Al_Blumstein Interview by Arjang Assad,

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Introduction and Early Life

ARJANG ASSAD: I'm Arjang Assad from the Katz School of the University of Pittsburgh, representing the History and Traditions Committee. And today, on November 5th, I have the pleasure of interviewing Al Blumstein, who is one of the great innovators and pioneers in the field of operations research. I won't give an introduction because we'd like to hear from Al directly. So let's start at the beginning, with your family and your background, and move chronologically forward.

AL BLUMSTEIN: I'm Alfred Blumstein, known to everybody as Al. I'm currently emeritus at the Heinz College of Carnegie Mellon University. Heinz College used to be the School of Urban and Public Affairs, then became the H. John Heinz III School of Public Policy and Management, and is now the Heinz College of Information Systems and Public Policy. And I went emeritus in 2016.

ARJANG ASSAD: 2016.

AL BLUMSTEIN: And started life in New York City. My mother was an immigrant from Russia, now Poland, the town of Bialystok. I grew up. For the first two or three years, my parents were not getting along too well so my mother broke up, and she and I moved in with my grandmother. My grandmother was an immigrant from Europe also who spoke no English but only Yiddish.

So during that time I became fluent in child's Yiddish, which I gather is pretty good for enhancing one's language skills in other languages. So she died when I was five. So for three years, I became a master of two languages, two childhood languages.

ARJANG ASSAD: Any siblings, Al?

AL BLUMSTEIN: No, I was the last of the opportunity. And so then we moved in with an aunt of mine. And when I was 10, we moved into our own apartment. And I went to the public school system in New York. Was a graduate of the Bronx High School of Science.

ARJANG ASSAD: Famous high school.

AL BLUMSTEIN: And one of the select high schools. I graduated in February of '47 and Pratt Institute was the only place accepting students in February.

ARJANG ASSAD: So before we go there, Al, what were your favorite subjects in high school? Did you know that you're very good at certain subjects?

AL BLUMSTEIN: I wanted science. As I was thinking about a career, I knew I was going to have to earn a living. Two options I saw were accounting and engineering. I had no idea what engineering was, but a cousin was an accountant. And that sounded pretty boring so the choice was easy. I wanted to be an engineer.

And when I was in high school, I got an application that said, what kind of engineer do you want to be? And I had no idea, but I went to an uncle who was an engineer, had been an engineer, and he said, well, when the Depression comes back, then electrical engineer is pretty good because you can open a radio shop. So that electrical engineering would be about the right thing, so taking his advice, I enrolled in electrical engineering at Pratt.

And finished that semester, that spring semester. Went for the summer. So by the fall, I was ready to be a sophomore. At that point, I learned from New York State that I had been the recipient of a scholarship to Cornell. So I was torn because Cornell engineering at that point was a five year program. I could have finished Pratt in three more years, whereas Cornell would have been 4 and 1/2 to fill in on what I didn't have.

ARJANG ASSAD: Right.

AL BLUMSTEIN: So I ended up, partly with my mother's encouragement, in contrast to the relatives who said, you're going to leave your mother all alone. And it was she who urged me to move on. And Cornell was just a wonderful experience, breaking out from all the familiar life I had had into a phenomenally cosmopolitan global environment.

Enrolled in electrical engineering at Cornell and discovered a new program they had put together following World War II. In World War II, they found that the engineers knew the handbooks but they didn't really know the theory. The physicists knew the theory but they didn't know what to do with it. So they set up a brand new program in engineering physics, where they had more theory, more mathematics, and that sounded really good. And so I enrolled in engineering physics and that was what my bachelor's degree was in.

When we were seniors, most of my colleagues went on to graduate school in physics, but that wasn't where my head was. I had no idea where my head was until, in my senior year in college, I read an article in Fortune Magazine about this new field that had come out of World War II. I graduated in class of '51, and so it was '48 that I started.

Discovering Operations Research

And so there was an article in Fortune Magazine that talked about operations research. I didn't know what operations research was. I think the world still doesn't know what operations research is.

ARJANG ASSAD: That's the first time you heard about it.

AL BLUMSTEIN: But it was the first I heard of it. And I said, that's what I want to do. And that was in the distant future. I went through job interviews, and it turned out that the Korean War

was on. The best job offer I got was from the Cornell Aeronautical Laboratory in Buffalo with a team that was studying defending fleets against air attack.

And it was an operations research group. Earl Isaac, who is one of the founders of FICO, was one of my colleagues in that group. And it was a very inspiring and exciting opportunity and it was operations research. And I said, gee, that's exciting.

And I really enjoyed what I was doing. It was just fascinating. I was able to use the operations research. Had an interesting experience. Since that was sort of a 9 to 5 job, I wasn't used to stopping working at 5. So I enrolled at the University of Buffalo, took a course in physics and in advanced physics and a course in statistics.

Because I had taken a course in statistics in my senior year at Cornell, an elective course that wasn't required, found that fascinating. And the person who had taught me that course in physics was becoming the Chair of the Department of Industrial Engineering at Cornell.

I went to the Department of Industrial Engineering at Buffalo and said, hey, what do I have to do to get a master's in industrial engineering? They said, send us your transcript. They didn't see very much that appealed to them so they said, if you take the following 15 undergraduate courses, we'll allow you to enroll in our master's program in industrial engineering.

I decided that wasn't what I wanted to do. I went to the Department of Statistics. They said, well, we'll give you credit for the statistics course, of course. We'll give you credit for your physics course. And the additional four courses that you would take and write a thesis, a master's thesis, then you're home free and you can get a masters. That sounded much better than industrial engineering. So I did that, got a master's degree.

ARJANG ASSAD: And what was the topic of the thesis?

AL BLUMSTEIN: The thesis was on air traffic control, which I had started dealing with initially. I went to the first meeting of the Operations Research Society of America, which must have been in about 1953 or thereabouts.

ARJANG ASSAD: National Bureau of Standards?

AL BLUMSTEIN: At the National Bureau of Standards, yes. And it was an exciting place, an exciting time. And I ran into Andy Schultz, the head of the Cornell Industrial Engineering Department. And he said, we're starting up a master's program, a PhD program in operations research, which was very much of a new academic entity.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: He said, why don't you come down and do it? So I had been working at Buffalo for five years. I had been on leave with a task force for the Navy during that time. So I was really ready to move on to more academic training in operations research. And the Cornell

Department must have graduated 1,000 or more PhDs in operations research, but I was the third one.

ARJANG ASSAD: You were the third? Interesting.

AL BLUMSTEIN: Salah Elmaghraby was before me, and one of the people who was on the faculty then was the first.

ARJANG ASSAD: And your PhD was '56?

AL BLUMSTEIN: The PhD was in '60.

ARJANG ASSAD: '60.

AL BLUMSTEIN: I did my thesis back in Buffalo on air traffic control. And Alex Jacquillat has been doing some exciting research on landing and operations of airports, and that's a much more sophisticated, much more modern version of the project that I did at the time, looking at how to move airplanes faster through a runway, or through runways.

So it was a very intriguing field. And when I finished, I got my PhD in '60. In 1961, we had a fascinating election. John Kennedy was elected.

ARJANG ASSAD: Yes.

Washington and the Institute for Defense Analysis

AL BLUMSTEIN: The one place I wanted to be at the time was Washington. Kennedy was an exciting person and I was already involved in public systems, military, transportation. And so I looked around in Washington and got a fascinating offer from the Institute for Defense Analyses.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: IDA was the think tank established by the Department of Defense because the individual services had their own think tanks. RAND worked for the Air Force. CNA worked for the Navy. And ORO, Operations Research Office worked for the Army.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And so the Defense Department set up IDA. And so I was intrigued by what they were doing. I was in Vietnam in 1962, worrying about how to defend villages against attack.

ARJANG ASSAD: How long did you stay in Vietnam?

AL BLUMSTEIN: I was there for three months, got back in time for Christmas.

ARJANG ASSAD: Nice.

AL BLUMSTEIN: I left in September, got back in time for Christmas. And in 1966, while I was at IDA, I had a call from the President Johnson's Commission on Law Enforcement and Administration of Justice. They said, we're establishing-- the commission had been running for a year.

ARJANG ASSAD: And Al, we'll get to that in a minute. I just want to backtrack because your work in counterinsurgency was--

AL BLUMSTEIN: That was part of the--

ARJANG ASSAD: But it was with some interesting people, like Ellsberg. You want to say a couple of words about that?

AL BLUMSTEIN: Shortly after I got to IDA, the Defense Department saw insurgency, guerrilla warfare, as where the future lay for communism. Nuclear war was a stalemate. Korea had proven that limited war was a stalemate. So insurgency was the means by which communism was going to succeed.

ARJANG ASSAD: I see.

AL BLUMSTEIN: So they set up two task forces. One went to the Middle East. The other went to the far Pacific. There were very senior people. Louis Alvarez, who--

ARJANG ASSAD: Nobel prize winner.

AL BLUMSTEIN: Who won a Nobel Prize was the chair. The individual who developed the air to air missile was a member of the team. They were all fairly senior people in their 50s, 60s, or beyond. And there were two young Turks they had. One was Dan Ellsberg, who had been at RAND and was assigned from RAND.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And myself. And so we had about a three- or four-week extended trip to Thailand, to Vietnam, to the Philippines. One of the members of the group was the author of a book entitled-- with a picture on the cover of MacArthur saying, “I shall return”.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: He was the general who said, “I stayed”. And the title of his book was *I Stayed*, and he was a member of the team. He was a major at the time. He became a general after the war.

ARJANG ASSAD: Did you view it as OR work when you were doing that, or was it different?

AL BLUMSTEIN: It was simply-- I mean, OR, at the time, was very much one of the issues and the problem.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: How do you deal with the problem? What's the nature of the problem? And so there was no OR in that team, but it was a skill that one develops if one does OR of, how can you grab hold of this problem?

ARJANG ASSAD: Very important.

AL BLUMSTEIN: What are the controllable variables? What are the outcome variables that you care about? So it's the structuring that's such an important part of OR.

ARJANG ASSAD: Exactly.

AL BLUMSTEIN: And so that's what we were doing and trying to find out how we'd structure it in that very diverse group of senior officials. And it was fascinating hanging out with Dan. And I anticipated this guy is going to be a hero, one way or another, sometime.

ARJANG ASSAD: Well, famous, for sure.

AL BLUMSTEIN: In his career.

President Johnson's Commission on Criminal Justice

ARJANG ASSAD: So I interrupted you. Now back to President Johnson's invitation.

AL BLUMSTEIN: So Lyndon Johnson was accused of crime in the streets, because there was, indeed, a growth of crime in that late '50s, early '60s period. The reason for the growth in crime had nothing to do with Lyndon Johnson. It was, essentially, the baby boomers who were coming into the high crime ages, so we had a high bulge in the population of the subset that is in the ages that tend to do crime.

But Lyndon Johnson, who was very good, when he saw a serious problem, he'd establish a task force, a commission. And so he had this commission on law enforcement and administration of justice. And they were underway for about a year. They had a task force on police, courts, and corrections, the normal parts of the criminal justice system.

Then they decided they wanted one on organized crime. They wanted one on science and technology. Somehow or other, they called and said, would you be willing to do something, to chair this commission? I said, I don't know a thing about crime or criminal justice. And I suggested some other people they might want to consider. I was involved, rather strongly, in doing some analysis about the Vietnam War on force levels and other related issues.

I got a call back from them about three months later. The work I had done was pretty much over. And careers are very strange trajectories, and mine was one of the strangest I know. And so I said, what the hell, I'll give it a try. The report was going to be over in a year or two.

And so I said, I'll try it. And I did some recruiting, and one of my favorite recruits was a young kid who had just gotten a bachelor's degree in electrical engineering at MIT named Dick Larson.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: A very important person in OR who really built on some of the work we had done. And we did a few papers on--

ARJANG ASSAD: And a book later on the subject.

AL BLUMSTEIN: And his book came out. And we did a paper on dealing with the criminal justice system as a system. Police had one measure of recidivism. Recidivism is the probability of a new crime. And police said, oh, it's very high. It's about 2/3. And the corrections people said, no, it's only about 50%. Both were right. Police who are measuring it on return to crime, corrections was measuring it on return to prison.

ARJANG ASSAD: I see.

AL BLUMSTEIN: So we provided both definitions and it showed the consistency. But Dick and I have been close ever since and it's been a delightful relationship.

ARJANG ASSAD: How did it work administratively? Were you on loan from IDA when you were doing all this?

AL BLUMSTEIN: I wanted to stay at IDA and they gave me the option. I was either going to take a leave and become a civil servant for that period, but I was going to be back at IDA in two years. And there was enough flexibility for this that they said, OK, we will contract for your time with IDA.

I had the staff support, a secretary, at IDA. That's a time when individuals had their own secretaries. So I stayed at IDA and we did the work out of the IDA building, which was not all that far from the Pentagon, which is not all that far from the Commission.

ARJANG ASSAD: Right.

AL BLUMSTEIN: So we did our report, and we were mostly systems engineers. And I think we were reasonably influential in pushing for dealing with the criminal justice system as a system, which was one of the important thrusts coming from the Commission, what where they convinced the Congress to provide money to the states to set up committees in the states that would award federal money where the need was within the criminal justice system.

We also were the ones who recommended that there be a single phone number, because we were in Los Angeles and we found that we wanted to call the police because we wanted to interview some of the police. And we saw about 50 municipalities that had police departments that were different numbers, and we had no idea what municipality we were in. And so the British had a single phone number, 999.

So the telephone company didn't like that idea. The telephone company said, we already have a single number. It's 0. You push 0 and you get the operator and the operator will get you to the police. But people found a long delay, not very wise, weren't sure where the heck locations were.

So one day, the telephone company, sometime after we published this recommendation for a single phone number, the AT&T monopoly people came by my office and said, we're going to have 911 as the uniform number. AT&T saw the opportunity for building new systems, to provide the single-number service.

ARJANG ASSAD: What a great contribution.

AL BLUMSTEIN: So they did that. And he said, it's going to be 911. I went to my phone and called 911. And after about seven or eight rings, I heard, “hello?” There was an operator that answered. The system wasn't ready for people calling 911, but they were going to announce it the next day. So I think they had a little bit of delay until they got the world accumulated to the 911 idea.

ARJANG ASSAD: Did the Commission have, specifically, criminology experts?

Transforming Criminology to a Quantitative Field with Simulation

AL BLUMSTEIN: Yes. Lloyd Ohlin was the head of a task force. But criminology was a pretty much qualitative field at the time.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And one of the things that we brought to bear was putting numbers on things.

ARJANG ASSAD: Yeah. You transformed this.

AL BLUMSTEIN: And doing analysis. And one of the projects that we took on some time later was the design of a simulation program called JUSSIM, where we could see the effects of change in crime rates due to population changes, or due to law changes. The drug war started up afterwards, and drug war wasn't an issue for the Crime Commission. Drug war was a major issue starting in the late '70s and early '80s.

So what are the effects on the courts? What are the effects on prisons? And so we were able to play analyses and worked with a number of jurisdictions. But it was a very complicated system, but we were able to at least trace the flows as changes in one part of the system showed its

effects downstream, and upstream through the feedback of recidivism of offenders coming back and starting through new crime.

ARJANG ASSAD: Interdependencies.

AL BLUMSTEIN: The interdependencies of change in law, changes in population, changes in economic conditions, and so on. So that was one of the initial simulation models that we started with.

ARJANG ASSAD: Huge contribution. So when did that work kind of end as a Commission? Of course, you continued in that field thereafter.

AL BLUMSTEIN: The Commission had its report in '67, I believe. We started in '66. We had a task force on science and technology, separate report with our own analyses, again, emphasizing the total system, changes in the system as flow progressed through it.

Analysis of police patrol. Police patrol at the time was seen as uniformly covering the community. We recommended heavier patrol in neighborhoods of high crime as a natural observation. And there were lots of quantitative analyses that we started putting together.

Computers were just starting out, so we put a lot of emphasis on the role of computers. The capability for using criminal-history records nationally would have absolutely surpassed the computer capabilities of the time, whereas today, just a single large computer can capture all the criminal history records of the nation on the order of 100 million individuals.

One of the intriguing projects was undertaken by another member of the team. Ron Christensen was a PhD student at Berkeley at the time and in fact nuclear physics, but he had a law degree. So he was a great analyst. And he said, I'm going to get a measure of the chance that a male would get arrested sometime in his life. And the data were available to do that.

So Ron started that and he came out with an estimate of 50%. I was sure that he missed the point. I said, Ron, you've lost the decimal point somewhere. And he said, nope, 50%. I was sure it was like 5% because that was my intuition.

ARJANG ASSAD: Sure.

AL BLUMSTEIN: And sure enough, Ron was right. And that notion of 50% was fairly accurate at the time. That's before we started arresting for drugs. That's when driving under the influence of alcohol was a traffic offense, not a crime.

ARJANG ASSAD: I see.

AL BLUMSTEIN: That's when domestic violence was of no interest to police as a crime, when it was, it's your problem, lady. Move out. So there has been considerable increase in criminalization of many activities that people engage in.

ARJANG ASSAD: I see.

AL BLUMSTEIN: So that set us on the route to examining the nature of a criminal career. What's the nature of a person who-- what's the frequency of offending? If they do a high frequency of offending, we called it lambda. And criminology people didn't like the idea of having Greek symbols for anything. So there were people with a Stop Lambda button, with lambda with a big slash through it. But lambda was a typical symbol for the frequency of offending that we established.

ARJANG ASSAD: Did even the term criminal career exist? I think that came out of your work.

AL BLUMSTEIN: I don't remember if we originated, but it was a natural issue. How long do they stay offending?

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And our average was about five years for those who do property crimes and 10 years for those who do violent crimes, because that's more of them as opposed to opportunity. So that it opened the door to lots of measurement, using crime records of that many states and police departments hold.

And one of the issues that our task force took on, we started talking about criminal careers and offending. But there was some real concern about establishing a single database for the nation, because there was a lot of concern about the leadership of the FBI, which would be the location for that database.

ARJANG ASSAD: Interesting.

AL BLUMSTEIN: Because of J. Edgar Hoover, who was found to have used some of the data in the database for his political advantages. So one of the recommendations our task force came out with, not so much because of us but because of the advisory committee that encouraged it, was that the issue of crime statistics, of criminal history records, should be maintained at the state level, because you had to do it anyway because of computer capacity then. But it was because of a political consideration of not letting the FBI take over the power to carry that out.

ARJANG ASSAD: Very interesting.

AL BLUMSTEIN: So that was one of the interesting recommendations that our report had, but we were not sophisticated enough to deal with all of the political issues, political ramifications of that. We had the analytics that we were bringing to the table, but our advisory committee, that was very senior folks. Jim Wilson was a member, and a number of judges, and a number of other rather senior folks, and we were just young Turks.

It was also looking at the duration of the criminal career, and that information is very relevant to the duration of sentencing. Because if you keep people in prison for well beyond the end of their

criminal careers, you're occupying valuable prison space that you might otherwise use for high lambda, high offending-frequency people.

In any event, I was in Washington for a few years. Stayed at IDA. Maxwell Taylor, a major hero of World War II, was the president of IDA, and I was fascinated by the civil issues that RAND was already moving very aggressively into. And I wanted IDA to move into civil issues because the operations research that we had, we were looking at the criminal justice system. We could do otherwise with other systems. I was interested in transportation issues. He said, nope, we only work for the Department of Defense.

Moving to Carnegie Mellon

And so I started looking around. And at that time, Carnegie Mellon University had set up, through the gift of Richard King Mellon, who was the man who cleaned the air in Pittsburgh.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And who was the major philanthropist in Pittsburgh. He had given Carnegie Mellon $10 million to establish a School of Urban and Public Affairs. Bill Cooper, a major contributor to OR nationally, was at the business school, the Graduate School of Industrial Administration at Carnegie Mellon. He was the initial dean of the School of Urban and Public Affairs.

Most of the initial faculty came down from the business school. I was one of the first outsiders who was hired in. I was obviously interested in application to civil issues and had brought OR into the criminal justice system.

ARJANG ASSAD: Did Bill seek you out? Who came after you?

AL BLUMSTEIN: Bill called me and said, hey, I'd like to meet you. And we met at a bar in Washington. Bill did a lot of consulting in Washington and elsewhere, and we had a delightful conversation. He invited me to come up and give a seminar on work I had done at the Commission, and he ended up offering me a position.

And Washington had gone from John Kennedy to Lyndon Johnson to Richard Nixon at the time. Richard Nixon ended up, in retrospect from today, as a rather broad-minded president with lots of good stuff.

And academia seemed like an intriguing place at the time because we were going to start to do all the civilian related things. And he said, would you like to be a professor of criminal justice? I said I'd rather be a professor of urban systems.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: That would allow us to do a variety of issues in other areas.

ARJANG ASSAD: Which you were pushing for in IDA.

AL BLUMSTEIN: Which I was pushing for at IDA, but I didn't want to be limited. And one of the areas that I pushed for initially-- I came there in '69, almost 50 years ago today. Came in '69. Our first class entered in '70, so we were still formulating the curriculum.

And I pushed for project courses because I thought that would be a wonderful opportunity for students who had developed all the skills that we were going to develop in them. Lots of methodology, particularly in the first year, and they could apply it to real problems so they understand, before they went on the job market, what the issues were.

ARJANG ASSAD: Is that the course that you taught, the first course?

AL BLUMSTEIN: One of the courses I taught was a project course. And initially, those were one-year courses. Because of the demand of other technical issues, they shrunk it to one semester. And it's always been fascinating to see how students who knew nothing about the system we were going to look at.

The course was called Systems Synthesis. That allowed you to link to a need in the community and learn what the issues were. What were the subset of issues that you could do something about, analytically bring your skills to the table?

ARJANG ASSAD: What was a typical class size then?

AL BLUMSTEIN: The first class you had 12 students.

ARJANG ASSAD: 12 students. And they all worked on the same project?

AL BLUMSTEIN: And they all worked on the same-- no. There were one or two projects. I think, initially, there were two, but it was a little larger, so we ended up with somewhere between six to eight students per project. Class grew. Now, we have about 75 students in the public policy management program.

ARJANG ASSAD: Nice.

AL BLUMSTEIN: One of the intriguing first projects we did, I was interested in transportation. And the rules had been set so that people who were disabled in various ways, the bus had to be made available to them with their wheelchairs. They had to wait for the bus in their wheelchairs, get lifted onto the bus. It seemed so much more natural that there'd be some kind of van service known as paratransit.

Taxis were too expensive. Vans were reasonable. Bus was uncomfortable. So we established, designed, a van service that would go door to door. They'd have to call on a Tuesday if they want to go somewhere on Wednesday, go shopping, go to the hospital, whatever their transportation needs.

So we designed that and it was a worthwhile project. We tried to get the bus company to be on the advisory committee. We always had an advisory committee to heckle, and we tried to get people who had similar interests or conflicting interests, and so the advisory committee.

The bus company said, what are you doing? That's our business. And I said, come on, it's just a student project. Well, at some point, I had hired one of our graduates to be the project leader using a grant I had from the US Department of Transportation.

That project followed on for two years or so. And the bus company, after about a year and half said, hey, can we hire this guy? We'd like to develop and implement that system. And that system is called ACCESS, Allegheny County being the first two letters of that name, of that acronym.

And I've seen ACCESS systems in L.A. and a number of other cities that have, essentially, picked up on that notion and upgraded their ACCESS system.

ARJANG ASSAD: Allegheny County being where CMU is.

AL BLUMSTEIN: That's where CMU-- that's right. It's Pittsburgh. That's the Allegheny County Port Authority, that runs the bus system.

After 9/11, we saw the long lines being formulated at airports, so we designed a system in a student project, we designed a system called SWIFT, Short Wait something or other, where you would identify the people who were credible, who had a long history of traveling by air, and get them through a much more efficient system.

And we had a student project do that. We did a study of the queuing systems at the airport. And it seemed that you can move these low-risk people through much faster because they've been checked out previously. And we tried to tell TSA to do that. They said, no, we can't take any risk whatsoever. And they finally established it as their TSA pre-check program. Obviously, a lot of thinking went into it.

ARJANG ASSAD: After many years.

AL BLUMSTEIN: After many years. So we did a number of things and a number of things in criminal justice, looking at other ways to decide who goes on parole, and so on. So these project courses were intriguing and exciting.

Leadership in ORSA, TIMS and INFORMS

ARJANG ASSAD: It's a wonderful-- your contributions to criminology alone are just eye-opening to any person. I want to talk a little bit about other roles that you've assumed, especially in connection with OR. You've been the president of both societies, and then also the combined society. Am I right?

AL BLUMSTEIN: I think John Little and I were both presidents of ORSA, presidents of TIMS. And John was the first president of INFORMS and I was the second president of INFORMS. And it was clear that we saw the two competing in ways and would be much stronger, and we were both involved in the process of formulating INFORMS.

ARJANG ASSAD: Yes.

AL BLUMSTEIN: And with a number of other very good people. But it was an exciting time. Here were two organizations that were doing very similar related things, and it was important that the strength would be greater if you pulled them together.

ARJANG ASSAD: I recall Dick Larson was very actively campaigning for the merger.

AL BLUMSTEIN: Very much so. And the field is an exciting field and it and it continues to be exciting. Unfortunately, the term "operations research" is sufficiently cryptic that so much of the world doesn't know what the heck-- can't figure out what it means. Its researchers who did research on military operations, and military operations became generalized to operations.

But the term "operations research" didn't work too well. But INFORMS now, it has information and informing decision-makers about what to do, and that was much more useful with the acronym being Institute for Operations Research and the Management Sciences.

ARJANG ASSAD: And having gone to the first meeting of the Society, you have a very long perspective on the field. So what are some of your--

AL BLUMSTEIN: 60 years or so.

Evolution of Operations Research

ARJANG ASSAD: What are some of your reflections on how the field has evolved throughout your career? Good stuff and bad stuff - both, perhaps.

AL BLUMSTEIN: I think the modeling skills have become richer. The optimization capability has become much more targeted and effective. So much of the field, however, is targeted at methodological development. And one of the exciting features of the early years that I found exciting, and I think most of us at that time did, was the degree to which we could come to fields that hadn't had enough analytics to their development.

And it's been the process of bringing analytics to just a wide variety of social activity, industrial activity, private sector, public sector, and infusing a perspective of analytic perspectives. That's been fascinating, in terms of the degree to which Washington these days is not terribly willing to bring research, not willing to bring analytics, not willing to bring science to improving operations throughout the society to make it serve the public better.

And there's a thrust of knowledge being important in the rest of the country, but Washington and the states are picking up so much of that issue. States are doing analytics to a degree that's

comparable to what Washington has been doing. And I think improving state operations, despite some of the pressure from Washington in the period of the contemporary ‘16 to ‘20-- 2016 to 2020, where there's the “don't bother me with the facts, I know what I want to do”, in terms of policy.

ARJANG ASSAD: Devolution to the state level.

AL BLUMSTEIN: Devolution. And certainly, we see this in the criminal justice system, where 80% to 90% of the issues are state level issues. And so the rhetoric coming out of Washington is a very different nature than the wisdom in dealing with the one issue on which the left and the right seem to be able to agree on is reduce prison population, which is an issue that I've been pushing for about 25 years.

When I came to realize that, one of the first papers I wrote as a criminologist was the stability of incarceration rate at about 110 per 100,000 with a standard deviation of about 8%. Until it rose from 100 to about 500 per 100,000. That saturated in about 2000. But since 2000, the national incarceration rate dropped down to about 450 from 500 and has been astonishingly flat since then.

ARJANG ASSAD: Interesting.

AL BLUMSTEIN: Even though everyone feels that there ought to be a better way to deal with it and recognizes that it would make sense. And even in the Congress, it cuts across the parties, in terms of finding ways to deal with it.

Family

ARJANG ASSAD: We didn't get a chance for you to talk about your family. Do you want to make any additions to the chronology, in terms of the family aspect?

AL BLUMSTEIN: Well, when I was in Buffalo, I had a business trip to Boston because MIT and the MITRE Corporation were doing some interesting things related to defense matters that I was working on. And I called a friend of mine there and I said, let's have dinner. He said, that'd be great, but I'm engaged to this woman. But she's got a roommate who's pretty nice, and her name is Dolores. And so we had a delightful time together and I had an occasional, very occasional, trips to Boston. And we got together. And it was several months apart, so not much happened.

And then I went to graduate school from Buffalo in Ithaca and was there over the first academic year, and then working in Washington on a Navy task force over the summer. And Dolores told me that she was going to be working, doing some programming. There was a team at RAND that became SDC, the System Development Corporation. She was working for RAND at the time, programming the national defense against strategic bombing.

So we had time together over the summer. She was working in New Jersey and I could drive to New Jersey and meet her. And so we spent our weekends together. And then I was going back to

Ithaca and she had a choice of going to San Francisco or North Dakota or Syracuse. And she chose Syracuse, which was only an hour away from Ithaca, and so we got married that fall.

ARJANG ASSAD: Which year was this?

AL BLUMSTEIN: This was 1968. No, 1958. 1958.

ARJANG ASSAD: '58.

AL BLUMSTEIN: We got married--

ARJANG ASSAD: While you were still in school, yeah.

AL BLUMSTEIN: In January. We recently celebrated our 60th anniversary.

ARJANG ASSAD: Congratulations.

AL BLUMSTEIN: We got married in '58. In February of '59, we had our first daughter. In May of 1960, we had our second daughter. And in September of '61, we had our third daughter.

ARJANG ASSAD: You were efficient.

AL BLUMSTEIN: Our friends who had one boy seemed to be going crazy, but we had three girls and they were just utterly delightful. Two of them are now married and the first grandchild was a girl. We said, of course. And then bing, bing, bing, there were three boys, and they were fairly close together. They've all graduated.

I tried to talk the two older daughters into becoming engineers. They would have nothing of it. So I said, OK, you've got to do the daddy requirements. Got to do calculus, matrix algebra, statistics, computer programming. Then you can major in whatever you want. But the world is getting more and more quantified and you've got to deal with that.

And sure enough, they fought it, but we were able to do it. And they've been out doing their thing. Our third daughter, Diane, has been delightful and she didn't get married and so she doesn't have any sons or daughters.

ARJANG ASSAD: So four grandchildren at this time.

AL BLUMSTEIN: Four grandchildren, all of whom are out of college. Three of them doing quantitative analysis of various sorts. And one, his passion is filmmaking. He is now working on a movie with the director of Avatar, James Cameron.

ARJANG ASSAD: Yes, famous.

AL BLUMSTEIN: And he’s even moving well. So we think our family is great. We get together. They're scattered between Boston and New York, but we make sure we get together three or four times a year.

Pivotal Accomplishments

ARJANG ASSAD: Wonderful. I'd like to conclude with two questions. And I'd like to ask them and then you can answer them in any order you wish. One, I'm curious as to, given your long career in OR, if you were to single out just two or three major accomplishments that have given you, as a person, the greatest satisfaction personally, what would you pick? And why? And my second question is, what advice would you give to a fresh start in OR, somebody who's just considering starting out in the field of OR?

AL BLUMSTEIN: First, one of the things that I was able to bring to the table in a variety of ways was simulation. I wrote my first simulation program in machine language.

ARJANG ASSAD: Yeah.

AL BLUMSTEIN: All the variables were addressed by their addresses.

ARJANG ASSAD: I remember that.

AL BLUMSTEIN: Rather than by their name. And it was a fascinating task that a 23-year-old could do, that would drive anybody past 30 crazy nuts, in terms of trying to keep track of what variables were, as the systems got larger.

My master's thesis was a simulation of an airport landing at an airport.

ARJANG ASSAD: A runway.

AL BLUMSTEIN: The simulation of the controller saying, hey, you're too far to the east, get a little bit to the west. And so all of that was a simulation that I did as my master's thesis. That was absolutely fascinating and mind-boggling to keep track of all those registers that the variables were in. But that was an intriguing experience.

The other was the whole development of the notion of a criminal career, because it's the notion of modeling a very complex phenomenon, which is variable over individuals with strength. Arnie Barnett and David-- Arnie Barnett being a wonderful MIT statistician and David Farrington being a wonderful criminologist at Cambridge.

And I did a paper on the nature of criminal careers and the interruption. High frequency offenders, you could tell that they interrupted it because there was a longer than usual gap. If people had a low lambda, then you wouldn't detect the gap. But people would move in and out of a criminal career and how could you deal with that? So it was just the whole process of dealing with criminal careers that was illustrated by the work we did in that. So those were two very interesting modeling exercises that we were able to do using the data.

But throughout my career, I've been interested in what you do with it rather than the development of methodology. In part, I got trained at an early stage of the development of methodology. So the methodology of the field has become so much richer, so much stronger that I never had. So I was able to bring sort of the notion of thinking of systems, of thinking of problems to deal with real issues.

Now, there was a period of time when all of operations research education was developing methodological skills.

ARJANG ASSAD: Tools.

AL BLUMSTEIN: And I've described OR as lots of methodologies and no substance in the education field. And for many people, it's methodology and no substance. I think the substance has been so important and satisfying, in terms of its contribution to the world.

We are building methodology, but too much of that today is really at a margin, rather than bringing operations research to making the world a better place and a more effective place and a more efficient place, which is needed in so many ways. So I like the idea. Maybe it's my own personal inadequacies in advanced methodology, but I would like to see OR mixing the substance and methodology.

ARJANG ASSAD: And the optimum mix is defined by research impact.

AL BLUMSTEIN: By research impact and by individuals. There was a time that my university, Cornell, that my university was, essentially, in its faculty and its students, doing just methodology. I think they saw the wisdom of the balance between the methodology and the substance, that it provided a richer training, a richer orientation, and they now became Operations Research and Industrial Engineering.

And then they became Operations Research and Information Engineering, so that a realization that industrial is just one piece of the whole field of where operations research can make its contributions. And it's now got a rich balance of methodology and substance that has made it a very important institution in its time.

Advice to Young People Starting in OR

ARJANG ASSAD: That almost frames the answer to the second question I asked, advice to a young person starting in OR.

AL BLUMSTEIN: Well, I would argue that it would be well to really build a methodology because methodology is moving very fast, and particularly with machine learning and big data. The data available and accessible is so voluminous that you could do much more rich analysis with it. So certainly, most of your undergraduate education interested in OR should be one of building a methodology, but then recognize that methodology is applicable.

And you want to get some feel for that ability to bring all of these skills to make the world a better place that is more satisfying to you, that is more satisfying to what the world needs, and that is encouraging and growing the field of operations research, because we can be leaders in so many ways, in so many fields.

I feel that I've become a leader in the field of criminal analysis and criminal justice, not because I knew anything, but because I was able to bring skills and technical perspectives and analytic skills to dealing with issues that people hadn't been looking adequately about. And I think so many fields are still crying for the kinds of methodology that OR people can bring to enriching the world and enriching lives throughout.

ARJANG ASSAD: Which means you're bullish on OR, in terms of the OR future.

AL BLUMSTEIN: Absolutely.

ARJANG ASSAD: Al, I want to thank you for your time today, valuable insights, but also for your wisdom and contributions over six decades of doing OR.

AL BLUMSTEIN: Thank you so much.