INTERVIEW
WITH
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SLOAN ORAL HISTORY SERIES

T: Tom Magnanti
A: Alan White
G: George Roth

G: We thought we'd ask you to go back. At the MIT 150, you talked quite a bit about your childhood, your father, and Syracuse, and going on to Stanford. Maybe we could go back over the part with the interviews at Stanford that ended up bringing you to MIT. In particular what would be helpful is to hear a little more about is when you came to MIT, the Sloan School, the conditions here, the people you worked with. I know the Operations Research Center has come up a number of times as a way of bridging between Management and MIT, and going back to that period.

T: Getting here, all this is logistics. I was a PhD student in operations research at Stanford. Was actually taking a second Masters degree in mathematics. I had one in statistics and one in mathematics. What I really wanted to do was get another PhD in math. I thought I'd get one in OR and one in math. My darling wife, Beverly, said, "Maybe enough's enough. Maybe you should get a job."

So when I finished, I was considering two or three options. A fellow by the name of T.C. Hu at University of Wisconsin very much wanted me to go there for a post-doc. My thesis advisor, George Dantzig, was *the* guru in operations research, and he really wanted me to go to IBM Research, which had a distinguished fellowship program through which they brought in one or two people a year for all of IBM research. They never would have taken someone in my field except that George Dantzig was so prominent; he got them to at least put me on the list. So I got on some finalist list.

I really wasn't looking that much for a faculty position. Jerry Shapiro came out to Stanford. He was interviewing or just visiting and asked the faculty there who they should talk to, and they said me. My first reaction to Jerry was, "Maybe you want to talk to my roommate,

Steve Mayer, because I just do mathematics. What's this business school business? I don't do business school stuff."

He said, "No, no, come interview." So I came and interviewed. Things were different at that time. I talked about some very esoteric math stuff, something called matroids.

G: Mr. Matroid.

T: That's right. Gordon Kauffman used to call me Mr. Matroid. At the end of the day Jerry Shapiro took me upstairs to the Faculty Club that was open at that time on the sixth floor of the Sloan building, and made me an offer on the spot. Today you'd have to go through weeks of interviewing of many people and that kind of stuff. At that time, things were much less formal, and in some ways, much less competitive. Then he took me downstairs. It was a snowy February, I think. Now you bring in young people, you court them, you take them out to dinner, do this and do that. He took me outside the Sloan Building and said, "Your hotel, the Hotel Sonesta, is down there. It's just a short walk in the snow." So there was no dinner, none of this fancy recruiting.

I went back to Stanford and mentioned to my department chairman that I had this offer from MIT. I said, I was really thinking of doing a post doc. He said, "Tom, are you nuts? Are you absolutely nuts? When are you going to get a better offer than an offer from MIT?"

G: This was George Dantzig?

T: No, this was Gerry Leiberman. He was a well-known statistician, who eventually became provost of Stanford. Really good guy. I was young and naïve and didn't know about such things.

"If I don't get a job at MIT, I'll get a job some place else." I really wanted to go to Cornell, which had a very strong OR department, more math-y, more focused as a department. And MIT, to this day, has never had a department of OR or operations research. We had instead this fluid inter-departmental program.

I remember when I was recruiting, I met with John Little, and he talked about the OR center. "What the heck is this OR center?" It never even dawned on me what it was until after I came. I decided to take the job.

MIT was very different then in many ways. The OR center was in Building 24 or Building 12, I think it was 24 down in the middle of campus. It had this small, very unassuming headquarters. It had only a couple faculty offices, like today. The faculty were spread all over, so there was no central place to accommodate all the faculty. I remember a few years later we had a student who became a professor at Harvard by the name of David Bell. David said when he first came from England to be admitted to the famous MIT OR center, he expected to see this huge marble building, and here was this cloistered little shack called Building 24. So at least this aspect of MIT was very different.

Sloan was also a very different place, as I'm sure you've heard through many of these interviews.

G: Would this have been February 1972?

T: It must have been February 1971, and I came in July 1971. Not having yet had my PhD signed. My PhD was signed in 1972. That was another story. For some reason, I decided I wanted to write the shortest PhD in the history of Stanford OR. I don't know why, I just thought this was some measure of high quality if it was short and got accepted. I don't know what it was that drove me. I wrote this thesis, and I had a very distinguished committee. George Dantzig, the father of the simplex method, Mr. Optimization, was my thesis advisor. Donald Knuth, the world-renowned, famous computer scientist, one of the most famous computer scientists of the last century, was on the committee. As was a fellow by the name of Curtis Eaves. I don't think my thesis advisor ever read my thesis because this was something he really didn't have much knowledge about or interest in.

Knuth, at that time he was writing the second or third of his seven- volume tome on computer science, and it was related to some of the things I was doing. So first, he would go to the back of the page I had written, and I'd have cited somebody's results in a theorem and he would re-derive it on the spot. Just to make sure he understood, because he was so smart. These

were famous results. Then he wrote me this scathing letter: “This was the worst technical exposition” he’d ever seen in his life. I was trying to make this thing so short, it was basically theorem & proof, theorem & proof. There were no words in the thesis! (laughing) And he was absolutely right. It was atrociously put together. So that’s the story of coming here in 1971.

The place was very different. The core MBA courses, the information systems course, I’m pretty sure they were teaching assembly language programming. We were teaching basic decision sciences or whatever it was called at that time. Might have just been called Optimization. We were actually teaching math. We would put matrices up on the board, do a computation on the matrices, and show the students how to do so-called pivoting in the simplex method. It was really a terrible thing to do in a business school! It had nothing to do with management or business at all. This was just math.

G: This was management science? What was this course?

T: This was management science, it was a core course. As I said, it might have been called Optimization. I’m not sure quite what it was called. At that time we had two core management science courses. There was one in Optimization and another one was in Statistics. Later they became blurred into a single course. As I said, the IT course was very computer science-oriented. This was the type of stuff you wouldn’t even necessarily teach in the Computer Science department at that time, but we were teaching it in the Sloan School. So it was a very techie place, and very specialized, too. It was very specialized in organizational behavior as well.

Probably all the fields were pretty specialized. I would say at one extreme, we had Harvard and general management, and then here there was us, and maybe Carnegie Mellon at that time. Everyone always talks about Carnegie Mellon, Chicago, and us as the three analytic business schools if you want to think of them in that way. Then over time, we moved to the center. I think many people would still say we’re not in the center, but I think we’ve moved quite a bit to the center, thanks to people like Rob Freund and Georgia Perakus in terms of the OR-statistics area where they’ve made the curriculum much more relevant, much more real. If not case-based, problem-oriented and very much more managerial. I would say a really significant transformation.

Also the Management Science area was quite different at that time because it included accounting. It was accounting, marketing, operations management, operations research, and management information systems.

G: So your office was in E53?

T: Yes. Over time, I had four or five different offices there. I just kept moving around.

A: What went into some of the things that are mentioned in the 150th interview? You've talked about the opportunities you felt Sloan has had, to really be the technical person's school. Also this kind of move would have brought Sloan much closer to MIT, perhaps. Yet in recent years, I think Sloan has gone further away from being the technical person's business school. LFM and SDM were programs that made Sloan more a part of MIT, but those were some years ago. Now it's clearly an MBA, used to be an MS. What are some of the reasons you think Sloan has gone in the direction it has gone? Do you see possibilities for Sloan to still recapture some of this more technical orientation, which would make it take more advantage of being a part of MIT as a whole?

T: Yes. In some ways I'm quite extreme on this in terms of my thinking.

My view always has been that what Sloan could have become was the place that took technical people—engineers, by and large; maybe engineers and scientists—and made them great managers. I have used the term "the Ecole Polytechnic of business schools." You bring in technical talent and you teach them management so they've got very different grounding, maybe a different way of thinking, at least as they enter the school. I've always thought that was particularly consistent with MIT.

This didn't necessarily mean that we're teaching math. I think if anybody had things to offer these folks, it would be areas like organizational behavior, strategy, that kind of thing. The math would be natural at some level. But the studies would provide a kind of complement to their undergraduate math and science.

I think there was another point of view, again probably strongly held, that we were already viewed as this techie place. No matter what you do, we're going to be viewed as a technical place. We don't want to corner ourselves into this niche of being "that technical place." I think there was that counterpoint -of view. I would say that, in many ways, that point of view has won out. The movement has gone more that way. LFM and SDM might be consistent with the first point of view. But it's quite different to have an entire school that is that way. That's really our *raison d'être* – to be this kind of place, which is a choice I think the School would have made over time.

I remember when I became Dean of Engineering, Sloan was holding some kind of retreat. It was maybe just after I was announced but before I actually became Dean. The school was kind enough to invite me to give a little after-dinner talk at the retreat. I gave this talk about this kind of positioning, and said wouldn't it be great if Sloan didn't go all the way but took a large portion of its class and reserved it for undergraduates from MIT who were in the engineering school, so they would come in and you could tell them to play this game (of management). I recall being basically loudly booed out of the room. There was a visceral reaction, that this was a terrible thing. It was a kind of "Go back to the other side of campus" thing. People feared that we would become too specialized, too much of a niche player, and would lose out in the broader market.

I also think when people think about that, it is just a techie guy who wants to do tech stuff, who doesn't see the bigger picture in terms of economics, organizational behavior, and stuff that's really important to this perspective. It's the positioning and what's the food stock? My sense is the food stock is really bright engineers and scientists who can make great managers and could provide MIT with a distinct footprint in the whole field, and could align closely with the rest of the Institute.

A: It's interesting. It's not talking out of school because this is recorded in the interview. When we met with John Reed, he expressed it exactly the way you just expressed it. The opportunity for the School, if it were closer to MIT, to be the place for those with a technical orientation who would go into management.

T: You'd go to all these technical companies, whether it was big oil companies, the airplane manufacturers; now, of course, all the IT companies. But even the banks and everybody that does all this IT stuff. We could say, "We want to be your business school. You need this kind of material."

A: Very quickly… The other thing that's happening in the market, I believe the MBA is becoming very much a generic degree. As you know, when things become generic in markets, you start seeing offshoots in different directions. So this could potentially be something that the School returns to in some way in the future.

G: With the challenge of now having a pretty large class size, we have to keep our business going, I would think. It's not that easy to make such a turn given the size of the school that we've become.

T: Right.

A: You mention the market. Obviously the market is going to play a big role in this. The goal of the School has been pretty much not to grow the MBA program but to grow other programs.

T: I also thought at one time that if Sloan or other places weren't going to do this, maybe an engineering school should do this. You could imagine a Masters of Engineering Administration, broadly. It was always odd to me that engineering schools never did that. In some ways, I think the currency of the best engineering schools has been their PhD program, not their Masters program. The currency of the business schools has been MBAs. So it just didn't come naturally. I thought there was a model there some place, if someone could capture the darned thing. But it never quite happened.

G: Speaking of models, you had a lot to do with the development of the Leaders for Manufacturing Program, which was a response to industry issues, but also a model for many

schools, as was in your interview, subsequent thinking about the other part of business, the engineering part, and not just the management part. Maybe you could talk more about the recollection you shared starting that, and about the integrating of the management school with business. I came here in 1987, and I knew Bill Hansen at Digital Equipment where I'd worked for ten years before I came here. I found the program strong and compelling, although I was here as a PhD student. When I think about what's happened to our economy, I often think, "What if we had had more of those? If instead of having MBAs, we had LFM programs and had a much stronger manufacturing base?" Which we now realize is a real drag on our ability to reboot our economy with better jobs after a financial crisis.

T: I must say, I'm enormously proud of that program. It was also a transforming experience of my life to be involved with that program. It was my first opportunity to really be engaged with business. Through that program, we had access to the Bill Hansens of the world. We had all these senior manufacturing leaders and engineering leaders, the Who's Who of corporate America at that time, I would say. It was transformative in the sense that it brought the two schools a lot closer together. We had something like 18 chaired professors between the two schools, and about the same number of junior faculty funded. At the time, it was the largest amount of money I think MIT has ever raised from industry. I think we raised $46 million for that program, $23 endowment, and $23 expendable. It was exciting. We were addressing important societal issues, important US issues. We were creating an innovative educational program. I think if it hadn't been for that program, I would never have gotten to be Dean of Engineering. I would never have gotten into the National Academy of Engineering, etc. I think it really was quite transformative for me personally.

I keep telling Don Rosenfield that someone should think about writing a book or writing an article or story about the first three classes of graduates of that program. It's actually quite remarkable. You've got Dennis Wilke and Jim Miller; Pat Shanahan, Senior VP at Boeing; and several other Boeing VPs. Just incredible what those two or three original classes have accomplished. I suspect subsequent classes as well, but what I most remember were those first two or three.

I get great enjoyment out of being an academic entrepreneur and starting these academic programs. It's just fun. I could never be a business entrepreneur because I have no sense for business and finance and all that stuff. But starting these new programs is just enormous fun for me, figuring out how to put the pieces together, how to get the faculty together, how to get the resources. That program was enormously exciting in that sense.

When we started the program, the driver for this was Gerry Wilson, the Dean of the Engineering school. Lester was involved, but Gerry was the driver. And Kent Bowen, who was my co-director. We had tried for some time to create a program. We tried several different models. They tried a large, government-funded grant to do it. Then IBM had a call for this and we lost that. At one time MIT was thinking about establishing a simulated factory on campus.

Then we finally decided, "Let's use industry as our living laboratory through the internship program." Gerry was very frustrated. It wasn't until April 1988, that Gerry said, "If we don't get the money needed by this April, we're not going to do the program." We got a big chunk of money. A couple big companies joined in April. Now we had the go-ahead, so the question was: "Do we start in July or do we wait a year?" We decided to start in July.

So how are we going to do this? The way we did it was to write notes. Did we have email at that time? I'm not sure. I think we had email. We contacted students who had already been admitted to Sloan and had already been admitted to some of the engineering departments, and we said, "Do we have a deal for you! Come join this new program. You'll get two degrees at MIT. You'll have full tuition paid." We got 20 of them to come from the two schools. It was almost crazy to do this. We started in July, and we got it up and running. I don't recall exactly what courses we gave that first July but we got it up and running. Two years later, when the first students graduated, several of them went off to management consulting. I think it was the front page of the *Wall Street Journal* that said, "MIT and corporate America have failed. They started this program to reenergize, reinvigorate manufacturing and 35% of the students went to consulting."

G: Not manufacturing consulting but general consulting?

T: I think some were doing manufacturing consulting, but it was consulting. The notion was they didn't go to the shops.

A: Went for high salaries.

T: Yes. But that program was enormous fun and challenging because we decided it was going to be operated differently than everything else. Things you guys know. We actually gave the companies voices in the program in a substantial way. We had a governing board and an operating committee. I always characterized the operating committee as 12 "smoking guns." Everyone came in with their own idea of what manufacturing was, what the curriculum should be, and all this kind of stuff, and we had the challenge of getting them all aligned and putting it together.

There was an incredible amount of nationalism at that time. It was, "Beat the Japanese." They were killing us. They had Deming and all this other stuff they were using, and we were way behind. So we took a group of us and went to Japan. We said, "We'd better go see what they're doing over there." We did tours with some companies. I can't remember much about the companies, but I remember going to a baseball game (laughing) and watching the cheering from the stands. The cheering was more like a college football game because they had these teams and each of them had their cheering sections. They'd get up and cheer.

A: Very organized!

T: Yes, but I remember the baseball games more than the companies!

A: Companies probably wouldn't tell you very much about what they were doing.

T: That's right.

A: Interesting. So you still see it as the LFM and not the LGO?

T: That's right. It is hard for me to say LGO. It's actually quite unfortunate that MIT changed the name just before all the renewed interest in the US about manufacturing. I think it actually hurt them with MIT because Susan Hockfield was down in Washington working and now they just changed their name. I think they weren't as involved in the MIT activities as they might have been. I think MIT never really took advantage of that core group of senior executives in the program. Here are these people who were deeply committed to this program and deeply committed to MIT. We never really captured them as much as we might have. You probably knew quite a few of these people.

A: Yes. I was also involved in the discussions about it becoming LGO, and they invited me out there to meet with the group. I can understand how you would feel. It could be global and still be called the LFM. It wasn't necessary to really change the name.

T: I guess they all thought that operations is broader than manufacturing.

A: True.

G: Was there a struggle with getting the classes populated? I know the support from companies changed dramatically. Originally students were all supported, and then you started having students come in self-sufficient.

T: No, the model changed quite a bit over the years. When they first came, the students were fully supported. They had a stipend, plus they got their tuition. Then we had a really interesting transition. There were three people from industry, myself, and Kent Bowen, my co-director, who had to come up with the model for the second phase of the program. It was Gary Cowger from GM, John Madsen from J&J, and John Cassidy from United Technologies, who formed this committee to create a new financial model. These were three very smart people. Gary knows MIT well because he's a Sloan Fellow. We showed John Cassidy how MIT runs the program, and here are its finances. John could never figure out MIT's finances, it was so

complicated! (laughing) So we came to different models with the students paying some of the expenses.

Then over time they went to a third model, fourth model, etc. But they've sustained it; it's quite remarkable that they continue to sustain it. Continue to still attract outstanding students, best I can tell.

A: Yes, and doing very well at a number of companies, like Amazon, for example.

T: Yes, and it's broadened considerably. I remember when they thought about the first international company joining, some of the companies were apoplectic about that. "It's by America, for America."

G: Did they ever get consulting company sponsorship?

A: I don't think so.

T: KPMG hired a lot of the folks. McKinsey did too. No, I don't think they ever brought a consulting firm aboard.

A: Tom, this was an exciting time for you because it led to some career opportunities and change. But it was an exciting time because you were learning new things, right?

T: Yes.

A: So now you're in a totally new kind of position, working in another country, a new educational institution, which provided opportunities for new kinds of learning.

T: Right.

A: It suggests that the people in Singapore want to develop a kind of MIT institution. It's interesting reading the approach you're taking to this in curriculum development, interdisciplinary, and so on. That is not necessarily the way MIT developed. MIT developed as a problem-oriented and -centered approach. In what way is this a new kind of learning for you, doing what you're doing?

T: In some ways it's not that different than being dean in terms of having broad responsibilities that cut across multiple disciplines. The big difference is it's a greenfield versus an established legacy organization. We've got enormous freedom and that provides remarkable opportunities. It's learning to manage and lead in different ways, I would say. I think perhaps because of the Asian perspective, they defer to you in terms of, "Here's your idea, all right, we'll do it." It is less challenging in quite the same way that you get in a place like MIT where everything is challenged. So it's a little bit different in terms of trying to make sure that it doesn't become a one-man show. Making sure that others feel vested, and that their ideas are being incorporated into what we're doing. You didn't have to worry about that at MIT, it just happens at MIT. Some of it's cultural, in that sense, because the faculty, by and large, are all very young. But this has been a different experience because it's a greenfield, rethinking the whole nature of how one would organize a technical school. In my best of moments I say we're redefining MIT for today's world.

I think if I were starting MIT today, it would be more like SUTD than MIT. But on the other hand, it's MIT within. It is this notion that your computer says Intel inside? This one has the spiritual MIT inside. It's MIT's fabric, MIT's culture we're trying to bring, MIT's genes. MIT developed much of the curriculum, but we're organized very differently. If you take mechanical engineering, aeronautical engineering, civil engineering, the core competencies of those curriculums are basically the same. They all do control, they all do dynamics, they all do some fluids, etc. But we separate them over time because as we conquered some elements of science, we've created engineering departments that align with those. That's why we started with civil engineering and mechanical engineering, and then later added electrical engineering and chemical engineering and nuclear engineering.

Given that the content is the same, why do we organize them separately? We've brought them together, so we have this one pillar which we call engineering product development that's like a mechanical, civil, and aero department all in one. We have another one called engineering systems, which is more OR, economics, it's not quite business but it's got elements.

G: Is this an undergraduate degree?

T: Undergraduate, yes. Then we have one that's information systems. We argue that what the world doesn't fundamentally need are mechanical engineers or electrical engineers or aeronautical engineers. It needs them at some level, but what the world fundamentally needs is products and services and systems. So why don't we organize our curriculum around products, services and systems? Either they're products or services or systems. We teach a very different way than we teach at MIT. It's more like professional schools, medical schools, business school and law schools, in the sense that we do cohort-based learning. We take all the students, put 50 of them in a room. It's not a tiered classroom like in these other places, but it's a reconfigurable room. If you know the TEAL classroom at MIT, it's like the TEAL classroom. It's got six projection screens and lots of white boards. The tables are reconfigurable. You go into the room and most of the times it has six or eight kids at a white board working on a problem together or working at their table together. There are two or three faculty roaming around, more as mentor/coaches than teachers in the usual sense. So it's just a very different way of teaching.

We try to use the best thinking of cognitive psychology, the learning sciences, and engineering educators that tell us that large passive lectures are a terrible way to learn. More active learning, active engagement is a better way to learn. So we've tried to take the best of MIT and best of other ways of thinking about education and maybe some thinking about how we might reconfigure engineering in today's world and had a chance to implement it.

G: So when you say MIT within, it's more engineering MIT.

T: And architecture. When we started this, I went around to all the deans. I talked to Dave, who said, "Don't do a business school as part of this. We don't want to join you in creating a business school as part of this." Why? One, because he had been involved in creating the Singapore Management University when he was at Wharton. His feeling was it was doing well. If we created a management school, it was probably going to be the poor sister or brother to the SMU and it wouldn't reflect well on MIT or Sloan. He suggested we not create a business school or management school. In Singapore now you've got SMU and the NUS and NTU Business Schools. INSEAD is there, Chicago was there, they've left now. But they had a lot of business schools.

So we decided to embed certain elements of business and management in what we do. We adapted the MIT undergraduate practice opportunities program. We have lots of stuff on entrepreneurship that we do. We do teach economics. We have a course in organizations. But now we partnered with SMU. We have a formal memorandum of understanding with SMU. They're developing some courses for us. We've got an accelerated program of getting an undergraduate at SUTD and then getting a one-year Masters at SMU. If all goes well, in the spring I think we're going to launch a dual-degree undergraduate program. During an accelerated period, you'll get an undergraduate degree from us and one from SMU. So we're taking advantage of the fact that there's a strong business school. It doesn't have an engineering school as part of it, where NUS and NTU do. So rather than duplicating efforts, work with them.

G: I had one more question on that. When you say Intel Inside, when I think of Intel Inside, I think of the chip architecture. What's the metaphor for MIT Inside?

T: It's the course content and the culture. MIT has developed many courses for us, either new or adapted courses. We're trying to adopt the MIT culture as best we can. We call it the MIT DNA in the sense of entrepreneurship, passion, rigor, etc. I would say its engagement with the world in terms of embracing the world and working with the world in the way that MIT does, both scholarship and engagement with the world.

A: In the 150th interview you mentioned that you couldn't see why in the future there couldn't be more development of multiple campuses of high quality.

T: Right.

A: What are your thoughts, as you know, the quality concerns at MIT prevent it from taking advantage of a lot of opportunities to do the kinds of things that Chicago and even INSEAD and some other schools have tried to do. How could you do this in a way that still preserves quality?

T: I don't know what Chicago and other places have done, but from what I know, INSEAD is the one place that's done this and really made it work in the sense of having two campuses that are sort of co-equals. If anything, I think the Singapore campus has become the more preferred for many of the students. So INSEAD has done a great job at this. At least it serves as a model. It's more of a school and not a university.

A: Yeah, a business school.

T: I don't think you could say, "As of tomorrow we're going to form a new school over here." I think there has to be some evolutionary path that can get you from here to there.

I've started some conversations with the senior leadership of MIT about doing more with SUTD in Singapore. I don't think they would go there, but I would suggest "What would you think about putting MIT's name on this? Call it the MIT-Singapore University of Technology and Design." Yale has done it in Singapore with Yale and NUS School of Liberal Arts. I think branding is important; you've got to preserve quality, that's for sure. But you need some confidence that there's some quality at the other side and that you can grow it.

I also think sometimes these universities see ghosts. John Hopkins was going to start a campus in Singapore, but it didn't work out. Depending upon whose story you hear, they either left or they got kicked out. Does anybody think any less of John Hopkins today because of this? I don't think so. Does anybody think any less of Yale because Yale had this branding with

NUS? I don't think so. I think the branding of the major universities is so strong you can run an experiment or two like this, you could lend your name to something like this. Try to preserve very high quality. I think you need some evolutionary path for getting there. You could take a risk, and I don't think it's a big risk in terms of brands.

The ghost in this is brand devolution, which we're going to somehow create this notion that MIT is not a high-quality place because we start something in China or someplace else and it doesn't work in some way. I think you've got to be sure of the environment. Singapore might not be the most natural place to go because it's small. But it's really a natural place to go in terms of English speaking. Very stable government. Very stable environment, etc. There are very few places in the world where you can get that.

I'm clearly very biased about Singapore because I've been involved now for 15 years. But I think MIT could establish a campus in Singapore or could co-brand with something, and I think it would work quite well. We've hired faculty that, if they're not MIT caliber, they're just below. We've been rigorous in our hiring of faculty. I sit in on the final interviews of every single tenure track k faculty member we hire. They come from Cal Tech and Harvard and MIT and Cambridge University, etc., so they come from the very best places. The students are very high quality, so it's a high-quality place. But it's not as complicated…

I don't know if you guys are following what's happening with MIT in Russia. It's so complicated there in terms of the instability. At least in our case, the Singapore government has been completely hands-off in terms of academic content, how we teach, what we teach, etc. They do set tuition, they give us all the funding, we have to go through all these hoops for funding, it's not as though they don't manage and in some ways micro-manage. But at least there's a fair amount of autonomy on academic matters, which I think is important, which I'm not sure you get in other places in the world. But what are the models? Has Chicago had successful places elsewhere?

G: What happened to the partnership model? I was involved in the Ford partnership that Chuck Vest started and those industrial partnerships, Merck, AmGen, Dupont, Ford became university partnerships. The Singapore-MIT Alliance and Cambridge Alliance and others. There's a series of those. So there's that model.

T: The SMA program has basically come to an end. MIT has had three major programs in Singapore now.

The second one was called SMART (Singapore-MIT Alliance for Research and Technology). I was the first director of that. It's basically a research campus. Singapore decided to set up a research campus and collect brand-name universities to come and do research there. MIT was the anchor client. It was either the Sears Roebuck or the Neiman Marcus of the mall. It was the anchor store, depending on how you think of MIT. Now it's got MIT, Cambridge, Berkeley, ETH, and Technion. It's actually collected all these brand-name universities and created a research park in a four-building complex, with laboratories and office buildings, etc. And that kind of partnership continues.

You were quite actively involved in the Ford one. The Ford partnership still continues. I just had a PhD student who graduated this semester, who was funded by Ford as part of the partnership and spent last summer there. The MIT industrial partnerships are not quite as vibrant or part of the ecosystem as I think they were at that time.

As you well know, George, we had eight or ten of them that were all pretty big. I was involved with two of them, Microsoft and HP. They were both $25 million, five-year partnerships. Great things for MIT. Ford is the one that seems to keep rolling along. Yes, and Amgen continued for quite a while.

G: We've had a huge impact here in biotech. Phil Sharp has been amazing.

T: Yes, but I'm not sure there are any of these other than Ford.

G: Even the Ford partnership has changed considerably.

A: Tom, we've had the sad passing of Chuck Vest. I'd be interested in your reflections not just on Chuck Vest but on the leadership you've seen at MIT. In particular, why do you feel these certain leaders have been effective in their work, which gets back to leadership in management?

T: When I was dean, I used to kiddingly say we had three deans of engineering at that time. One was the President, Chuck Vest. One was the Provost, Bob Brown, and one was me. I was quite pleased that we did, actually, because they were both extremely talented individuals. They knew certain elements of engineering much better than I. I'm just this simple math guy doing his engineering stuff.

Effective leadership…. They're all different. I worked with Chuck and Susan. They're quite different in terms of their personalities, how they go about things. I worked with several provosts. My first interaction with a provost was John Deutsche where he threw me out of his office and got Abe Seigel mad at him! (laughing) Abe thought he was my father!

A: Abe was everybody's father.

T: Right. And Gerry Wilson, when he was dean. Gerry and John were sort of take-no- prisoners type of leaders. Both very, very capable people who did immense good for MIT but had a certain style. They actually frightened people.

A little tidbit about Gerry. Just as we started LFM, the *Globe* called, as they typically do, with one-day notice said, "We'd like to do a little story. Can we come over to campus?" We said fine and Kent Bowen, who was the engineering school co-director, wasn't on campus that day. So Don Rosenfield and I met with the *Globe*. They published an article with Don's and my picture. They talked about developing the program, they talked a lot about Lester, and not about Gerry. Glen Urban I think was associate dean at the time. So the next morning Gerry called Glen and me into his office, and he rips into us—I think rightly so, actually. (laughing) We weren't very sensitive, Don and I, about getting our pictures in the paper. And Gerry was pretty sensitive about him and Lester. They were quite different. I worked with Gerry pretty closely. Worked with Bob Brown both when he was dean and provost. Bob's an idea guy. But I wouldn't necessarily say slow based consensus builder, because he makes decisions, but he would talk to people in a certain way to build support. You had a sense that Bob was listening and always knew what you were doing. All these people are really smart. They all cared deeply about MIT. They just went about it a bit differently.

Bob has an enormous legacy as provost. Just look at Kendall Square, look at the bio things over here. Look at the Whitehead Institute. All these things that he was involved with as provost are quite remarkable. He remains a good friend. I really like Gerry Wilson.

A: You mentioned MIT as a meritocracy. I was interested in your comment. I assume when you talk about MIT as a meritocracy you're talking about faculty meritocracy?

T: No, I would say the meritocracy of the whole.

A: You would?

T: Yes, I would say in terms of students. We function on the basis of merit for admissions, for how we reward students, and how we think about them. It's a merit-based place in terms of staff. It's not as though we always succeed with that, but I think those are our genes. I think our genes are "merit is what counts". We don't give honorary degrees. We don't do any of that kind of stuff. You have to earn it at MIT. It's based on qualities, not the color of your skin, not your gender, that kind of stuff, as best we can. We clearly have biases in this system, I would say, more commitment to meritocracy than most places.

A: More so than other universities that you've seen?

T: I think so. But I've not been deeply immersed in other places. I think the notion of merit is palpable at this place.

A: In my experience working here, we've had to work very hard in this area of meritocracy. Not from the standpoint of students or faculty, but from the standpoint of staff. Creating a climate in which staff are respected in the same way that others in the community are respected.

T: I think that actually is an issue. In that way, I think there's an issue with meritocracy at MIT, and I think at almost all universities. The faculty are kings and queens, and the staff is just supposed to support them in what they do. We're trying to be different in this regard in the new university as well. We actually have the staff involved in student recruiting. They're involved in interacting with the students. But there's this natural tendency at universities—I think it's evolved over time, and I don't think it's very healthy—we sort of divide the faculty and staff. I guess you need some notion of organizational structure for functions. You need some division of labor.

But I think the university has gone too far with this. It's all these administrators and these faculty. They all have these mental models of each other. It used to be the mental models that people had of Sloan and Engineering. Engineering would say Sloan are all these money-grubbers, and Sloan would look at Engineering and say, "These people don't understand the world at all. They only understand their formulas." There's maybe a little element of truth in some of these stereotypes, but they're really over-blown.

I think that part of the meritocracy doesn't work well in most universities. We actually are trying to work at it, but I must say it's really interesting to watch. We've hired senior people at SUTD who come from the Western system, and their inclinations are to say it all revolves around the faculty, so we have some tussle back and forth. In our case it's a little aggravated because we hired some senior staff before we even hired the senior faculty. So the head of marketing, the head of HR were there, and they have a certain sense of primacy because of that. But we've got HR working with us in faculty recruiting. The faculty ask, can't we have a place like other universities and split this off and only the faculty do the recruiting? It causes a little bit of friction sometimes, but we're also different because we're small. So we can do certain things that MIT can't. We'll undoubtedly wake up 20 years or 30 years from now and hopefully the faculty-staff divide won't be as bad as other places. But I suspect some of that will happen.

A: We were fortunate to have Gabe Bitran in the Dean's office. Gabe had this theme of professionals working with professionals. He really impressed that on them, and I think really made a difference. It's something that's a work in progress.

T: My first PhD student ever. Not bad, eh? Start at the top!

G: I have one final question. One of the things you've talked a lot about at MIT in the original days was the fluid boundaries. Has that changed? Are you still plugged into what's going on at MIT and Sloan? The second part of that question is, how is that influencing you as you're trying to start a new culture?

T: MIT has always been remarkably fluid in the research dimension. People talk to each other, they have interdisciplinary centers. It's not as fluid in terms of education. In education we tend to stovepipe within the departments of the school. We have some programs that cut across – LFM, SDM, and at Sloan, I'd say the relationship with Economics maybe long term for Sloan. I think it's as fluid as it has been in terms of research. I think in education, there's some chance it may become even a bit more fluid. They're talking more about flexible degrees in the Engineering school. Who knows what these MOOCs are going to do in terms of all this, in terms of whether that's going to get people thinking a little bit differently.

G: It's clear what you're doing for fluid boundaries in the way you've organized the program in the Singapore.

T: Yes, we're also going to get rid of lectures completely. I want to get rid of them. I actually want to make an announcement. I've got to get the funding for this. I want to create this center called Foresee (Future Of RESidEntial Education). You get the right letters in there and you get the word Foresee. I really want to re-think residential education, particularly in engineering and science, in terms of using more what I call MODES. Not MOOCs. MODES are Moderated Modular Learning Courses. You moderate them. You have maybe ten minutes of lectures or something, then you do something; you have another ten minute lecture, you do something. The ten minutes could be a video, could be a simulation, an animation, etc. I just think there are better ways of teaching people and more active learning. It's not to say you don't do deductive education. You do both deductive and inductive both, and you do active learning as well.

You organizational guys talk about reflective learning and reflective action. I think you want to do that type of thing as well. We're just starting these conversations, but we have the opportunity to do some things that no one else can because, first, we have a young faculty, so they're not anchored on the past. Second, we are greenfield so we are not entrenched. And third, we have only to the first order, even when we get everything up and running, at least for a while, about 100 courses. So we could take all 100 courses and do this. If you went to MIT, you've got 2,000 courses and it's almost impossible to do this.

Interview ends…