

Interviewee: Matthew Allen

By: David Zierler

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ZIERLER: Okay. This is David Zierler, oral historian for the American Institute of Physics. It is May 19th, 2020. It's my great pleasure to be here today with Doctor Matthew Allen. Matthew, thank you so much for being with me today.

ALLEN: Oh, it's a pleasure. I hope I can remember things accurately.

ZIERLER: Okay, great. Alright, so to start, tell me your title and institutional affiliation.

ALLEN: Well, I joined SLAC as a staff member. The storage ring group. And I ended up as an associate director when I retired.

ZIERLER: And so is that your title now? Associate director emeritus?

ALLEN: Yes.

ZIERLER: Okay, good. Now, let's take it right back to the beginning. Tell me about your family background, and your birthplace, and your childhood.

ALLEN: I was born April 1930 in Edinburgh, Scotland. I was delivered at home by a midwife, and I grew up in Edinburgh. And I went to a school called George Heriot School, and I graduated 1947, I started at the University of Edinburgh.

ZIERLER: How much of your life was affected by the war?

ALLEN: Well, I was evacuated because Edinburgh was not a target for Hitler's Blitz. The war started in September the 3rd, 1939, and but I was evacuated about September the 1st to a village about (laughs) you won't believe this, about eight miles outside Edinburgh. And I was put up with a family there. And my older sister was with me at the time. She was one and a half years older than me. My mother was with my younger sister, who at that time, was five years old. And so she was separately given an apartment in Penicuik and evacuated there. I just had, I think, a pretty normal childhood growing up in Edinburgh despite the war.

ZIERLER: What kind of high school did you go to? Was it private school?

ALLEN: Well it was a particular institution in Scotland. It's called a trust, it's run by trustees. It's just really a private school. And it was originally founded in 1628 by the jeweler to James the 6th of Scotland, who became James the 1st of England, and he was a very wealthy man, and he left his

estate to found what was called George Heriot Hospital. And it was for orphan children. And still to this date, if you're an orphan, if you're fatherless or motherless, you don't have to pay tuition. The tuition, at least when I went, was pretty nominal, about one pound a quarter. It was from 1st grade to high school which had an entrance exam. And I graduated from there in '47. I was 17. And I went to the University of Edinburgh. My first year there was in the arts division in natural philosophy, which was physics, and mathematics, but the following year, I transferred to the sciences division. And I went, I became just a physics major. Physics-- Natural philosophy in the arts department, physics in the sciences department.

ZIERLER: What was the difference between the two?

ALLEN: They were the same, really.

ZIERLER: (laughs) Okay. Why did you make the switch?

ALLEN: Pardon?

ZIERLER: Why did you make the switch?

ALLEN: Because I was more interested in physics and mathematics.

ZIERLER: I see.

ALLEN: Physics was the main subject mathematics was a tool. But not my planned profession.

ZIERLER: Right, right. So what were, if you can remember as an undergraduate, what were some of the exciting things that were going on in physics during your time there?

ALLEN: Let me see... I think the discovery of the Appleton layers, the layers for reflecting radio waves from the upper atmosphere, so the way it can be transmitted around the world. I think that was mainly atomic physics and the atomic bomb!

ZIERLER: And then, at what point did you decide that you wanted to pursue physics for graduate school?

ALLEN: Well, I developed an interest in microwave physics, and microwave electronics I took a post-graduate course after I got my four-years BSc degree in physics. And I developed an interest in microwave physics, At that time, the Korean War was on, and I could've gotten a reserved

occupation, but I was drafted. And I went in as a private, and I was selected for officer's candidate school, so I went to officers candidate school. I was stationed in Devon to start with, then I went to officer's candidate school in Chester in England. And then after that, I did further training in radar, at that time I became a radar specialist, and my final job for the last seven months of my two years' stint, was heading up a light aid detachment for an artillery regiment. I was in the Royal Electrical and Mechanical Engineers (REME). We provided support for the artillery, for their radar artillery and their vehicles. I was stationed with the regiment in Chester as well as my officer training was in Chester. And also my final posting as a regular lieutenant was in Chester as well.

ZIERLER: So this was all domestic? You never went abroad during the war?

ALLEN: Pardon?

ZIERLER: You never went abroad?

ALLEN: No. Fortunately, the officer's candidate school I went to, it was mainly infantry, because... I was put in infantry one because the REME had to defend their workshops in the field. So that's why they were given infantry training. And in the assembly hall there, every day there was another second lieutenant's name went up who perished in Korea. So I was fortunate not to be sent to Korea.

ZIERLER: When did you leave the service?

ALLEN: January of '55, after the required 2 years.

ZIERLER: Mmhmm, mmhmm. And--

ALLEN: I was there--

ZIERLER: Please.

ALLEN: I was there during the coronation of Queen Elizabeth.

ZIERLER: Oh wow.

ALLEN: So she's in her 90s now. And anyhow, my younger sister had married an American GI. Actually, he was a physician who was doing his two years military service. And he was stationed in Scotland. And my sister met up with him and they married and they moved to San Francisco, and he had already done his internship. He was a otolaryngologist. Ear, nose, and throat guy.

ZIERLER: Okay.

ALLEN: So he set up a practice in San Francisco. Anyhow, after I got out of the army, I wasn't sure what I wanted to do. My father was very much pro-America, and he urged me to go to the United States.

ZIERLER: Did he urge you as a matter of furthering your education specifically, or did he just think that there was more opportunity generally in the United States?

ALLEN: Well, he just generally thought there was more opportunity. So I applied to the American Consulate in Glasgow. Fortunately, I didn't just apply for a visitor's visa. I applied for an immigration visa. In those days, it was dead easy if you came from Britain or northern Europe. There was a quota system, but it was very much biased in favor of those countries. So I think it took me a month to get an immigration visa. It would have taken me two weeks to get a visitor's visa.

ZIERLER: Sure, sure.

ALLEN: I was booked on the Queen Mary to go across to the States. However, I boarded the ship in a late afternoon, and I got my cabin and I went to bed. And I woke up in the morning, and we were still dockside. It turned out, in the ship stewards had gone on strike.

ZIERLER: Oh no.

ALLEN: A lot of labor unrest in Britain. So the passage was canceled, and the airline arranged for a flight to fly us out. So I flew to New York, and in New York, my mother had a brother who lived there. And so I met up with him and I stayed in New York for a while. And then I had a former friend who was at medical school at Edinburgh, and who was in practice in Chicago, so I went to Chicago for a while. And then I took the California zephyr from Chicago to San Francisco, a We stopped i in Denver before we went over the Rockies, and we had an observation car in the train, so we went through a train wash to make sure the windows of the observation car were clean when we went through the Rockies and then we went through the Sierra Nevada, and we ended up in Oakland.. Though it was no service to San Francisco. But we went by ferry from San Francisco-- From Oakland to San Francisco. So that's a marvelous way to approach San Francisco. It was breathtaking. And it just so-- Yeah?

ZIERLER: Matthew, what was your game plan during these months? When you got to America, when you got to Chicago, what were you thinking you were going to do?

ALLEN: Well, I knew that Stanford was very heavily involved in microwaves. So I went down to Stanford and I interviewed with the chairman of the physics department, and he was quite impressed with me, and I was provisionally accepted in graduate school. Pending getting all the documentation over from Edinburgh.

ZIERLER: Now, he was impressed, I assume, not so much with your undergraduate degree in physics, but with your experience during the war?

ALLEN: No, the undergraduate.

ZIERLER: Oh, really?

ALLEN: In physics. They were very much... I think that they held physics degrees from British Isles in quite high regard.

ZIERLER: Uh-huh, okay. Interesting. Interesting. So did you know when you came to New York that ultimately pursuing a graduate degree in physics was part of the plan? Or you sort of made that up along the way?

ALLEN: Oh that was sort of made up along the way. (both laugh)

ZIERLER: Okay.

ALLEN: I just grabbed an opportunity when it--

ZIERLER: Do you remember who it was, who was the professor that you interviewed with initially at Stanford who was impressed with you?

ALLEN: It was a gentleman called Leonard Schiff.

ZIERLER: Oh yes, of course. Leonard Schiff. That's a good person to impress. (laughs)

That's a good person to impress.

ALLEN: Yeah. Well, he unfortunately, he died at a relatively young age.

ZIERLER: Right, right.

ALLEN: You know, so... So it was Leonard Schiff. Anyhow, I was suggested that I go over to the microwave lab and so I went to the microwave lab and that was... I don't know if you know a person called Ginzton?

ZIERLER: Yeah, sure.

ALLEN: Ed Ginzton, he was the head of the microwave lab. And they had a lot of government contracts at that time. So I got a job there as a research assistant. So but during the summer, I was full time as a research assistant. And I rented a room and then a house at Palo Alto.

ZIERLER: And you were a full time student also in the program?

ALLEN: No, when the academic year started, in September, I became half-time. I was half-time a research assistant and half-time a graduate student.

ZIERLER: And so what year was this, when you started as a student at Stanford?

ALLEN: '55.

ZIERLER: Okay, 1955. And so who were some of the professors that you became close with?

ALLEN: Marvin Chodorow, Ed Ginzton, Felix Bloch, he was a professor at the time.

ZIERLER: Yeah, wow.

ALLEN: Yeah. And let's see, who else? There was a guy who went to Columbia and he got a Nobel prize. I forget his name now. He was also a professor there at that time.

ZIERLER: Okay. It'll come to you.

ALLEN: It'll come to me, so... Yeah, so.

ZIERLER: And how did you go about developing your dissertation topic?

ALLEN: Well, I was fortunate to have, well, at that time they were very much into high-powered klystrons. The klystron was invented at Stanford, you know. So there was a high-powered klystrons.

So I worked on the theory of coupled cavities for high-powered microwave klystrons in traveling wave tubes. So that's... I was fortunate to have a very good thesis advisor. Well, my official thesis advisor was Marvin Chodorow.

ZIERLER: Okay.

ALLEN: But I worked with a research associate of his Gordon Kino. And Marvin was my official professorial-- because this guy was a research associate, he couldn't sign my thesis. He did a stint at Bell Labs and returned to Stanford and had a distinguished career as an EE professor So anyhow, I fortunately, managed to pass the qualifying exams. And I became a PhD student.

ZIERLER: Well before, Matthew, before we move on, what was your dissertation on? And what did you see as its contribution?

ALLEN: it was the theory of, for developing wide-band traveling waves tubes. The theory of long slot coupled cavities as a circuit for high-powered microwave tubes. And was used in accelerating cavities in high energy electron storage rings. And fortunately, it was also under a government contract, so my thesis was also a government report.

ZIERLER: And in what ways did you see, either then or in retrospect, in what ways did your dissertation contribute to the field?

ALLEN: I think high-powered traveling waves tubes were better understood. Because of this.

ZIERLER: I'll push you on that. How were they understood better?

ALLEN: Well, they... What went on in the cavities sort of limited the gain of the traveling wave tubes. And they better understood how the electromagnetic waves behaved in the circuits, the higher gain and higher power tubes,

ZIERLER: And what year did you defend?

ALLEN: '59.

ZIERLER: 1959. So I have to ask, during this time, was Sputnik, was that a big deal for you either personally, or did you feel the presence or the impact of Sputnik on campus in the physics department?

ALLEN: Yeah. Sputnik happened, I think, in '57, didn't it? I think while I was a graduate student then. Microwaves were very well-funded after that time.

ZIERLER: Right, right.

ALLEN: Right. Let me say, 1956, a young lady came as a graduate student from back east, a Bryn Mawr graduate and a resident of Queens, New York name Marcia Katzman And we got friendly, and I got engaged, and we got married in 1957. And she was a biologist, and she worked on her PhD. But in 1959, when I finished up and got my PhD, Marcia was still working on her research. So I got a job as a research associate in the microwave lab, and we settled down in Menlo Park in California.

ZIERLER: Were you continuing on with your dissertation research, or were you doing new projects at that point?

ALLEN: I changed different subjects. I got interested in beam plasma interaction. It was still the holy grail of getting coherent microwave amplification out of interaction of an electron beam with a plasma. But I did some of the early work there, early plasma work. And then, I got to know another electro-engineering graduate student at Stanford, and after he left Stanford, he went back east and worked for a company called Microwave Associates. And he recruited me to go to Microwave Associates, in the Boston area. So we relocated to the Boston area, and my wife got a job as a post

doc at MIT, in her biological work, I continued plasma interaction with Microwave Associates. And then, a former colleague at Stanford, at that time the linear accelerator, was being built--

ZIERLER: And what year would this have been? Just to orient the narrative.

ALLEN: This was in. '65.

ZIERLER: '65, okay, right.

ALLEN: I'm in Massachusetts from '62 to '65.

ZIERLER: Okay. And who was, do you remember, who was that colleague at Stanford that clued you in on this?

ALLEN: What was his name?

WOMAN: [inaudible]

ALLEN: No, no. Who got me into microwaves in Boston? Or you mean the person who got me back to Stanford?

ZIERLER: Yes, correct. The person who got you back to Stanford.

ALLEN: It was a person called Greg Loew.

ZIERLER: Oh, okay, yeah, Greg Loew, sure. Sure.

ALLEN: You know him.

ZIERLER: Of course.

ALLEN: At that time--

ZIERLER: What did he have to tell you? Did he say this is a really big deal, and you should come back?

ALLEN: They were looking for an RF guy to join the storage ring group. Burt Richter was trying to get people interested, or get Panofsky in developing a storage ring, electron positron storage ring to sort of be useful for physics research and--

ZIERLER: And Burt Richter was heading the group on the storage ring at this point?

ALLEN: Yes. Yes. And they were, well let me see, when I joined in 1965, SLAC had a summer study group sponsored by the research division to look into what might be done with storage rings. And I can read out the name of some of the people who participated in that group. There's Jerry Friedman, who worked-- Henry Kendall, who eventually got a Nobel prize, somebody called Richard Plano, Melvin Schwartz. I think eventually got a Nobel prize. And then a professor called Mark Ross at the University of Michigan, and Daniel Green at University of Rochester. I'll just tell you some of the people who were at this summer study. Might be of interest to you. There was somebody called Phil Morton who was a theorist in accelerator physics. Everhart Kyle, who was a prominent member of the accelerator physics at CERN. Arnold Shoch, also from CERN. I don't remem-- you probably don't know many of these people, but let me... Amos Shallid from the Weizmann Institute. Gary Feinberg from Columbia. Frank Von Hippel from Cornell. Let me see some of the other people that were there. A guy from Russia called Churikov from Nova Sebius. And I guess that's it, had a lot of other people.

ZIERLER: Sure, it's a lot.

ALLEN: And, what we came up with was two separate rings. One for electrons and one for positrons. And the various positions they bent the beam, and they had collision points, so they were asymmetric. So it was the Stanford Positron Electron Asymmetric Rings. And that's why they got the name SPEAR. Although it ended up as a single ring when it was-- But it still kept the name SPEAR.

ZIERLER: And you got there in 1965?

ALLEN: '65.

ZIERLER: And how far-developed was SPEAR at this point? I mean, were you really involved in its creation, or was it already up and running at that point?

ALLEN: No, it was just in early design concepts they had this summer study. It wasn't up and running,

ZIERLER: It was conceptual?

ALLEN: Conceptual thing, yeah.

ZIERLER: And what was the transition? What actually happened so that it moved onto getting built?

ALLEN: Well, we had trouble getting the Atomic Energy Commission to fund it. So the group was pretty much disbanded, and I went to accelerator physics and did some other work there. But Burt Richter, who was very clever guy, persuaded the people in Washington to fund it just as an experiment. As an equipment project. And there was still, after the war, there was still surplus equipment around all over the place, and we managed to find some power supplies to run the magnets and, let's see, I think we built the whole thing for about seven million dollars or something, yeah. And I'll tell you a little story about myself.

ZIERLER: Please.

ALLEN: I needed a radio transmitter to energize the RF system of the storage ring. And I was told that there was a surplus equipment from something that was called the dew line. You know, that was supposed to defend us from over the arctic, missiles from Russia. And it was in this warehouse in Washington. So I went and I took the red eye from San Francisco to Washington, and I'd had a briefcase with me, and I was advised and I was told that these warehouses are pretty dark places, you bring a flashlight, and the stuff you're going to see might be crated up, so you should bring a

crowbar. So (both laugh) with a flashlight and a crowbar, and I think some change of clothes I might have needed or--

WOMAN: No, just a shirt.

ALLEN: Pardon? And I went to this warehouse and I opened this crate, and you know it was, this is just real government stuff. It was crated up for the tropics, although it was all covered with desiccants and wax paper and stuff like this. Although it was supposed to be originally for the arctic. And anyhow, we were successful in acquiring this equipment. And we shipped back, and we modified it to be the RF power source for the storage ring. And I was very fortunate to have assigned to me a very knowledgeable RF engineer, who really helped me tremendously. And got this transmitter, he used tetrodes or something like that to, I think it was originally designed for something like 20 megahertz. And we managed to get it to work at about 60 megahertz, because that's what the cavity we were designing was. And his name was Roger McConnell.

ZIERLER: Okay.

ALLEN: Unfortunately, he's no longer living with us now, but he was a really a Renaissance man. And he really was very helpful.

ZIERLER: Matthew, what were some of the major research questions that the storage ring was designed or was hoped to answer as a result of its successful operation?

ALLEN: I mean, I was an accelerator physicist. You know, so the beams that collide and it means the center of mass energy was very high. Maybe you heard this in some of the other oral things about this. The center of mass energy was higher. From this, the electron and positron annihilated, and you've just got a burst of pure energy, and you know energy transforms into mass, and from this these new particles were created, this significant particle for which Burt Richter was awarded the Nobel prize.

ZIERLER: Right.

ALLEN: And also back in Brookhaven, there was another experiment going on with, not as clean as that, with protons. And Sam Ting also shared the Nobel prize with him, because he was recognized for also discovering the particle but gave it a different name. I think it was called the psi there, or no we called it the psi. I forget what they called it. It was something else, but anyhow, they shared the Nobel prize.

ZIERLER: And did you work closely with Burt on a daily basis?

ALLEN: Well, the thing about Burt's management style was such that he left it up to you.

ZIERLER: Okay.

ALLEN: But he was always there if you were sort of stumped or get into trouble. He was always there. So he was, that was part of his secret to success. He was a very good manager.

ZIERLER: And Matthew, give me a sense of the day-to-day. What did your day look like on any given day when you were working on the storage ring?

ALLEN: Well during the day it was usually modifying this equipment that we got from the Navy in Washington. And developing the cable that would take the RF power from the transmitters to the cavity that was in the storage ring. The equipment was in the housing adjacent to the storage ring. And the storage ring was shielded. So day-to-day work was getting the transmitter to work, getting the tuners to work in the cavity and also there was another person who was, I don't know, you probably couldn't interview him because he is no longer living, but probably you heard his name mentioned quite a bit. John Rees?

ZIERLER: Of course, sure.

ALLEN: He was a straw boss of the, you know, for the Ring construction. But he was also a former RF man. So he was a pretty good help to me. You know, so we became quite close friends.

ZIERLER: And were there prominent visitors who would come to SLAC who were interested in the storage ring?

ALLEN: Yes. Yes, yes. The accelerator physics side, I had more contact with the accelerator physics types, but the high energy physicists were mainly a team from Lawrence Berkeley from Stanford. It was, Burt headed up something called Experimental Group C. And that was where the storage ring started. But then it became a separate thing. But then, let me go on a few years later, what happened was there were two separate accelerator physics types. There were the people who developed the storage ring, and the people that developed the two-mile accelerator. The accelerator physics, not mechanical engineering. But the head of the technical division at SLAC was somebody called Richard Neal, Dick Neal. I don't know, you probably came across him.

ZIERLER: Yeah. Mmhmm.

ALLEN: And he retired and while Panofsky still had another couple of years to go, so Panofsky picked Burt Richter as the head of the technical division.

ZIERLER: Was your sense that Pief was grooming Burt to take over eventually? Was that part of this decision?

ALLEN: Yes, yes. I think that was probably the case. But Burt didn't need much grooming. (both laugh) Pief was sporting a winner, you know, with the... (laughs) So anyhow, Panofsky was very selfless, you know. He just allowed people to do the great work and he was an enabler, but not in the details. So he really was probably in a way should have got the Nobel prize many times over. Let me see, where was I? You wanted to know for the... Anyway, how, yeah. Burt Richter wanted to combine the accelerator physics with the accelerator from the storage ring group, and he asked me to head up the group. But--

ZIERLER: What do you think his motivation was in doing that?

ALLEN: Well, to get the most out of the people.

ZIERLER: Uh-huh, I see. So you're saying it was a bureaucratic move more than a scientific move?

ALLEN: Well, it was scientific. Yeah, I wouldn't call it quite that. But let me give you, back up a little bit. Why he finally chose me. During that time that the storage ring was running nicely, and

then we worked on a higher-energy storage ring called PEP, Positron-Electron Project. You probably, some of your people talked to you about that.

ZIERLER: Sure.

ALLEN: I worked on that as well. And that was the accelerator people from the storage ring were the main driving force behind that. My work was less intense at that time. So I got involved, I was living in Mountain View at that time, and I got involved with a group that was involved with setting up a regional park district. You know, and actually Roger McConnell was also involved in that. So I was involved in that and it was a government agency that had to be set up. So one of the things is that all the local jurisdictions had to approve of it. Mountain View, Palo Alto, Sunnyvale, Santa Clara San Jose, I think were the main ones that were involved. So, and I'll get to the point in a minute. So anyhow, I went to the Mountain View city council, and it wasn't too difficult to persuade them to support it. Anyhow, one of the council members took me aside afterwards and said, "Look, we are expanding the planning commission and we are looking for additional people to join, and "I think that," he said, "that you should apply." So I applied and I served on the Mountain View planning commission for about three and a half years. And there was a group in Mountain View, mainly the League of Women Voters, and they were somewhat dissatisfied. They thought that the city council was not responsive enough to the citizens. They were looking for other people to run against some of city council. So I was one of the people that they selected. So I ended up on the Mountain View city council. And I served there for eight years. And two of those years, I was the Mayor of Mountain View.

ZIERLER: Oh boy.

ALLEN: And that was the thing, that Burt said, "Well, look, if you can be Mayor of Mountain View, you can get these two factions together." So that's how I became a Technical Manager.

ZIERLER: (laughs) That's great. And so you're still full time at SLAC during this time? Or did you take a leave of absence?

ALLEN: No, no, no. Because it was, the city was run by a city manager.

ZIERLER: Right, right.

ALLEN: And the city council appointed the city manager, and the city manager hired the police chief, the fire chief, public works director, et cetera, et cetera. We had the city attorney and the city clerk. They were the ones that reported to the city council.

ZIERLER: Right. So did you make good--

ALLEN: The meetings were mainly in the evening. And when you're a mayor, it was mainly ribbon-cutting.

ZIERLER: Did you live up to your political reputation at SLAC? Did you accomplish what they hoped you would accomplish?

ALLEN: I think we did. But the other thing that was... I don't know if you've been looking up the whole of SLAC?

ZIERLER: As much as possible, yeah.

ALLEN: Yeah. Well, you knew about the, what's it called? The... I forget what it was called now. It was in which they got electrons of very high energy and got them to collide, and that was also made some significant work. SLAC linear collider

ZIERLER: That's right, it'll come back to you. That's fine. And so to orient us in the narrative, in the chronology, roughly what years are we talking about now?

ALLEN: Well, this was '80... I think, let's see, Pief retired...

ZIERLER: Early 1980s?

ALLEN: I think was early 1980s, yes.

ZIERLER: Okay.

ALLEN: I think '82, I think. I think about '82.

ZIERLER: Matthew, can you talk a little bit--

ALLEN: There's a-- Pief retired I think '84.

ZIERLER: Right, that's right. So--

ALLEN: Is that right?

ZIERLER: Yeah, he was. I think it was '84. Can you talk a little bit about when Burt succeeded Pief? Did you see things essentially, was Burt's mandate essentially to keep the ship running as it was? Or do you think he was looking to take SLAC in new directions? Or maybe perhaps a bit of both?

ALLEN: Well, this is the-- I don't know if you investigated the, how photon physics came to SLAC? You did, I guess? Well, Pief was still very much into...

ZIERLER: High energy.

ALLEN: Particle physics, high energy physics.

ZIERLER: Right, right.

ALLEN: And Burt was as well. but as the... I can't remember when the photon physics group was put together, but it was, you know, it ended up, it was the tail of the dog, it ended up wagging the dog.

ZIERLER: Right, right. I've heard that, right.

ALLEN: Yeah, you've heard that. Right. And so, but that's another story. I guess, who have you been talking to on this? On the... Have you been talking to people like Herman Winick?

ZIERLER: I have not talked to Herman yet.

ALLEN: I think he'll be very productive for you.

ZIERLER: Okay, okay. I'll make a note of that, that's good. That's good.

ALLEN: Yeah. And there was somebody called Gerry Fischer who was also on the storage ring group. And he was involved in the early days. You know, the first light beam that was taken out of SPEAR was put in a Sears garden shack. It was put on top of the housing of the SPEAR storage room. Have you heard that story?

ZIERLER: I have not heard that story.

ALLEN: Yeah. And so people like Tony Ackland, I fear the other guy is not living now. Seb Doniach and Arthur Bienenstock, they were the people that--

ZIERLER: I talked to Artie. I interviewed Artie.

ALLEN: Oh you did?

ZIERLER: Yeah, yeah.

ALLEN: Well, he probably interviewed very well.

ZIERLER: Ha. He certainly did. (laughs)

ALLEN: Yeah.

ZIERLER: So we're in the mid-1980s, and so my question was about Burt and when he took over and how that may have changed SLAC's focus to some degree.

ALLEN: There was this other big project, SLC, SLAC Linear Collider. Yeah, SLC, that was it. And I got involved in another way. We wanted to upgrade the klystrons for SLAC. So we developed a relativistic klystron. Let me see here... It was the SLAC Linear Collider. We needed the klystron, it was at 2856 megahertz, which was the frequency of the accelerator, and it put out about 67 megawatts. And we started, it really got into trouble. The project. Because the klystrons were failing. The windmills were cracking, you know, so they were failing, so at that time, there was somebody who Burt hired as head of the technical division. I don't know if you heard-- did you come across a guy called Kaye Lathrop?

ZIERLER: Yes, yes.

ALLEN: I don't know if you interviewed him.

ZIERLER: I tried, I was not able to. But yes.

ALLEN: Yeah. He's somewhere skiing somewhere right now. I've lost touch with him as well. Anyhow. We put together a task force to try and solve the problem, and I headed up this task force. And it turned out, and I didn't discover it, but it was a very simple cure for the problem. Because we didn't have a high enough power ceramic window to, you know, to short chill the shield of the klystron, high vacuum in a klystron from the less good vacuum that he was going to go into. The windows were, the power was split two ways, so each took half the power, to the power splitter. And

the windows were sitting horizontally. Well, the accelerator side of the accelerator, the vacuum wasn't very good. It was very poor vacuum. There's a lot of crap floating around anyway, excuse the expression. And these landed on the window and some of them caused an arc and it cracked the window. So the simple solution was, we made the windows sit vertically. And that cured it. It turned out a very simple cure. Anyhow, there was a guy called Ray Steining. I don't know if you ever— He was also involved very heavily at SLAC. He went to MIT, I think. Yeah, and anyhow--

ZIERLER: And Matt, how had your role at SLAC changed by this point?

ALLEN: What?

ZIERLER: How had your role at SLAC changed by this point? Both in terms of the projects that you were on, and your promotions?

ALLEN: Well I ended up heading up the klystron department. And I also,

Kaye Lathrop made me assistant director of the technical division. And he gave me three departments to look after. I think it was the electronics department, the klystron department, and accelerator physics. Now, the... I seem to be, I've given you three departments, that's right. And the guy that headed up the electronics department went off to form his own company. He's now back at SLAC. Ray Larsen. Have you ever come across Ray Larson?

ZIERLER: I talked to Ray Larsen a few weeks ago.

ALLEN: Yeah, Ray Larsen.

ZIERLER: Yeah.

ALLEN: Did he tell-- You know, anyhow, I hired a guy to take over the electronics department, and Lowell Klaisner. Did you speak to Lowell Klaisner?

ZIERLER: I spoke to Lowell yesterday.

ALLEN: Oh you did?

ZIERLER: I did.

ALLEN: Yeah. Did he tell you (laughs) I was the guy that hired him at SLAC. Brought him, he was doing something at Boeing, I think. I can't-- was somewhere, maybe univer-- He was in Seattle, I

know. I brought him down. Did he mention, well I guess you... Anyhow, okay, so there's Klaisner. So I was for a while I was the assistant director. Assistant director of the research division. Oh, of the chemical division. Then, I don't know, did you hear about the tiger teams?

ZIERLER: No, I don't think so.

ALLEN: They went around, there were some fatalities at government labs, so they put these tiger teams together to make sure that they were behaving properly and safely. And SLAC was going to be visited in about a year's time, so we had a year to get our act together. So--

ZIERLER: And did you need that time? Were there issues that really needed to be addressed?

ALLEN: Well, Burt Richter, safety was buried in the business services division, I think. (both laugh)
The physicists were more interested in physics than safety.

ZIERLER: Reasonable, reasonable. (laughs)

ALLEN: So anyhow, we needed to have a change of culture. So anyhow, Burt decided to make another division called the Environmental... ES&H. Environmental Science and... Environmental

Something and Health. ES&H division. And I was put in charge of that. I was made an associate director of the laboratory. So there was the technical division, the Environmental Science and Health division, the business services division, and there was another... I think it was just the business services. But there used to be two of the divisions, it was put under one. So anyhow, we survived the tiger team and so anyhow. So I became an associate director then. So I was doing less really technical stuff, but I was doing some radiation physics and so on. Anyhow--

ZIERLER: And so how had your day-to-day changed? Who were the main people that you were working with on a daily basis?

ALLEN: There was the head of radiation physics. He eventually took over the division. I think it would mainly be the safety people. You know, each sub-division had a safety office. So we taught, mainly, physicists kicking and screaming become more safety-oriented. For instance, when SLAC was started, there was just an enormity of being down from the klystron gallery to the accelerator itself, it was just a rung step ladder. It was-- I don't know how many, I forget how many feet it was now. But boy, if you fell off that ladder, you were--

ZIERLER: That was bad. (laughs)

ALLEN: There was no safety strap on anything, you know?

ZIERLER: Right.

ALLEN: There were couple of [inaudible] the tiger team. Well before the tiger team, we put them [inaudible].

ZIERLER: So how did that review turn out, the tiger team review? Did SLAC do okay in the end?

ALLEN: Yeah, they did, I think they did okay. At least they weren't shut down. (laughs)

ZIERLER: Right. Right, right.

ALLEN: Yeah, so... So--

ZIERLER: Now in that role, were you dealing with people on the outside? Were you dealing with Stanford or with other national laboratories?

ALLEN: Not from a management point of view. I had visited practically all of them from a technical point of view. I used to go to CERN, Brookhaven, Hamburg lab, Nova Sebius in Russia. There was one in Tokyo. So it was a very closely knit group of accelerator people.

ZIERLER: And what were some of the values that were garnered as a result of these visits or these collaborations? How were they valued at SLAC?

ALLEN: Well they were helpful. Yeah.

ZIERLER: And so what years were you in this position for? What's the chronology here?

ALLEN: Let's see... Let me, it must have been... Let's see, I retired in 2003. So it must have been in the 1990s. I was doing that, I think the tiger team probably came in. But the other job I had, you know when I was finished with the tiger, I gave the ES&H division to somebody who was really a-- knew more about this stuff, and my job was to put together a guesthouse at SLAC. You know, most laboratories had guesthouses. We didn't. So did you... Let's see, who was the director after Burt?

ZIERLER: Oh, I can look it up right now. It's... South African gentleman.

ALLEN: ... so close to him, actually remember. Anyhow, he--

ZIERLER: Dorfan, Jonathan Dorfan.

ALLEN: Jonathan Dorfan. That's right. And that time, he says, "Look, you put together a guesthouse. The rent, they should be no more than," I think he said, "\$16, or \$15 or \$16 a night." So we had to put a very, well first of all it was the first iteration. It could be seen from Sandhill Road. And somebody on the board of trustees of Stanford objected to that. We had to go to the Stanford... And so we had to drop it down out of sight. And so that, it was still more of a challenge to keep this low cost going. Anyhow, we finally put it together and in the end, we got Stanford to run it, because they had more expertise in running these sort of things. And then it was opened up to the whole Stanford community. The Stanford, the guesthouse. And that was my last project.

ZIERLER: Now Matthew, have you kept in touch with your SLAC colleagues? Have you been staying on top of what's been going on at SLAC in recent years?

ALLEN: Well, not really. I mean it's mainly photon physics.

ZIERLER: Right. Right.

ALLEN: Well, I got involved with the photon physics people. And I spent ten years as... on an advisory committee to Taiwan, was building a photon factory. And I was on an international review committee. So I used to go to Taiwan once a year. And so...

ZIERLER: Well, Matthew, now that we've brought the narrative up to the retirement and your retirement and up to the present day, I'd like to ask you for the last portion of our talk, a few broadly-retrospective questions about SLAC and your career there. And the first is, you know, being there essentially from the beginning, to what extent did it stay true to Pief and then Burt's conception of what SLAC should be, and how did it change over time, in ways that they might not have been able to foresee?

ALLEN: Well, I think Pief and a lot of the other high energy physicists pushed back a bit from the photon factory development. And--

ZIERLER: Why do you think so? Why did they push back?

ALLEN: Pardon? Burt saw that that was going to be the future of SLAC, so he jumped aboard. So SLAC has managed to reinvent itself.

ZIERLER: Right. What do you think the original resistance was, though?

ALLEN: The... I don't want to get into the head of some of these particle physicists. But they were pretty resentful of the way things were going. And you know, support for high energy physics started going down, and for photon physics started going up.

ZIERLER: I wonder if you can comment at all about the rise and the fall of the SSC? In the late 1980s and early 1990s, and how that may have influenced what was going on at SLAC?

ALLEN: Well, we lost John Rees. He went and he became a, in charge of the accelerator end of things. And fortunately, he didn't sell his house in Los Altos. So when the SSC collapsed, he could come back. And he had his house there, so... And I actually went and interviewed to SSC, to... actually Texas. For a job there.

ZIERLER: Oh really?

ALLEN: But-- yeah. And I was made an offer, but I turned it down. Fortunately.

ZIERLER: Right, indeed. Indeed.

ALLEN: So I never ended up in Waxahachie.

ZIERLER: And so then Matthew, let me ask the same question but make it more narrow to you in particular. What do you see as your principle contributions to the overall work that was being done at SLAC during your tenure?

ALLEN: I would say the RF systems for the very successful projects. Not for the accelerator itself, but then I'd made contributions to the klystrons. But I would say to the RF systems of the storage rings. I'm very proud of that.

ZIERLER: And what do you see as some of the long-term results of your work, in terms of pushing the field forward?

ALLEN: Well, I don't know the number of storage rings world wide is staggering. Because it's relatively inexpensive to build. You know, relatively. You know. Not like the CERN large project, you know, so I think that's what I feel like I might have made some contributions there.

ZIERLER: And here's a--

ALLEN: And also just--

ZIERLER: Please, go ahead. Also?

ALLEN: Well just generally for the welfare of SLAC.

ZIERLER: Yeah. Yeah. And now here's a very broad question. Maybe a little difficult, but I'll ask it anyway. What do you see as the overall contribution of SLAC to the world of physics in general? How did SLAC move physics forward in terms of looking at the entire field over the course of your tenure there?

ALLEN: Well, I said, I'm more of an accelerator physicist. I think the Taylor's deep inelastic scattering. I think and the contribution to the quark theory, and the storage rings, you know, just generally. I think that Taylor's group and Burt's group were, unfortunately, David Leith's group, they didn't... their projects didn't turn out to be the best and greatest. So.

ZIERLER: And so Matthew, for-- Please, go ahead.

ALLEN: Very good. I think there were very fortunate people like Greg Lowe, Ewan Paterson, John Rees, and Burt of course. And then also there was, earlier on there was Gerry Fischer, but he died at a fairly young age.

ZIERLER: Yeah, yeah.

ALLEN: Yeah.

ZIERLER: Well, Matthew, for my last question, I want to ask you one that's forward-looking. And on one level, I want you to think about it in terms of institutionally for SLAC, and then also personally in terms of your own interests and your contributions to the field. And that is, what are you excited for in the future? Both in terms of how SLAC can continue to perform such groundbreaking work, and advance its, you know, the field of physics in general. And then what are you most excited about just in terms of being a physicist and thinking about things that are on the cusp of discovery and things that we might not understand now but we might understand in the future, and how SLAC might have a role in establishing those advancements?

ALLEN: Wow.

ZIERLER: That's why I save that question for the last. (laughs)

ALLEN: Well, I mean, just fortunate to have acquired very good people. And I think the future lies in photon physics. And I think the people who have trained at SLAC will be doing their research at places like CERN or Brookhaven or Hamburg. You know.

ZIERLER: Why is the future there? Why do you say this is the future of physics?

ALLEN: Well, I don't know, I've been talking more like engineering physics, right? Not... I don't appreciate the... I think there are a lot of trained theoreticians who are trying to earn their keep and I don't know, it'll die out over time.

ZIERLER: Yeah. I've heard that as well. Well, Matthew I want to thank you so much for your time today. It's been a delight speaking with you.

ALLEN: Well, I enjoyed it. Sorry about my memory lapses.

ZIERLER: Not at all, not at all. I mean, the degree of institutional memory is quite impressive, and it's a crucial part of this overall history. So I'm so glad we were able to speak. So I'll cut the recording here.