The Foundation of the American Academy of Ophthalmology
Museum of Vision & Ophthalmic Heritage

Conversation Between Lee Jampol, MD and Morton Goldberg, MD
New Orleans LA, November 17, 2013

Drs. Lee Jampol and Morton Goldberg recorded this conversation on November 17, 2013 during the Annual Meeting of the American Academy of Ophthalmology, in New Orleans, LA.

In this excerpt **Dr. Goldberg** describes his experience as a first year resident at the Wilmer Institute. **(.mp3 file)**

Here**, Dr. Jampol and Dr. Goldberg** discover a shared background in marine biology. The first speaker is the oral history moderator, David Noonan. **(.mp3 file)**

The Foundation of the American Academy of Ophthalmology
Museum of Vision & Ophthalmic Heritage

Conversation Between Lee Jampol, MD and Morton Goldberg, MD
New Orleans LA, November 17, 2013

LEE JAMPOL: This is Lee Jampol. I'm professor of ophthalmology at Northwestern, and this is November 17, 2013. And I'm sitting here with Mort Goldberg. Mort, I'm really curious how you got interested in ophthalmology in the first place.

MORT GOLDBERG: When I was around 16, I began to have poor vision. It turned out, in retrospect, to be very simple. I just had early, progressive myopia, but it was a little shattering not to be able to see the blackboard at school. And my father, who was a GP in the little town of Amesbury, Massachusetts—10,000 souls, no eye doctors, no optometrists—took me to a town named Haverhill, Massachusetts, 10 miles away. And one of his personal heroes was a double ENT guy for whom refraction was duck soup. He was such a kindly old gentleman. When my father introduced me to him, he immediately gave me a hug and a kiss. I said, "This is pretty good." And he gave me my first pair of minus 0.75 eyeglasses. I thought it was a miracle. And I was "taken" by all the fancy gadgets in his office, refraction devices for the most part.

And then when I went off to college and then med school, Harvard College and Harvard Med School… I know you're a Yalie, Lee, so I'm not going to dwell on that side of my background. You might get upset! But in medical school, I liked almost everything except specialties with mucus. I said, "I'll never do one of those," or specialties with orifices, I didn't want to do those either. But I liked most everything else. And in my last year of medical school, I didn't know… I really didn't know what to do. I had been taking an elective with the Chairman of General Pathology at Harvard, a man named Arthur Hertig, one of whose major claims-to-fame, and it was justified, was that he studied the regenerating arteries and veins of the menstruating uterus. And I thought he was so brilliant, and I thought the vascular regrowth was so fascinating at a histopathologic level that I thought I wanted to study blood vessels for the rest of my life. And I think that's where my interest in retinal blood vessels stems from.

In any event, I admired Hertig. But Hertig, himself, admired someone else more, and that was the Chief of Ophthalmic Pathology at Harvard, David Cogan, at the Howe Laboratory at the Massachusetts Eye and Ear Infirmary. Cogan had not yet been made the chairman of ophthalmology at Harvard. He was running the research lab, and I took an elective with him. He sent me to the Joslin Clinic to go through old files of clinicians to see what they had written in their diabetic patients' records regarding retinopathy. And then he, Cogan, would look at those dead patients' retinas after trypsin digestion and see if there was a correlation. Well, there was absolutely none, because the diabetologist's ability to record fundus details was close to zero. From that point on, I never trusted a retrospective study of any sort ever again.

In addition, I was a student volunteer as an undergraduate, and I went to the Massachusetts Eye and Ear Infirmary as a volunteer. The truth is that my job was to empty bedpans. In return for that, they let me go to the operating room and sit in an upstairs amphitheater with binoculars, handheld binoculars—there were no microscopes in the operating room at that time. I could look down from the balcony in the gallery and look at people doing retinal surgery. This was at the start of Charles Schepens' scleral buckling. You know, we're talking about 1957, '58. And through the binoculars, the eyeball looked the size of a softball. I couldn't believe they were operating on it. And the retinal drawings were, of course, red and blue and green and yellow. And I said 'Wow, they really study those things.' So that combination—seeing that surgery, learning what a great human being David Cogan was, and concluding that if the field was good enough for someone like Dr. Cogan, then that was good enough for me.

There was no Residency Match at the time. This was 1962. And I said to Dr. Cogan that I wanted to stay there at Harvard with him. He said, no, he wanted me to come to Baltimore to the Wilmer Institute and be a resident for Ed Maumenee. And, you know, this is like a baseball player swap—"I'll give you one player now and three triple-A players next year," that sort of thing. So Cogan called up Maumenee and said, "Take this guy." And Maumenee said, "Well, I've got a guy who wants to go to Harvard. Take him." So they swapped me. Howard Leibowitz was the guy who came from Baltimore to Boston. I went from Boston to Baltimore. So, you know, one-player swap, no money. And it was the most important, professional move in my life, and I loved it. And I walked into the Wilmer residency without

an interview—no interview. I had a job. And I looked around the halls, and I saw these great photographs of wonderful old men—no women, of course, at that time—on the walls. And I said, "Well, hell, this is the greatest. I'm so happy to be here," and that's a long answer to your question, Lee.

JAMPOL: So how did you get into sickle cell retinopathy?

GOLDBERG: I had had a really good medical education like you. I was fascinated by the influence of general medical illness on the eye, particular the retina. I knew all about sickle cell disease, because of the hematology I took as a medical student at Harvard. And then when I moved from Boston to Baltimore, I was surrounded by sickle cell anemia patients, there was so much of it, and they were bleeding into their eyes all the time and no one knew why. They were getting vitreous hemorrhaging. Nobody knew why. People were operating on their retinal detachments, and they were going into post-operative anterior segment necrosis, and nobody knew why. So, as a second-year resident, I made personal ward rounds on the hematology service at night after my work was done in the Eye Institute. I just went to the nurse's station and found every person who was hospitalized for sickle cell disease and just walked around with a portable indirect scope, and I drew all their fundi. In the morning I showed them to Dr. Bob Welch, who was one of the attendees on the retina service. And the two of us, then, did a very modified natural history study, a phenotypical descriptive study of sickle cell retinopathy. We were wrestling with what to call the retinal lesions and Bob and I simultaneously thought that the neovascular tissue looked like sea fans in the ocean, so we called it a seafan sign. And then fluorescein angiography had just been discovered by Ed Maumenee, and we did fluorescein angiography on those eyes and were shocked by the extent and the interesting pattern of the retinal vascular abnormalities.

As you well know, because you were an integral part of it, when I then moved to Illinois, you and I set up the world's first and, I guess, the only sickle cell eye clinic, and we studied together well over 800 hundred patients with sickle cell retinopathy. And published maybe more papers than needed to be published on the subject, but I really am proud of them.
The very first paper I wrote as an eye resident was published in 1966 on sickle cell retinopathy, 1966. And then a couple of years later when I had moved to Chicago, I published a couple of papers on the fluorescein

angiography—the, then recently described, technique of fluorescein angiography. It was a revelation to see what vascular abnormalities in sickling really looked like with that new technique. Like so many things, after you get a new technical innovation, suddenly there's an explosion of research related to the new technical innovation. And, you know, we then provided a classification of sickle cell retinopathy. Although many textbooks at the time, including retinal textbooks, said the major event in sickle cell retinopathy, the primary event, is vascular occlusion of the veins, we showed together that it's basically an arterial occlusive disease. So I'm really happy to say that those observations from 1966 and 1970 and thereafter have stood the test of time.

JAMPOL: So I would certainly say that there's been very little new discovered since the era of the Sickle Cell Eye Clinic at the University of Illinois.

GOLDBERG: Well, you discovered a lot of those things there. We had a great time. This was the only place in the world where people interested in retina could take a fellowship in sickle cell retinopathy. I'm not sure if it was good or bad for their careers, but they, in the process, learned a lot. They really learned how to examine the peripheral fundus and they learned how to interpret fluorescein angiograms. They learned how to conduct clinical studies, so it was a great experience. It was total immersion and, you know, we helped a lot of patients in the process, too, and we contributed a fair amount of original knowledge. So, yes, it was very gratifying on multiple levels, and still is. In retrospect, it's one of the nicest things that I like to think about, and I'm nostalgic about it.

JAMPOL: So we also learned how to draw retinas, which is a skill that's lost now and to really examine the retina in detail. That's why all those new findings came out. And I would say those skills are not as well developed in the people we're training these days.

GOLDBERG: Well, you're right. I mean very few retinal people draw the retina in detail before they go to the operating room now. When you were a resident, and when I was a resident, and for our early days on the faculty, we insisted that we, ourselves, and our residents, do a detailed, 8-by-11-inch, full color, highly accurate drawing of every blood vessel in the retina and

find every hole and every bit of pathology. And by the time we went to the operating room, we knew everything about that retina. It was a good system. However, there was no operating microscope at the time. Vitrectomy had not yet been invented. And now with operating microscopes and vitrectomy techniques, people find holes during the operation they had never seen pre-operatively, and they get by and do a good job with primary vitrectomies for retinal detachments from all kinds of etiologies.

JAMPOL: I still think your results are better if you know where the holes are [before] going in…

GOLDBERG: It would make me feel better to know where every bit of pathology is before going to the operating room, but that is not the way retinal surgery is taught today.

JAMPOL: So tell us about your career at the Wilmer Institute.

GOLDBERG: I started as a resident in 1963, and had three years that were absolutely wonderful. My first chief resident was Dr. David Paton, who had just returned from a year's so-called fellowship. He went to the Kingdom of Jordan and set up the first eye bank in the Middle East and did a ton of surgery. When he came back to be the first-year residents' teacher, he had done… I don't know how many, but many, many dozens and probably a couple of hundred corneal grafts, and was really good in anterior segment surgery. He was Dr. Maumenee's fair-haired boy, and he was a great teacher and a great person. So it was a wonderful experience.

The Wilmer Institute at that time had, I think, only five full-time clinical faculty: Dr. Maumenee, Dr. Frank Walsh, the father of neuro-ophthalmology, Dr. Paton, Dr. David Knox, Dr. Jimmy Duke in eye pathology—and that was it. That was it for that famous… that world-famous institute. Now, there are over 130 full-time faculty members at the Wilmer Institute, 18 of whom are full-time retinal surgeons, if you can believe it—18. That was more than the entire Wilmer Institute when I was in training there. At that time there was very little formal teaching. It was a see-one, do-one, teach-one atmosphere, which is both good and bad.

As a first-year resident, I, like all the other first-year residents, was on-call in the eye emergency room, which was one of the busiest places in the entire Johns Hopkins Hospital. We were on-call at night with no other doctors around. In our first summer it was frightening, because we had to take care of whatever walked through the door—penetrating foreign bodies, knife wounds in the eyeball, sockets fractured in—whatever it was, and no one there to help. So under that set of circumstances, you assume a lot of responsibility early in your training program. And the only way to survive is to read like crazy and learn as fast you can; if necessary, call a backup person, but it was a matter of pride not to call a backup person. And, therefore, one learned an enormous amount in a hurry. And that experience has remained with me. It has stood me in good stead for the last, you know, 50 years or so. And I still rely on knowledge I gained in that emergency room. It was just so intense with so many cases and such a variety. I learned an enormous amount, and I did a lot of surgery. I did a lot of blowout fracture repairs, and I did a lot of intraocular foreign body repairs, just about anything you can think of.

Other than reading as much as one could in a hurry, the way to survive was to listen to the emergency room eye nurse, who was the only person present with the resident. Well, those old women nurses were so experienced and they were so polite, you'd be sitting at the head of an operating table trying to get an iron foreign body off the cornea, something simple, but which was terrorizing to a first-year resident, who thinks he was going to perforate the cornea, you know. And so the nurse would lean over and gently say, "Would you like to have a rust ring remover, Dr. Goldberg?" And I'd say, "Oh, yes, thank you! Thank you. Hand me a rust ring remover." And they were so good and so experienced that every single Wilmer resident had enormous affection and respect for the nursing staff. Sometimes nurses and doctors don't get along. That was never the case at the Wilmer Institute. We learned that we needed those nurses, and they could teach us a lot. And we loved them.

JAMPOL: I might just comment that every place I've ever been, the nurses were like that, and they really supported us at Yale, and, to some extent, at the University of Illinois. So it's not a unique experience of the senior nurse helping out the poor, first-year resident.

GOLDBERG: Well, good for nurses. We'd be hard-pressed to function without them. But they're a dying breed of animal. You know, it bothers me to see that nurses don't wear white caps and white dresses anymore. I'm old enough to remember white caps. Do you remember white caps?

JAMPOL: I remember it, but I don't think it bothers me.

GOLDBERG: It bothers me. You know, I left Wilmer and went to the University of Illinois for close to 20 years. When I came back to Wilmer, I saw that the nurses were now wearing pink scrub suits and dirty sneakers, and no caps, and angora sweaters that picked up the dust of seven continents. And I thought they looked god-awful. So I thought I just had to change that. I couldn't mandate wearing white caps, okay, I knew I couldn't do that. There would be a revolution. But I told them that I would buy them all uniforms. They simply had to be standardized, and they had to be clean. I would buy them, but I would let them pick the design. They had to be dresses, okay? They had to be standardized, but they could pick the design and the color. Well, to my enormous happiness, they picked pure white. They picked pure white. And we were the only service in the entire Johns Hopkins Hospital where you could tell a nurse just by looking at her. Everyone else was dressed in dirty scrub clothes.

JAMPOL: Okay, tell us a little bit about your time at the University of Illinois.

GOLDBERG: It was the best professional time in my life. I went there as chairman when I was 32 years of age. I went there after my fellowship at Hopkins. I had a fellowship in medical genetics with Victor McKusick, the founder of medical genetics. And from there, I went to Illinois. I was the first full-time faculty member, as well as the chairman. The first, full-time faculty member in the history of that fine institution, because they had relied very heavily in the past on part-time volunteer faculty. Those people were really good and devoted, but their primary responsibility was elsewhere in their own practice, outside the building, in a different town, often.

My total budget that the Dean gave me as a dowry for my first year was, I think, about $300,000. I could use that for anything—recruitment, equipment, renovations—whatever. And it was an amazing experience. The

Illinois Eye and Ear Infirmary was an essentially brand new building with over 130 beds for ophthalmology. There were no real training programs. Most of the residents who went there were just interested in learning how to refract and do strabismus and cataract cases. That was it. Most of them had no higher motivation than to learn those few clinical disciplines and then go into solo practices in small towns.

JAMPOL: Why did you take the job at such a young age in light of that?

GOLDBERG: I didn't know any better. I was brought up in this Wilmer residency system where the tradition was that the chief residents would move on to do highly responsible jobs. And you trained at Yale. Your chairman was Marvin Sears, and he was a disciple of that same tradition. He went to Yale when he was 33, as the first full-time chairman of ophthalmology at Yale, right?

JAMPOL: Right.

GOLDBERG: Okay. I did the same thing. I was a year younger at the time, but it was the way Ed Maumenee set goals for the residents. He wanted his residents to have responsible leadership jobs. And that's all I could think about, except I did toy with the idea of a couple of very nice private practice offers in Miami and elsewhere. Actually, my income would have been quadrupled if I had accepted them. But when push came to shove, what I really wanted to do was to contribute to new knowledge, and develop a ripple effect in which I had a chance to be a role model and influence younger people.

JAMPOL: Did Maumenee tell you to go?

GOLDBERG: He had offered me an opportunity to stay at the Wilmer Institute as an assistant professor. And, yes, he was… I think he was very happy to see me go. It validated his own personal success story and it's what he wanted for his residents. And, yes, he was happy to see me go.

JAMPOL: Okay, and tell us about the environment that the University of Illinois in those days.

GOLDBERG: Well, it was a great, physical facility, without any substantial intellectual efforts to speak of. And the training program was okay in the sense that residents learned how to do strabismus and cataract operations, but not much else. And they were quick to go into the sort of private practice I was describing.

JAMPOL: But that wasn't the case, by the time I got there, so what changes did you make?

GOLDBERG: Well, I had this amazing opportunity to appoint every single full-time faculty person, 100% of them. But the first person I appointed was a librarian, because I wanted the residents to read the literature, and to have help in getting literature, and to write papers, and to get help in assembling their bibliographies. That was why I made that decision, but I didn't know how good a decision that was going to be. The person I hired had a Master's degree in both Library Science and in Medical Library Science, but, more importantly, she had a facilitative attitude, and she helped everyone write their papers.

JAMPOL: She loved me, and she helped me out, I'll tell you that.

GOLDBERG: Well, she was a great, absolutely great person, and lasted there for 30 years. And everyone loved her. And then I was very eager to appoint people like you who were what I would call clinician scientists, who wanted to excel clinically but who wanted to do it on a scientific basis and also conduct research. They wanted their research to be scientifically-grounded, whether in the laboratory or in the clinic. The first two people I appointed were Ed Cotlier, who was a biochemist as well as an ophthalmologist, and then Gholam Peyman who was, amazingly enough for that era, developing a vitrectomy machine. At that time, vitrectomy was considered unethical, but I thought he was a bona fide pioneer, and I wanted the department to be doing pioneering research, and so I appointed him.

For something like 19 consecutive years, that department expanded in both quantity and quality every single year. I changed the residency so that it was very much like the Hopkins system, with a chief resident who would go away for a year after the first three years, learn special techniques and acquire special knowledge, and come back and help teach the residents. I

had liked that system a lot in Baltimore, and I wanted to introduce it at Illinois. But it took me three or four years before I could appoint the first chief resident, because there were a lot of people in the pipeline who had no interest in teaching and research. They had no interest in writing papers and no academic interests at all. They were clinically good, but they had no academic interest. They weren't interested in learning new things. They weren't interested in either acquiring new knowledge and, just as importantly, disseminating new knowledge. They just weren't interested. But as soon as I found someone like that, I appointed him as the first chief resident, and he was great. And after that, we had a series of terrific people.

There was no Residency Match at that time. This was before the matching was introduced. And my wife, Myrna, and I would sit home at night, crossed-legged on the bed, literally on our bed, with all the applications. We flipped through them, and she had great insight, and she helped picked residents. I did some terrible things at the time, terrible in retrospect, but I had to do them to get good people. We would find someone we thought was terrific, and I'd call them up…you know, three months before the big programs were offering them jobs…and say, "I think you would be a great person here. Come for an interview, and if all goes well, I'll offer you a job. I'll expect you to accept or reject within 72 hours." Well, this was very hard on those people because they didn't know me and they didn't know this new program. And, of course, the good people wanted to go to the famous institutions, but some of them took a chance with me, and, frankly, it worked out very well for everybody.

JAMPOL: Okay, and then tell us about what it was like coming back to Johns Hopkins as the Chair, and how's your career been there?

GOLDBERG: It was a totally different experience. I followed in the giant footsteps of two great ophthalmologists. Ed Maumenee, my own teacher when I was a resident was, in my opinion, the greatest ophthalmologist in the world of the 20th century. I'm convinced of it. And I admired virtually everything he did and I wanted to be just like him. So did everyone else. A lot of the residency graduates stayed around as chiefs of the various specialty divisions. They were still there when I came back as Chairman. After Dr. Maumenee came Arnall Patz, who not only got the Lasker Prize for his research in retinopathy of prematurity, but became President of the

American Academy of Ophthalmology, and, just a few years ago got the United States Medal of Freedom in the White House from President Bush. Not too shabby a performance! So those two guys were tough acts to follow, and they had appointed all the faculty who were there. And each of those faculty members owed their careers to those two great people. And they owed me nothing, of course.

Initially it was difficult to prove to those guys that I was going to be beneficial for them. So it was quite different from the University of Illinois, where I was initially making every decision without consulting anybody, and there were no traditions that were holding me back, and no culture that I had to worry about. Whereas, when I returned to Wilmer, I had to think about the culture all the time, which is okay because I ascribed to the culture, but I also had to be very alert to the interpersonal relationships, the rivalries, the political niceties and political difficulties that all those people had created over the previous period. It was very complex. A lot of people left initially to go into private practice. They had wanted to be chairman and were passed over, or they had previously made decisions to leave the Institute to conduct private practices elsewhere in Baltimore. And so within a year of my returning to Baltimore, I was facing a multimillion-dollar annual deficit, whereas, I'd been told before I came that the department was in positive territory, in the black. Within a year or two, we were losing a lot of money.

So I had to make a lot of unpleasant, Draconian decisions in order to balance the budget, and that was not easy to do. There was a lot of personality breakage. The faculty said, 'Don't cut the budget. We'll just see more patients and make more money.' But what they didn't realize was that if you bill out a dollar, you don't get a dollar in return. You might get 50 cents or 40 cents after all the taxes and the bad payments and so on, whereas, if you cut the budget by one dollar that goes right to the bottom line and you actually do save a dollar. You save 100% of what you cut. So I had to cut the budget. And when you cut a budget with established high-fliers, who are really good people, that is not an easy thing for anyone to swallow. But it was inevitable, and we did a lot of cost-cutting. We reoriented our clinics and we reoriented the private practices. We changed a lot of things. And within two years thereafter, we were making money, and we made progressively more money every single year after and kept going up exponentially. So, finally, you know, after a few years, people said, "Well,

okay, these terrible changes actually turned out to be pretty good." But it was not easy for a long time.

JAMPOL: And tell us what the Institute was like when you stepped down as chair.

GOLDBERG: Well, it had been named, by *US News* and *World Report*, the country's best eye department for 10 consecutive years. And the annual budget had gone from about $15 million to $75 million, and the full-time faculty had increased by about 50%. The patient volume had increased by about 50%. All the practice numbers had improved tremendously. It was on very solid ground from a business perspective. So I was very pleased with it, and it's gone to even greater heights thereafter, in terms of the business performance.

JAMPOL: Anything else you want to tell us, want to talk about?

GOLDBERG: Well, I don't know how frank to be in this. I'll tell you one anecdote about the hospital president who taught me a lesson in situational ethics… when he broke a promise and reneged on my dowry to put on two new floors on top of the Maumenee building. It's an interesting lesson. And he's dead, so I'll tell you that story.

Part of the dowry I was offered, to return from Illinois to Baltimore, was $2 million towards adding two floors on top of the, then, existing Maumenee building. Arnall Patz had built the first five floors. I wanted more space for both research and clinical offices. And so I said, "I'll come to Baltimore if you pay for a two-floor expansion," along with some other nice things for the faculty, and some more money for recruitment. And I told the faculty we were going to have two new floors; I felt I had to give them something, because they were not so happy about my proposed cost-cutting. And I said, "Well, we're going to have two new floors. You'll have more space for your offices, for your labs, and it won't cost the department anything. It's part of the dowry." "Okay, great." And then about several months into…

JAMPOL: Did you have it in writing?

GOLDBERG: I had it in writing, signed-off. It was irrelevant, however, because a few months after getting back there, the president of the hospital came to see me in my office. I knew something was very bad because the department chairman usually goes to the president's office, not the other way around. He came to my office, and he began the discussion with this phrase, quote, "The situation has changed," end quote. Because of that, I have learned never ever to use that phrase. If I make a commitment, I am going to keep it. I don't care if the situation has changed and it's going to hurt me to keep the commitment. I have always kept a commitment. What he said was, "The situation has changed. I can't find the $2 million that I promised you. We're not going to be able to do the expansion of the building. We can't put on those two floors." Well, my heart was racing, and I broke into a cold sweat, because I had promised those things to the faculty who were worshiping the ground my predecessors had walked on. Well, what am I going to do, renege on them? And I realized that my credibility would go down the toilet, and I'd have no legitimacy anymore. And I'm trying to think, "How am I going to convince the president not to do this?" I realized I couldn't. You know, he was the president. He had the power to do it. And so for the only time in my entire life, I played the resignation card. I said, "You can do whatever you want. You're the president. But if you do this, I can't and won't be able to function here, so I'm resigning. I still have my Illinois license. They still like me in Chicago. I'm going to go back there and practice in Chicago." And like the classic situation where you confront the neighborhood bully and he backs right down, well, that's exactly what happened. He said, "Oh, don't do that. We'll find the money somehow," and he walked out. So that was a push-comes-to-shove situation, and I was totally unnerved by it. Well, that's enough about that.

JAMPOL: That's a good story.

GOLDBERG: Well, now let me ask you the same sorts of things.

MODERATOR: If you would, I'd like to know about your family background. Somehow you developed this personality, strength of character – where did that come from?

GOLDBERG: Well, I'll say something about it. I grew up in this little mill town in northern New England. It was a very tough place. It was not a

friendly place. It was a very unpleasant, unhappy childhood for me, and I couldn't wait to get out. The very best thing in the world that ever happened to me in terms of personal growth and change was to leave the little public high school where I went to school. I actually got a good education there, but, socially, it was dreadful. And the best thing that ever happened to me was to go to Harvard College, where, for the first time in my life, I became acculturated, and I took courses in art history and music history, as well as all the sciences. And I loved it, and it changed my personality; it changed my attitude to the world, and so on. But the town itself was so difficult that when I recently wrote an autobiography… I don't know whether you know this?

JAMPOL: I read some of it.

GOLDBERG: Oh, okay. So I wrote a little autobiography—not just for Lee! But for my unborn grandchildren. Since I don't know much about my own grandparents, I wanted my unborn grandchildren to know something about me. I filled in a lot of details that I won't describe here, but in this little autobiography, I talked about that period in my life and I entitled this autobiography the following, quote, "I Grew Up in Amesbury…and it wasn't Fun," end quote. I simply wanted my grandchildren to know that it was a painful, god-awful experience. And getting to Harvard College changed me from a small-town boy, who knew nothing about anything, to someone who, literally, got the world's best academic and social education—what a change in my life.

After getting to Harvard College, I was running scared, like all pre-med students. In my first semester at college, I got all C's. And I said, "My God, I'll never get accepted to medical school anyplace!" So I just redoubled my efforts and worked harder and harder and harder, and then got all A's for the rest of college, and was a Phi Beta Kappa and in the Senior 10 at Harvard College in Phi Beta Kappa.

Well, the funny part of it was that in my last college year, I applied to five medical schools, and Harvard Medical School was beyond hope, but I applied there anyway. And I got a letter on Halloween, in my senior year. On Halloween. It said, "Congratulations, you've been accepted to Harvard Medical School" and I threw it out. I thought it was a hoax from my

classmates, who knew I wanted to go there. They sent it on Halloween and I actually threw the thing out. I got a call from the Admissions Office a month later saying, "We haven't heard from you." I said, "Oh, my God! Yes, I'm coming, I'm coming!"

So then… well you'll appreciate this, Lee. My house master encouraged me to apply for fellowships after college and before medical school. He nominated me for a Rhodes Scholarship. It was an overwhelmingly bad experience, because I was tongued-tied and I didn't do a good job in the interview, and I didn't get it. But he also nominated me for a Scandinavian-American fellowship, and visions of blue-eyed, blonde young Swedish women danced through my head. I said, "Yeah, I'd like to go to Stockholm for a year and study." And I got that fellowship and I wrote Harvard Medical School, where I had been accepted, and I relayed my wish to go to Sweden. And they said, "Oh, well, okay, but you'll have to withdraw and apply again in a year." Well, I haven't forgiven them to this day, because I never did go to Scandinavia! I was not going to give up Harvard Medical School, no matter how pretty the girls in Stockholm might be.

So those are some of the trials of my early life.

[END PART I]

GOLDBERG: So it's November 17, 2013 and I'm Morton Goldberg, sitting here with Dr. Lee Jampol. And it's a pleasure for me to talk to you, Lee, because we've been through a lot of exciting times together, and have supported each other so well. I look back on it as one of the happiest moments in my life when I met you at Yale. And then you came from Yale to the University of Illinois. So tell us, first of all, how you got into medicine, how you got into ophthalmology, why you left Yale to come to Illinois, and why you left Illinois to become chairman at Northwestern?

JAMPOL: Okay.

GOLDBERG: All those key inflection points in your career.

JAMPOL: So this is Lee Jampol, and this is November 17, 2013. My dad was a cardiologist and, initially, he was in private practice. But he was one

of the smartest people around. He went to CCNY, which in those days, in New York City, the children of immigrants who couldn't get into private colleges went, and they had brilliant classes there, and then he went to NYU Medical School. And he got his residency training in the Army in World War II. My dad could have been a great academician. In the New York State exams in high school, he was number one in the State of New York. And his whole life, he regretted that he did not have the residency training to be a true academic person. So that was the background. And he was on the peripheral faculty at Cornell, but when I was in high school, he took me on a trip to New York, to grand rounds, internal medicine grand rounds at Cornell. This was a great experience. It was… first of all, it was a terrifying experience because they showed all these pictures of organs and things that were really terrifying. And, on the other hand, the environment…

GOLDBERG: Did you throw up?

JAMPOL: I never threw up, but I didn't look forward to that part of it. But the intellectual environment of these brilliant people up front fighting each other about the diagnosis and the treatment, I thought that was just great. So I think from then on I always knew I was going to go into medicine.

I applied to Yale College on the urging of a friend of my father, also a physician who was an old Yalee. He was Jewish and in those days, they didn't take very many Jews to Yale. Yale has a great history of anti-Semitism, which has been written about. I don't know much about Princeton and Harvard and other places. I came from a New York City high school. My class had a thousand people in it; I was fifth in the class.

GOLDBERG: That was the only time you weren't number one!

JAMPOL: I was close. Actually, the people at the top of my high school class were as smart as anybody I've met in my life. So I got onto the waiting list at Yale with that type of background. They hadn't taken someone from my high school in 10 years, at least. So I was a little discouraged. I was ready to go to Cornell, when suddenly this letter arrives from Yale accepting me off the waiting list. And I really was so angry about the initial rejection that I almost didn't go to Yale, but I did decide to go, but I always resented that about Yale College, I have to say. And in my freshman year at Yale, I

found it much easier than my high school classes, and I was second in my class at Yale.

GOLDBERG: What high school did you go to?

JAMPOL: Jamaica High School in New York. Jamaica is a very famous place, because out of my neighborhood comes Al Sommer and Dave Abramson, and Tom Weingeist, and there was this little cluster of streets there – something in the water led the people going into academic ophthalmology. And there's many more people that I haven't mentioned, all came from this little neck of the woods. I knew some of them at that time, but not all of them.

So, anyway, now I'm at Yale and I'm 16 years old when I enter Yale, because I skipped 8th grade—New York City did that to you—totally, socially inept. The sophisticated Exeter and Andover people were all around me, very few high school people, very few Jews. The class had a 10% Jew quota at that time. So, intellectually, it was easy for me, but socially, incredibly difficult.

The other story I have to tell about Yale is a little bit like Mort's story. So when I interviewed at Yale, I was probably 15, and the interviewer looks at me and he says, "You know, we really want to take you here, but you're just too immature. If you're willing to take a year off and sail around the world, we'll guarantee you a place in next year's Yale class."

GOLDBERG: Would he guarantee you a boat?

JAMPOL: So I went out to my dad and I said, "Dad, can I take a year off and sail around the world?" He never answered the question, so you know what the answer was. And I always wondered what my life would have been like if I had matured that extra year and seen some of those Swedish girls and things that you were talking about.

So, socially, it was a very difficult environment, but intellectually, very easy. I loved the environment at Yale in terms of the biophysics and the chemistry, and things like that. And I finished at the top of my class at Yale.

But then I still was probably socially inept at that time. I only applied to one medical school. That was Yale Medical School, because they offered me a place immediately. I did love New Haven, and I did love the Yale life, I have to say, despite the social difficulties there. But the Yale Medical School was an entirely different place. I mean, it's only four blocks away from the main campus, but there you were gauged not by your pedigree, and your religion, and your ethnicity, but by what was inside your head. There was this sudden transformation that occurred. My medical school class had 80 people instead of 1,000 people like the old class. I loved Yale Medical School immediately, it was great, and I really thrived in that environment. I got very interested in research and academic things as a junior at Yale, and I did a senior research thesis…

GOLDBERG: What was it in?

JAMPOL: It was on transport, electrolyte transport. I was interested in sodium transport across the gills of fish that allows some of them to swim in the ocean and in lakes, very different salinities, and ducks that can drink salt water and excrete the salt from their nasal gland. So I was studying sodium potassium ATPase. And I went up to Mount Desert Island in Maine and worked up there on sodium transport.

My mentor at Yale, after I did research on transport as an undergraduate, had introduced me to Frank Epstein, who was the first mentor in my life. Frank Epstein was eventually the Chair of Medicine at Beth Israel Hospital in Boston. At that time, he was at Yale. And he was a great mentor – he was a great doctor, a great physician, and took terrific care of his patients. At the same time he was renowned for his research and published in the first-rate research journals. So I really thrived under Frank Epstein.

Then I found out about this person in medical school named, Marvin Sears. I have to say a little bit about Marvin. So Marvin was the chairman at Yale. He was a Maumenee product also. He modeled himself after Maumenee also—a great surgeon, great clinician, a great researcher. But Marvin was, perhaps, not as facile with interpersonal relationships as Maumenee was. He built up a great department at Yale, despite that, and at various times during my residency we had Mike Kass there and Dan Albert there, and John Keltner was there, and Rufus Howard, and really great faculty. The

environment there was basically the Wilmer environment. We had the same system, and the residents taught each other, primarily, and the senior residents taught the freshman residents. They didn't just teach us. They made us excel at seeing details in the clinical exam. I mean, if you missed the most minor physical finding, your senior resident gave it to you. And that honed my clinical skills way beyond what I believe I would've gotten almost anywhere else. That's really what's helped me so much in my career, and I owe that to Marvin and the environment he had there. Marvin also supported my research, and I continued to do a lot of research, but maybe the most important thing Marvin did was he invited Mort Goldberg to be visiting professor during, probably, my second year in residency. I think he only invited Mort for one reason—that was to get Mort to meet me and to get me to go to work with Mort, because he saw a natural bridge between us.

So Mort came to town and I really, you know, wasn't particularly interested in retina at that time. I did glaucoma work with Marvin. But Mort started lecturing on internal medicine in ophthalmology. He knew about internal medicine diseases, the very diseases that I liked. That's what had attracted me to ophthalmology. I could take care of patients with very complex medical diseases. You didn't have to be up at 3 o'clock in the morning giving them potassium, but you could take care of their eyes and learn about those diseases and help the patients by learning about those diseases.

So Mort Goldberg comes to town and he's lecturing on the various areas that I love, so it was natural that I asked him before he left town, "Could I do a fellowship with you?" I went to the Illinois Eye and Ear Infirmary and gave a lecture on prostaglandins. That was a hot field at that time and that was my research at that time. With Art Neufeld at Yale, we were the first ones to show the importance of prostaglandins in ocular inflammation and the use of non-steroidals to inhibit inflammation. I'm sure the most important paper I ever published was with Sears and Neufeld that appeared in *Nature* on aspirin affecting inflammation in the rabbit eye. That's quoted, by far, more than anything else I've ever done. So now I move to Illinois Eye and Ear Infirmary and there's this great intellectual environment with Peyman there on the surgical side and Mike Goldbaum was one of my teachers – who is an incredibly talented retina person with a lot of engineering background and a great observer, and a great clinician and, I understand, a great surgeon. Howard Tessler is there, and Mark Tso is there. And every day we ride

together on the train to work, and we stimulate each other. We discuss our research. We give each other ideas. We discuss patients. What a great way to commute to work for 45 minutes and get this type of environment. And if you're lucky, you got it twice a day—going and coming. So I really loved my time as a fellow there.

Then, what happened was that the army called me up. That was the Vietnam era. The head of ophthalmology at Walter Reed had promised me that if I went into an academic position, he wasn't going to require me to go in and serve my mandatory two years in the army. But he reneged on the promise. And the next thing I know, I'm a major in the Medical Corps, but Mort got me an appointment at Wilmer with Ed Maumenee, and I'm at Walter Reed one day a week and I'm at Wilmer one day a week, and I'm at Fort Meade three days a week. That was really a good experience. I got to know all the Hopkins people. I never was a fellow with Arnall Patz, but he considered me one of his boys, and, of course, I was never a resident there, but Maumenee considered me one of his boys, too. So that was a great environment to come from. Then I had to decide what to do after the army. I did two years in Maryland. Mort offered me a position back being the head of the Sickle Cell Eye Clinic, and that was a great offer, and I loved Chicago from the first day I was there. So I went back and I haven't left Chicago since then.

So after a few years of being Mort's vice-chair, I felt like there were new callings, that I was getting bored and I needed more challenges. I almost went to UCLA for an endowed chair there, but I decided that Chicago is a better place to raise my kids. So at that time, the Northwestern job came open, and, to my amazement, I got it. The Chicago medical schools didn't get along well in those days—Northwestern and Illinois hardly interacted at all. But they gave me the job at Northwestern and I went to a very different environment. I was almost the first full-time person in the department. There was no academic productivity. Northwestern had a great ophthalmology tradition with Sandy Gifford, Derrick Vail, Jr. and Dave Shoch, but they had invested almost all of their energy in building national ophthalmology. They were the president to the Academy, they were the president of ARVO, the president of the AOS, etc., but they really hadn't invested the time in the department. I had this model of Mort's department

across town of what could happen if you invested our energy in the department.

So I began to slowly and steadily build up the full-time faculty. I think now it's…it's not like Wilmer, but it's probably 40 full-time people and fellows there. So the department grew and I really loved being the chairman for a while, I would say. I ended up being chairman there 27 years, which is too long.

GOLDBERG: Is there an ideal duration?

JAMPOL: I think they ought to have a 10-year limit.

GOLDBERG: Ten years?

JAMPOL: Yeah. I think the same about editors of journals, too, that 10 years is long enough. But I stayed on 27 years and mostly because my faculty wouldn't let me step aside. I had recruited them all. They felt like… many of them I had trained, and they felt like, "What would Northwestern be without Lee Jampol as chair?" Of course, it was fine when I stepped down, but I stayed on too long.

Then a great opportunity came along as I stepped down as chair. We got Nick Volpe as the chairman there, who's doing a great job, and the Diabetic Retinopathy Clinical Research Network offered me a position running the network, which had been run by Neil Bressler so successfully before, and I just love that. So now I've transitioned to 50% of my time running the DRCR and 50% taking care of my white spot syndrome [cases], which is my field, and doing much more teaching than I ever did. It's so funny, I love teaching now. When I was really at my peak intensity I felt it was taking me away from other things. And now, I just really love it. If you read the residents' evaluations, I'm a much better teacher now than I was when I was chair..

GOLDBERG: Well, you had a great impact on Northwestern, not just on the department, but in the practice plan for the whole medical school. So when you look back at this long, very successful career at Northwestern,

what stands out as the most exciting achievements that you can take credit for, and what were the biggest frustrations, also?

JAMPOL: Okay, let's start with achievements. First of all, I think the reason for being the chairman is to impart your values to the people you train.

GOLDBERG: Yes. Absolutely, that's a great point.

JAMPOL: The opportunity to do that is such a great experience, and I am proud of the ethics, the behavior and the skills as doctors of almost everybody that I trained—not quite everybody, but almost everybody. For those people who go out in the community, I think they practice at a very high level, and they come back to me and they say they recognize that they have different values that make them much better doctors than people who have trained at some other places. So that's my greatest… The faculty there is so ethical and such fine doctors. The physicians who are out in the community, they've made me proud of the way they've taken care of patients; some of them, they're academic achievements as well, so that's my greatest satisfaction.

In terms of frustrations, it's becoming increasingly difficult for ophthalmology to get resources out of the hospital and the medical schools .

GOLDBERG: But that hospital probably has the biggest bottom line of any major hospital in the country.

JAMPOL: Right. We have a fabulously-wealthy hospital, but they never understood, until recent years, the academic mission of full-time physicians. And one of my main roles, I think, over the last few years was helping to show what their role should be. As Mort said, I was the head of the Finance Committee of our doctors' practice plan—700 doctors—with multimillion-dollar budgets, hundreds of millions of dollars.

GOLDBERG: Well, you had such an influential role. If you couldn't get money out of the hospital, nobody could!

JAMPOL: Well, I was working for the practice plan, not the hospital. And we viewed that hospital as the adversary, rather than our ally. And they probably viewed us as their adversary, too.

GOLDBERG: I see. I see.

JAMPOL: The changing forces of medicine are changing that now. And hospitals can't be alone, and doctors can't be alone. So I think that, at least, at our place now that doctors and the hospital are much unified in terms of seeing what the academic mission is and getting the hospital, where most of the money is, to invest in the academic mission.

GOLDBERG: So if you had anything to do all over again in your formative years, is there anything you regret and anything you would change?

JAMPOL: Well, I would've sailed around the world that year.

GOLDBERG: Would you?

JAMPOL: Yeah, in a second. I think, perhaps, that during my first years I worked too hard and didn't pay enough attention to my family. I suspect a lot of academic people might say that. When my kids were growing up, I wish I had spent a little more time with them. Fortunately, they still like me and we have great relationships, but I have some regrets about that. Really, nothing else.

When I was a resident, Marvin Sears said to me, "You have to pick an area of interest, of specialization, super-specialization, or no one is going to know who you are." So first, there was sickle cell disease with Mort. And he and I, I believe, changed the way those patients are cared for all around the world. And then in 1983—this is a funny story—Paul Sieving, who's now the head of the National Eye Institute—came into my office and he said… It was a Friday afternoon, everybody else was gone, my office was right next to the resident clinic. They often came in. He looks at this patient [and he says to me], "I'm doing a study on APMPPE, and I just don't think this is APMPPE." And so I went over and I looked at the patient. And I said, "That's not PMPPE, and I don't know what it is, but I've got five other cases

of it. And let's get them together and write them up." And so that was the multiple evanescent white dot syndrome.

GOLDBERG: Oh, of course. Let me just interrupt to say that's a sign of a great clinician, that you remember clinical appearances, clinical signs and clinical symptoms without really trying. All the great clinicians can resurrect tiny little details about their patients' histories or physical findings months and years later. And when they next see a similar case say, "Well, you know, I think I understand that. I think I've seen some of that before. Let's pull out the old cases and see where they're similar, see where they're different." And, of course, you did that with the white dot syndromes, which today, years after you first described them, have become an area of major interest for retinal clinicians.

JAMPOL: So my hero in this area was Don Gass. He was amazing and probably described 50 new diseases or physical findings, maybe 100. And so I've tried my whole life… I'm a splitter. In my whole life, I've always recognized differences between patients that have been lumped together before. Our group has been really fortunate to describe a whole bunch of new diseases and physical findings. And that's the thing I'm proudest of, clinically. I mean, I had an R01 grant and done basic… animal research and all, but I think the thing I've been best at is recognizing new clinical syndromes and describing them. And all of the diseases we're interested in are rare, but it's very interesting, when retina people get together, they don't discuss age-related macular degeneration very often, or diabetes. They talk about the white spot diseases and other unusual cases. So that's very satisfying. And we're still working on it. The new imaging that's come into ophthalmology, all of the new things, autofluorescentce, , and spectral domain OCT, etc., have just added so much to our understanding of what's going on in those diseases. So we're busier than ever working on those diseases, and it's real exciting to see these papers coming out describing all new findings in these patients.

GOLDBERG: Well, you mentioned some interesting new technologies. So you look back on… how many years, 40 years in ophthalmology?

JAMPOL: Forty, yeah.

GOLDBERG: Roughly 40.

JAMPOL: Yeah.

GOLDBERG: What were the biggest…

JAMPOL: Forty-four!

GOLDBERG: Forty-four! What were the biggest developments? In retrospect, what were the most important changes in clinical ophthalmology?

JAMPOL: So here's the situation. When Mort was a resident and I was a resident: If you had an eye with opaque media, you had no idea if there was a melanoma inside that eye. The only way you could find out was to remove the eye. So ultrasound was probably the first jump. Suddenly, we had a way to look behind the cataract and do that.

Then, Mort's already alluded to the second major thing I think that I saw happen, and that was vitrectomy. And I was at Illinois when Peyman was developing the technique and Machemer was working on it, and a few other people around the world. And that changed all of the rules. As Mort and I have discussed recently, the vitreous was inviolate in the past. You couldn't dare go into the vitreous. And, suddenly, you could help these terrible diabetics and other patients with eye disease where the media were opaque and you could remove the vitreous. So that and fluorescein angiography, developed primarily by Don Gass, was a tremendous step forward. Before then, we had no idea of what was going on with age-related macular degeneration. You didn't know that there was neovascularization, central serous, hypertensive retinopathy. He wrote a series of landmark papers that were really the first understanding of the pathophysiology of any of those conditions.

So that's what's been so exciting about our whole careers, is this new development. Then, ICG is developed. And then, recently, OCT—first the time domain, which hardly helped us much, but a little bit, and now the spectral domain, where we're almost down to the cellular level in seeing details in the retina. So we've gone from being clods, you know, we had no

idea what was going on, to be able to see the photoreceptors, cells in the retina. It's really an incredible experience.

Then the last thing I want to mention is the treatments for vascular diseases. There's a famous photographer now, Howard Schatz, who was a retina person, and he's told me that the reason… I mean, he's a great photographer and he loved photography...but he told me the reason he left ophthalmology was his frustration with not being able to help patients with macular degeneration. And the patients would come in day after day and he'd say, "There's nothing we can do." And now, suddenly, the vast majority of patients with anti-VEGF treatments and sometimes laser and sometimes PDT and sometimes steroids, we can cure people, or at least control the disease and they can lead the rest of their lives seeing. And that was unimaginable 10 years ago.. So maybe I'd put anti-VEGF up there with all of those other things.

GOLDBERG: Yeah, so you mentioned the therapeutic issue or the therapeutic advance with anti-VEGF therapy. No doubt, it's been a true revolution, a good one, an important one. But before that, there were some amazing therapeutic achievements that didn't exist when I was a resident and just had come along when you were a resident, including laser photocoagulation.

JAMPOL: Right, so I remember at the infirmary, we had one of the first… well, first of all, we had one of the first krypton lasers in the country. We had…

GOLDBERG: Argon, yeah.

JAMPOL: …an argon laser, very early on. Those things were pretty… It was amazing that you could cause regression in neovascularization. And going back to Meyer-Schwickerath, who invented the xenon arc photocoagulator, that really was an amazing break-through. And, of course, the story there, which most people don't know is that the first photocoagulator used the energy of the sun. Meyer-Schwickerath used to go up on the roof and used magnifying lenses to focus on the retina and create burns, and then he invented the xenon arc, or at least used it. And then

people in California, Boston, and New York developed the argon laser. And that changed our lives, of course.

Then, well, the other thing, of course, is the development of clinical trials. Ophthalmology should be so proud of the way we've been at the forefront of clinical trials for all of medicine. And going back to the Diabetic Retinopathy Study through the most recent studies, we've outperformed… maybe the cancer people might be comparable, but everybody else we've outperformed in terms of helping our patients with clinical trials. And almost all of our retina people know about clinical trials, because they learn about them in residency and fellowship and then they go out into the community and they support the DRCR and research studies by pharmaceutical companies. And that's helping our knowledge advance tremendously. So if you're going to make your list of top five advances, the clinical trial is certainly part of it.

GOLDBERG: I think you're 100% right about that. As part of clinical trials, of course, ethics has become very important and getting informed consent, and having institutional review boards, and ethical concerns have been terribly important. But when I was a resident, there were no IRBs, and there were no clinical trials, and informed consent didn't exist. The night before an operation, the patient would sign a form approving the operation, but that was it. And surgeons could take unproven instruments into the operating room and use unapproved drugs to treat them. If a clever ophthalmologist got any new idea in the world regarding either diagnosis or treatment, he or she could just institute it without any oversight, without any advance approvals and so on.

The other thing, of course, has been the advance in cataract surgery and in intraocular lenses, which have revolutionized the care of eye patients. And all of these things that you have mentioned, and I have just added to the list, all of those things came after I finished training, which emphasizes to me, more than anything else, that when you finish a formal residency training, that's just the beginning of one's lifelong educational effort. You simply have to stay up-to-date, because it takes as little time as 12 to 15 months to fall hopelessly behind if you haven't been staying abreast of all the new rapidly-evolving technologies.

JAMPOL: So if there are any current residents out there – there are residents that finish their residency and they never learn anything more after that, and that's a big mistake. You need to have some continuing education going on… grand rounds or the Academy, whatever it is, but otherwise you're not practicing the best medicine.

GOLDBERG: You're absolutely right. Well, that may be a good point to end this phase, or do you want to add anything, David?

MODERATOR: One question. Both of you, did you study marine biology at one time?

GOLDBERG: I did, yes, what a memory!

JAMPOL: Oh, I studied marine biology… I worked in marine biology for three years, yeah.

MODERATOR: Woods Hole?

GOLDBERG: Woods Hole! How do you remember this?

MODERATOR: Well, I went to college with Bob Lynch, who's a Jesuit priest now, and he spent every summer of his adult life doing research in Woods Hole. He was looking at the cellular structure in plankton, he wrote four or five papers, and he was well published in that whole field. So I knew something about Woods Hole…

JAMPOL: So I was at the Marine Biologic Lab, and my dad worked at the Marine Biologic Lab in his time.

GOLDBERG: Which one?

JAMPOL: Woods Hole.

GOLDBERG: Your father did?

JAMPOL: Yeah, my father was there. He was on the collecting crew. And I saw James Watson up close there when I was there, the Nobel Laureate.

But I'll tell you a funny story about getting into ophthalmology. So I'm a marine biologist in college, and I'm doing all my research on transport and everything. And, you know, I decided to go to medical school. So I go to the professor of biology that runs all of the programs, and I say, 'I've really decided to get an MD." And he was crestfallen. He thought this was… "How could you do that? You're going to waste the rest of your life!" It's really funny.

GOLDBERG: Well, so you bring that up, David, but this is another interesting parallel between Lee's career and mine. I didn't know that we both had this marine biology background, and that we both studied at Woods Hole. I wanted to be a marine biologist, too, for a long time. I loved it. I loved collecting specimens and then going into the labs with the specimens I collected. Then, afterwards, in the case of lobsters, we ate the experimental subjects!

JAMPOL: I…same thing! I also spent two years at the Mount Desert Island Biology Lab in Maine, which is a wonderful place.

GOLDBERG: So you worked at Woods Hole?

JAMPOL: I worked at Woods Hole, yeah.

GOLDBERG: I never knew that.

JAMPOL: I took the marine invertebrates zoology class.

GOLDBERG: Oh, that was my introduction too.

JAMPOL: Yeah. I managed to talk to Marvin Sears when I was ophthalmology resident to let me go to Maine and work up there on fish eyes. And the other residents could not believe that I was not there! There I was up there in Maine over the summer eating lobsters and doing research on fish eyes. But it was a very productive time. A lot of papers were published.

MODERATOR: Well, I'm curious to know if the Academic culture from Woods Hole…if that transitioned to your training programs as well? As you think about how you created academic freedom, intellectual curiosity, the freedom to think, is that where you got some of that? From your training, just that experience at Woods Hole?

GOLDBERG: Well, the fun of research…

JAMPOL: The fun of research, yeah.

GOLDBERG: The fun of research… sure, absolutely. It was fun to be an invertebrate zoologist, wade around in your bare feet in the ocean, and then pick up specimens, and then go to the lab. And they were nice people.

JAMPOL: But my problem was they always wanted us to draw the specimens, and I was the worst artist.

GOLDBERG: Were you?

JAMPOL: I had a lot of trouble with that!

MODERATOR: You're both cutting edge. What would you guess might be the next big thing in ophthalmology?

GOLDBERG: Genetic therapy. Gene therapy. In one way or another, that's going to be the big series of events. Not right away. It's beginning already, of course, with gene replacement for Leber's congenital amaurosis, an extraordinary proof of principle that you can replace a missing gene in a child's retina and convert a blind child to a seeing child. This is reality! This has happened. And then there are going to be hundreds of more examples of that. Not right away, but in eight years, 10 years, 20 years, that's going to be the big revolution in all of medicine, including ophthalmology.

Before that, I think the new imaging modalities will get more and more refined. More and more refined like a lot of things, like lasers got more and more refined over 10 to 20 years. And I think imaging with OCTs and all kinds of other…such as adaptive optics… all these things will get more and

more refined and we'll be able to do more and more diagnosis. But in terms of revolutionized therapy, it's got to be genetic engineering and gene replacement. And, I'd add to that: stem cell treatments for currently untreatable diseases. Genetic engineering of a wide variety of sorts. Maybe nano technology, too. But, again, not meaningfully within the next several years.

JAMPOL: So I agree with those. Nano technology—I would just broaden that to say drug delivery because it's…

GOLDBERG: Drug delivery, yes.

JAMPOL: …there's going to be all sorts of ways to get it… But if I can predict, so people 10 years from now can see if I'm right, I think imaging is going to evolve in the following way. Right now, we can look at the anatomy—okay?—but imaging is going to show physiology, too, using various tracers and dyes, and chemicals and things, you'll be able to see the cells of the retina functioning with the imaging. And you'll be able to tell if the drug is helping the photoreceptors see better, and that will be imaged. So we'll be able to image down to the cellular level and you will be able to see the cell functioning using various ancillary methods, and that's going to be incredible. So that's why I am not retiring anytime! Anytime soon. Because the next few years are going to be so exciting.

[END PART II]