INTERVIEWER: This is the 150th anniversary celebration interview with Robert Silbey. And let me start by saying, where were you born, and where did you grow up?

SILBEY: I was born in Brooklyn. Grew up in Brooklyn, lower- middle class family-- Jewish family. And went to the public schools in Brooklyn-- this is in the forties and fifties. They were good schools.

INTERVIEWER: Can you tell me a little bit about your family?

SILBEY: Sure. I have an older brother, who is a professor of history at Cornell, now retired. We were the only two kids. My mother and father were New Yorkers-- both of them born in New York. Their parents were born in Eastern Europe and had come over in the early 1900s, or well maybe a little earlier, and settled in New York. And we lived in a two- bedroom apartment in Brooklyn.

My father was the only person in his immediate family who had gotten to go to college for a few years. He studied chemistry in college in Cooper Union, but didn't finish. He was the youngest of five children. My mother was one of 11 children, so I had an infinite number of aunts, uncles, and cousins, all of whom lived in Brooklyn Queens area. And that's the way we grew up. My brother and I.

INTERVIEWER: Were there any particular influences during your childhood that you think sent you on a science path?

SILBEY: Well the fact that my father had studied chemistry was known to me. And he was not an intellectual man, but he was a man who was interested in science and understanding things. And he would talk to me about it. And of course, I had a chemistry set when I was a kid. Set fire to the table a couple of times, and he took an interest. So that is essentially the entire thing. He really didn't know any chemistry anymore, but, it was okay.

INTERVIEWER: Was there any moment where you really knew that you were destined to go into science?

SILBEY: Actually I had decided in high school that I wanted to be an engineer. And therefore, when I applied to college, I applied to City College in New York, which is the only place where you have an engineering program in the City University. I also applied to MIT and Carnegie Mellon and a few other places, and got into every place. But we couldn't afford to send me anywhere. So I went to the City College on 137th Street, in Manhattan for a year, studying chemical engineering. And it was in that year studying chemical engineering, as it was taught then in the late '50's, that I decided that this was not for me. And I decided to study chemistry, and switched to Brooklyn College to finish my degree in chemistry there.

INTERVIEWER: And why Brooklyn College?

SILBEY: It was close to home. My brother had gone there. It was a very good part of the City University system. It was one of the top ranked places in the City University system. Mostly convenience, because it was on a bus ride from my house.

INTERVIEWER: Was there any particular characteristic or aspect of chemistry that drew you in?

SILBEY: Yes. Of course as soon as I started studying chemistry, I got interested in the area of chemistry that's closest to physics-- what we call physical chemistry. And I started to realize that that's really what I wanted to understand, and to study, and think about. I would say that was a very slow development in my mental apparatus. And it didn't happen instantaneously.

I should point out that the City University and Brooklyn College, in particular, had a very large number of required subjects in all areas. So I had to take philosophy, history, economics, sociology, English literature, classics and so on, before you could begin studying chemistry. And so the last year is really where you studied a lot of chemistry and physics. And that's when things really got settled in my mind.

INTERVIEWER: Sounds like a great education.

SILBEY: It is a great education. It is. It was.

INTERVIEWER: Were there any kind mentors at Brooklyn College?

SILBEY: Yes. There was a professor of physical chemistry there named Albert Levine who was serious chemist. And he taught me and two other seniors what we call quantum mechanics and statistical mechanics out of textbooks that are still useful textbooks. And we had a seminar on this. And he was the guy who really helped me understand what I wanted to do. He also got me a summer job at General Telephone and Electric, GT&E, doing lab work, working on semi conductors, and so on. And actually knew some real chemistry, and got us excited about it.

INTERVIEWER: So how did you wind up at the University of Chicago for grad school?

SILBEY: Well that's another simple story. I talked to Professor Levine. My friend and I, who were the top students in the class at the time, we asked where should we go? Where should we apply? So he gave us a list of all the top schools. I applied to Harvard, MIT, Berkeley, Chicago and so on. Now at Chicago-- it was a time when you didn't go visit these places like you do now, but there was a man there who was very young and very successful in this area of physical chemistry, and he had gone to Brooklyn College. So he lured us, me and my friend both, to the University of Chicago. Professor Levine, my mentor, thought this was great. This was a terrific thing to do. So I went to the University of Chicago which also doesn't have an engineering school, and is fiercely intellectual about everything.

I didn't get married till after my first year in Chicago, but my wife-to-be also applied to Chicago to come the next year in political science. And so we spent four years there, and it was great. It was a great place to get a graduate education.

INTERVIEWER: And one of the world's most beautiful campuses.

SILBEY: It's a great campus. And the Hutchins tradition of liberal education fit very much into the way my wife and I thought that education should be. And we really felt very much at home at the University of Chicago.

INTERVIEWER: And then it was time for your postdocs?

SILBEY: Yeah. So when I finish my PhD, which was pretty good-- while I was at Chicago there was another man-- an Israeli, who came to work with this man, Stuart Rice, who I worked with for my PhD-- and this Israeli's name, Joshua Jortner he's a very high level physical chemist, as well, and he spent a few years at the University of Chicago, coterminous with my staying there. And I worked with him, as well as with Stuart Rice. We were very successful in what we were doing.

And so, when I applied for postdocs, I had to make a decision about whether to stay more or less in the same field, or go into a different field, and a slightly different field. Didn't really change very much. And I decided that it would be good for me to try something new.

And so, instead of going to Caltech, where I had an offer from somebody that I knew, I went to University of Wisconsin to work with an older physical chemist, a man named Jo Hirschfelder who was very well known at that time, and had been one of the few theoretical chemists or physical chemists to work at Los Alamos during the great war time. And he had a million stories. He was a very interesting guy. And so I had one year there.

But then I decided after doing things with him, that I'll go and do something else. And so, applied for jobs. It was a great time to apply for jobs. This was 1965. I must have had 10 interviews. I didn't have 10 offers, but I had a lot of offers. And one of them was MIT. Well, I came here for an interview. I met group of chemists here, physical chemists here, and it was the place that I thought I would fit in best. And so I accepted their offer and arrived July 1, 1966, at MIT.

INTERVIEWER: Do you remember what it was about MIT that made you feel like this was the place that you would fit in best?

SILBEY: Well, it was obviously the colleagues in the department. I was correct about that. I met people like Irwin Oppenheim He's in his '80s now, but he's still coming in every day. I still see him every day. And Jim Kinsey and Carl Garland and, later on, other people arrived. It was a great bunch of colleagues. A man named Isadore Amdur who, unfortunately, died soon afterward. They made me feel right at home. Intellectually, they asked the right questions. They pushed me in the right way. We got on immediately. We started talking to one another and so on, which was unusual. At other places there was a little bit of standoffishness. I had an offer from Harvard and I just thought I couldn't go there. It just was completely different. The MIT colleagues were just completely different. And very welcoming.

INTERVIEWER: Do you remember when you got here? You'd spent some time in a number of academic institutions. What were your first impressions of MIT?

SILBEY: Well, I think my first impressions of MIT were everybody's first impressions of MIT at that time. The buildings are old. The paint in the corridors is something they must have gotten from the Navy. Why aren't they making this a nicer place to be? The physical plant was deteriorating. It was already old, even 40 years ago and then the buildings all had numbers. They didn't have names. Well they did have names, but nobody used those names. And the department had numbers. Everything had numbers. It just seemed a little odd to me when I arrived. Maybe a lot odd. That this is the way it was. It just seemed different. Obviously after 44 years, I've figured it all out, but at the time, I thought this is kind of strange. Different.

INTERVIEWER: When you first got here-- since you came anyway, despite the numbers, was there anything different or distinctive about the culture, the student body, the--?

SILBEY: Well again, I would point to my colleagues. I came in July, '66. I had to start teaching almost immediately. I know this was all organized. My colleagues immediately came to me and said if you're going to teach this subject, I have lecture notes. I've taught it a couple of times. Let me bring down my lecture notes. You can look at what I've done. They were so supportive of everything that I wanted to do. And basically, I wanted to do research and teach. And I wasn't thinking about anything else but those two things.

And my wife and I were enjoying Cambridge, and we were living in Cambridge. And we thought they were great. They invited us to their houses. We had dinner with them. It was an immediate embrace-- my immediate colleagues in the chemistry department. And it wasn't just the physical chemists, it was the entire department coming out and saying, we're glad you're here and we welcome you, and we're going to help you. And they did. And so this mitigated completely the numbers and the paint and so on, because it was the right choice for us. We immediately connected with a bunch of really nice people.

INTERVIEWER: Did your wife join the faculty at the same time?

SILBEY: No. My wife hadn't finished her PhD yet. I arrived in '66. She was getting a PhD from the University of Chicago, but her mentor was 900 miles away. So she, very luckily, found a mentor at Brandeis University who helped her with her PhD thesis. And she finally got her PhD thesis and her PhD degree. And very soon after, got a job at Wellesley College. And she taught at Wellesley College for 20 years before coming to MIT.

INTERVIEWER: Going back to that welcoming spirit, has that sort of characteristic of corroboration been important over the years in your work?

SILBEY: Yes. Yes. And my group has widened, and maybe also lengthened in various ways. And collaboration with my colleagues here in my department, but also in other departments, have been crucial for my own research and my teaching. And in the best of places like MIT, and I don't know other places very well, but in the best of places, this always happens. The sum is much larger than the parts. And it is tremendously important to keep that collaboration going, and that welcoming spirit. It's enormously important.

MIT, remember, was a smaller place when I arrived 44 years ago, with a smaller undergraduate body, a smaller graduate student body, a smaller faculty. And it was a different place in a lot of ways. And it's changed. And I think this collaborative spirit and the connections that are there, are still there. Although as I've gotten older, I've taken different roles in the playing out of that.

INTERVIEWER: Are there any examples that you have of a time when collaboration made a big difference in your work?

SILBEY: Collaboration at MIT, with people at MIT? Well there was a man in our department named Jim Kinsey-- he became department head some time in the '70s-- and he was a very close friend of mine. And I would say that although we published a number of papers together, it was the daily interaction with Jim, who has a very sharp mind and a very critical stance on things that really changed the way I did science, and made me think in different ways. He finally left to become dean of science at Rice University in the late '80s, and it was a big loss for us. But I still am friends with him. And when we get together, he still has that critical stance that I remember so well. And that really made a difference.

The other thing was that in-- so I arrived in '66. In late '69, Jim Kinsey and I, cooked up an idea. We decided we wanted to hire John Deutch from away from Princeton University and he was a guy in our field. We knew him because he graduated from MIT, so he had visited a number of times. And we just thought this was a guy we had to have in our department. And so we were two young, untenured, faculty members, but we decided we were going to push this. And we went to the department head, who was John Ross, who was another great man, really another mentor for me, and we pushed it. And we did it. And the department came through and said yes. This is the guy we need to get.

And we hired John Deutch away from Princeton. And he arrived, I think January 1970, and sort of the rest is history. And he became a mentor as well. So Jim Kinsey, John Deutch and I were the trio doing science together, and having a lot of fun, but doing really good science.

And I should mention my friend John Ross, who was department head from '66 to '71, or something like that that, and stayed at MIT for another 15 years before going to Stanford. John once pulled me aside, and he said, let me give you a piece of advice. Be nice to the young guys on their way up, so they'll be nice to you on your way down. Best piece of advice ever given. And I live by that.

INTERVIEWER: I would imagine a lot people do. So I'd like to talk a little bit about your areas of research and expertise. Not being a chemist myself, I'm mostly interested in what it is about this area that interests you and why it's been a passion. So physical chemistry?

SILBEY: Physical chemistry, as I said before, is the connection or the interface between physics and chemistry. So you apply physical laws, like quantum mechanics, and statistical mechanics to try to understand chemical problems. Why reactions occur, why molecules have the spectrum that they have, and so on.

It is not something that you immediately say, oh I have an application. I'm going to make a widget, or solve the world's problems. But it is trying to understand, at a basic level, what's going on in molecular interactions and how that can be used.

If you understand interactions between molecules, how that can be used to understand the properties of materials. That's the basic idea. And the passion is that this is supposed to be that theoretical framework that is foolproof.

The only thing is, it's very hard to make it work correctly. And so there are tricks. There are ways of working. There are creative things to do to think through how to make it work right for the system that you're looking at. Which is the art of this. And so quantum mechanics has become my passion.

I want to understand how quantum mechanics works in all its glory. It has led to my current passion, which is to try to understand the initial steps of photosynthesis where light is absorbed, energy is transferred, electrons and holes are separated, and chemical reactions begin. All in a picosecond. A very short time. And so this is all quantum mechanics. And it all has a very nice story about it that you can tell about photosynthesis, and perhaps, solar energy, and so on. It's been my passion.

INTERVIEWER: I'm just fascinated by people who have an interest that sustains them for such a long period of time. It morphs. But it's very interesting to me. I have the properties of polymers?

SILBEY: Yes. I was interested for a while. I should say probably the essential thing that I've done in research has been to work closely with experimenters. So when a new experiment comes along, and something unusual is seen, often, my friends, the experimenters, will come to me and say, I've seen an unusual thing. What do you think? And therefore, I sit down and think about it together with the experimenter. And we often come up with some answers.

And about 1980, or 1979, some physicists at the University of Pennsylvania discovered that if they took a molecule that they called polyacetylene, which is a polylene. It's a molecule that chemists know very much about. And they oxidized this molecule. They got very high conductivities. They saw very high conductivities. And there were some very puzzling properties about this conductivity. And they were physicists. And they started to use quantum mechanics to try to understand it.

And I was contacted by a friend who was working at Allied Chemical now, who I had worked with before. And he said, did you hear about this stuff? It's absolutely fascinating. Why don't you come down to Allied Chemicals. Spend the day. We'll talk about it. We'll think about it. I came down to Allied. We spent the day talking about the experiment, how it could be explained, and so on. And then suddenly, we had a new project.

It was on these polymers that conducted electricity. And it subsequently won a Nobel Prize for the University of Pennsylvania scientists. But it became a very big area of study. And we got in there very early because a friend of mine called me up and said, hey do you understand this? I don't understand it. Let's talk. And that's happened subsequently in other areas where I just go from one to another, within the general area of quantum mechanics and materials.

INTERVIEWER: So it sounds like when you wake up in the morning, you don't know whether today's going to launch you on a whole new field of interest?

SILBEY: Well. These days, I'm pretty sure it's not. But you're right. There were many, many years when it was all dependent on what the mail or telephone have to do.

INTERVIEWER: And then, single molecule spectroscopy?

SILBEY: That's another example where a scientist at IBM in California discovered a way of looking at the spectrum of a single molecule that is stationery on a slide, let's say. And he could actually interrogate that molecule with light, and measure the spectrum of the molecule. Now if you measure the spectrum of the molecule, you measure the energy levels of the molecules-- what the electrons are doing, and what the vibrations are doing. One molecule that was a tour de force experiment, and very quickly, other people started looking at it. And we said, I don't understand the experiment. So I contacted the experimenter, we talked about it. I talked to my students and postdocs, and we sat down and we started writing theoretical models for this kind of experiment.

And it got very interesting for about six or seven years. And now, this kind of single molecule spectroscopy is used in biology all the time in slightly different kind of ways than originally. But it is now a big deal. So we were there at the beginning.

INTERVIEWER: That must be kind of fun.

SILBEY: It's always fun.

INTERVIEWER: And then the interactions in molecules and solids? Vibronic?

SILBEY: Yeah. That was in collaboration with my colleague, Bob Field in the chemistry department, who's an experimenter. I'm a theorist. He's an experimenter, and he and I got together to think about what happens when you take a molecule-- let's say with four atoms, or five atoms-- let's say four atoms, and you pump a lot of vibrational energy-- so what I mean, we were looking at acetylene. And acetylene is a linear molecule-- two carbons, two hydrogens. You pump a lot of vibrational energy and the hydrogens are moving all around.

Can you turn that acetylene into another molecule? So the hydrogen flips over onto the other side into another molecular, which is called vanilidene and is very reactive.

And so the people who do real chemical reactions think it goes to this other species, and we were trying to do it-- Bob, in the lab, was trying to do it with light, by just exciting the molecule with light, very, very highly excited. And we were trying to understand theoretically by modeling what would happen to a molecule when it got up there. So it was another collaboration that lasted probably eight or nine years, here at MIT, and was very fruitful.

INTERVIEWER: This is my favorite, the highly vibrationally excited polyatomic molecules?

SILBEY: Well it's the same stuff.

INTERVIEWER: Same thing? Okay. And the relaxation and coherence in low temperature systems?

SILBEY: So that's quantum mechanics. There's something about quantum mechanics that is not very odd, but is a signal of quantum mechanical interactions. When molecules interact, the excitation on one molecule and another molecule can [INAUDIBLE] feel each other, and they get coherently interacting. They work together and in a funny way.

Recent experiments, this is within the last couple of years, have shown in photosynthetic systems, at very short times, there seem to be this coherence. This quantum mechanical coherence showing up. And the question is, does this make a difference for the tremendous efficiency of light energy transfer to the reaction center of photosynthesis, so that you can start the chemical reactions going? And it looks like, in some systems, this quantum mechanical coherence is necessary to explain the efficiency of the process. And so we are in the midst of doing calculations now of these experiments that were done at Berkeley and Chicago.

INTERVIEWER: And is this related to molecules in glasses and solids?

SILBEY: Well, no. The molecules in glasses were early attempts to understand the single molecule spectroscopy, because that's the way people looked at them. They put them in a glass and lowered the temperature very much, so that they could keep them in the same place, and do single molecule spectroscopy. So there's quantum mechanics there, and all of what we do is try to apply these quantum mechanical ideas, and see whether they are operative in the systems. Of course, they're always operative, but can you see the signal that they are operative? Can you understand how it is?

INTERVIEWER: And what's the particular appeal of theoretical chemistry?

SILBEY: Well. I started out at the University of Chicago thinking I was going to be an experimenter. And I worked for nine months with a very strong experimental scientist named Clyde Hutchison. And I was doing experiments which required low temperatures. At that time it was liquid nitrogen 77 degrees Kelvin. And I realized in that nine months, after the number of accidents that I had, and the number broken things that I had, that I didn't have the temperament for experimental science. For experimental science you have to be patient person. You have to not grab. You have to think before you do everything. And I was young. I didn't have that temperament. And so, I did have the temperament to spend long hours slogging over equations. And so it was clear to me that theory was my strong point.

INTERVIEWER: That was an important thing to learn in school. From the research you've done, are there any applications that have come out of it that have been particularly interesting to you or that you're particularly proud of?

SILBEY: Well, unlike most of my MIT colleagues, I've never been someone who's been oriented toward applications. Obviously, if something happens, that's wonderful. But I've never pursued it very much. These conducting organic polymers that I told you about from 1979, 1980 are in use now. I mean in all the organic light admitting diodes, and even television screen that Sony has uses these organic molecules. So some aspects of the kinds of work we did very early on have led down the long road to these applications.

And my hope is by understanding the early steps of photosynthesis, we will be able to make design criteria for synthetic photosynthetic arrays for man- made arrays, and so. But I'm not going to do it. I'm just going to try to understand and understand how you can make the efficiencies high.

INTERVIEWER: So your interest is really in figuring out how it works? And then moving on to the next thing to figure out how it works? So I wanted to talk a little bit about teaching. How would you describe the experience of teaching at MIT?

SILBEY: Well, first of all, I've always been interested in teaching. I knew when I came to MIT, I wanted to teach, and I wanted to teach well. My first year teaching at MIT, I was 26 years old.

The students in my class-- I was teaching a freshman class, so they were 17, 18 years old. And there was a young man in my class. I was teaching freshman chemistry to a group of 25 students or something like that. And there was a young man in my class who came up after class and said, ask me a question about quantum mechanics.

And I realized that this was an interesting group of students. This kid knew what he was talking about. And we became a little friendly. And he was well beyond the chemistry that I was teaching the other students. And he kept asking his questions all term. And I realized that teaching at MIT was going to be a very interesting sport. Because there were just incredible students. The average student is very high. But there are these four Sigma or six Sigma students who are just unbelievable. Much smarter than I am. So that was interesting.

INTERVIEWER: So you have to be on your toes.

SILBEY: I always tell the story of teaching thermo dynamics one year to 250 kids in the class, in 10-250. It's the middle of the term. And a student raises his hand in the lecture, unusual, and he asks me a question. I won't bother you with the question, but he asked me a question. I said well, it's easy. Write down the equations. I wrote down the equations, and I couldn't solve them. And I said, okay. I tell you what I'll do. I'll get back to you next lecture. And tell you the answer. I can't figure it out on the board right now. But to make it interesting, I will give 25 extra points on the total score of the course for anybody who comes up with the answer before I get back.

And I went back to my office and I worked, and I worked on this, and I could not solve the problem. So I finally said, I've got to go talk to one of my mentors. So I went to talk to Professor Oppenheimer who's a great thermodynamics expert, and talked to him, and I gave him the problem. He looked at me, and he said, hmmm. I'll have to get back to you on that. And I knew I was in trouble. And so, I went back to my office, and I worked again. For the next day, I still didn't solve the problem.

On the way to the lecture that I was going to have to admit I still didn't solve the problem, I ran into an emeritus professor in the chemistry department named Clark Stephenson, who had taught thermo dynamics for years. And I said, Clark, you've got to help me. I asked him the question. Instantaneously, he gave me the answer and I understood. I went to the class very proud that I had the answer.

And that kid who had asked me the question had the answer too. Same answer. So you've got to be careful about what you say to the students. You cannot snow them. You can't say, well, gobbledygook. And they just don't buy it. So you've got to be honest. And you've got to admit when you don't know. And you've got to work hard figuring out how to explain things.

INTERVIEWER: And do you know where that kid is today?

SILBEY: No I don't. Unfortunately.

INTERVIEWER: You've been a real advocate of excellence in teaching. I'm kind of wondering why that's been such a focus for you. Why you think it's been so important to you?

SILBEY: Well as I said, I knew I wanted to be a teacher. I enjoy teaching very much. I should say that lecturing, which is gone out of style now, but still a good lecturer can provide a tremendous amount of information that gets into the heads of the students. Whether it stays there is always a question. And I've tried to be a good lecturer.

And the other aspect of why I'm interested in teaching, especially at MIT, is my education which was completely different from an MIT education. Which was, as I told you, was filled with humanities, arts, and social sciences, in a prescribed way, where we all did, more or less, the same stuff, always a few electives. And in which I learned so much and thought was so important to my life, that I thought MIT should move in that direction. And so I became an advocate for changing the general Institute requirements for decreasing the size of the departmental programs and allowing the students to have more latitude and take electives and things like that, early on when I came to MIT.

In fact, I told you I came in '66. By '68, we were living in a dormitory, as assistant house masters in Senior House. '68 to '70. It was an interesting time to be living in a dormitory. And we moved out only when our first child was born in 1970.

In addition, about 1969, there was a group of faculty who were putting together Concourse, the first, or maybe the second, special freshman year program. And they wanted a chemist. We were going to do physics, math, chemistry, humanities, arts and social science of first year at MIT, in a unified way. We were going to study the 17th century. We'd study Newton. We'd study Galileo. We'd read Brecht's *Galileo.* We'd do everything, and try to dovetail it into the thinking about the beginning of the Enlightenment-- the beginning of the 17th century. And I thought this was great. So I joined them. I was in Concourse for two or three years. You burn out pretty quickly there in something like that. Because it was constant. We had 25 freshman students.

I have no idea why MIT allowed us to do what we did, but it was an experiment. I think it was an experimental time at MIT. So they let us do this, and we got 25 students. Concourse is still going. It's changed off and on over the years. And we had a great time. I mean the faculty learned more than the students did. I can tell you that. We had a great time. And I was doing my, also, chemistry department teaching, as well. This was just an add- on that I just decided, I'll do it. And I'll enjoy it.

INTERVIEWER: I would love to take that course.

SILBEY: It was a great course. It was a great course. Unfortunately, of the faculty, only one person had tenure. And most of them did not get tenure. Larry Bucciarelli got tenure. He's the aero-astro guy. And I got tenure. And the rest of the people in the group, Duncan Foley in economics, and Dave Oliver, in aero-astro, and Nancy Dworsky in literature, and a few other people, for whatever reason, they didn't get tenure. And it was too bad. We lost a lot of good teachers.

INTERVIEWER: You don't think it had anything to do with their participation in this experiment?

SILBEY: They might have spent too much time doing that, and neglecting the research that one has to do. I don't really know. In my case, it worked out fine.

INTERVIEWER: Can you talk a little bit about the technology enhanced active learning program?

SILBEY: I was involved in that only as a dean. This arose from the Physics Department worrying about how much students actually retained from lectures, and doing 801, and 802, which are the first two physics classes. And people like John Belcher and Dave Pritchard, and others, I don't know the whole cast of characters, were really concerned that students were not getting it. Were not understanding the way you do physics where you think through physics problems. They could do the problems, up to a point, reasonably well. But they were not really understanding what's going on. That's what was worrying them.

If you had gone to a physics lecture usually you were in 26-100. This is the biggest classroom on campus. You have 600 students, or 500 students in the room. It's almost impossible to have control of that situation. Walter Lewin, who is a lecturer par excellence, a man who's half an entertainer and because he gets to students to listen and to think by doing that. But he's unique. It's very hard to do.

So you have to figure out a way to replicate getting this information into the students' heads, and having it stay there, so that you don't get the next year a problem that they say, I don't know that. And you can prove to them you taught them that, but they really don't know it. And so you have to think through how to do it.

The idea was to have nine students sitting around with their laptops and a mentor going around talking to them, and trying to see whether this is TEAL-- technology enhanced active learning-- was going to solve the problem, at least partially. At least get more students to understand how to do the problems, and how to think through a physics problem.

The funny part was the really good physics students hated it because they wanted to macho stuff. They wanted it differently. And they thought this was watering it down. But I think, largely, the students who are taking it now find it a good way to learn.

Now the question should we do this in the other large classes? We haven't gone that way yet. We haven't figured it out. It's a capital intensive, money, to build all these things and so on. And the physics faculty, Dave Pritchard and John Belcher are spending a lot of time assessing how well they're doing. And I think we will know pretty soon the real effects of doing it this way. It's a great idea.

INTERVIEWER: Did it take the place of the large lecture, or was it just sort of like--

SILBEY: Well of course it started as an experiment. But now it's taking the place of large lecture. It started as an experiment, side by side, and grew until, I think, now in both 801 and 802 they are doing TEAL.

INTERVIEWER: I wanted to get into some of the ways that you've contributed to the MIT community. So why don't we start with the taskforce that looked at tenure.

SILBEY: Well let's not start with that.

INTERVIEWER: Okay. Start where you want.

SILBEY: Okay. So I think if I were to say, what am I proud of? What I've done at MIT? I've been department head in chemistry. I've been director in the center of material science and engineering, and I've been dean of science, but I think, most proud of being the co-chair of the first taskforce on student life and learning, and the next taskforce on the undergraduate commons. They had very different outcomes, which is too bad, but I think we've learned a lot. And we pushed the envelope a lot at MIT.

So the taskforce for student life and learning was in the mid- '90s. And what happened was I'd stepped down as department head after five years, very happily, to go back to research and teaching. And Chuck Vest called me up and he found me in Switzerland where I was at a scientific conference. We talked and he said he wanted me to co-chair this taskforce on student life and learning.

And he said to me, basically we're in a situation now-- it's the mid- '90s-- a lot of talk about delivering lectures over the internet. What is MIT going to look like in 2025? What will we be? What do we have to do to retain our quality, and our position? He was talking about education-- undergraduate education.

So we had a taskforce. It was a bunch of great people. And John Hansman was the co-chair. And we met for two years, and thought about a lot of different things. We wrote a report, which I think was a pretty good report, about thinking through what MIT should do in order to position itself with respect to internet and all this.

There were lots of suggestions, but the bottom line was, we said, what makes MIT great as an educational institution is what happens when the students and the faculty work together, and when the students and the students work together. That's what makes MIT work. That's what makes MIT a great university.

You can't have everybody sitting in their homes, not actually interacting with each other, and expect to have a great university. Therefore, if you want to have a great university in 2025, you're going to have to have a campus here. And this campus has got to be something that students and faculty are going to want to be at. And they're going to want to work together, as they have always worked together in the past.

And so the most important thing to do is to say we're going to have a campus that's going to be great, that people will want to be at, and will, therefore, have the necessary structure to allow for this great collaboration that goes on. And they agreed. Chuck and the Corporation agreed. And we have new dormitories, we have a new athletic facility. The campus has been changed. We talk more about interactions between students and other students, and students and faculty. We think differently, I think, after that report. And I think we made a difference at MIT.

INTERVIEWER: Did the big building thing come out of that taskforce report?

SILBEY: Well. We didn't say build a lot of buildings. But we said, if you want students to come here, you've got to have dormitories that are interesting places. Good places to live and interesting places. Simmons Hall came out of that, I think. I mean the research buildings weren't part of this idea. But the idea that-- and I think also the new Zesiger Building, the new gym and new swimming pool came out of that. I mean the idea that this is a community where faculty and students get together and this has to be a complete community, some that more faculty can live nearby. More faculty can live on campus with the students. This is a great idea. This will make MIT or continue to have MIT be a great university. That was the import of that.

INTERVIEWER: And it sounds like that thinking has permeated all the way through. Because I've been hearing a lot of that from the interviews that I've been doing, about the importance of the student teacher collaboration.

SILBEY: Yeah. We didn't invent this idea. Believe me, we're not that creative. We listened on the taskforce. We listened to everybody who was willing to talk to us. That's the way you do it. And you listen until you say, ah, this is what people want. This is what they see as the quality of MIT arising from. Let's write it down so that we don't forget it. And I think that's what we did.

INTERVIEWER: Other contributions to the MIT community?

SILBEY: That was the taskforce for Student Life and Learning. The taskforce for the Undergraduate Commons; this was, again, Chuck Vest called me up, wrestled me to the ground. I was dean of science at the time. He said, you're the only person that can do this. We have to look at the general Institute requirements. The undergraduate program.

I didn't really want to do it because it was trap filled with people who have interests that they're afraid to lose. But we went through it. And we had a great committee again. And we made a lot of suggestions for what I said before, of opening up the Institute requirements.

This is a triviality, but the idea that an MIT student can graduate from MIT without ever having taken a statistics or probability course, or quantum mechanics course, or a course on Shakespeare it makes my blood boil. Why is the system so tightly wound that we can't allow students to search around a little bit more? To think through it? Why do we have to have these absolute set of the Institute requirements?

So we had two levels of Institute requirements in our report. One that was absolute for everybody, a year of physics, chemistry, year of math, but then you could have some other choices in the matter. We almost won. And, of course, the humanities, arts and social science, we wanted to change dramatically. I think that will change somewhat. But the science requirements, you come up against a lot of interests that don't want to change because it means changing your undergraduate requirements, changing your undergraduate program in chemical engineering or mechanical engineering or chemistry or something, and so we lost by a few votes. And it was a big disappointment. And spent two years doing it.

INTERVIEWER: Let's go back to the Task Force on Undergraduate Educational Commons. Tell me what happened when you put together the list of what everybody should know before they graduate?

SILBEY: Right. So we put together a list-- a group of 25 of us put together list-- what should every graduating senior at MIT know. And, of course, it was a list that would take 10 years of courses to master. And we realized in four years you can't do this. But what can you do? Well it goes back to the Greeks. Education is not filling a bucket. Education is lighting a fire. And that's the idea.

The idea is you excite students about learning on their own. And learning by interacting with one another. And you're off and running. And MIT students are fantastic. You know they can do it. So it's only a question of lighting the fire. And there are great teachers in MIT who do some of that. But there should be more of it. And there should be more ways of lighting the fire. And one important way is to make sure that students can take electives in a variety of things, so that they can find out where that fire will start.

INTERVIEWER: So before we talk a little bit more about the administrative work you've done, are there other committees? Do you want to talk about the Task Force on Tenure?

SILBEY: In the '80s, I was on a number of committees, again on education. I was on the committee that suggested that the biology requirement be instituted-- the change in the GIR to put biology in. Which I think our committee thought was a no brainer. But we ran into the usual kind of thing where if you added at an extra requirement, where was it going to come out of? It's not going to come out of my program. And we had to compromise in some ways about that. But we got it done.

And I worked with Margaret MacVicar on a variety of committees and trying to move in the direction that I've always tried to move in, as I've told you, over and over again. And so I got to be known as a person who was interested in education, has strong views, but was willing to work with people, and be on committees and trying to do things. And I did that as often as I could.

See, MIT is a nice place that way. If you want to do that stuff, they let you do it. So, I think in 1971, I was put on the Committee on Educational Policy, which was the forerunner of the Committee on the Undergraduate Program. I was an untenured faculty member, but somebody knew I was interested. And they put my name up, and I got on that committee. And I started meeting people from other departments who are interested in similar things. And I learned the richness of MIT early on in a variety of ways. And that's something that doesn't happen to every junior faculty member. Of course, sometimes they are cloistered. They want to do their own research only. And I was very lucky about that.

I was also on the Committee on Undergraduate Admissions which wrote a report saying we should have more women students at MIT. And that was something that was clearly going to happen. And we wrote a report very early on, in the early '70s, saying admit more women students. You're crazy. There's 50 percent of the world. And we'll get good students. That also was fought by a lot of the faculty at MIT saying that women can't handle the MIT program. But that got done. And that got done because Paul Gray was right behind it. He made it happen.

That's another thing. This is a story. In 1978, or 1979, Paul Gray who was chancellor at the time, got an invitation to come to China-- or MIT got an invitation to come to China with a group to start interactions between MIT and Tsinghua University and other universities in China.

And Paul Gray who is a great man-- I'm sure you've interviewed him, or somebody has-- Paul Gray decided to take along a group of faculty who were teachers. And so he took me. He took Art Mattuck, Fernando Corbato from electrical engineering, Suzanne Berger from political science, C.C. Chen from civil, I think. And we went to China in 1979. It was a couple of years after the gang of four were arrested. And not so long after Mao died.

And we went to China, landing in Beijing airport, the biggest picture of Mao Tse Tung ever saw at the airport. It was fantastic. And we went to Beijing, Shanghai, Hangzhou. And then I went out through Hangzhou and Hong Kong at the end. It was fantastic. I mean I was a young guy. I wasn't a big shot. Paul just wanted teachers. He wanted to bring teachers. Show them what we had.

INTERVIEWER: Around here, it seems like when you have strong opinions, but you can get along with other people, you wind up in administration. So talk to me a little bit about first department head?

SILBEY: Every administrative job I had was an accident. In 1990, Mark Wrighton was asked by Chuck Vest who had just become president to be provost. Mark was department head in chemistry. So the dean of science, at that time, was Gene Brown asked me in, and he said, would you take a temporary assignment as department head, until we can find a real department head. I said sure. I spent five years.

And at the end of that five years, it was not a good time at MIT. It was a time of budget cuts, and it's not as bad as it was last few years, but it was a time when it was hard to do things. So not much happened in the chemistry department, at the time. We needed a new building. Renovation didn't happen. So I was disappointed at the end of that. And I didn't think I wanted to stay in administration.

So after being department head for five years, I stepped down. And then I continued my research. I was, at that time, in the Center for Materials Science and Engineering. I was part of that center's research program. And the center director was Marc Kastner and Marc was asked to be department head in physics. And so the vice president for research asked me whether I would be willing to be interim director of the Center for Materials Science and Engineering. So I said okay, I'll be interim director.

And so, I became director of the Center for Materials Science and Engineering. And we submitted a proposal, and got the great scores and defended it at NSF, and we did great. So I was proud of that.

And a few years later, 1990, in February, Bob Birgeneau was offered the presidency of the University of Toronto. He was dean of science. He accepted. And Bob Brown, the provost, called me up, and said would I temporarily take the interim dean of science job. And I said, okay. I'll do it.

So every time, I was just somebody who could be fitted into the slot. And nobody had to worry that I was going to do something crazy. I did my job. And being department head wasn't fun. Being director of the Center of Materials Science was great. It was all research. I didn't have any personnel decisions to make. We had lots of money, and I got to give it out. Everybody's happy. There were no hard decisions.

Dean of science was crazy. There's the personalities in the School of Science, just like every other school, are all over the place. It's the complete distribution. And you have to deal with all of them. But I worked for five years with Bob Brown and Chuck Vest and then two and a half years with Rafael Reif and Susan Hockfield and Bob Brown and Chuck Vest. It was a good time, financially. And they got the Corporation to agree to build.

And we built the Stata Center. We built the neuroscience building. We built a new physics building. We renovated the chemistry department. I mean it just went on and on. We did a lot of deferred maintenance. And I got to wear a hard hat a lot and go around and look at buildings. The cancer center was the last building that I kept clamoring for, that we had to have. And, happily, we got the donations to do it. So that was fantastic.

And we won four Nobel Prizes in the School of Science while I was dean. I had nothing to do with it. But it was great. And my friend, Dick Schrock invited my wife and me to come to Stockholm with him. So we even went to the ceremony. It was absolutely great. So it was a lot of up and there were a lot of downs, too.

INTERVIEWER: Were there things that you wanted to do as dean that you weren't able to do?

SILBEY: Well. I was not somebody who said, I have a list of things that I have to get done. I listened to the department heads and the faculty in School of Science. And from what they told me, I learned what had to be done. And then I would have to prioritize.

The one thing that I think we never really got done was the fact that the earth's atmosphere and planetary sciences department, which is a great department, is in this very tall building, which is a bad building for research. And they really need new laboratories. And they were spread out, and we never got that to a high enough priority to get them what they needed. And I was desperate about that. But it just never came up. Never got done.

While I was dean, we were winning Nobel prizes, we hired great, new, young faculty. We hired a lot of senior faculty, too. The first five years were like go go years. Bob Brown always was willing to talk about you what want to do something? Let's talk about how it can be done. He never told you how it can't be done. He told you how it could be done. If it could be done. And we had a lot of crises, as well. But he was always there working with me on getting things done. And Rafael is a similar kind of guy, but the economic situation is desperate. It's completely different now, unfortunately.

INTERVIEWER: What is it that people don't know about being a dean?

SILBEY: If I would guess, I would guess they don't know how complicated their colleagues can make life. When you're a department head you see your colleagues differently. Let me try to explain. When you're just a faculty member who's doing research and teaching, what you want as colleagues are great researchers. You want Nobel Prize winners. You want potential Nobel Prize winners. You think, hey that's what you want, at least in the School of Science.

When you're a department head, you say, I also need people who are going to be good citizens, who are going to do the scut work that has to be done. Who's going to deal with the students, who's going to deal with the staff. The staff is great at MIT. They're not highly paid. They love it here for reasons that are more like the faculty. And being a department head means you have to make a community-- a little community that works. Not just have people win Nobel Prizes. Even how great that is. When you're a dean, you say, I've got to have departments that all work, and I've got to have citizens that are going to do interdepartmental things, and they're going to go to school thing. And you look at your colleagues differently. Those people that you thought-- I'll be honest-- those people you thought, well they're mediocre researchers on an MIT scale, we could lose them, no problem. And then you find out that without them, the teaching schedule doesn't get made. The teaching doesn't get done. Or some other important function of the department doesn't get done. And you start to appreciate people in different way.

Building a department, and building a school requires a lot of different talents. And a lot of those talents are invisible to most of our faculty. And so, that's what you learn when you become an administrator. How to judge people in a broader context. And appreciate people in a broader context.

INTERVIEWER: It almost sounds like the higher you go in administration, the more important the people skills become of everybody.

SILBEY: Of course. And the lack of people skills in faculty, and students, and staff, that are there, because we're a diverse group of people, can often cause problems that you can't believe. When your name appears in the front page of the *Boston Globe* about something that one of your faculty members has done, you know it's going to be a bad day.

INTERVIEWER: As part of my research, I read the report about increasing the number of women faculty in the School of Science. Can you talk a little bit why that's been such a challenge to do?

SILBEY: There has, obviously, been a lot of work done. We started with the Women's Committee-- the group of senior women in the School of Science that met in the '90s, I think it was mid- '90s, and Birgeneau, as dean of science, put Jerry Friedman and me and Danny Kleitman, who were all former department heads, on the committee. Asked them to accept some men on the committee who would know how to deal with the MIT administration. So we were put on the committee. We supported them very strongly in terms of their requests. And we helped them to do the research that allowed them to get things changed.

So then comes the point where you have to hire more women into the school. We made lots of offers. We got lots of women to think about it, and not everybody came.

When I became dean, there were a group of women that had been hired during Bob Birgeneau's last couple of years. A number of them left MIT. So while we were hiring, while I was dean, there were women leaving MIT, so our numbers didn't go up very fast. It was very difficult to figure out how to make this happen. It's like the old *New Yorker* cartoon of these five gentleman smoking cigars around the table, and one of them says, anybody here not a feminist? Everybody believes in this. On the other hand, making it happen is always tricky.

As dean, I was twisting arms all the time, and there were people who telling me, just tell them you're not going to approve anybody unless they hire women. And that works for the first woman. And then they go back to where they were. So I finally said I have to get more women into positions of power.

So I appointed the first woman to be head of the Laboratory of Nuclear Science, June Matthews. Now that's one of the largest grants, and one of the largest laboratories in MIT. And we have now a woman, and then she sat on Science Council. And then, I appointed Jackie Hewitt as head of what's now the Kavli Center. And then I appointed Maria Zuber as head of earth, atmospheric and planetary sciences. And now, Maria hired about five women, as head of the department. And now Sylvia Ceyer is head of the chemistry department. So I appointed the first woman department head in the School of Science ever. And I think it might have been the first woman department head in science or engineering ever. That made a difference.

I think that was really more straightforward about getting things done than anything else that I did. No matter how hard I tried. And when the Science Council, which is the heads of the departments, and the heads of the major labs, is half women, not quite there yet, but when it's like that, it's going to be a different story.

INTERVIEWER: When you made offers to faculty members who chose not to come, or when you had people on the faculty who chose to leave, what were the reasons that they gave?

SILBEY: People never tell you you're a terrible place and I can't come there. Whatever they think, they tell you you're a great place, but it's not the time of my life to move, or it is the time of my life to move, and so on. I'm not sure you ever get a really straight answer about what it is that's going on.

I tried to interview everybody, men and women who left MIT to try to figure out what was going on. Some people don't get tenure. You know 50 percent of people don't get tenure. Fifty percent of people do get tenure, approximately. Some people don't get tenure. They leave, you try to make sure they get a good job elsewhere. You do the best you can.

But when a senior faculty member, a woman, moves to Harvard, it's not because she doesn't like the Boston area. There's something else going on. And that happened early on when I was dean. It was a hire that Birgeneau made from Cornell to MIT as a senior faculty. A couple of years later, she went to Harvard. My guess is she wanted to go to Harvard all along, and she didn't get the offer until she got to the Boston area and was able to make the contacts, or something. I don't know. In any case, it happened.

INTERVIEWER: Do you feel like with the addition of women in more administrative positions and more women around, do you feel like there's still an issue with sexism in the School of Science?

SILBEY: It's a subtle thing. I don't want to accuse people. It's a subtle thing. I think in some departments, you can't say that. Because in chemistry department, we have seven out of 28 faculty members are women. We've been increasing it, and there's a woman head. And it's hard to imagine there is overt sexism in this.

But there's always the chance-- and I think this is true, that men look at women's applications differently than they look at men's applications for a job, let's say. And women graduate students or postdocs in science often seem different to certain men, than men postdocs. Graduate students seem better in terms of their enthusiasm. In terms of their willingness to work long hours, and do what has to be done, and this kind of baloney. If they actually say anything, you can tell them what you think of it.

But in all the meetings that we have to say lets hire people, we always say, how do the women candidates fare? What do we have? And so on.

In chemistry, over the last few years, we've just hired women. We've hired men too, but we've hired women sort of one to one.

In certain areas of science, it's harder to find the women PhDs. It's not as hard as some people say, but it's harder. And in math, it's harder. I have no real ideas about why that should be so. But in the life sciences, biology, in chemistry, and neuro science, and brain and cognitive sciences, there's no reason why we shouldn't be going toward 50 percent men and women, except for the fact that it takes a long time to get there.

INTERVIEWER: Having seen the increase in women in your school, do you see any advantages from it? Has it changed the character of the school in any way?

SILBEY: I think it's been very good for the men to see women who are excellent scientists, and often going home and taking care of families. To see that they can do it. You can scratch your head and say, I don't know how they do it. How they do all the things that they do. We have people in Biology, women in biology, who have two small kids, take care of things. Of course, they have supportive husbands, perhaps. I'm guessing. But still, you know that the reality is most of life doesn't change so much, and so women get the burden of taking care of the kids.

We're seeing more women with children, with real families, doing it all. I think that changes perceptions of people when that happens. It isn't the old macho guys working 80 hours a week that are getting things done. It's also the women who are working only 60 hours a week, and spending time with their kids.

INTERVIEWER: Has it changed anything for the students?

SILBEY: Well the students changed first. You know it's 50 percent women, or 45 percent women in the undergraduate program. And in the School of Science, the number of women graduate students is about 40 percent, something like that. So the students have changed. They don't see any issue here. And the fact that still the majority of the faculty are male probably doesn't go unnoticed. But I haven't heard of any or elicited any comments about that.

INTERVIEWER: You've won a lot of awards and honors, and I'm wondering have any of them meant anything that were particularly special to you, or meant more than the others?

SILBEY: Well of course I've won three teaching awards at MIT. And that, to me, were the best things. I've won the School of Science Teaching Award, and the Baker Undergraduate Award, and the Graduate Award, and I guess, I got a MacVicar Fellowship. So those are things that I really am proud of, because they signify what I try to do here at MIT as much as possible, which is to improve teaching, improve learning, and do as good of job that I can. And the stuff from research, I'm not a Nobel Prize winner. I do good research. I'm a member of the National Academy, but compared to having your students tell you that you did a good job, not much.

INTERVIEWER: I thought it was very interesting that your physical chemistry books-- it says on Amazon, that it's been a leading book for 80 years. [LAUGHTER] Hmm. He's an older gentleman. Talking a little bit about MIT in general, what do you think it is that makes MIT unique?

SILBEY: Well, I'm not sure it's unique. But I mean it has to be unique in certain areas. But I'm not sure it's unique. What makes it one of the best places in the United States and the best places in the world to be a student, and to be a faculty member? And you have to say that the quality of the faculty, the quality of the students, in collaborative work, in their intellect, in their willingness to interact, and in their broad range of interest, has been, for me, a wonderful thing, that made my life here so great. And made my career great.

Had I been a professor of chemistry at, let's say, the University Of Wisconsin, it would have been a different life. It would have been a different group of people. It would have been a different group of students. It would have been very, very different.

Because the quality of students here on average, and that distribution at the far end is unbelievable. You don't get that just anywhere. We have to make sure we don't lose that, right? I don't think we're in danger of losing it, but we have to make sure we don't lose that.

And the quality of the faculty is also just very high. And I'm not just talking about science faculty. I'm talking about humanities, arts, and social science faculty, and Sloan school faculty, and engineering faculty, and architecture faculty. You become dean, you get to know a lot of different people. And you sit on all these taskforces and so on. You get to know a lot of people. And you get to know how smart people are about what they do. And the concentration of smart people around here is just astonishing.

We had a group meeting for dinner. I don't know how it started. Bob Jaffe in physics and Cynthia Wolff in literature, decided to start a dinner meeting where a group of faculty would meet-- this is back in the '80s sometime. I don't remember when. We would meet for dinner, and somebody would give a talk about his or her research afterward. I come to this meeting, and there's Vicki Weisskopf from physics, and Hermann Haus from electrical engineering, and Cynthia Wolff from literature. It was just astonishing. I mean these are great people. Great men and women. And Gian Carlo Rota from math, and Joel Moses from electrical engineering.

And we would meet every month. We would have dinner. And then, somebody would give a talk. And I had to give a talk. And people listened to me. And they actually interacted with me from all over -- these were really top find people, and it was astonishing. It went on for about five years, and then I dropped out so somebody else could move in. But it was absolutely great. And that kind of intellectual quality is rare. The concentration of intellectual quality is rare. And that's what I wanted when I came here, and that's what I found.

INTERVIEWER: Is that why you've stayed here so long?

SILBEY: Well, I've had a good life. I've had offers to go various places, and have seriously considered them, three or four. And I said it wouldn't improve my life. Of course, my wife and I have been married now 48 years. Our kids live in the Boston area. Our grandchildren live in the Boston area now, so there's no reason to leave. And we've had a good life.

INTERVIEWER: Since you've been here for 44 years, do you have prospective on how the institution has changed? How the students have changed? The faculty? Administration?

SILBEY: Well. It's hard to tell whether I appreciate the students more or they've got better. But the students have certainly gotten, in my view, remained very high level, and have gotten better as far as I can tell. You know, there's sometimes a rash of cheating and things like that goes on that really disappoints you, but by and large, it's a minority of students that are like that. And most of the students are just spectacular in my view.

The faculty, I think, has improved. I think the School of Engineering has shifted in ways that are more compatible with the School of Science. I'm always preaching to my engineering friends that science and engineering are collapsing toward one another, and we ought to do something about it.

And the departments in the School of Humanities, Arts, and Social Science, which were actually mostly service departments at one time, have come in their own, and they are often just great departments. Economics, of course, is terrific. Political science is highly rated. Linguistics is highly rated. And you have people in literature who are top- flight people, and writers, and music and theater arts. I mean it's a really interesting place.

I didn't know it was an interesting place when I came, in that way. And maybe it wasn't. I don't know. You know maybe it was not as interesting. Maybe things have gotten a lot better. Or maybe I just have connected more.

INTERVIEWER: Well I think definitely the humanities and social sciences have changed in the years that you've been here. Can you talk a little bit more about what you just mentioned about the School of Engineering and Science sort of dovetailing better?

SILBEY: It just is happening. For a variety of reasons, the engineers, not all them, but many of them are doing more scientific work. Because if you're going to work with nano particles and nano systems, you know that's science. And that came out of science. And there's lots to learn. And lots to think about. And the engineers have picked it up. And the engineering departments are hiring scientists to be in engineering, because that's the direction that their research is going. So the faculty is moving closer to a set of unified interests.

It's not completely true, of course. There are people who are interested in transportation systems. That's hardly science. But if you look in electrical engineering, if you look at mechanical, parts mechanical engineering, if you look at chemical engineering, I think chemical engineers and chemists are doing the same thing, more or less. And talking the same language. Which wasn't true 30 years ago. And so I think people are coming together. And it's being driven by things that are happening in science that the engineers are picking up and taking over. And it's great. Absolutely great.

When Magnanti was dean of engineering, and I was dean of science, I kept saying this to him-- and he didn't want any part of it, because he also wanted to emphasize the large scale projects of engineering that are also out there. And I was seeing only part of the story. There's no sharp boundary any more in my view.

INTERVIEWER: One of the things that interests me is the sort of concept of creating leaders. Leadership training. Do you have any thoughts about that at MIT?

SILBEY: Well, as I told you, I was put into administrative positions by accident. Nobody said, go read a book, or go even spend an hour talking to somebody else about what it's like to do this, and what the job is. So at MIT, it seems to be you learn on the job.

And I would say that my experience has been that one year of being department head or one year of being dean, you go through the full cycle. You figure it out. And if you're lucky, there wasn't a terrible thing that happened that meant that you didn't learn that year. But it's learning on the job.

And I think it's very important at MIT that the administrators are practicing scientists, or engineers, or social scientists, or humanists. That it is not an administrative class that is doing this. That's why I felt very strongly that I was going to step down as dean of science. Susan and Rafael asked me to stay on for awhile, for the transition, but I was going to step down as dean of science, and go back to my teaching and research. I gave up teaching while being the dean of science. I didn't give up research. But I wanted to go back. And I think that's the proper mode of a great university. People come into administration. They work at it for awhile. They're probably smart enough to figure it out, and to do a good job. And then they get out and go back, and somebody else can come in. I don't think that the professional administrator is a good position. I worry about it.

INTERVIEWER: Do you worry about it just at MIT, or in general?

SILBEY: In general I worry about it. But in an academic institution, what are we here for? We're here to teach, to educate, and to do research, which is another form of education. And you know if you're spending your time making out budgets and thinking about the problems of balancing the budget, and you're not thinking about those two important things that we do then you lose contact with the central part of the university. I think, in a business, the job is to make money. So it's a different story. Here, this is what we do. And everything the administrators do should be with that in mind. That we are an educational institution. We are a research institution. Don't do anything that harms those two essential things.

INTERVIEWER: It's an interesting thought that as an administrator of that sort of an institution, you get further away from the mission of the Institute.

SILBEY: Well. Because you're doing something else. I mean I did it for seven and a half years. I know that you think about other things. And it's hard. You have to go back and say, no wait a minute. What does this do to education? What does this do to research? [INAUDIBLE].

INTERVIEWER: It almost seems counterintuitive that would happen.

SILBEY: But if you're worrying about your budget, you have got to cut it, or something like, then you've got to think about what's the most important thing.

INTERVIEWER: How good of job do you think MIT does in terms of developing leadership abilities among students?

SILBEY: That's hard to know. Students are young. I mean we're talking about undergraduate students. Students are young. We can probably do more. I think we try. There are a variety of programs that we try to do things. We could probably do more. But students come in with a broad range of abilities to be accepting of leadership. You do get a lot of students coming to MIT who have never been leaders in their group because they've been intellectually narrow. And they've really concentrated on learning whatever it is they learn.

We do, of course, get some students who were very broadly educated in high school, or personally able to handle interactions and so on. But we get a lot of students who are not so easy to handle, and personal interactions. And you see it at MIT. Maybe more then at the University of Wisconsin, but less than at Caltech.

So we should have these extra curricular activities that help them do this. And a lot of the clubs, and the fraternities, and FSILGs are places where the students learn how to be leaders, how to take care of their group. How to figure out what to do with their group. And that's why I'm a supporter of the FSILGs and the student clubs. Because I think that's where students learn how to do this as well as they can.

Can we do more? I'm sure we can do more. But I think it's got to be something that you offer but you don't require.

INTERVIEWER: What about your hopes for MIT for the future?

SILBEY: Well. I think we're in pretty good shape these days. I think intellectually and educationally, we're doing a very good job. I hope we don't screw up in any way. It's always possible, but I doubt it. We are a very conservative organization. We don't rush into anything without really doing experiments, looking at the data, and thinking about it. So I'm pretty sure we're not going to go into anything bad. It might be nice if we we're willing to take a flyer every once in awhile. But it's just not the ethos of the institution. So I'm pretty sure that MIT's going to be fine for the next 20, 25 years, and maybe all of us here can be proud of it.