occupant was Shirley Chatfield." I broke into tears. I had just flown that approach with her days before, and I knew her. She was a professional. She was a very good pilot. I walked

into my meeting in tears. I don't cry a lot; I really don't. And the guy who was running the meeting, who happened to also be a pilot, said, "What's wrong with you? I told him, and he said—I'll never forget this—"Maybe she mis-set her altimeter." And I ragged all over him. She was a professional. He said, "No, really. I did that once. When you set your altimeter, when you take off, one inch on the barometric pressure is 1,000 feet." Most of the time, you are only tweaking the digits to the right of the decimal point, because you don't get huge pressure drops or raises often. But that night, they did.

I got interviewed by the NTSB, because I was the last person who flew that approach with her. Anyway, when they finished their findings, she had mis-set her altimeter by exactly an inch, which is exactly 1,000 feet. The scenario was, she was ferrying an airplane, just moving it for a friend from National Airport, which is one of the Washington airports, over to Dulles.

For months after that, every time I was flying, I would get ragged on the altimeter setting. And the guys I was flying with, if they were flying, wouldn't. There was this mindset among the controllers in the Washington area that females obviously can't set their altimeters. It wasn't vocalized, but every time there was an altimeter setting, they would have me read back all the digits, whereas they wouldn't with the guys. So there are all kinds of underlying, perhaps unconscious, prejudices [when it comes to women versus men].

You ask whether I was treated differently professionally. Well, by some and not others. I worked for a couple of guys—accidentally, because I was put in a job and then the management above me changed—for some unbelievably chauvinistic guys. It was so obvious. It was obvious what they did with the reviews, with everything. It was a very frustrating situation. One was very subtle and sneaky about it. The other one was very obvious about it. He'd say, "Well, you can take care of the girls. Go get presents for the secretaries." He treated me terribly.

CHEN: That's terrible.

ADAMS: All the women, regardless of our jobs, we were just "the girls." The girls? In the aerospace industry, there's a lot of cronyism and buddy-buddy stuff and all of that. The man I mentioned was incompetent, in addition to everything else. But you know what? He looked great. He was a very good-looking guy. Tall and distinguished-looking. He was a Heisman Trophy winner. I couldn't care. I didn't know what that was, but that's all they talked about.

One example: We had been overspending the contract every month. This contract had always been bailed out by the Air Force, and the Air Force had told us that they were not going to bail us out again. They didn't have the money; they couldn't put

extra money on the contract. But upper management was still going along, saying just keep the current staffing, current planning. It got to be September, and this company's fiscal year started on October 1, so the boss I mentioned called a meeting of all his first reports, so-called. I was running technical. The guy from accounting was there, and maybe eight others. He sits down, and he taps on the budget and says, "This is a problem." Everybody looks around and says, "Yes." And he said, "Well, we've got to fix this." And everybody's looking at him, because we've been getting told all along not to change anything. I finally said, "This is September. If we send everyone home on this program right now and don't spend another dime, we're still overrun. We are overrun for the year right now. There is nothing we can do to change that." He literally did not understand me, and everybody else started giggling. It was so damned obvious, but he didn't understand us. He didn't get it at all. The level of some people in management in these companies is hard to believe.

CHEN: That must have been hard to take.

Actually, that makes me think about your experience at Bronx Science. Were there any women you looked up to there—role models?

ADAMS: I think the quick answer to that is no. But some of the other gals who were students at Science were really good. The gal who was salutatorian, second in the class at Bronx Science the year I left, desperately wanted to go to Radcliffe. Her boyfriend had gotten into Harvard with a scholarship, and she wanted to be there. Now, this is the salutatorian of Bronx Science. Not shabby. She also got a Westinghouse and a Merit Scholarship.

CHEN: Wow.

ADAMS: This gal was fabulous. She was also a musician—apparently, Juilliard really wanted her—but nobody from Bronx Science while I was there got into Radcliffe. Nobody. They put her on the waiting list and never admitted her. She went to Brandeis instead.

I went to Harvard eventually for graduate school. But my advisor was so snobby. He would say, "MIT is that little trade school down the river." It was really silly – a large number of people in our department had gone to MIT, but it just didn't "rate" at least to some people!

CHEN: I didn't realize that.

How would you compare MIT, where you were an undergraduate, and Harvard, where you were a grad student, in terms of how they treated women?

ADAMS: I didn't see that much difference in how women were treated, with the exception of what I've mentioned about Tech having rules about no females getting lab jobs. As for Harvard, again, you can see some of what it was like from that movie about Ruth Bader Ginsburg's first year at Harvard Law. Women were treated like a different stripe, kind of a different class. That was true at Radcliffe and Harvard, Barnard and Columbia, et cetera. The classes were the same, the exams were the same, but there was an underlying prejudice that women are not quite as good as the men. I actually worked for a guy who had all his degrees, including a PhD from MIT, who really believed that. I actually liked the guy, but in one discussion he asked "Name one really good female physicist." I said, "Madam Curie." He said "Marie Curie was a hack." How do you deal with something like that?

There's a very interesting treatise called "Keep the Damned Women Out" about the struggle for coeducation in America. It's by Nancy Weiss Malkiel. I think she was at Princeton. It's a history of the fight, and the attitudes. Anyway, it's not just one university.

MIT was at least founded as a coeducational institution. That's not true of most other places, like Caltech. Getting into Cal? No. Caltech didn't admit women until who knows when. [Caltech began admitting women undergraduates in 1970.] That's true of RPI also.

CHEN: That book sounds really interesting.

I wanted to ask if you could talk a bit about the companies that you worked for, to get a better sense of the work you did.

ADAMS: Well, let's see. I had summer jobs twice with Boeing, once with Northrop Norair [then a division of Northrop]. I went to work for American Science and Engineering, which is in Cambridge. I enjoyed that, actually. A lot of the work involved analysis of nuclear weapons effects on the atmosphere from U.S. atmospheric nuclear weapons detonations recorded test data. Before that ended, I also co-authored a paper in *The Astrophysical Journal* on stellar X-ray sources. The guy I was working for left, and somewhat later, I left.

I went to work for EG&G. [Edgerton, Germeshausen, and Grier, a Massachusetts defense contractor that designed and operated systems that timed and triggered nuclear bomb tests; founded by Harold "Doc" Edgerton, famed MIT professor known for his work in making the stroboscope an accessible lab device, and Kenneth Germeshausen '31 and Herbert Grier '33, Edgerton's graduate students].

Edgerton was an MIT professor who invented strobe photography, among other things. EG&G was involved in the U.S. atmospheric nuclear weapons tests, and much

of the work for the AEC [the Atomic Energy Commission] was devoted to analyzing the test data. Soon after I got there, the AEC declared all work was to be done in Los Alamos, New Mexico. They offered to move me and I declined. EG&G went from around 1,500 people in Bedford [Massachusetts] to under 100.

I also worked for Riverside Research, Inc. in Manhattan for a brief period, and landed in Falls Church, Virginia working for Computer Sciences Corporation. It was at CSC that I really got into the analysis of satellite system and optimization of systems, as well as formulating and managing projects.

Then I wanted to get out of the Washington area, and got a fortuitous job offer from Raytheon in Sudbury, Massachusetts. We were working on communications programs. I had an awful manager there who was totally unreasonable. I clashed with him badly. There, I don't think it was just women who had issues, I think it was everybody. When I quit, the vice president called me and said they knew my boss was no manager of people. And I said, "Then why did you make him a department head?" He offered me a transfer, but I told him I'd already taken another job.

That's when I went to MITRE [The MITRE Corporation, which manages federally funded research and development centers supporting U.S. government agencies]. That's where I met my late husband. He is the one who really had really no prejudices.

CHEN: Could you talk about your husband a little bit? You mentioned him to me when we spoke before.

ADAMS: I was married twice. I met my first husband, Jim Adams, when I was a graduate student. We divorced amicably in 1970. But as I was saying, when I went to MITRE, I met my second husband, Mique S. Talcott, a very interesting guy. He died recently. He couldn't have a more different background and upbringing than I do. His father and his mother homesteaded in Washington state. The government would give you 40 acres if you had promised to build, and his father built a sawmill. Mique [pronounced "Mike"] took me to see their house in his hometown of Wahkiacus, Washington. When he was growing up, it consisted of about 26 families over a huge number of miles. They had no electricity and no running water.

CHEN: Wow.

ADAMS: Yes, and I'm from New York City!

Anyway, Mique had a very interesting background in radio and TV. He actually had worked his way through college, simultaneously supporting a wife and two children, as a night DJ. He had what I would call a textbook radio announcer voice. Great at

presentations. Great at reading to record. MITRE had him recording things because he had a really great, great voice. I'm bad. I don't like presenting, but Mique was the opposite. He was an interesting person.

At one point, Rockwell offered Mique a job out here [in Southern California]. I got two offers; I was here first. That's how we got here, and that was 41 years ago. I had worked for aerospace outfits (Boeing and Northrop) in summer jobs while in grad school before that, but after one of my jobs at TRW was coming apart. I went into what was basically the air and space part of Rockwell.

I was working first in El Segundo, then they moved that program to Lakewood. Then I was in Seal Beach. I worked for Rockwell about seven or eight years, until they were overspending and there were problems there. And then I went to Hughes, but Hughes came apart too. I got out before Boeing took over. I ended up at Logicon in San Pedro. Northrop bought them, and they also bought TRW. But Logicon was going down the tubes and Northrop just ditched it. They closed the division. They closed the organization. They closed the building. It's all gone.

Yes, the aerospace industry is not good. That's my unequivocal comment!

CHEN: In these aerospace companies, were you a part of their engineering departments?

ADAMS: It varied. Rockwell was structured around programs, so I was usually in an organization working for a specific program or programs. I had also proposed, won, and managed a small air force program related to the National Aerospace Plane program (NASP). I got an air force commendation for that job. I was in systems engineering organizations. The companies were all structured differently. At Hughes, you were managing people, but you were also often managing little programs that you had or brought in. I was in engineering organizations in most of my jobs in the aerospace industry.

CHEN: What kind of work did you do, specifically?

ADAMS: We were all over the place. When you're building rockets, and you're building spacecraft, you get into all branches. That's why systems work is interesting. It involves thermal. It involves optics. It involves mechanisms. You need all the disciplines.

I've done analytical work on atmospheric effects of various kinds. I worked on nuclear atmospheric as well as nuclear effects on everything else. Nuclear is nasty stuff.

The atmospheric work is interesting, and varied. I've been looking for specific excitation and absorption of molecular species (as I did in at least one "research

exam” at Harvard involving planetary atmospheres) to just attenuation of specific radio frequencies for communications, involving complex three-dimensional geometric models.

I've worked on a lot of what we call front-end studies. That is when you're going to build a system for the military or others. You're trying to meet their requirements in different ways, with different options, if you will. So you're looking at all the options. There's a lot of analytical work, in terms of what you're going to present to them.

Just in terms of orbital analyses, I've done some orbital analysis for which orbit you're going to put your spacecraft in, how many spacecraft you're going to have and that kind of thing.

I'll give you an idea of my systems engineering mindset, which you can chuckle at, because I chuckle at it a lot. When I was in Washington area in the '70s, I was aware that there was this proposal document floating around in the upper echelons of the DoD [Department of Defense], and I read it. It proposed the global positioning system, GPS. I thought, “That's a lot of satellites. This could be expensive. I'd love to see this system. It'd be great.” I remember saying it'd be a great system but they'll never build it, it's too expensive. It's one of my really insightful predictions! So I'm glad they did develop GPS, but I think we're becoming too dependent on it.

In any case, there are a lot of interesting insights that you get while working these kinds of systems engineering problems, which often involve things other than engineering, like money. But it's fascinating. But you get into all kinds of things. A given individual who's only working in thermal has a view of the thermal control system and nothing else. And the guy who's doing the optics says, “Well, I need this view, but you're going to get in the way of these other things. The deployment mechanism isn't going to work,” or whatever.

CHEN: When you decided to leave the PhD program you were in at Harvard, was it your goal to go into aerospace engineering specifically, or have another plan?

ADAMS: I had no Plan B. For reasons I cannot justify, I had this idyllic vision of what academia would be like. I was dead wrong, and it was a shock. I wanted to be a professor. I thought for sure that's what I wanted to do. But Harvard really cured that. My advisor was a terrible snob, and there were other issues.

I was working on an idea that my advisor had not approved. I worked on it for a year, and he said, “I told you this is not a suitable thesis.” One of my friends said, “Barbara, don't you know your thesis advisor is the last absolute monarch on Earth?”

You're probably much too young to remember card decks and punch cards, having to run them at night if you have a big program or anything like that. I had five boxes of

punch cards on the program I had built to run cases. This wonderful idea I had about theoretically bouncing electrons off ionized atoms to look for bound states, rather than doing it the other way; my advisor had developed this thing called the Z expansion, and he wanted all of his graduate students to grind out another couple of atoms using his Z expansion. But I wanted to do something more original.

CHEN: On an entirely different topic, I saw that you worked at WTBS, MIT's radio station, when you were an undergrad. Was that fun?

ADAMS: Yes. I was a DJ and helped out doing other things. But I had to give it up at some point, of course, because I had no time.

CHEN: With the nine classes you were taking, right?

ADAMS: Yes, it got a little busy—I was also working. But yes, I enjoyed that. Buck Rogers was there. His real name was Arthur Harold Rogers, Jr. [Physics '61, PhD '65]. He eventually got a PhD at Stanford and was very successful. He was class of '61, and he used to engineer my shows. He'd be operating the equipment while I was on the air. Buck was in the drama club and had a great speaking voice. An excellent, deep voice, and he had perfect diction.

I have my New York accent, and he hated it. Every time I'd have a New York-ism, like "cawfee," or "dawg," he'd wince! Anyway, I did do some announcing. I would've done more, except I could only squeeze so much into a day. I had the drive to get out. I wanted credentials, so I'd know that I'd at least have that.

CHEN: Have that secured, right.

ADAMS: Yes. My family had no money, and it was clear that women have two strikes against them right away. I mean, I had an interview at Convair Astro way back—after I graduated from Tech. It was a long day; I had to interview a bunch of different people. I got back, and it was around 4:00. And I thought I'd done the whole schedule. And the guy at—I guess it was a gal at HR—said, "Oh, there's one more person who wants to speak to you. It's not on the schedule." And I said, "OK." She took me over there to this guy's office. He had his feet up on the desk, and he was leaning back and sneering. I saw an MIT ring on his hand—He said, "Well, I'm not going to hire you, but you I just wanted to see [you]." And I said, "Great, you've seen me. I want to go back to HR right now." That is literally what happened. "I'm not going to hire you, but you I had to see." And I felt like saying, "Yes, well, you didn't have to see." I wish I hadn't!

CHEN: You've really met all different kinds of people.

ADAMS: Some were just wonderful, and some were just so awful it's hard to believe. One guy I interviewed with once was looking at my resume and said, "Oh, MIT. What were you, the affirmative action candidate?" I was livid, and said, "You are old enough to know that affirmative action didn't happen until 1967. I graduated in 1961. No, I was not the affirmative action candidate." He made me a good offer, and I turned it down.

CHEN: Switching gears again, did you tell me earlier that you never actually graduated from Bronx Science?

ADAMS: Right. I didn't have a high school diploma, and I never got one. I was applying to the University of Chicago and to Radcliffe for their "early admission" programs. MIT didn't have one, but I really wanted to go to Tech. I wrote to MIT and told them that (and that I'd only be missing one course of their "requirements" – senior English but that I was in the Journalism class and on the school newspaper, "Science Survey"). I also noted that the MIT catalogue said they'd entertain admitting somebody who was missing just one course – and, oh by the way, that means I wouldn't have a high school diploma either. I can summarize their fairly formal reply in one sentence: "Take the College Boards and we'll see."

Guys I know who went to Harvard from junior year in high school got GED's (Harvard made sure of that). In fact, Steve Strom, who went to Harvard on early admission (when he was getting a GED) asked me about it: "What if *you* don't graduate from MIT?" I told him that if I didn't graduate from Tech, I had *lots* of bigger problems than not having a GED.

CHEN: That's amazing, especially being admitted to MIT and working for so many top aerospace companies.

ADAMS: When I first went to Northrop Norair, I was signing in. They'd hired me to do summer work on hypersonic reentry and to teach a course for them in statistical physics. But when I was signing in in HR, and they all had forms—high school diploma, no. Bachelor's, master's, yes. The HR woman said, "You don't have a high school diploma?" I said, "No, I don't." She said, "You have to have a high school diploma to be on our technical staff." I said, "Well, I don't have one." This went on and on.

CHEN: Back and forth, right?

ADAMS: Eventually, I said I could get on a plane and go back to Boston. They had to get the signature of a vice president that it was OK for me to be on the technical staff.

CHEN: Bringing things to the present, what do you make of COVID-19 and all that's going on?

ADAMS: Well, this thing where some people say they're making a political statement by not wearing a mask—I can't believe it. I don't get it. It is a fearful time, and it's not just the virus. I feel like the whole world is awfully precarious. The reaction to the virus is illustrative of a lot of things about this country, I think. It's dysfunctional in a lot of ways. It's not working.

CHEN: As a student, I'm concerned about the spring semester. I'm not sure about what to do. Even if the situation is a little bit better, is it better enough for me to feel comfortable walking around campus? And we'll have mandatory meal plans where we don't actually eat in the dining hall. Instead, you go downstairs, pick up your meal and stay six feet away from other people, and then walk up to your room to eat by yourself. There are a lot of considerations on our end—for students.

ADAMS: Yes, I can imagine.

CHEN: Getting back to your time at MIT, do you remember how many women were in your class?

ADAMS: In the entering class of '62, there were two commuters, Joanie Levinson [Joan Levinson Zorza, non-degree '62] and Ervina Irbin [Ervina Shaw Irbin, SB Mathematics '62], and there were about 10 in the dorm. So there were about a dozen, although that's not an exact number. Joanie Levinson is Norman Levinson's daughter. She married Thomas Oakly Sherman [SB Mathematics '61, PhD Mathematics '64]. They had two boys; Joan became an attorney and, after divorcing Tom, she married another attorney named Zorza. They are very active in Anti-Violence-Against-Women. [Norman Levinson, MIT SB and SM Electrical Engineering & Computer Science '34, PhD Mathematics '35, was a mathematician who was known for his contributions to non-linear differential equations and number theory, culminating with the development of the Levinson recursion, Levinson inequality and the Levinson theorem]

I don't know how many graduated, but it was certainly not all of them. Ervina graduated. Joan Munzel [Joan Munzel Gosink, SB Mathematics '62] did, certainly. Marilyn "Buzz" Arsey [Marilynn Hope Bever, SB Humanities and Science '62] went to another school. Vivian Alibozek [Vivian Parsons Alibozek, non-degree '62] went to another school. Joline Jordan went to another school. Mary Ann Davis left after one semester. Jacqueline "Jackie" Clark [non-degree '62] also left to New England Conservatory and later married Steve Simpson [MIT junior faculty in Earth, Atmospheric, and Planetary Sciences]. I'm not sure how many graduated. I'm guessing around half.

I graduated with the class of '61, and there were half a dozen graduating then. I don't pretend to know everybody, but it was Sue Lippman [Susan Lippman Kanenberg,

transferred in to MIT from Smith, SB Physics '61], and me, and Karlene Klages [Karlene Corbit Gunter, SB Physics '61]. Who else? Marla Moody [Marla Marie Moody, SB Physics '61, SM Earth, Atmospheric, and Planetary Sciences '65] and Barbera Wertz [Barbera Wertz Stephenson, SB Electrical Engineering & Computer Science '61] also graduated. Karen Marie Strom [Karen M. Lewallen, non-degree '62] married a friend of mine from Bronx Science attending Harvard, Steve Strom (who, incidentally, was the one who called me at Brown to tell me Harvard was finally admitting women!). I'm not sure who else was there. I'm guessing that about half of us graduated. Audrey Buyrn [SB, SM and PhD Physics '58, '63 and '66] was a 'success story' counter-example, but she had graduated in 1958.

Interestingly enough, Karlene Klages [SB Physics 1961] and Emilia "Millie" Ivanoff [Reverend. Alia Zara Aurami-Sou, non-degree '61] were the two "upper class" monitors in the freshman "dorm"—120 Bay State Road. They were both '61, but Millie dropped out.

CHEN: Do you recall what the gender distribution was like when it came to the hard sciences? Were you often the only female undergrad in your courses?

ADAMS: Yes. In most classes, I was the only female. I can't remember a class where there was another one, to be honest.

CHEN: That's amazing. You were definitely a trailblazer.

ADAMS: Well, in a way, yes.

CHEN: Were there any women professors at all?

ADAMS: I did not know of any at that time, although there might have been a few. There were some at Harvard. I don't know how many. Not a lot, surely. There was definitely a shortage of women on the faculty. It didn't bother me much. It's just what it was.

I remember that I was taking French at BU at night, just to get a language requirement out of the way for when I was doing my PhD later. I had the advanced calculus texts with me, M351, at that time. Anyway, there was a guy there from BU who said to me, "Oh, you're taking that?" And I said, "Yes, it's a requirement." It was clear that there was such a difference in curriculum between the schools. It was interesting. You'd meet a gal from another school and she'd say, "Oh, you're at MIT with all those men!"

CHEN: We've talked about women at Tech a bit, but I'm also curious to know whether MIT was racially diverse when you were there.

ADAMS: Not very. There were a certain number of Asian students. A very small number of Black students. Actually, I went out with a Pakistani guy as an undergraduate. There were a certain number of foreign students, of course. But it was not racially diverse at all, I would say.

CHEN: When you were in grad school at Harvard, did you have to work?

ADAMS: I had a Pickering fellowship. Pickering [Edward Charles Pickering, Harvard SB 1865] was a well-known astronomer/astrophysicist many years ago. He kept a stable of slave-like assistants—women—doing all the grunt work (taking and developing plates; cataloging, reducing data, etc.) for very little pay and no recognition. Even his colleagues thought it was outrageous. When he passed, they took up a collection and funded a small fellowship: the Pickering Fellowship for women in the field. I know because I was one!

I also had an assistantship, so I was working for the Smithsonian. Harvard-Smithsonian is basically one institution, but I was on the payroll for the Smithsonian Institution. That's the government—it's a GSA role.

I was able to use the work I was doing at Smithsonian for one of my papers at Harvard, and things like that. They required that you do two research exams, and I was essentially getting paid for it. One research exam involved analyzing optical spectral absorption and emission from stellar and planetary atmospheres. My advisor on that paper was Charles "Chuck" Whitney, a full professor at Harvard's Smithsonian Astrophysical Observatory and a really great guy.

CHEN: You mentioned to me earlier that you were interested in teaching. I would assume that you probably were a teaching assistant at some point, right?

ADAMS: I was teaching when I was doing graduate work at Brown, before I went to Harvard. I was actually teaching.

CHEN: Great.

ADAMS: First, I was teaching the labs. I got very aggravated, because students were cheating. This was "modern physics," the required science course for art majors or English majors or the like. A lot of these kids didn't want to be there, and they made it obvious. But when I taught electromagnetics, I really enjoyed that. I was teaching to the people who were majoring in physics and math and that kind of thing. They were motivated. In fact, there was one student in my class who was absolutely brilliant. He'd been first in his class at Andover on scholarship but he was blind, so I volunteered to read for him since texts were not available in Braille. I asked him why he'd gone to Brown and he said he'd wanted a small campus he could easily

memorize since he didn't want to use a cane. I later saw him in grad school at Harvard.

CHEN: Well, I really appreciate your taking time to share so much about your history, both personal and professional.

ADAMS: I enjoyed our conversation. It was good fun. Thank you very much for asking me to participate.

CHEN: Again, thank you so much.