I have heard that in your student days you were actually employed as an assistant to Emil Wolf. Could you please tell us that story.

I have chronicled my early interactions with Emil Wolf in a recent paper, “Guide Philosopher and Friend; Emil Wolf: the Coherent Master of Physical Optics.” This paper was the lead paper in a recent conference titled, “Tribute to Emil Wolf: Engineering Legacy of Physical Optics” (4 Aug. 2003 SPIE Conference San Diego). There will be a volume published resulting from this meeting.

Our joint work on two-beam interference with partially coherent light that was conducted starting in early 1956 was submitted to JOSA on Dec. 17, 1956 (forty-seven years ago almost to the date of this particular writing!). This particular work became one of the features of Principles of Optics by Born and Wolf, with a two-page spread of the illustrations plus several pages of text (pp. 511–514 in the original volumes). I was also asked to prepare a number of the experimental illustrations for use in this book. Thus a lot of interaction between Emil and myself relative to “Born & Wolf,” which culminated in my being “hired” to help with the proofreading of the manuscript in galley and page proofs—a great opportunity for me to get involved and immersed in the text in a very detailed way. I had carried out a similar task with my other two mentors, Henry Lipson and Charles Taylor, for their book, Fourier Transforms and X-ray Diffraction, which included the preparation of a detailed experimental and illustrative appendix and the galley and page proof routine.

How did you come to become director of the Institute?

It came “out of the blue.” I was attending the spring meeting of OSA in 1968 when Lem Hyde caught me in the corridor and told me of his new appointment as provost at NYU University Heights campus. He followed this announcement by telling me that the Institute had started a search for a new director—would I be interested? I responded that if this was a serious request, then yes, I would be very interested. As Walter Cronkite would say, “and the rest is history.” Having spent the first eight years of my professional career in the academy
(four years at Manchester University and four years at Leeds University), I always knew that I would return to academic life at some point. What better point in time than Sept. 1, 1968, and what better academic position was there than professor of optics and director of The Institute of Optics at the University of Rochester? Hence for me, thirty-five years at the University and thirty-five years of involvement with the Institute, and we are still counting!

You have served in several capacities at the University: as director of The Institute of Optics, as dean of the College of Engineering and Applied Science, and as provost. You have had the opportunity to view the Institute from several different vantage points. What would you say are the unique features that distinguish the Institute from other departments in the University? Similarly, how would you distinguish the Institute from the optics departments in other academic institutions?

It has been very rewarding for me to work with and for the Institute over many years and in many capacities. The Institute of Optics has been a special activity for the University from its inception. It was formed to meet a national need and to meet a need by the optics industry for an “academic lighthouse” that would help formulate and develop the intellectual and scholarly underpinning of optical science, engineering and technology. This includes, of course, the education of people at all levels who have been and will continue to be vital for the industrial communities and for the further development of the academic community. It is very different from the usual academic department since its range of activity covers the field of optical science and engineering from the very fundamental concepts, to applied optics, to technology development, to engineering principles, to system design, and now to hybrid systems that interface with many other discipline areas. We are in truth an integrated science and engineering organization that supports our discipline of optical science and engineering to be inclusive of all the sub-areas that have separate and changing names: photonics, electro-optics, fiber optics, optoelectronics, etc. etc. etc.

Over the years The Institute of Optics has spun off a number of centers, labs, and companies. Among those that immediately come to mind are CVS, LLE, the quantum optics group and solid state physics groups in physics, COM, CEIS, COI, Tropel, QED, Gradient Lens Corp., and Rochester Photonics. If the Institute had kept even a small fraction of these activities within the department it would be a greatly expanded enterprise. Could you comment on what you see as the pluses and minuses of the department remaining relatively small while spinning off these successful startups?

I am certainly proud of all of the activities that you mention in your questions. They do fall into several categories. First there are the internal University activities that come about because of the importance of optics as an enabling science and technology that can help develop academic units in some specialized area where another major component is needed, e.g., CVS—optics and psychology. LLE and COM are examples of mission-driven programs that must focus on that mission whilst providing an important academic climate for learning; these activities are large enough that they need their own interdisciplinary structure. The quantum optics group and solid state physics group naturally belong in the physics department because the Institute was founded with a very strong coupling to physics, and that coupling has continued to the benefit of both the physics department and the Institute. The spin-off into commercial companies was of significance for the Institute long before it was a popular or financially driven institutional program. This is not the forum to get into the debate about intellectual property.

Finally I can really only see pluses for the historical situation. It would have been impossible to build all those activities into the Institute without turning the Institute from
a very strong academic unit into a mini-national Lab that could not exist within a university of our size.

You have put a lot of time and effort into the Institute over the past thirty-five years. Are there particular things that have happened in that time in the Institute that make you proud to have been here?

I have remained proud and supportive of the pre-eminence of the Institute. We are a University of Rochester treasure. We are a major national and international player both intellectually and structurally. We have been the academic model that other programs have been held up against. I am most proud of the leadership that the Institute, its faculty and its graduates have provided to continue to define and redefine our discipline—and to recognize that it truly is a discipline, i.e., an integrated body of knowledge.

In the 1950s, just before the invention of the laser, many people regarded optics as a dead field, unlikely to be the source of any great scientific or engineering breakthroughs. Of course, the field has been one of the most dynamic in all of science and technology in the past fifty years. But with laser science becoming a rather mature field, and with the optical communications boom behind us, some are again questioning the future of optics. What is your vision for the future of optics in the coming decades?

This is the hard question! It is a question that has been posed many times over many decades, and as far as I can tell, nobody had definitive and correct projections! However, I take great encouragement from both history and the current high level of activity. Light is such an important part of our lives and our connection to our external worlds that we will continue to see significant new technology and application of that technology over a set of wide-ranging fields.