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**TAPE RECORDED INTERVIEW PROJECT**

**Interview of Zev Levin  
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**Interviewer: William Cotton**

Cotton: I'm Bill Cotton, and it's April 22, 2007. So to begin with then, Zev, when and where were you born?

Levin: I was born in Israel, city of Haifa, December, 1940.

Cotton: And where did you grow up?

Levin: I grew up in Israel. For the first four years, I was in Haifa; then we moved to Jerusalem, and in 1951, we moved to a town outside Tel Aviv called Ramat Gan, where I lived until 1962, when I left to the United States to study for the university studies.

Cotton: So how did you get interested in science, and atmospheric science, in particular?

Levin: Well, I was interested in science all along. I was very interested in things that had to do with engineering and science in high school because I went to a technical high school, and in addition to the regular studies, I also concentrated on things that had to do with refrigeration and air conditioning. And I decided at that point to go to the United States to study engineering. And after about one semester in the university, I had a very good physics professor, who convinced me that I should better go to physics. I finished my first degree, my bachelor's degree in physics, with honors, and then I got into graduate school at the University of Washington in the physics department, intending to study nuclear physics. But shortly after I started, about a semester or two afterwards, I decided that this is not exactly what I want to do and I switched to atmospheric sciences.

The reason I got into cloud physics is sort of an interesting story by itself because I had a colleague in undergraduate studies who finished with me in physics and I asked him what did he plan to do, and he told me he was going to study at UCLA cloud physics. Well, I knew nothing about cloud physics and it sounded funny to me. But when I got to the University of Washington and to the Atmospheric Sciences Department, all of a sudden I saw a

laboratory by the name of cloud physics, so the bells in my brain start ringing and I made the connection and I found out it would be a very interesting field to study. And that is how I got into the field.

Cotton: As far as background, who were your parents and what did they do?

Levin: My parents immigrated to Israel from Poland. They came here primarily because they felt they wanted a Jewish state and so they decided to contribute by moving here themselves. They left their families back home and came here. Their whole family was killed during the Holocaust. My mother was a housewife all her life. My father was involved a little bit in politics, he was the head of something like a clinic, he was not a doctor but it was something like Kaiser Permanente. He was the head of this kind of a clinic in Israel. During the years he got involved a little bit more in politics, he was even a candidate for the Israeli Parliament at one point, but never made it actually, his party did not succeed in bringing in a number of candidates into the Parliament. My father died in 1956, I was 16 years old, and my mother started working to support the family since then.

Cotton: Good. I don't know---you mentioned on how you actually ended up going to the US in the first place for school.

Levin: I always wanted, my father had visited the States twice when I was young for different things that had to do with his work. This was fascinating because I had family in the United States, and I decided at one point to go and study in the US and this was just for curiosity, nothing else. I mean I could have studied in Israel, but for some reason I felt, I was just an adventurous young kid. And at that time it wasn't so popular like it is today to go travel around the world, so for me it was very unusual to take a boat, which took 15 days to get to America. So it was a challenge and I am happy I did it, I am very happy.

Cotton: So once you got into graduate school at the University of Washington, was there someone in particular who mentored you and influenced the direction of your research?

Levin: Well, once I got into cloud physics definitely Professor Peter Hobbs was my advisor, and he was the one who suggested some of the topics that I ended up working on. Among them, of course, was atmospheric electricity, which was my main topic for my PhD. But my research involved a number of other areas that had to do with hydrodynamics of interactions with particles and drops and ice crystals. And yes, Peter Hobbs and then another one was one of the associate members of the group by the name of Bill Scott, who was also one of my first mentors in graduate school. We kept in contact ever since, yes.

Cotton: What was the dissertation title and topic?

Levin: (phone rings) The dissertation was the hydrodynamic and electrification due to condition of, or splashing or water drops. The interest was primarily to try to understand how, when the water drops interact with ice crystals in the cloud when they splash and they break into smaller pieces. What kind of charge separation occurs, and trying to understand the mechanism in which clouds are electrified.

Cotton: So after you finished your dissertation, did you come back here to Israel or did you go on to post-doc?

Levin: I went on a post-doc to UCLA and I worked with Professor Neiburger at UCLA in the Department of Meteorology. I was in charge of the wind \_\_\_\_\_; they still have a vertical wind tunnel for studying interactions of cloud particles. I spent one year at UCLA, and after that I came back to Israel, but for the next three or four years I used to go back every summer to continue work on the wind tunnel.

Cotton: Now was this before Hans Burger?

Levin: This was during the time that Hans Burger was there. The laboratory was divided basically into two groups. Each one had about six weeks to work on the wind tunnel, and then had to withdraw and let the other group go in. And so Pruppacher and Neiburger were the two group leaders, and Ken \_\_\_\_\_ -- he was the one who originally influenced me into cloud physics. He was the guy who worked with Pruppacher and I was the one working with Neiburger. Circle closed.

Cotton: And after your post-doc where did you go and what did you do?

Levin: After my post-doc I came directly to Israel and was appointed as a what you call here, a lecturer, which is comparable to assistant professor at Tel Aviv University. At that time, the department was called the Department of Environmental Geophysical Studies. Later on the name of the department changed to Geophysics of Planetary Sciences, but it is basically the same department. So I have been here since 1971.

Cotton: What factors influenced the direction of your research?

Levin: Well, I actually taken the form myself to do a number of areas, to take a number of areas that have to do with cloud physics. One of them of course is weather modification, but more importantly atmospheric electricity, which was a direct continuation of what I did for my PhD. But some of the work that I did in UCLA entitled me to deal with some of the elements that had to do with the hydrodynamics of interactions of particles. I did some experiments in that. I was fascinated at one point in the mid-seventies by the idea that some biological materials could be very important for the frost that we find on plants in Israel, and so we begin studying the ice nucleation ability of some bacteria that we collected from some orange groves and avocado

plants here in Israel. This lasted almost thirteen years [that] we worked in this field. But simultaneously I did some work--and began working with American models. I had a number of PhD students working on some American models primarily for atmospheric electricity. One of my PhD students at that time developed a model that simulated some of the electrical processes that took place. And we published quite a lot during the seventies and eighties about atmospheric electricity. It was part of our main drive to understand this process.

Cotton: So how did you get into administration and what positions have you held?

Levin: Well, in 1985 I was elected to be the department chairman. It wasn't something that I was searching for but it was something that people were forced to take upon themselves when they reached a certain stage in their career. And this was after I became a full professor in 1984. A year later it was my responsibility to take on the department. And I stayed in this position for two years and at that point I was asked by the Director of Tel Aviv University to--he wanted to submit my name as a candidate for Vice President for Research and Dean of Research of the university. Reluctantly in the beginning, but later on I was very active and I decided to go with it, and I was elected for this position and I served for five years, which is the maximum allowed, which is two terms, three years and two years in this position. So this is what I did as the Vice President.

Then I finished with this job and in the year 2001 I was asked by the President of the University, the President of Tel Aviv University to take on a position to establish a new school for Environmental Studies. The objective of the school was to be something different than what normally happens in universities, something that actually breaks down the barriers between different faculties. The objective was to have a special curriculum that allows students from different disciplines all the way from social sciences, law, medicine, whatever, to take on a basic curriculum, core courses which would prepare them for an advanced degree in environmental studies. And I was the head of this school for four years and finished it in 2004. Sorry, 2005. 2005, I finished, and that was my administrative responsibility in the university.

Cotton: Were you able to sustain a research program along with being an administrator?

Levin: Yes, I did sustain my research program, my laboratory was working continuously. I had students all along. Of course it was much more difficult and my students had to suffer a little bit for the lack of direct access to me on any day, any minute of the day, but I managed to spend time every week in my laboratory. At least once, one day a week, and my office was always open for questions. So, yes, I did maintain my research.

Cotton: What do you see as your greatest accomplishments scientifically?

Levin: Well, we've done a lot of work in a number of fields. I never concentrated in one area. I was always interested in spreading my wings over a fairly wide--many topics. I would say that in the seventies, I think that my contribution to atmospheric electricity was significant, primarily because we tried to promote certain mechanisms for charge separation in clouds, which generated a lot of discussion in various conferences and published in the journal, in scientific journals. I think our work in ice nucleation, which actually took place during the late seventies and eighties, I think was fairly a milestone in my career. Not too many people at this time dealt with this subject and it is interesting that now in 2007 there is a renewed interest in the whole subject. Groups from all over the world are beginning to look at it again, so I feel that our work at that point was not pioneering, but among the pioneers in this field. We have done a lot of work in numerical models and I think that we have contributed a great deal to the understanding of how clouds precipitate. With special emphasis, I would say, some years on the role of cloud seeding for enhancement of precipitation. I think we have done some work there. One of the elements that I think we can be still proud of is some of the work that we did on dust in the atmosphere. We have done a lot of work on dust, the effect on precipitation, we did some analysis on chemical composition of dust particles and discovered that many dust particles are coated with soluble materials which actually are very good materials for producing cloud drops, primarily giant cloud drops. And these have a very important effect on precipitation development and ramification also for climate change and so forth. So these are some of the main topics I think that--

Cotton: Well, good. What then would you say are your greatest accomplishments in administration?

Levin: In administration, I think I have done actually quite big for Tel Aviv University. Something which was not very popular here is to allow professors to develop ideas into commercial products, and I initiated a special format in which the university will encourage university Professors to develop things in the form of spin-off companies out of the university. This is something that today already routine, but at that time it was something absolutely new that had never been done before. In fact, they frowned upon people from the university developing something commercially. So today this is one of the things that I think I can say that this is something that I started.

I developed a certain method which allowed the university to reward professors who bring a lot of research money to the university by allowing some of the overhead of the university to be returned to the research group. This way to encourage professors to submit more and more research proposals and this is something that is still working today almost seventeen years after I did the job.

I think one very important thing that I am very proud of is the establishment or development of the School of Environment. I think the school at this moment seems to be flourishing, and there are something like fifty graduate students already in this School. There is quite a lot of money that comes from a donation that started the whole school, but also I established the connection with foreign governments and I managed to get something like over two million dollars from the Italian government for environmental research in our university. And some of the groups that are working on this collaboration are still benefiting from this particular connection. So these are some things that I did for administration here.

Cotton: Well, good. How about accomplishments as an academician?

Levin: In addition to the research that I mentioned before, I think that I can say that I am proud to be the godfather, or the advisor, for about fifteen (?fifty) PhD students who finished their degree under me, and maybe the same number or maybe a little bit more of master's students that finished over the years here.

Cotton: Are there any students in particular that you are especially proud of?

Levin: Yes, there are a few students that I am especially proud of. And one of them is in Colorado, Graham Feingold, one of my prime students who actually came here as an undergraduate from South Africa, and had difficulty with the Hebrew and managed to get his first degree in our department and then got his master's degree under my supervision with distinction and then finished his PhD with distinction also from our department and he is presently in NOAA Colorado. This is one student and I have others like Tamir Reisin and I have Yoav Yair, and a few other bright promising students.

Cotton: Well, this may be a topic that you'll be a little uncomfortable with, but could you tell us about your involvement in the Columbia Space Shuttle Program, and how it affected you?

Levin: This is a very sad story. We were asked at one point to submit a proposal for research that could be done with an Israeli astronaut, the first Israeli astronaut in space. We were--three of us actually here in the department under my initiative submitted a proposal to study dust from space. The idea was--two objectives. One of them was to study the microphysical properties of dust storms as seen as from both, in situ from an airplane and from a spacecraft looking from above, and to try to correlate the two measurements. The idea was to help in this way to help master calibrate some of the satellites that are sometimes looking at the same dust storms, but with different wavelengths, at different times of the day, at different angles, and very difficult to correlate and measurement. The idea here was to have an airplane fly at the top of the dust storm initially, as the shuttle moves overhead and then compare and then compare it what the shuttle measures with what from the airplane measures below. Everything worked very well except that over the years this always

happens at NASA, the shuttle, the mission, the launch was delayed five times. In the end it was launched in January 2003, and we had some very good measurements on board the shuttle, and unfortunately, as we all know, the shuttle crashed on the way down and seven of our friends were lost. So it affected us very, very strongly; the first year we were really almost paralyzed here, we didn't know exactly how to deal with it. We slowly decided that our mission is to devote all the work that is related somehow to the space experiment to dedicate it to the name of the astronauts. We have published a number of articles already, both about dust and sprites in the upper atmosphere, all dedicated to the seven astronauts.

Cotton: And did you lose some data in the process, too?

Levin: Oh, we lost a lot of data. Primarily the data on the dust, we lost. We did not lose the data on the sprites, which was transmitted to ground online during the shuttle flight. All this data was received and we did not lose it. But the data on the dust, especially some measurement that we carried out in the Eastern Mediterranean, all of these were lost.

Cotton: Would you want to tell us about your retirement plans and goals?

Levin: Well, I am retiring this coming October and I am planning to continue to do work, almost as before. Some people tell me I will finally do more, work harder. But I hope that I will be able to devote my time to research, family, travel. That is what I hope to do.

Cotton: Any other comments you would like to make before we close?

Levin: No, I think that I summarized my life in a very short... I would just like to make a comment that the background music that you hear today is the memorial day for the fallen Israeli soldiers over the years from the beginning of Israel until today. Tomorrow is a very sad day, but today they are going to have a special ceremony in the University and the background music that you hear is preparation for the ceremony, which will take place in about an hour or so. So this is a special day for us here.

Cotton: Well, thank you. This concludes the interview with Zev Levin.

## **END OF INTERVIEW**