MATT SOBEL: So I'm Matt Sobel. I've recently retired from Case Western Reserve University. And we're here to interview Bill Pierskalla. And it's a great pleasure. Bill and I first met when we were graduate students. Bill has been President of the Operations Research Society of America, one of the two predecessors of INFORMS.

He was editor-in-chief of operations research. He was president of the International Federation of Operations Research Societies. He's played a major role, a very important role, in bringing operations research to bear on health care systems analysis, and he's received many awards and honors, but he's one of the rarefied few who's had a prize named after him while he's still alive.

And so each year, the health application section of INFORMS awards the Pierskalla Prize. So Bill, in order to set the scene, please describe to us your early years-- where you were born, your family background, your early schooling.

BILL PIERSKALLA: Now, that's an easy part to do, Matt. And thank you for the compliments. I was born in a small town in Central Minnesota. Actually, it's only a few miles from the town that claims to be Lake Wobegon. And I wasn't living there very long.

My father moved then, World War II, when he had to go into work in the defense industry. So we moved to a suburb of Minneapolis, and spent some years there. And then he went into farming in a farm way up in the northern part of the state, town of Bemidji, Minnesota.

And it was just a subsistence farm, but he loved it, and he loved living in that environment. And he liked to hunt and fish, and he taught me to hunt and fish. And I was raised basically as a farm kid, because we moved there when I was about 10. And then I went to school there and did all those kinds of things. But I was fortunate enough in high school to have a friend who encouraged me to apply to universities that I'd never heard of.

Farm kids in northern Minnesota don't hear much about universities. And he encouraged me to apply to Harvard University. So I applied to Harvard and University of Minnesota. Well, I got a scholarship to Harvard, so it paid my way. And my dad didn't have any money. So I went to Harvard.

And that changed my life. Totally changed my life. I became very interested in an academic

culture, and loved every minute of it. And I kept going from there. Did go to Harvard Business School, then went with Westinghouse for a while. But I really like the academics.

So at night, I picked up a master's degree in mathematics at Pitt. Oh, by the way, undergraduate, I was an economics and math major. And then decided, well, I've been on the East coast all this time, try the West coast. And so applied to Stanford and Arizona, and got scholarships there. But Stanford's was a more prestigious one, so I went to Stanford, and that's how we met, in that program. And that was nice.

MATT SOBEL: While you were in high school, did you have a particular interest in math and science? Were there teachers who particularly influenced you in that direction?

BILL PIERSKALLA: I don't know that I had a particular interest in math and science, because I found all of the areas interesting. I liked Latin, I liked English, I liked social studies. I liked all of them. But the teachers in math and science were particularly good teachers, and I felt very comfortable learning and working in those areas.

That was in the days when the teachers, a lot of them were women, and it was one of the only few career opportunities they had, and they were very bright and very talented people. And so it was fun, and I enjoyed those classes. And then on the SATs for Harvard, I did well on the math and science parts. Not quite as well my Latin, because I had taken it two years earlier and forgotten a bunch of it.

But they didn't care about that, so that was all right. But yeah, I did have some very, very fine teachers. And I can remember them now. I can even see their faces. They were good.

MATT SOBEL: When you got to Harvard, at first, did you feel ill-prepared or well-prepared, given that most of the other students probably came from more urban settings?

BILL PIERSKALLA: I was actually behind in the classics and things like that. We didn't study those much. Math and science, no problem. I didn't have any problem in competition there. But in the, especially the classics and political science, and in English literature, and some of those areas, we were really not well-educated in the rural public school system. And especially, were not well-educated relative to the prep school kids-- the Andovers, Exeters, Grotons, and all those. I mean, they just ran circles around us. All of us. I mean, not just me. Other kids too.

MATT SOBEL: Me too.

BILL PIERSKALLA: Yeah.

[LAUGHING]

But it only took about six months, and we were up with them, and then ahead of them. So it wasn't a big problem, but you had to work like heck those first six months, and learn a new language. Because a lot of the English words that they knew and that were in this literature, we didn't run across very much. So it was quite a high-speed, high-curve learning period. And that was good.

And the scholarship depended on grades. So if you didn't make at least a B average, you were out. You didn't get your scholarship. So you had to work hard. But after, it got easier, and it was more fun.

And in my first year there-- one the few people I knew well in my hometown, which is a town, was a lawyer, the father of one my good friends. So I thought I would be a lawyer. I liked him. He was a great guy. A good lawyer. And so when I went to Harvard, I said, well, maybe I'll major in law.

Not major. You can't major. But I would major in political science. And that's a natural entree to law. Well, I took a course from Brzezinski. I don't know if you know Brzezinski. But you know of him. He was a terror. I mean, a real terror. And the biggest problem he had was he had this great flair for the girls in the class, because the Radcliffe women were taking the same class as we were.

And so, all the Radcliffe women, especially the prettier ones, got high grades. All of the guys-- there's a few exceptions-- got low grades. I said, I don't think this political science is for me. So I switched to economics and loved it. Really terrific, and mathematics, and it was fun.

But that was quite an interesting thing. I almost gave up-- I almost dropped that course, which would've been no big deal. But I fought my way through it for a C, and I was happy. Because nobody got higher than C from the Harvard group.

[LAUGHING]

MATT SOBEL: Were there faculty members who influenced you in a positive way?

BILL PIERSKALLA: Oh, at Harvard?

MATT SOBEL: Yes.

BILL PIERSKALLA: Oh yeah, there were some terrific ones. I liked Galbraith. What a great guy. He was really a challenging, good professor. I took seminars with him, and he would just ask all of us-- and all of the other students were graduate students. I was the only undergraduate who took his course. And he would just go around the table and ask us questions, really tough ones. And we'd have to talk, and then he would criticize it, and break it down, and knock all of us down, and then build us all back up. Really a great professor.

And the other ones I liked, I liked Leontief He was doing early, early basically linear programming models. And so was a guy named Dorfman, Bob Dorfman. And he was doing linear programming models. And that perked my interest-- I didn't know it at the time-- in operations research. I didn't even know about operations research.

But basically, that's what they were doing and talking about, and it's very interesting.

MATT SOBEL: So did Bob Dorfman use the label linear programming?

BILL PIERSKALLA: He did. Yes. He called it linear programming. He definitely did. And Leontief didn't call it that. It was more systems of equations kinds of things. And he wasn't really doing so much optimizing as he was doing more econometric kind of analyses.

Yeah, so it was a little bit different. And then I had a couple of good advisors. Eckstein, Otto Eckstein, was one of my advisors. And he was a very, very capable guy. And who was the other guy? I can't remember his name. Joe? [Merton J. Peck] - It may come to me. But he was also a well-known economist who worked on the President's Council of Economic Advisers.

So that was the days when Harvard required all of their full professors to teach undergraduate courses. So you really got to meet these people and know them. I don't think that's a requirement anymore, so I don't know that some of them ever touch undergraduates much. But in those days, it was good.

MATT SOBEL: When you went on for your MBA, was it at that point part of the path you foresaw that might eventually lead to academia?

BILL PIERSKALLA: No, I didn't. I was still coming from the farm, and I knew I sort of had to get a job and do things. I loved academia. I really did-- the studying and the learning and everything. But I didn't think of it as an occupation at that point.

So I went to the business school. And it's a really sort of a mistake, in retrospect, to go to the business school right out of college. Because you're thrown in with all these guys-- in my case, a lot of people coming back from World War II and the Korean War, who were coming back. And they were-- I'd say the average age was probably 25 or 26. And here's a 22-year-old kid, a couple of us, a couple from Northwestern, Max Pine and Herb Evert, and we struggled with these guys.

Because the Harvard environment, really Harvard Business School environment, really is not so much intellectual as it is interactive, in a combative sense almost. Because they were really training us to take the pressures of business when you're in that environment. And so the most senior people, the 24, 2 26-year-olds, who had had four or five years of experience, were really much more capable in that environment than we were.

I mean, we did well and we survived quite well and did OK. But it was a different environment than I'd expected to find, because it wasn't at all close to the college environment.

But it was fine. And I did fine. I went with Westinghouse for four years. And as I say, I've got a master's in math from Pitt in their night school program. And Westinghouse paid for it, so that was helpful. But that's when I started developing this interest in being an academic and having an academic career.

MATT SOBEL: Was there any operations research content in what you did at Westinghouse?

BILL PIERSKALLA: No. Well, I did some statistical content, but not what I would call operations research content. I was in charge of-- I was in the area of procurement, and we would have to do analyses of various groups of procurement practices. And mostly, that was a statistically-oriented kind of analysis I did at that time. Used regression, and that kind of thing.

But I didn't really know any operations research. The program at Pitt did not have any operations research in it. And I wanted to go over to Carnegie Mellon and take some of the courses from Gerry Thompson and some of these people, but Pitt wouldn't take those courses.

And Carnegie Mellon wasn't really interested in giving me the opportunity to take those

courses. So I talked with a couple of the guys over there, but I never took courses over there. And it wasn't until I was at Stanford that I-- and I started in statistics at Stanford. My first year, I was in the Stat Department, because there was no OR department.

And then they created that, and I joined it. I've enjoyed operations research -- it's just a terrific field of study. And I've enjoyed it.

MATT SOBEL: Amongst the portfolio of applied mathematical emphases that are useful and were useful in industrial and commercial settings, what drew you to operations research in particular?

BILL PIERSKALLA: Well, I didn't really know a lot about it until I got to Stanford. But I did want to do things, even in my undergraduate economics, and then in the MBA program-- I wanted to use mathematics to work on problems, solving problems of business.

And I didn't know how to do that. Nobody was doing-- except Dorfman was doing linear programming, and that was a very important area, and I like that. We didn't really have-- at Harvard at that time, we didn't really have any operations research courses, that I knew of, anyway. They put some in later, maybe five or eight years later, but at that time, there weren't.

At least I never heard of them. It wasn't until I was at Pitt and doing the mathematics that I found out about operations research, and that's when I knew I wanted to do that, and I looked at the programs at Stanford-- and it's only because I did want to go to the West. And Arizona actually had a little more OR than Stanford did, as far as you could see, in terms of looking at the programs.

And the only place where the OR was was in the Stat Department. And there was a little bit in IE, but the IE was still more oriented towards the classical IE. And so I didn't want to apply to that, so I applied to the Stat Department. And started to do some OR.

And then, I was fortunate to get two advisers, Jerry Lieberman and Herb Solomon, who were both very heavily interested in operations research. And Herb was the chair of the Stat Department. So he eased my way into OR.

And that was hard, because he had to make some hard decisions. I was an NSF Fellow when I was in the Stat Department. They don't like to lose NSF Fellows to another department. But he eased the way, and so he let me transfer over to the OR department.

MATT SOBEL: So when you applied to Stanford and went there, it was a big gamble on your part, before the-

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BILL PIERSKALLA: Yeah. It was. Yeah. I didn't really know that much about operations research. But I had confidence ---- you know, I knew I could do just about anything in those days. If you're dumb and confident, then you just think you can do anything. And I had two kids and my wife, and we just packed us all up into a little Ford Falcon, and drove out West, like a '49er.

[LAUGHING]

MATT SOBEL: How did you, now that you mentioned your family, how did you balance, or try to balance, the obligations that I know and you know I know that you felt towards your family with the pretty intense pressures of the academic program?

BILL PIERSKALLA: That was hard. And fortunately, I have a great wife who was very, very accommodating, and didn't cause any problems. She just went right along with everything we had to do. Basically, I would get up in the morning, and be with the kids. And both of them were going off to school at that point.

One was, I think-- one was four or five, and was going to Kindergarten. And the other one was about seven or eight, and he was going to a grade. And so I'd be up, and they'd go off to school. And then I'd go over and take classes, and do my work over there, and come home around dinner. And then I would spend three or four hours, and they'd go to bed. And then I'd just work until midnight down in the study room that Stanford Village had-- big, long room with one table stretched from one end to the other with chairs around it-- until about midnight, and then come back home, and get up about 7:00, and do all that stuff.

But I did have a requirement that I would always take Sunday off. So we would always do something on Sunday. And my oldest son was in the Little League. So we always went to all the games no matter what, and things like that. But we did a lot of camping. When we had breaks, we'd camp up in Yosemite, or down on the desert, or we'd go up to the Redwoods. We'd just do a lot of stuff.

MATT SOBEL: Besides Herb Solomon and Jerry Lieberman, were there other major influences at Stanford?

BILL PIERSKALLA: Well, yeah. You know most of them. There was a terrific number of really outstanding people. I thought the best teacher we had in the OR program was Pete Veinott. I mean, he was a terrific teacher. He was so well-prepared. You'd learn so well. He gave you new twists on thinking that

most of the other ones wouldn't do. I thought he was by far the best teacher I ever had.

Ken Arrow was really good. I don't know if you ever took a course from Ken Arrow. But he had this habit-- I don't know how he could do it-- of flipping a piece of chalk up, not watching it, talking all the time, and catching it, and flipping it up, and catching it. And you'd sit there watching that chalk go up and down. When is he going to drop it? What an amazing guy.

Anyways, but he was always fascinating, because he just had such a range of topics that he would talk about. I mean, some days, he'd come in and talk about, "well, last night I was reading Othello." Then he'd draw something [from Othello] that would fit into the economics of dynamic programming -- just an amazing guy. He was good.

Fred Hillier was very good too. Very well-prepared. And Harvey Wagner. A whole bunch. Sam Karlin, I'll tell you, I had a tough time in his class. But he was also another one of those teachers that they have with great talent. I took this linear algebra class. He would just come into class

and say, anybody have trouble with the homework? And then, somebody'd ask a question. And he'd say, which problem is that? And he'd look it up, and he'd just write it all up. Never prepared. He just came in and did that kind of stuff.

But we took his exam-- I'll tell you, this is the only exam I've ever taken where I didn't know what I was doing. We took his exam. It was 100 points. I got an eight. The highest guy in the class got an 11. And most of the people got threes and fours. None of us knew how to solve the problems on his exam. Even the math majors couldn't solve the problems on his exam.

And he thought it was easy exam. Well, for him, it probably was. That was an interesting course. I felt I'd failed it totally. And fortunately, he graded on the curve, so it turned out all right. How can you grade on a curve from 11 to three? I don't know.

MATT SOBEL: What was your dissertation research on?

BILL PIERSKALLA: Actually, it was a problem that Jerry Lieberman had worked on with Cy Derman. And it was a problem in depletion of perishing inventory or a perishing product, which has a decay factor. It decays over time according to some kind of function. It's usually concave, but it could be convex or some other shape.

And the question we wanted to do was, how would we optimally manage an inventory of those

kinds of products? And Derman and Lieberman had written a paper on that. And I was taking Jerry's class, where we were just reading papers, basically.

And I happened to pick that paper up to read, and it was very interesting. And I immediately saw there were a lot of interesting extensions that I could do. And I started working-- and I asked if Jerry could be my adviser. And he agreed. He was just a terrific guy.

MATT SOBEL: And at that point, in the paper by Jerry and Cy, was blood inventory used to motivate it?

BILL PIERSKALLA: No, no. It was mostly just generic perishable product. I would guess they were probably-- they didn't specify, but I would guess they were probably thinking food products, most likely, of various types.

MATT SOBEL: So that was not the genesis of your health care?

BILL PIERSKALLA: No. No, it wasn't the genesis of my health care interests, but it was the genesis of my work in blood banking. Yes. Because that's a similar phenomenon. And that decay as a concave-convex function. But the convex dies rapidly, it's basically a concave function of deterioration.

But, you know, I started working on my thesis in September of my last year. And by December, I was basically done, because it just opened up. One particular result opened up all kinds of other ones, and that was basically done.

So I spent the next four or five months writing it, and taking other courses, and TA-ing for Fred Hillier and making extra money on the side.

MATT SOBEL: And I want to thank you in front of the entire community for treating me kindly.

[LAUGHING]

BILL PIERSKALLA: So it was a good time. Stanford was a good time. And I had a lot of good colleagues. I had Bill Zangwill. And you know Bill. He isn't so active in OR anymore, but he was really a bright guy. And Art Geoffrion and Mike Connors, (actually in IE), and who else? Oh, and Gene Durban. A bunch of the early guys.

I was the fourth graduate in the program. I think it was Gene, and then Art, and then Bill Zangwill, and then me. And they were all within a period of six weeks.

[LAUGHING]

So it was good. The other thing we did, and this I give advice to some of my students. We had to do the written examination to qualify for the Ph.D. program. And that was a tough exam. It was 16 hours long, four hour exams.

And so Bill Zangwill and I, and Mike Connors -- ?] I can't remember who the other guy was. Kent. Kent Quisel.

MATT SOBEL: [INAUDIBLE].

BILL PIERSKALLA: Yes. We studied together. But Bill, and I, and Mike took it very seriously, and Kent didn't. The three of us passed-- and when we were studying together, we met-- every week, we would take a topic, and everybody would have to prepare that topic. We did for 10 weeks or so. And so, we got past the exam fine.

But Kent didn't. He had to take it over again. But he passed. I mean, he's a good guy. But that joint studying together, really-- not only did we learn a lot, but we bonded quite a bit in that time.

MATT SOBEL: What were you seeking when you left Stanford? That is, if you could have described what you hoped you'd find in an environment, what was it?

BILL PIERSKALLA: Well, I wanted to have a set of colleagues and interesting things to work on, and use the knowledge that I got at Stanford to do some work with. And so, I only applied to four places, three academic and IBM, for positions. That was IBM in Armonk at the Research Center.

And at that time, Gomory and Gilmore, were there, and some other very bright people. And I got jobs at all of them, fortunately, because OR was in big demand then, and there were few students. So everybody wanted them. The other three were Northwestern, Case, and the Postgraduate School in Monterrey. And I liked all of them. All those places were terrific.

And then I made, I would say, a fundamentally poor decision. I went to Case Western Reserve, because they were really well-known for OR. Unfortunately, they were well-known for OR that I didn't know. I knew the mathematics of OR, and they knew the practice of OR, with Russ Ackoff.

But he had left before I got there, so I never did work with or know him well. But I did run into one or two colleagues and a lot of good students at Case. And so that really helped. I mean, Leon Lasdon and I did work together. And Dick Evans-- you may not know Dick, because he

was less publishing, but a very bright guy. Very capable guy. And so we would work together. And we had grants together, and did a lot. And then we had great students, with Evan Porteus, and Gordy Wright, and a whole bunch of other good people along that way.

MATT SOBEL: Now, was Leon Lasdon on the faculty of the program?

BILL PIERSKALLA: Yes.

MATT SOBEL: He had been a graduate student in engineering at Case.

BILL PIERSKALLA: Well, the OR program was in engineering. Case was only an engineering school.

MATT SOBEL: OK. So this was before the--

BILL PIERSKALLA: Before the merger.

MATT SOBEL: Before the merger of the two institutions.

BILL PIERSKALLA: Yes. Before the merger. We were separate universities. And so we were only Case. engineering school. But a very good engineering school. And so yeah, Leon was on the faculty, and I, and Dick Evans. And those were probably the most prominent OR people. Burt Dean was there too, but he was more of the Ackoff variety, and did very nice things, but not the kind of things that we were doing.

So it was a pretty good group, but I would have been better up taking the Northwestern offer, because then I would have been with Jack Mitten and Erhan Cinlar. But I did go to Northwestern shortly after that, so it didn't matter. Anyway, it was an interesting time. I decided against IBM, because I really wanted to be an academic. Otherwise, I would have gone with IBM, probably.

MATT SOBEL: Now, when you moved to Northwestern, you hadn't gone then on health care yet, right? But it was while you were there.

BILL PIERSKALLA: Right.

MATT SOBEL: I think I would be interested, and I'm sure the community would be interested, in hearing about how that developed.

BILL PIERSKALLA: Well, it was sort of serendipitous, really. I had a good friend that I met at SMU named Ron Gue, who started a health care consulting company. And he was headquartered in Chicago. And I'd gone to Northwestern. It was a company, but he poured about half a million dollars into trying to schedule nurses in hospitals.

And his people were using a fatally flawed approach. They were using an IT approach that was flawed. And the reason it was flawed was that they were trying to artificially create in the computer how the nurses did it in their own mind, in their own thinking.

And there's no way you can replicate that, because they follow inconsistent rules all the time. I mean, they'll follow some rules sometimes, but not another time, because it human factors would come into play, and they would make changes and do things differently. And they tried to program that.

Well, that's an impossible task. Really. I mean, the variables are-- when you call combinatorially large, it was really combinatorially large. So he came to me and said, I want you to evaluate what we're doing, and if we can do anything better.

So I spent a day, and I went and looked at their programs, and talked to the people who were doing it, and talked to the nurses and staff, and wrote a report that said, it'll never work. Just never work. You can put all the money you want into it, and you're never going to get anywhere.

And then he said, well, can you make it work? And I said, well, I thought about it a little bit, yeah I can make it work. We can schedule nurses and do a really good job of it, and we can optimize. We can actually save money and improve their quality of work life.

And I worked on it for six months. A terrific systems programmer built the computer models of my work. We had them running in 12 hospitals in the United States in about a year, doing all the scheduling in those hospitals. And it was very interesting.

I had to build the optimization part of the schedules, which maximized the amount of nursing service to the patients, but minimized the amount of disruption to the nurses and their lives. But we also had to do behavioral analysis. How do nurses behave, and how can we handle this problem?

And when we wanted to optimize how the nurses actually accepted these schedules, we had to know things such as how many weekends did they like off? Did they like to work weekends more or less? Do they like short spurts of days on together, or do they like them longer, or what? We had to gather data on every nurse as to their preferences. And then we built those preferences into to the objective function that we were optimizing for all these nurses.

And so we were able to produce schedules that were far better for them, and yet far better for the patients. And it was really a nice little exercise in optimization, because we used the behavioral and the mathematical part.

MATT SOBEL: This one year from gestation to implementation to results, has that been much shorter than you've typically experienced?

BILL PIERSKALLA: Oh, yeah. I think so. Well, we had a leg up. And the leg up was that this company-- Medicus, it was called-- had contracts with all these hospitals to produce more schedules, and they couldn't produce them. And so, we had to produce them. And my algorithm was very easy to implement. And I had a really good systems programmer.

I did optimization modelling that was probably somewhat unique in the field of optimization. I did it in machine language using registers, zeros and ones. Because a day on is a one, and a day off is two. So we'd have this 64 or 32-bit register, and we'd just treat those as a schedule. And we'd just manipulate those registers very rapidly. And machines weren't big then.

They were machines. We only had 64K storage. And then, they'd have to swap it out onto drums. And we had to do all this scheduling for 1,200 nurses in a hospital in less than half an hour. That was our objective. And we did it. Every unit in the hospital, and there were probably 40, we would spend only a minute, minute and a half, scheduling it.

And these are big combinatorial problems, each little unit. So using those registers and manipulating it was very fast. Very fast. We did a nice job.

MATT SOBEL: How did you handle in other settings the much greater delays between inception and implementation? And for that matter, there must have been occasional instances and applications where the implementation didn't occur?

BILL PIERSKALLA: Oh, there were. And when I got into blood banking area, we did some good implementation. But we had some where we never did implement. And the reason-- I think that largely the

reason was a lot of the blood bankers were afraid of taking the risk of implementing the new system, because the old one was quote, "not broken." But it was basically broken, and rather than take a risk of changing how they managed their inventories of red cells and platelets and various other blood factors they preferred to ignore the problems.

We did make change, and a lot of it. We had some national panels at NIH, where they would decide as to what the best procedures were to use, to use different bloods for different programs. And those were implemented. The panel said, that's the way it's going to be done, and that's the way it was done in the country. And we had a lot of inputs. We were in real-time with the panel doing what-ifs kind of scenarios.

And so that got implemented. And that was fairly-- well, I shouldn't say rapid. But we pulled together our models. Maybe it'd take us months or a year, and then the panels would meet. And then they'd promulgate an approach that all the blood banks had to follow, and that would be the national policy. But there were other places, other things, where I'd go to the blood banking meetings, and all the major ones for the Red Cross and the American Bank Society and get indifference to our work.

And we'd talk and lecture, and people would ask questions. But some of that would never get implemented. Because I didn't work with those people. But the opportunity was there for them to do it. I worked basically with the blood bankers in the Chicago area.

MATT SOBEL: It sounds as if you have to be emotionally resilient in doing applied work.

BILL PIERSKALLA: Yeah. Well, one of the applications really took a long time. In Chicago, they had seven blood banks that were distributing blood for the hospitals and clinics in the city. And they were all competing for donors. And so we built the model showing the Chicago area people that they could do much better with just three blood banks.

And the reason we couldn't go lower than three is that because of the nature of blood banking, the American Red Cross would not cooperate with the certain other blood bank centers and vice versa. So three was the minimum we could get to, so we showed that three would be much, much better, for the whole Chicago metropolitan area, stretching just South of Milwaukee, over to Peoria, all the way down and around, including Gary, Indiana.

Big area. 150 hospitals, 140 hospitals. And we presented that. Years went, maybe five years. And eventually, it was three. Because a couple of smart blood bankers, the bigger ones,

started to absorb the little ones. And they absorbed, until there were three. And it was just exactly how we sort of predicted it. But it had nothing to do with us, other than that we maybe gave them the idea or something, that's about all.

MATT SOBEL: At some point, you made a transition from the Midwest to Philadelphia.

BILL PIERSKALLA: Yes. [LAUGHING]

MATT SOBEL: What were the attractions and what were the regrets in making that career move?

BILL PIERSKALLA: Well, the biggest attraction was I was given an opportunity to run a research center and an MBA program with a health care major. So I was given the opportunity to run the university's Leonard Davis Institute. and the Wharton Health Care Management Program. So I went to take that job at Wharton.

I also got a terrific raise in pay. Business schools pay far better than engineering schools. I mean, far better. I mean, not even close. But the regret was leaving the students I had in the engineering school because the kind of work I'm interested in, or was interested in, they are much better prepared. They're not necessarily brighter, but they're much better prepared. And so you could do a lot of better modelling things. The PhD students in engineering were just so easy to work with on problems, because you didn't have to try to explain or teach the kinds of things to them that they needed to know.

There were a few exceptions, like Hau Lee. He was an exception. But he came well-prepared before he was at Wharton. He had his math background already.

But that was probably the biggest regret, is I regretted not being able to teach the advanced courses, because at Northwestern, almost all the courses were masters and PhD courses. We had a very tiny program for undergraduates.

And so, every year, I'd be teaching all the advanced work that was going on in those particular areas that I was interested in teaching, which ranged from math programming to stochastic modeling, to inventory, reliability, and things like that.

And then you get to Wharton, and none of those courses are there. I mean, you don't teach those courses, because there's no students who could take them. So basically, I missed that, and I missed then the background quality of students, like the Steve Nahmias's and others,

who were really capable, bright young people and fun to work with.

MATT SOBEL: Were there other ways, other revenues, at the Wharton, or more generally at the University of Pennsylvania, for you to sustain your sharpness in the topics that did interest you?

BILL PIERSKALLA: No. There were really none. I was a joint professor with the Systems Engineering Department in the Engineering School. But that group was so out of favor with the dean that it was starved for resources and didn't have much of a PhD program. It was very small they were basically a teaching department for undergraduates and master's students for the school.

And the dean-- well, the department eventually got wiped out. The dean just wiped them out, and they don't have that program anymore. So there was no way to do it down there. The Wharton students, we would occasionally get a Hau Lee, or some other person similar in background, and we could do things. But you couldn't ever teach those courses. And then I moved more and more into administration.

I became the deputy dean at Wharton, pretty much cutting off any deep research, because I couldn't keep up in the reading in those fields, those areas. So I started doing more business school type research. Modeling larger scale systems using Markov processes or Markov programming. And other optimization, and other techniques, to solve those kinds of problems. But they were just solving the problems, not deepening the theoretical application of them.

MATT SOBEL: Were there occasional opportunities as an administrator and manager to capitalize activities largely undertaken by others?

BILL PIERSKALLA: Well, yeah. You had a lot of opportunity that way. And I took advantage of that as the Deputy Dean. I was able to make a lot of changes in the nature of our hiring, because I was in charge of all hiring of faculty, and allocating slots to the various departments and programs. And I built models for that, my own OR models to do that allocation process, based on many, I think, pretty good criteria.

So we did that. So I was able to influence the hiring of a OM, finance people who were more mathematically trained, capable people. Because the old school of finance wasn't that way at all. It was mostly investments and how to look at portfolios and stuff. But they really didn't use math much.

And that doing the same kind of thing, we had a public policy group, which was just sort of general public policy, but we were able to really bring in some sharp economists to improve

that group. Same with insurance. Insurance was old traditional insurance, but we brought in OR trained insurance people, who that was their specialty area. But they were OR people.

I was able to make changes like that at Wharton. And I think for the better, because the ranking of Wharton went up a lot farther in the decade of the '80s than it had been. And I was responsible for hiring 110 people, approving the hires and directing where we were going, and so on.

MATT SOBEL: Have the qualitative characteristics of those changes remained?

BILL PIERSKALLA: I think so. I haven't looked at them recently-- I haven't looked at Wharton recently. So I don't know. But it had remained for a long time after that, because the faculty wanted it. The finance faculty recognized that you had to have that kind of approach, bringing that OR kind of knowledge into the study of investments, and other financial instruments.

MATT SOBEL: At some point, you had had enough of East Coast, and you headed West again, right?

BILL PIERSKALLA: I headed West again. Right Another 49er trip. A little different.

MATT SOBEL: Why don't you describe the circumstances, and what you went into, and how it was different from what you'd been doing?

BILL PIERSKALLA: Well, while I was Deputy Dean at Wharton, I was being pursued for deanships around the country. And most of them, I mean, I'd go and talk to them, but I really didn't have an opportunity to make a difference at those schools, a lot of them, mainly because the dean's job is raising money largely. There're other factors too, but largely raising money.

And to raise money, you've got to have opportunities to get money from places or you're just not going to be very successful. And a lot of these schools have great hopes, but they don't have the basis for raising the money, and so you can't really make much of a difference in helping the school to change, or build, or improve.

So finally the one that was intriguing was UCLA. Because not only do they have a very fine program, excellent faculty, in many areas, in most areas actually, but also they had a very good alumni base, and a very strong support from the entire LA community of business leaders.

And I was able to inherit a board and expand it, which had some really outstanding civic-minded people and education-minded people who were very, very wealthy, John Anderson being one of them. So I thought, this is an opportunity to try to make a difference at UCLA. So I went out there as a dean, and was really quite fairly successful in raising funds. E.g. professorial chairs, 14 when I started, and then four or five years later, we had 31.

So we had Chair Professors coming in, and another funds, a lot of other funds coming in. We changed the nature of the funding basis for the business school. The business school's tuition was always set by the Board of Regents of the University of California.

I was able to get the other deans from the other four UC business schools to petition the UC Board to agree to give us the opportunity to raise tuition on our own, and make it so that money coming in from that tuition would go to the school.

We gave up some of the state funding for that opportunity to have our own funding. Now, that was hard on the students in a sense, because they had to pay a lot more tuition. But on the other hand, we were able to use that money for major program improvements. A lot of money came in, because we went from initially $4,000 a year per student to $12,000 a year very rapidly.

And now, I don't know where it is. Probably up around $20,000 or so, or $2000. I have no idea, because I haven't looked recently. But that way, it give us a firm funding base, and that and raising the other money. So there was an opportunity to do things, and then start new programs, hire faculty, and do all those kinds of things we had to do.

So it was a place where you could make a difference. And so I took the job and enjoyed it. Now, the new dean-- I mean, she is absolutely terrific. Judy is just amazing. She's taken it the next leap, which I was trying to take, but couldn't get buy-in from the faculty or the university of taking us basically private.

The School is still part of the University of California Los Angeles. We are owned by them, but totally independent in raising all of our own money, keeping it, paying some taxes to university, because you have to pay your taxes in almost every environment, and she's done that. And she's just done a terrific job.

And then Marion Anderson, John's wife, because John died about 10 years ago maybe, now just gave them $100 million, a lot of it for endowments. So it's been doing very well out there.

MATT SOBEL: So what year did you go there as dean?

BILL PIERSKALLA: 1993, and left Wharton. And retired from Wharton, actually.

MATT SOBEL: By this point in your career, you'd had a gradually and sometimes not so gradually increasing managerial responsibility, and also, a broadening of responsibility. And so, I think it would be interesting to hear your views on how operations research-- and I'm using the label very broadly-- how operations research can nowadays fit in productively in a management school setting.

BILL PIERSKALLA: You mean from a managerial point of view, from an educational point of view?

MATT SOBEL: Including educational. The viewpoint of most people seeing this video will not be as broad, as extensive. And you've had the advantage, on the one hand-- you drank the Kool-Aid, you drank the Kool-Aid, and you were immersed in intense operations research activity.

And yet over the years, your experience has become much broader. And so I think it would be interesting to hear how that breadth of experience might have influenced your notions of how operations research could or should fit in.

BILL PIERSKALLA: Well, I guess I'd like to step back just a little bit. Back in the '80s, I was president of ORSA, and then president at the IFORS, which is the International Federation. I have a very broad view of operations research, just like the early Stanford program had. When they had Patrick Suppes, and Ken Arrow, and Lieberman, and all these people, very broad. It wasn't just a math-- it had a heavy math content, but it was a very broad view of what operations research could and should be doing.

Then in these jobs that I just mentioned, not so much President of ORSA, but President of the International Federation, there is a huge amount of fighting that goes on within the International Federation among societies, that some take, like the British, a very applied view of what operations research is, and some, like on the continent, take a very mathematical view, such as the Dutch, and the Swiss, and some others.

And they were at concept loggerheads while I was president. And I was trying to convince them that both should be living together. That really, we need the people doing the

mathematics, and we really need the people doing the good applications, or we're never going to have a long-term survival as a field.

I mean, there's no way to do it. Either we become a little adjunct of applied mathematics, or we become a business school kind of level of applications. And we've got to have that interaction. So I spent a lot of time, a lot of talks, around the world or our societies and pushing us, with some success. And I think with some success, because I think the Europeans have broadens, and the British have also broadened.

So now, people like Kevin Glazebrook and those folks who are doing basically what I would call a more math-oriented OR, are really now interacting a lot more than they used to do and used to be. So I think that's good.

Well, that brings you back to the question, then, of how OR fits -- in a business school, or in any other educational setting? Well, because I take a broad view, I consider a lot of the things finance, and marketing and even to some extent the behavioral kinds of people, when they're doing decision-making, they're basically using a lot of the techniques, indirectly or directly, that have been developed from what I would call the OR field-- the optimization techniques, the statistic modeling techniques, and even some of behavioral modeling, from the nominal group techniques, and those kinds of off-shoots in terms of decision analytic approaches.

So in the business school as the dean, I was really encouraging all of those programs to use this level of, I would say, well, for a better word, it's a good word, analytics in their areas, which I considered operations research, a lot of it. Because it was really, they were trying to optimize. They may not use that word, but they were trying to optimize in finance, portfolio management, in marketing, consumer behavior, and consumer management. And in the behavioral sciences, they were trying to optimize how to better do human resources management, and those types of things.

So I always encourage it. And I feel it's fundamentally important for the faculty and the students to really understand and utilize those techniques in business settings, in real business setting. Also, in the academic courses that we teach. And it has been going that way, at least at all the better business schools. I'm not sure about a lot of the business schools. I don't know them. But the ones I do know, which are the main leadership business schools, they're doing a lot more of that and doing well.

MATT SOBEL: Let me ask you another evolutionary question about health care research. If you were to

contrast the state of affairs and opportunities for health care research in general and operations research approaches to health care systems research in the '70s with nowadays, are they basically the same, or have they changed significantly?

BILL PIERSKALLA: Well, a lot of things have changed. Some of it is very much the same. In the 1970s, health care was really a fertile ground for operations research work. It wasn't big, it wasn't real big, but it was fairly a good sized and growing. There were Centers of Excellence at Johns Hopkins and Case-- not Case, at the University of Pittsburgh. Case Western didn't have much. But MIT had a fair amount. Columbia had a fair amount, Johns Hopkins and other places too.

But then in the late '70s, there was a fundamental change in the funding of research in Washington. Before that, they had a couple leadership people in the National Institutes who really were pushing for using more quote, "optimization" or analytic kind of approaches to a lot of health issues.

And that changed and switched radically, because the NIH was taken over by the physicians. The physicians in general had no interest in this type of stuff. So in the '80s, the funding basically dried up, and people left the health care arena, health care OR type arena, rapidly. I stayed and a few others stayed, but most of the people left and did very nice research on other topics.

Then in the '90s, it was slowly starting to change a little bit back. Not so much the funding, although there were some funding improvement. But also, there were some young physicians who-- at Wharton, for example, we started offering courses in decision-making. Mainly decision trees, things of that type.

And some young physicians liked that idea, and they took it over, and they started, and I was one of the beginning members of the Society for Medical Decision-Making. And that started in the early '80s. At Penn, we had two or three leadership physicians who were very active in that society, and some from other parts-- Yale and some other places.

And they built that society. And we put in a decision-making course in the medical curriculum. So even more young people were interested in that area. And now some of those people, some of our physicians, rose to top positions in Washington and various parts of the agencies. And they brought that thinking with them.

So we started to see then in the '90s some slow changes and more funding for use of what I

call OR, what they call medical decision-making-- I don't care-- to fund it. And so, we started seeing a growth in funding. Slow growth. Then with the help of some legislation, primarily the HIPAA a little bit, but also the information technology legislation in the 2000s, it started under Bush with-- my student was actually driving them, David Brailer headed the IT input agency, which was created. And he was the first director of it, reported directly to the Secretary of Health and Human Services.

He was really pushing IT. And David was a decision analysis kind of guy. He wasn't really what I'd call well-trained in OR, but he was really interested in decision analytics. So he was pushing that in Washington, and that legislation has really opened up the funding areas, the research funding areas, through the various agencies, including the NIH. And the NSF has gotten back in.

They had dropped out of health care too, and they came back in with it now, and they're funding a fair amount of it. Considering the small budget they have, it's still helpful. And we're starting to see now just this huge growth. The HAS, which is the Health Application Society of INFORMS, was really technical section before.

And back in the '70s, we had probably about 400 members in it. In the '80s, we had about 50. In the early '90s, it was almost dead. There were maybe 20, 15 or 20, people would come to an Health Care Technical Section meeting.

But then about that time, I was helpful, but some other people were really hard workers, because I was an administrator, and I didn't have as much time. They really started to work hard to try to build up that group. And in the '90s, it started to grow. By around 2000, I don't know how many we had. We can look in the history. But we probably had 100, 200 people.

Well, now, they're one of the biggest societies in INFORMS. That's what I was told today. I don't know if that's a fact, but I was told that today. They must have had 800 or 900 people in this society. Maybe more. I don't know what the number is. I know it's well over 500 or 600.

So it just blossomed beautifully, and the problems in OR, in health care, are just huge and ranging. When you take an area that is almost 20% of our GDP, there's going to be a lot of interesting problems to work on, from policy all the way down to the microlevel. So it's a great area to work in.

MATT SOBEL: Do you regard to your influence in health care applications to be your greatest

accomplishment, or would you add something else to that?

BILL PIERSKALLA: It's probably my greatest contribution in terms of field building. Yes, I think there's no question about that. Because I haven't had that influence in the perishable inventories, because I sort of dropped out of that as I became an administrator.

I've had other administrative accomplishments that were good, but they're sort of minor compared to that one. Like IFORS. When I took over IFORS it was bankrupt almost. Had $50,000 in the bank, and we were spending at the rate of $10,000 a month. So it wasn't going to last very long.

And we had to spend $10,000 a month to run the place. So I made a bunch of changes in terms of fundraising. By when I left, they had about $300,000. And now they've got, I don't know, a million and a half. More than they need, but they've got a lot of money.

And INFORMS was in the same hole. You may not remember this, but when Karla Hoffman was president, INFORMS was in deep financial trouble. And then I took over the publications. She appointed me as VP of publications,

And in those four years, we took INFORMS from being in deep financial problems to having lots of money. Because it's just a matter of analysis, applying good operations research thinking, to how you solve this problem using the tools you've gotten, and publications were a powerful tool.

One thing that INFORMS has going for it, that a lot of societies don't, who do OR sort of stuff, decision sciences and-- some of the others, is that we've got the best journals, package of journals, in the world. Better than any other country. No question about it.

And because we have the best package, and because we have a funny thing that academics have, and that's called tenure, and because academics have this concept of tenure, and concept of publishing to get tenure, those best journals are a super asset. They're the best asset of INFORMS. And so we could take that asset and leverage it to make money on. And we did. So that was another accomplishment. But probably the best and most impact one is the health care. I think that's true.

MATT SOBEL: Suppose we had a superb undergraduate who's looking around for what to do next, and the student approaches you and asks your advice about whether to go towards operations research today. What advice would you give? Would you encourage that student to head

towards operations research?

BILL PIERSKALLA: Well, I've never advised a person to do something without knowing where that person is, and what their goals and objectives are. So I really do a lot of work on talking to find out what do they really want in life, and what are the kinds of things-- that excite them. They usually don't think about that. But when you talk to them long enough, you get an idea.

And this is graduate students too. You get an idea of, would that be really the best way for them to go? And so after I probed that, and get to the point where I believe and am fairly convinced that this would be a rewarding and a great field for them to go in, at least in the shorter run, maybe 5, 10 years - after that things often change.

I would advise them that, yes, this could be the opportunity field for you to do what you really want to achieve. I would do that. But if it wasn't, I would caution them and say maybe you should think about some of these other fields.

MATT SOBEL: My last question. What are you planning to do in the second half of your career?

BILL PIERSKALLA: [LAUGHING]

That's a question I wish I knew an answer to. Well, right now, I'm not planning to do deep research. Because my math skills have eroded. I was just trying to think of some of the theorems I used to teach my students the other day. And I said, I was hard pressed to think of some of them. You know, of the named theorems.

So I probably would not do that. I would have to capitalize on my ability to do more strategic level of knowledge and thinking, and more strategic combined with implementation practice, practical things. So that's what I have been doing in the health care arena, giving talks and things.

And I think that's where my skillset is, and my available time. But in terms of career, you talk about a career, I also want to have a very good career as a grandfather. And I think I'm doing a lot better at that than I did with my kids, although my kids are doing fine.

So yeah, that's basically where I am at this point in life. And very much enjoying it. So I see that as the culmination of almost everybody's life, is to enjoy their family. When you really come down to it, that's what you really leave behind largely. And that's what you should really

do a good job, at if you can.

MATT SOBEL: Thank you so much, Bill.

BILL PIERSKALLA: There's one thing you did ask me about earlier that we didn't cover. I don't know if you want to.

MATT SOBEL: Please, please, tell us.

BILL PIERSKALLA: This prize, this Pierskalla Prize. I was approached by the Health Applications Section, it was a Section then. And now it's a society. They wanted to name a prize, the Pierskalla Prize, for the best research in operations research in the current year. And I said I'd be honored. I mean, there's no question it's an honor to do that.

So they went together, the officers of the Health Application Section at that time, went together and formed that prize. And they allocated $500 of their funds, their member dues funds, to that prize. And I thought that was really, really marvelous. And the first year, they had maybe four or five applications for it.

Now they're in the 20's, and 30's, and 40's of submissions for that prize. And the work is just phenomenal. I mean, really fine work. And so it was a great honor, and I'm just so happy that they did that. I am very happy. And that's only because probably because I outlived everybody in this field.

[LAUGHING]

So thank you.

MATT SOBEL: Thank you.