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SHEILA

Well, I want to talk about four things. And as I thought about it, I was going to put number 4 last, but I've decided to put it first because I think it'll move some stuff out of the way.

WIDNALL:

And that fourth thing, I think, is don't be cynical. There are a lot of people who grow around life thinking that every organization they work with is corrupt, every society is corrupt. And I think that's very debilitating and I think it keeps them from really latching on to what I think are very important and valuable ideas, ideas that I consider are extremely pragmatic.

I mean, I'm an engineer. And I think the whole question of ethics and values is an extremely pragmatic set of tools. And so that's why I started out saying don't be a cynic. Be a person for whom the glass is half full and always try to be the person who urges on your friends, your organization, your society, to higher goals. Because again, in the end, that's pragmatic. All we have to do is look around the world and see the usefulness of these ideas that we're talking about.

So the other three ideas I want to talk about are individual values, professional values, and institutional values. Now, to talk about individual values, I brought along the United States Air Force Little Blue Book on core values. When I was Secretary of the Air Force, I really felt the need-- and it was not an original idea. I was getting this from people in the Air Force that what the Air Force needed was a fundamental statement of core values so that people could internalize the values that they and their fellow hold. I saw it as, actually, a psychic reward. Yeah, we couldn't give them money, but we could give them core values.

And think about it-- what we were doing is telling them how good they were, not to mention the fact that this is a very pragmatic thing to do from all sorts of reasons. It builds trust-- the guy working next to you shares the same values.

I can't tell you the number of times-- well, I mean, an organization like the Air Force that espouses high values is under the microscope of the media. And all you have to do is just move a little bit in a direction that probably most institutions would get away with in our society, and all hell breaks loose. And that's fine.

We espouse high values. And when we let them down, let the people down, we get hammered. And I never had a problem with that. I thought that we needed to explain ourselves and let the chips fall where they may.

So anyway, we established a program of core values. And I'll just tell you what those values are. I don't believe there's a unique set of core values, but there's a lot of overlap and a lot of commonality. And the core values of the Air Force are integrity first, service before self, and excellence in all you do. That works for me. And I believe those values also work at MIT. I think those are also the MIT values.

The phrase, service before self, has a little different meaning in a military organization because it means that you could put your life on the line, that you would be expected to put your life on the line. That's what service really means in a military organization.

I think, at an institution like MIT, we think of public service. We think of all the values that MIT brings to the table which serve the public-- making admissions to MIT possible for low-income people, not evaluating people for financial aid on the basis of what score they got on the SAT, being willing to do certain kinds of research for the government even though it creates a level of difficulty that maybe we wouldn't want to be involved in, but we've done it since World War II and it's been an important part of what we do.

So the public service part is just really very much front and center at MIT. And obviously excellence, but I need say no more about excellence.

So I'm going to pass this around, and as I understand it, everybody gets this Little Blue Book when they get into the Air Force either as an enlisted person or as an officer. And I actually don't know whether you get it if you're in ROTC. I actually have to check that out with the commander here. But I think the basic idea is that that is what we--

And when I go to a briefing of Air Force officers, they may be talking about, how do you connect a satellite up? Down at the bottom, on the master slide, it says integrity, service before self, and excellence. It has nothing to do-- well, sort of-- with organizing a satellite, how you put it together, but it is a statement about the Air Force and about their public commitment.

And most of the time, the people in the room have no idea that I had anything to do with this. So they're lecturing me on core values and how important they are. And I say, just wonderful. How did this happen? It's like, never say anything.

OK, so I think that's basic. That's core. That's where we all begin.

Then the other thing that I wanted to talk about are professional values. And I think that's probably a subject that you've spent a lot of time at. But what I would say is that integrity is basic to the scientific and engineering profession.

And I brought along the report of a committee that I chaired. And it's called Fostering Academic Integrity. And the year was 1992, actually before I went to the Pentagon. These were the years of controversy over allegations of scientific misconduct in our nation's universities.

And we had some major problems here at MIT involving David Baltimore and charges that data by one of his coauthors had been falsified. It literally took 20 years to unscramble that. And he paid an enormous price for it. And MIT paid an enormous price for, I would say, brushing it off fairly early in the game, saying, oh, well, I know David. He wouldn't be responsible for anything like that. And in fact, in the end, he wasn't.

But not taking the allegations seriously-- Congress went into high gear. David testified in front of the Dingell Committee. Universities were-- you're under the gun. Federal agencies were instituting policies with respect to issues of academic integrity.

I think we had always taken the view that science was sort of self-checking. And I believe that science is self-checking. And so that was kind of the stance in the community.

But I think what we learned from the government in this thing is that we have to develop a process that takes these initial allegations seriously even though we believe that, ultimately, it is self-checking. And you know, you saw it in the case of the Korean example of cloning. And it happens here at MIT, and it works. We do, in fact--

But the National Academy set up a committee on academic integrity. I was a member of that committee. MIT set up a committee on academic integrity and asked me to chair it.

This is a characteristic of MIT. We tend to get in early. So MIT finished their report in time for it to be an appendix in the National Academy of Sciences report, which I think gave us kind of extra visibility, extra prominence. And I just think it was an opportunity for us to make this not only statement at MIT, but very visible.

In academic integrity, the key words-- and I hope I get them right-- are falsification, fabrication, and plagiarism. It is those three words which are the technical terms associated with academic integrity.

And let me pass this report around. This is, again, another very famous document.

Now, and also that's on the MIT website. And in fact, we had an incident this year, I think, where-- I'm trying to remember the details. I think a graduate student came forward and made an allegation against his professor. I think that's what it was.

And so there was an investigation along the lines of the procedures laid out. I mean, it's confidential. There's no assumption of guilt. It's arm's length. It's two stages. It's very, very careful to protect the rights of everybody and the confidentiality of everybody, but to sort of get on with the process to determine whether there is an issue that does not meet MIT standards.

So that's an important set. And I would characterize that as professional values. And a similar set of values is involved in engineering. Engineering is more complex. The responsibilities to the public are more complex than the responsibilities of, say, an individual scientist in their lab, but they are no less compelling and important.

And I know you talked about the *Challenger*. I guess all of that I was on the *Columbia* Accident Investigation Board. And sometimes, as I reflect on the difference between those two situations, it seems to me, in the *Challenger* investigation, the behavior with individuals was more prominent. In other words, I think we all know the story of Roger Boisjoly, an individual raising issues against an organization.

I think, in the case of the *Columbia*, it was almost reversed. It was a band of engineers who were attempting to raise issues. And these were tamped down by individual people in the organization at management level. And so, in some sense, the situation was a little reversed but the issue is obviously no less compelling. And I think we made a number of recommendations of an organizational and cultural sort that I think had great impact and are still having great impact on the organization.

So that's another theme. And obviously, for people at MIT, the whole question of engineering and professional ethics, scientific ethics, are just extremely important. And that's why I'm glad you're doing what you're doing.

So I'll just pass this around and don't expect you to read it. [LAUGHS] But if you look at the table of contents, I think you'll see that, in addition to talking about what broke, we also had chapters that dealt with organizational culture, how do you develop a safety culture in a large organization like that, and what were our recommendations for doing that.

OK, so that's kind of that topic. I think the third thing I wanted to talk about was what I would call institutional ethics. And I brought a couple of things along. This is a report-- again, I do a lot of committee chairing-- this is a report that deals with research at MIT and what are our policies with respect to accepting money from the government and what are our values. And these are complex issues.

But I would summarize the report in this way. And MIT, again, we were the first to publish. There is no other university that has published a report like this certainly as quickly as we did. I mean, we were out of the box-- I mean, obviously a lot of this was driven by 9/11. And we were out of the box in January and we had the report done by May. And it's widely publicized.

I love the title. It came to me while I was riding my bike. The title of the report is In the Public Interest. And I think that says a lot about what a place like MIT is trying to do.

But I think what we recommended-- it's a big, long report and there are lots of complexities to it-- but something like this, that everything on our campus should be open to every student and we don't want any material on our campus that cannot be shared. Now, it seems fairly straightforward, but with people who do government contracts-- oh, and also that includes no restrictions on publication, that our faculty and students should be able to publish their research without restrictions.

That sounds fairly straightforward, but there are lots of forces who would want to change that. And I can just give you some examples. For example, in the federal government, there's this category of information, called sensitive but unclassified. One of the problems is that nobody has any idea what that means. There are 35 different definitions of this.

In fact, I just got back from the National Academy of Science and Law panel last week. And that was a big issue. We have a committee set up on it. We're trying to work with federal agencies to really understand what in the world are you guys worried about. I mean, can we help you without having just lay all over us?

The problem is even worse because a lot of the decisions are made fairly low in the agency. And but anyway, MIT says, we will not accept a contract that contains a clause relating to this issue. And it's just a flat prohibition against this. That is not true at all universities. Other universities, it's kind of a slippery slope that they do this.

Restrictions on publications-- I mean, we felt that it was extremely important that we not put restrictions on the federal government that we were not willing to put on industry. And I mean, that would be a conflict of interest on our part. So we said, OK, in industry, when we do contracting with industry, we will allow them to review a paper for 30 days, 60 days, some number like that, to see whether there are patentable inventions within this paper.

But we control the time and we control the decision. We say, OK, well, let us know your concerns. And at the end of 60 days, we will make a decision as to whether your concerns are valid. When you work with the federal government, it's exactly the opposite. They control the time and they control the output. And there have been many examples where it has seriously impacted the career of a student or a faculty member because of delays.

Now, there are always issues that have to be fought in this. There are certain marching rights for extremely serious things that need to be classified. But these are the rare events. So this is a less than 1%. So I think we've been very open, very public, and very firm about these issues. There are issues having to do with contract monitors. And these are more-- this is more gray, not from the point of view of MIT, but because we don't always have visibility into these issues.

There are some contract monitors who say, well, we would prefer if you didn't hire any international graduate students on this. And we have no way of knowing how MIT faculty respond to that, but it certainly does not line up with MIT's policy.

On the other hand, MIT is very active working in the federal government to ensure that there are no unreasonable restrictions on visas for international students. I mean, again, this is all part of the same picture.

But on the other hand, what this report talks about is the important public service dimension that MIT performs when it engages in classified research. And if we actually recommend that MIT faculty get security clearances so they can serve on federal advisory committees that evaluate the quality of research-- because research that is done behind a black door is not necessarily a very high quality.

So how do we ensure that the nation gets its money's worth from classified research? One answer to that is to have MIT faculty involved. And we have many faculty involved in government advisory boards, special report, review, program evaluation, plus Lincoln Lab, which we see Lincoln as a public service, that this gives the Defense Department access to excellent people with very high standards of integrity.

And of course you're probably all familiar with the flap that's going on now. And MIT is absolutely determined to carry that through to the end, to get to the bottom of allegations, again, of scientific misconduct, actually using that framework that is laid out in that report to determine the truth of those allegations.

So that's one example of institutional values. The other one, I just happened to get this. I'm on a corporate board. And this corporation builds rocket engines, my favorite thing.

And anybody who works for the federal government has to really maintain a very high standard of integrity. And the costs are enormous for failing in this responsibility. I can just give you a little example. If you follow aerospace, then you would know that a Boeing senior executive-- I think he was higher than a vice president, might have been president of the division-- a Boeing senior executives made an inappropriate job offer to a high official in the Defense Department.

And it cost Boeing \$5 billion and it landed this woman in jail for nine months. And I think it landed the senior executive in jail for six months, I think, yeah. So who was served by that behavior? Nobody. Nobody was served. The company was not served. The individuals involved were not served. The nation was not served. The Air Force just landed on its backside.

So I mean, when I say that I believe that values are pragmatic, it's that sort of thing I'm talking about, that, rightly so, the consequences for what one might be able to rationalize as reasonable behavior at some early stage in the process simply becomes extraordinary at some later stage.

This is a code of business conduct, which-- I was at the board meeting. And it just lays it all out-- business entertainment, timekeeping, bribes and kickbacks, dealing with suppliers, use of company resources, conflict of interest, export control, political contributions, corporate citizenships, reporting. And they have a hotline that's anonymous. Any employee who has a concern about anything that they observe going on in the corporation calls the hotline, and the hotline goes directly to the board of directors and, I believe, the corporate governance committee. And the matter's taken very seriously and is reported.

So and this is not unusual. It's just the one I happened to pick up last week when I was in California. So let me pass that out.

Now, it may be true that, since the Defense Department has, in fact, a whole set of governing regulations, it may be that companies who do business with Defense-- and maybe, more generally, the government-- I suspect that anybody who does business with the government has to be quite explicit about their corporate values because it is, in fact, required. This kind of behavior is required. And if there's a slip-up, all hell breaks loose. It goes from bad to worse very quickly, and large amounts of resources are at stake, and people's individual careers are devastated.

So anyway, that's all I planned to talk about. So I guess we could throw the field open for questions.

[APPLAUSE]

PROFESSOR: Well, I'd like to ask a couple of questions, but I want to give priority to the students, but I want to start off with one.

SHEILA OK.

WIDNALL:

PROFESSOR: Back in 1986, I got a letter and a manuscript from Hans [INAUDIBLE].

SHEILA Yeah.

WIDNALL:

PROFESSOR: Right after the *Challenger* [INAUDIBLE]. And he wrote to me in response to a news article I'd written in *The Washington Post* about [INAUDIBLE].

SHEILA Right.

WIDNALL:

PROFESSOR: And what he said in that letter was that he had the final authority at NASA to OK a shuttle flight. And he said that, in his years of experience, that every time he gave the OK to fly, it was over the objections of some engineers who said that it was going to explode.

And he had the rationale that we'll never get to the moon or do the things we're supposed to do without risk. I don't think it was really a risk issue, but I wanted to ask you. I just want to know what kind of principle that sets.

SHEILA Right, I got it. [LAUGHS] No, I have the answer to that question.

WIDNALL:

PROFESSOR: Go ahead.

SHEILA Yeah, no, I have the answer to that question. Of course, I think one answer is that's why we need leadership.

WIDNALL: That's too simple an answer. I've served on a lot of what I would call a mission review boards. I did the mission review for the first flight of Boeing's Delta IV launch vehicle. I chaired what was called the Return to Flight. There was a time in our nation's history where-- I'm more on the launch vehicle side as opposed to NASA. I hadn't done a lot with NASA.

But on the launch vehicle side, we went through a period where we lost something like four launch vehicles in a row from all sorts of ridiculous accidents, just failure to do certain things. And so we kind of shut everything down and we began looking across at processes.

So what I would say in answer to that is that engineers must put their concerns in actionable form. Don't tell me what keeps you awake at night, tell me what you want me to do. And I actually looked at the *Challenger* thing the other night, because there's a TV thing, one of those little old things on the History Channel.

So I think the way to distinguish between the concerns of engineers that are just always there-- and sometimes I wish I could just take these guys, line them up, and shoot them, because they're just not giving me what I need in order to take the next step. It is not useful if you tell me you're worried.

You've got to tell me what you want me to do. What tests do you want me to run? Why are you worried? What's the data? What's the analysis? What's the next step? How can I take the next step in order to understand whether I share your concern or I'm about to dismiss your concern.

And it seems to me, in the case of Roger Boisjoly, he did all of those things. He had the data. The data, I think, validated his concern about opening the envelope in terms of external temperature. He had the previous flight data, which indicated a concern. So I think he met my barrier for an engineer who should be taken seriously. He also had support from, I guess, his counterpart-- slightly other part of the organization. But two of the major senior engineers, I think, expressed their concerns in an actionable form, which I believe needs to be taken seriously.

So I think that's my threshold. And I've told that to engineers when I'm talking about these issues on the *Columbia* Accident Investigation Board and other things. So for me, that's the threshold.

So that's one threshold. I think there's another threshold in what I would call the collective processes of whatever safety program an agency is using. And in the case of space, there are some really fundamental rules that you do not break. And one of those rules is test as you fly. Resolve anomalies. And those are the two rules.

I think, in the case of *Columbia*, and maybe *Challenger* too-- I think there might have been a little bit of this-- is do not use a successful flight to expand the envelope of operations. When you start the program, you have an initial requirement. When something happens that goes outside, that busts that requirement, you do not use that as justification for expanding the envelope. And in the case of the *Columbia*, foam was coming off the shuttle from the beginning of the program.

OK, you go back to the "test as you fly" rule. And that's kind of a cute play on words if you think about it. Test as you fly means you identify flight conditions, you test every component according to or exceeding those flight conditions. It does not mean you run the test as you fly, which is--

[LAUGHTER]

--in some sense, the way NASA-- and it took me a long time to think a little bit about that play on words so that I was a little more careful saying test as you fly.

But you know, the test that we ran in the *Columbia* Accident Investigation Board was to take a large chunk of foam, put it in a foam gun, 800 feet per second, and blast it at the leading edge. Well, if you back up a little bit and say, now, the fundamental rule of space flight is test as you fly, once NASA determined that foam was coming off the shuttle, they should have run that test. They should have run it a long time ago.

So I would say those are kind of the things, that the fundamental responsibility of engineers is to express their concern in a form that is actionable. That's a general rule. Then I would say the second rules have to do with a particular field or discipline that you're working in, but certainly in space, which is a very hostile environment, which, because of successful missions, has developed this set of rules about test as you fly and resolving anomalies.

The specific thing about *Columbia* is that they had actually taken-- that particular anomaly had really become very serious and it had almost systematically happened. And they actually took it off the table and they put it in a category-- "we're working on that." So they actually paid less attention to it at the beginning of the *Columbia* mission assurance review than they had on some of the previous reviews, not that it would have made a difference. I think their fundamental process for getting to flight is broken and they need to re-examine that. And that's what we basically recommended to them. And hopefully that will happen.

PROFESSOR: Questions? Comments?

AUDIENCE: I have a question about the In the Public Interest [INAUDIBLE], the policies on accepting federal funding for research. How are professors at MIT bound to those policies? Are they bound to accepting research according to the policy?

SHEILA
WIDNALL: Well, first of all, I kind of want to turn your question around. MIT's policies will not let money come through the door. All the contracts that MIT has are with MIT, not individual faculty.

So an individual faculty member might be willing to accept a contract that specifically said no international graduate students or you must obtain permission to publish. MIT would not allow such a contract to be signed. Now, I'm not saying there aren't under-the-table winks and nods, but these don't satisfy my definition of ethical behavior.

So that's basically the way it's done, is that all contracts are with MIT. And that ensures this openness that we insist on, open information in the classroom, open information-- freedom to publish and all of that. Those are the things that we think are really important.

AUDIENCE: So then does that mean that there are no MIT contracts that include classified research?

SHEILA
WIDNALL: Not on campus. In fact, that's kind of, historically, very interesting, because we used to have contracts on campus that include classified research. And during the Vietnam unrest-- you were probably two at that point, if that-- we basically made a decision that we would not do classified research.

And when we got this committee together, because we had recommended that MIT faculty get clearances, and they do serve on government advisory boards, and they are in a position to oversee the quality of classified research, we gave some brief thought to thinking, well, should we have a reading room on campus for the convenience of such faculty where they could go and read these documents that are part of what they need to do?

And in the end, we said, no, we won't do that. We just said that it's much, much better if we just say-- in fact, we got that particular advice from Ernie Moniz. Ernie is a major figure around here, but he was head of the Physics Department. He was Undersecretary in the Department of Energy, physicist. They work a lot with classified material because of the nuclear issue. And so he had been very close to that. And he said, really, don't do it.

So I think if MIT faculty-- and when you're serving in a situation like that, you need to review materials. So I typically go out and Hanscom but when I have to review materials. And I can get access to the classified web out there and do it.

There's also Draper Lab. We have a kind of a relationship with Draper Lab. And so if an MIT faculty member was serving on a government advisory panel and needed to be able to read a report and make comments on it and stuff like that, they could conceivably do that at Draper. Lincoln is a great facility. So there's lots of possibilities. But we do not have classified material on campus.

AUDIENCE: During the Vietnam unrest, when that decision was made, was it because of the desire to enable every student to access everything?

**SHEILA
WIDNALL:** It's really hard for me to remember. I was a young faculty member at that time. There was just so much turmoil involved.

I think it was more a matter of principle. Obviously, if you had a little room somewhere, that doesn't really interfere with the right of students. I mean, a little room in the basement, from a pragmatic point of view, would be OK.

I think it was a matter of principle. I just think that MIT, at that point, divested Draper. And I think we just made the decision. I mean, for example, there can be no classified student theses. Now, people at Draper-- we have a lot of Air Force officers at Draper-- they have access to classified material. They're probably doing work that involves classified.

But when they get around to writing their thesis, their thesis is a public document. The thesis committee does not need classification to serve on a thesis committee. So we really do maintain kind of a totally open educational campus program. And that's kind of how we emerged.

I mean, I remember, when I was a graduate student, we had locked file cabinets. And I can hardly remember. I think I had a confidential clearance. It's all very fuzzy. It means very little. "Confidential" is-- I don't even if anybody uses it anymore. It's a fairly low level of security clearance. But when I got my last security clearance, I asked him, what level is this? And they said, we can't tell you.

[LAUGHTER]

Yes.

AUDIENCE: I have a question. You talked about personal ethics first. And I was wondering if, at any point in your academic or government career, you came up to a situation where your personal ethics were really challenged. Maybe there was a mismatch between the institution you were affiliated with or the people you were affiliated with and your own personal ethics sort of had to--

SHEILA No, I mean, I don't--

WIDNALL:

AUDIENCE: [INAUDIBLE]

SHEILA --mean to sound pollyannaish, but I actually can't remember a situation that really-- it was probably those nuns.

WIDNALL: They raised me. [LAUGHS] I see Sister Albertine standing behind me every time I get in a tight situation.

No, again, because I think the value structure is very pragmatic. And I'm a pragmatic person. I've simply seen too many examples of the slippery slope, the big explosion, the penalty for letting up in some sense, on these issues. So I can't really remember a situation that would have been stark. I don't think I'm dodging it.

AUDIENCE: Maybe I can make the comment that I think is really helpful. Because you talk about organizations acting as a safety [INAUDIBLE] a certain ethic. It just helped me to think about it, the way you laid it out in terms of the importance of leadership. That was very helpful. I'm trying to think about a specific question. Based on what you said, do you think that maybe that speaks to the importance of being affiliated or becoming involved with organizations whose cultures match yours? Because I think, in your case, maybe you're [INAUDIBLE]. Do you think that is important to [INAUDIBLE] compromise [INAUDIBLE]?

SHEILA Yeah, no, I think it's extremely important. I'm actually glad you raised the issue. You will all be faced with the issue of deciding what organizations to be a part of if you leave here, go out and get a job, you join some other organization. How do you make that choice? What do you need to know about an organization? When you see something within that other organization that gives you concern, does the organization support your concern? And I doubt very much that people think about those things as they're thinking about their operations.

But organizations are very complicated things. For example, I consider myself a real fan of Boeing. I worked for them when I was undergraduate in Seattle. And every time one of these things comes up, I feel like a dagger is going into my heart because these complexities, I don't believe, are representative of the entire company. But they have a devastating effect on the company, on its business line, its profits, its image. And I say, oh god, there they go again. Something got away from them.

So I still believe that they are a great company. And I just anguish every time I see one of these things. So I think, in order to understand a company, you have to understand them at the inner layers as opposed to what's in the paper. Not that that's any easier. And I think any company needs people who are able to contribute in a positive way to the culture [INAUDIBLE].

PROFESSOR: As background to some of this discussion, I had told students that, back in the early '70s, when engineering with ethics was forming itself as a field, a legitimate field of study, one of the great hopes of all of the philosophers who were involved-- that accounts for about 75% of the people involved-- was that they would get their names written up with Aristotle and Plato by discovering a new ethic.

[LAUGHTER]

And one of their specific hopes in those days was to break away from the precondition, the tradition, that holds that only an individual can be a moral agent. And the hope was that the ethicist would do like lawyers, where a corporation has personhood in law, and can commit a crime, can [INAUDIBLE] independent of the people in it. They wanted to see if they can come up with an ethic where a corporation could be ethical or not.

And then, with the *Columbia*, there was this big conclusion coming out that was something that had to be admitted as a culture.

SHEILA That particular organization, yes.

WIDNALL:

PROFESSOR: And then we are saying the same thing about Enron. It wasn't just a couple of the bad people.

SHEILA No, yeah, no, that's true.

WIDNALL:

PROFESSOR: That there was something that went all through the culture. So I'm thinking that there's this unavoidable inclination for leaders talking about people who are in positions that you have occupied and had these experiences. There's something that's unavoidable, inescapable, to think about culture as being good or bad and the organization being a moral agent, no matter what the philosophers said.

Is there something-- how do you think about organization in terms of being good or bad? And if you judge it to be bad in some sort of way, how do you go about correcting it? And of course, we've already talked about how we deal with codes of ethics, rules of conduct. But I'd just like to see how you think about that.

SHEILA Well, I guess I do believe that there are organizations that are good and not so good. And for me, I guess I look at it primarily as an issue of leadership. And I mean active leadership. I don't mean people who just talk a good game, I mean really active leadership.

WIDNALL:

And I would have to say that I believe MIT is a good organization. I mean, I've been involved with MIT for a very long time, since '56, when I came as a freshman. But the typical pattern of MIT is to get in early and do the right thing. And I could just think of so many examples of that.

When affirmative action came in-- and this is like '72 or '70-- this was a very long time ago-- many universities gamed it. They said, well, we can figure out a way to deflect this stuff. And MIT said, we're going to do it, and we're going to do it next year.

I mean, it couldn't have been more different. It happened to be Howard Johnson. Basically said, we're going to do this and we're going to hire women faculty, we're going to hire minority faculty, and we're going to move on, and we're going to do this. We're going to make this happen.

And I just think of so many examples where that's true. MIT was sued by the federal government over the issue of merit-based aid. I always get this mixed up, but it's the basic issue of need-based financial. All the Ivies just kind of withered away from the issue, leaving us standing all by ourselves. We won the case.

And it's been leadership. It's been top leadership. It's been passed over from leader to leader. It's been Howard Johnson, Jerry Wiesner, and Paul Gray, it's been Chuck Vest, and now it's Susan Hockfield.

And there's been a passover in leadership from these different leaders and a highly visible statement, followed by action. MIT is a very action-oriented place. These guys just don't talk a good game, they put in place the organizational culture and policies and dynamics that would actually make these things happen. So I mean, I think, as I look around, MIT, I think, is a fine example of an organization, probably one of the best I can think of.

And then there are other organizations. And then there's some really bad ones, like Enron, totally corrupt. And ones in the middle that I think are fundamentally good but, every once in a while, individuals who somehow haven't gotten the message. And that's the responsibility of leadership, is to get that message out. And if leadership doesn't do it, well, shame on them. I mean, it's their responsibility to-- I think the Air Force is a very good organization. I didn't have-- I mean, obviously we had challenges, big challenges, but the organization responds to leadership. It is a leadership-focused organization with a good set of core values. So those are the tools that you use in order to motivate people to aim high. That's what we all say is aim high.

So no, I agree with you that organizational ethics is an extremely important issue. And I would have maybe not called the NASA thing "organizational ethics," but the fact of the matter is it is. NASA's responsibility is to spend the nation's resources wisely and to protect the people that are involved in human spaceflight. And those are high ethical responsibilities.

AUDIENCE: That brings up something that's been challenging for me in this class, which is the tension between when you're considering an organization or a company, the tension between the bottom line and the need to stay on the ground financially, and the well-being-- so I there's three things-- finances, the well-being of employees, and the well-being of the public [INAUDIBLE]. I wonder what challenges you've faced in managing that tension, how you approach [INAUDIBLE].

SHEILA WIDNALL: Well, of course, most of the-- well, I guess, no. I can see organizations I've been involved in really do worry about the bottom line. I mean, even though we get money from the taxpayers in one form or another, the fact of the matter is that you spend most of your time-- a leader will spend most of their time arguing for resources. That's basically what you have to do.

But in both of the organizations that I've been involved in, there is no benefit and considerable risk for what I would call taking the side door. I mean, if you just look at the things that have been going on in Washington with lobbyists, there is no benefit, say, to an institution like MIT or the Air Force ever trying that kind of behavior. The costs of doing that are extraordinary.

So in that kind of organization where you do, in fact, spend most of your time arguing for resources, you will be most successful if you argue for resources from a high plane. I mean, MIT is always looking for resources. It looks from alumni, it looks from corporations, friends, benefactors.

But the story is a consistent story of excellence in public service. And that's about all you can do. That's about all you can do. To depart from that, I think, is self-defeating because that begins a slippery slope. Anybody's ever able to point to an organization like MIT or like the Air Force for some inappropriate act, it all just goes away.

I guess I believe enough in the Adam Smith theory of economics to believe that there are corporations that definitely provide a benefit to our society by their inventiveness, by getting talented and excellent people together, by producing products which produces jobs. I do believe that those organizations provide a net benefit to our society. Do they have challenges? Of course. Of course they have challenges. But I think that there are many companies that one would be very proud to be associated with because they do, in fact, provide a benefit to our society.

PROFESSOR: Actually, Ms. Pesky, you ate my [INAUDIBLE].

AUDIENCE: I apologize.

PROFESSOR: Well, actually, I think if we bring the conversation in to the student now, you've got a bottom line. It's called grades and graduation.

[LAUGHTER]

And I haven't been here quite a calendar year yet, but I've been invited to give an ethics talk before the graduate students. And they brought up some issues. And one student said it's kind of hard-- it's just kind of hard to be working real hard in a class, some student over there cheats, gets an A-plus, and I get an A-minus.

SHEILA Turn them in.

WIDNALL:

PROFESSOR: Yeah, that's bad for morale. But you've got the same problem. What are you going to do? And I think that the fact that the classroom, the research lab for students is more than a training ground. It's a case in point of the kind of thing you get when you get out.

But apart from that lecture, I just want to go back to Dr. Widnall, when MIT has a personality to really get it on-- be first, really get in to the ground floor, to be a leader, where does the student share in all of that? That seems like it's a faculty and higher administration thing.

SHEILA No, I guess I don't-- Yeah, no I don't think so. First of all, so I was the student at MIT. I think the students benefit enormously from being here. I mean, there's lots of different ways to put it, but first of all, at the undergraduate level, there's UROP. Other universities have tried UROP and not been successful. Primarily, I think, we have some lucky numbers in faculty-student ratio. And that makes it possible, frankly.

WIDNALL:

The other part is, I used to tell students, knock on the door. 99% of the time, you will see a friendly face on the other side of that door. Students benefit, I think, enormously from the volume and the quality of the research that's going on in this place. I mean, it's very exciting. It drives the place.

Nobody has time to get all the benefits. I guess the other thing I wanted to say in connection with your comment is that I do believe it is the responsibility of the faculty to ensure that students can benefit from ethical behavior.

I think faculty who are casual and careless about the structuring of exams so that students who take inappropriate measures can benefit, I think that that's unethical behavior. So I think that the faculty have a responsibility to structure the educational and research program in such a way that students get the most out of it and also are not disadvantaged from somebody else's unethical behavior.

And I say that as the former chairman of the Discipline Committee. [LAUGHS] Because we're the ones that heard the cases about [INAUDIBLE]. But you hope it never gets to that. You hope it never gets to that. You hope that the rules are clear and that the system is set up in such a way so that students get the benefit from it in proportion to their talents and the energy that they put into the endeavor. And that's really what it's all about because that's where the true education comes from.

You had a question, right? I saw you with your hand up.

AUDIENCE: Actually two questions. And one relates to something you were just talking about. If you're at MIT, and when you encounter the situations that are gray-- I mean, if it's black and white, you know here's the ethical thing and here's not. But if you run into things that are gray, is the appropriate course of action, then, to err on the side of being ethical [INAUDIBLE] and just don't do it? Or [INAUDIBLE] can you run this idea by somebody. Is the [INAUDIBLE] person the person to talk to, to say, hey, this situation is not [INAUDIBLE]?

**SHEILA
WIDNALL:** I think talking to somebody is the right thing if you have questions. It seems to me it probably isn't just a single individual. It probably is case dependent you know, it could be a faculty colleague. It could be somebody in your Department. It could be somebody in the provost's office. It depends an awful lot on what the situation is.

But yeah, I would think to have a dialogue about these things is very healthy for an institution. It probably strengthens everybody who gets involved in such a dialogue.

AUDIENCE: That's a question [INAUDIBLE] as well. It's the individual in the organization. But particularly-- and this organization could be military or corporate, but I personally have more direct interest in the military as a place. If you're given the order, say, by a [INAUDIBLE]-- we saw that in-- we had a [INAUDIBLE]. In the military environment, how is that regarded to-- You mentioned this a little bit when [INAUDIBLE], but how is it regarded in the military to say [INAUDIBLE] to question more? Do they have that flexibility? Are there maybe some of the information just-- are they shielding some information so that when it's critical for them to, say, do a particular action, at time of action, they don't hesitate-- in the military, there are extreme conditions.

**SHEILA
WIDNALL:** Yeah, there are extreme conditions. Yeah, there are--

AUDIENCE: [INAUDIBLE]

**SHEILA
WIDNALL:** Right. There are extreme conditions. I think that is probably a very complex situation. It's a little like your question about engineers. What is the-- I mean, if engineers just worry about everything but or not expressing their concerns in actionable form, that would tend to bring an organization to a halt. And I think the same thing is probably true in the military.

If, say, you're going to get a group of guys, and you're going to get in this Humvee, and you're going to drive out to the center of the city, I mean, the last thing that could happen at that point is people arguing about whether that was a good idea.

So it seems to me-- and I'm not an expert on this-- it seems to me there have to be kind of a set of ground rules about what is reasonable to object to. I think it's very clear, in the Abu Ghraib situation, that it would be very reasonable to object to that, that there's a bright line there.

But as I understand, the structure in the military, I don't think you can do it the morning that you've been told to go out in a Humvee. I But there is a Jag Corps military justice system that is attached to the command at some level. And these people are, for all practical purposes, lawyers. And it would not be unreasonable, I think, to bring concerns of a kind of global nature to such people. And certainly in the case of things like Abu Ghraib, those things were so obviously wrong that individuals must have felt like there was a boundary there that they were crossing. So I think there are opportunities.

And I'm also assuming-- and I don't this for a fact, but I'm assuming, in officer training, either through the Air Force Academy or officer training school or something, that these kinds of issues come up and that officers discuss, what would you do in a situation where you had concern about an order given by a superior officer? And just as a corporation has a hotline, making the assumption that there are avenues that younger officers or enlisted personnel could use to, again, talk with somebody and get a sense for what the boundaries are.

I mean, otherwise, I think people are going to be kind of lonely if they don't have an opportunity to really talk to somebody about this.

PROFESSOR: I was in the Army during the Vietnam era. I was a captain in the Corps of Engineers. But I was never called to do any duty. Frankly, I was happy about that.

SHEILA Oh, yeah, good.

WIDNALL:

PROFESSOR: But it was a big scare for us, culturally. Before the My Lai incident, you were very comfortable in following your orders. Because if the order was a bad order, the person who gave it to you was the one that got punished. My Lai came about and changed all that for us.

But I think-- and I really would like to know what you think about this, because I don't have a clue-- is that there was this movie-- I can't remember the name of this movie. It starred Gene Hackman and Denzel Washington. One of them was--

AUDIENCE: [INAUDIBLE] was it the submarine one?

PROFESSOR: Submarine.

AUDIENCE: Yeah.

PROFESSOR: You're getting like me.

SHEILA Yeah, I know. I have these problems.

WIDNALL:

PROFESSOR: Well, the issue was that a lower-ranking officer didn't want to follow the order of a higher-ranking officer because the stakes in the game had lifted so high. You're talking about a nuclear weapon. Even in My Lai, I [INAUDIBLE]. But the worst that happened was the killing a lot of women and children in a village. A nuclear weapon--

SHEILA

That's a whole different thing. No, I mean, that's why we have movies. But yeah, no, I mean, I vaguely remember the movie, but I guess what I remember about it was not unreasonable for a younger officer to challenge a senior officer. And there are, evidently, situations under which he could have been declared unfit for command at that moment.

WIDNALL:

And it's possible to imagine that happening, getting agreement from the crew that that was, in fact, the appropriate thing to do, and coming back ashore to have it adjudicated and found that that was, in fact, appropriate action given the circumstances, given the risk, given the judgments that were being made. It sounds to me like a very doable thing.

I do consider the military to be an extremely ethical organization. There's just been so-- following upon my experience as chairman of the Discipline Committee, I really took a great interest in the military justice system. And I pursued every case-- I had to sign off on all officer cases. And so I went through the history of every case very carefully. And I could see the response, the actions that were taken by various officers along the way, during the incident itself, and getting it into the system, and the decisions that were made until it finally reached my desk.

I guess all I can say about that is that it gave me a very good feeling about the integrity and about the excellence of the officers. I can give you a simple, somewhat humorous example. And this happens. People get midlife crises. But we had a general-- maybe he was a colonel, but I think he was a general-- who was at that tender age for men, 45, 50, something like that. And he's got this absolute attraction for this young airman and just couldn't live without her.

Well, she would have none of it. So anyway, he had her transferred with him when he moved from Europe to the United States. And he just tried to get her alone with him, and she just kept resisting.

Finally, he chased her around the desk. And she ran out into the hall, and ran into this Canadian major and told him what had happened. The guy turned him in immediately, just like that, with no question.

And I saw that constantly. I mean, nobody in the Air Force who was engaging in bad activity could have any confidence that they wouldn't be turned in just like that. It was the culture of the organization that people would simply not put up with bad behavior.

This was not a-- all the things your mother told you about don't tattle on your friends, this was not an operative principle in the Air Force. People moved very quickly to take appropriate action. And I felt really good about things like that because it said that the fundamental loyalty of people was to the organization, not to some kind of underground buddy system.

AUDIENCE:

I've never experienced anything like that.

SHEILA

What's that?

WIDNALL:

AUDIENCE:

I've never experienced an organization like that, where it's so clear. You just turn people in.

SHEILA

You just turn people in.

WIDNALL:

AUDIENCE: Really?

AUDIENCE: Uh-uh.

SHEILA Well, it's hard.

WIDNALL:

AUDIENCE: Just because most of the organizations I've been affiliated with are school, where friendship--

SHEILA Is very important. Well, yeah, I mean, we don't have an honor code here at MIT, but there's an honor code at the

WIDNALL: Air Force Academy and there's also an honor code out at Olin College. And I basically have been involved in both systems.

And then you get into is this constant tension between loyalty to your friends and loyalty to the institution. And the notion of turning someone in is a tough thing for most young people to deal with. It takes a long time to rise to a level, I think, where you see that clearly.

And if your friend cheats on some exam or something, you probably would not turn them in. It's when you get like me, you know, you get to a certain level, and you just simply-- "turn them in."

AUDIENCE: Well, you've seen so many examples.

PROFESSOR: Well, before you ask your question, I just want to make one observation. And that is we have not discussed women's issues yet in this class. We started out with some racial issues, but [INAUDIBLE] about that. I was hoping that you would bring one up and say that, now, from this point, right now, on in the class, women's issues are legitimate fodder for this class.

And I want you all to really gain from Dr. Widnall's experience because this engineering game can be pretty tough [INAUDIBLE].

SHEILA Yeah, I mean, it's--

WIDNALL:

PROFESSOR: It's male-dominated.

SHEILA Yeah, very much so. But there are lots of humorous things that happen. You have to have a good sense of humor in a situation like this. But again, getting back to MIT, back in 1970, MIT began to take this issue seriously. And we had a women's faculty group. It was a mentoring group. We met with the senior administration of MIT. They said, we are going to take this seriously. And we said, you're lucky to have us because we're really good and we will help you solve this problem. So we didn't want anyone to lower its standards.

But no, it's a very, very complex issue because it's so culturally related. But at some level-- of course, I'm so far beyond all of this now. I come out swinging every time I get in a situation where this becomes an issue. I come out swinging. But not everybody can do that.

As you move through your life, you-- I always tell people, I only pick battles I can win. So I don't react to every slight. Most of them, I just kind of go. But of course, as I've gotten more senior, there are more I can win so I take on more of them.

But I think society is changing in a dramatic way. And of course, I think MIT is a very special place. Our high percentage of women students, our real commitment to women faculty, the sheer numbers, the critical mass, the momentum, all of that has changed this place dramatically. The question I have is, what is it like when you get out to the outside world?

I don't know much about that, but I suspect it's different in different fields-- nuclear engineering, construction, environmental probably great. There are certain obvious places you could go where you would find a high percentage of women, but there are certain other places where it's really quite an old boys' network. I do think it's changing, just changing very dramatically.

PROFESSOR: I think we have time for one more, and then you've got the last word.

SHEILA OK.

WIDNALL:

AUDIENCE: I was just interested in the previous three or four questions. They were more hierarchical issues with authority and ethics. And I think the situation we find ourselves in is also sort of the lateral, collaborative issues where international or gender challenges present themselves.

And I was just wondering if you could comment anything about where you draw the line in terms of trying to influence your ethical standards with somebody else's, whether they be internationally different than yours or the organization that they're in. Can you talk about that a little bit?

SHEILA

WIDNALL:

Well, I don't know if I'd be too coherent on that. I certainly have great concern, on a global scale, about the various ethical positions that various groups take. I'm obviously concerned about women in the large when you talk about the global ethics.

The environments that I've been in have been very comfortable environments. I've hardly ever had to really challenge anybody very much. I think most people around here, if there's a need for a challenge, it's a little push. Just a little push is all it takes.

And I'm trying to think of situations where that comes about. For example, imagine hiring faculty. You're in a search committee, and you're hiring faculty and you're looking at women and minorities. And sometimes you have to push a group like that a little bit to get them to think more globally to get them to not make assumptions about people based on race or gender-- just a little push. Because this institution, I think, really does respond.

So I think, in a situation like that, it is an issue you're conscious of, but just a little push is really all it takes to move it. Then there are obviously other issues in which there's no compromise. And I would say the issue of academic integrity is one for which there is no compromise. And so you would just basically lay out those basic principles and just make sure that people understood.

Because I think the importance of an issue like that is, if you present it properly, it is so obviously right. It's not a matter for discussion if you present it right. And so this organization will respond.

I've just not been in situations where people were cheating or stealing or that sort of thing, and not likely to be at this point, because everybody knows I'll turn them in. [LAUGHS] It's just not an issue.