66. Address to Class of 2003

Paul Forman

Thank you. I am both honored and somewhat overwhelmed by this award.

I was in your place forty-seven years ago—this university gave me a wonderful grounding for my life’s work, for which I am extremely grateful.

In those forty-seven years, I have done a number of interesting and significant things—some apparently noteworthy enough to have landed me up here today. It is a privilege to address you at your graduation.

For what it is worth, and this may be somewhat encouraging to some of you, I was certainly not the smartest in my class. So, what made me successful? That’s what I am going to talk about today—and maybe it will be helpful to some of you.

1. Persistence: I learned one of my most important lessons in life here—but not in the classroom. I was a research assistant to Dr. Shina Inoue. I assisted him with a polarizing microscope he was developing, and once complained about the awkwardness of the focus mechanism. Two days later he handed me a gadget that completely eliminated the cause...
of my complaints. It was a sophisticated, not-at-all-obvious solution, and I asked how he came up with that solution. He explained that he simply believed there must be a good solution and worked at it until he found it. “I don’t understand,” I replied. He asked me, “Can you balance a raw egg on end?” “Sure. Just sprinkle salt on the counter and the egg can be balanced,” I replied. “No, no. No tricks. A raw egg—balanced on a steady tabletop.” “No, I do not think it can be done. I’ve tried it before without success,” I replied. He took a deep breath, looked me in the eye, and asked whether I trusted him. “Of course.” “Well, then trust me when I tell you it is quite possible to balance a raw egg on end, no tricks. Now, go to the biology refrigerator down the hall, get an egg, bring it back here, and try it,” he demanded. It took me less than a minute of trying to balance that egg, because I had perfect confidence it could be done. That lesson has guided me so many times in my life, in so many important ways.

Lesson learned: If you believe something can be done and it is worth doing, be persistent and just do it.

2. **Aim to be the best:** Perhaps most people know me as a co-founder of Zygo, a company three of us started thirty-three years ago. Today it is a public company, doing about $100 million in revenues annually, and known for its precision measurement instrumentation (particularly interferometers) and the fabrication of large, plano optics (such as all the laser amplifier slabs for LLE and the National Ignition Facility at Livermore). There is not enough time today to tell the Zygo story but a few highlights might be instructive.

- Contrary to what is today considered necessary practice, we did not have a product identified as the basis of starting the company. Instead we had a philosophy: We will be successful if we provide outstanding products and services. Our vision was to be the best at whatever we set out to do.
- We started out with the intent of building the best plano optics fabrication shop in the world and today many of our customers would agree that we have accomplished that goal.
- If we were going to make the best optics, we needed to be able to measure them—and we felt there were no adequate ways at that time. We began to develop an interferometer for our own use. We needed sales, so I went out and sold an identical instrument. Today, thousands of interferometers later, our various measurement instruments are used around the world.

Lesson learned: Aim to be the best and never lower your sights.

3. **Teamwork pays dividends:** As I said, there were three founders: a scientist, an optician, and I. We divided responsibilities in a logical fashion: all engineering and technical matters for the first, all fabrication matters for the second, and all sales, marketing, and administrative matters for me. An interesting fact: never were there three people who are so fundamentally different. We had differing views about almost everything and different ways of finding solutions. But, and most important, we all respected each other. We were each more or less free to do our jobs, but when we faced overarching issues, we had the benefit of complementary skills and viewpoints. Our diversity turned out to be our strength—and it would not have worked if we did not have a high regard for each other and had we not had the same vision—to be the best. Today, amazingly enough, all three of us continue to contribute to Zygo and enjoy good relationships between us.

Lesson learned: Teamwork, and employing complementary skills, usually pays dividends.

4. **Choose your partners carefully:** When it came time to raise capital to fund the start of Zygo, we were careful to seek out sources of funding that would have a long-term benefit
from the success of Zygo. We purposely did not pursue Venture Capital funding because we knew their time horizon was short and they would be in it to make a profit for themselves. We interested Canon Inc., the Japanese optics company—who was intrigued by the prospect of what collaboration with Zygo might produce, and we interested Wesleyan University—who was expanding their science curriculum and was interested in starting a sort of mini industrial collaboration ala MIT/Route 128. We chose partners, not funders, and in retrospect it was exactly the right thing to do. Wesleyan’s approximately $600,000 investment grew to over $30 million and they finally sold out when it became too large a percentage of their portfolio. Canon today remains a major shareholder in Zygo, and a major customer.

Lesson learned: Choose your partners, in business and in life, very carefully.

5. Smarts in hiring: It took a while to learn it, but we found it important to hire better people than we needed at the time. First of all, two junior engineers cannot substitute for one senior engineer. But, more important, there needs to be an experienced mentor for others, since learning by your mistakes is expensive and discouraging. I used to opt on the side of promoting an employee, even before he or she was ready, instead of hiring his or her boss—but soon learned that was not fair to the employee or to the organization. Creating a culture where you can hire a person’s boss, with their encouragement, is desirable.

Lesson learned: Be sure, in your next job, you have a mentor from whom to learn.

6. Importance of a can-do attitude: Some people attack each new problem with a vengeance. This is particularly evident in successful new start-ups where every employee is gung-ho and enthusiastic. Some big companies manage to maintain a culture where this enthusiasm thrives, while others ossify into what I call the “twenty reasons why it cannot be done” syndrome. Don’t be one of those people. They are for hire by the dozens, while the person who consistently figures out how to get something done is a rarity, is more highly rewarded, and has more job satisfaction.

Lesson learned: an enthusiastic, can-do attitude is contagious and drives creativity.

7. Exceed customer expectations: Those of you who have become familiar with aspects of the quality revolution of the past ten to fifteen years are familiar with the term: exceeding customer expectations. It was not in the lexicon thirty-three years ago when we started Zygo. As part of being the best we set out whenever possible to “exceed customer expectations.” If you can do it without disproportionate effort, it pays dividends.

Lesson learned: Always try to exceed expectations.

8. Sense of urgency: At least in business, and probably in most of life’s activities, time is of greater value than money. Sufficient time enables you to do the job right, to be the best, to exceed expectations. The lack of time erodes all options. Some tasks deserve more time and care than others. Know how to prioritize. Some daunting tasks can be accomplished quickly with a bit of common sense. I often use the rule: get ninety percent of the benefit in ten percent of the time. For example, how often have I watched a group of engineers labor for days over a quotation, which they ultimately complete two weeks later than when it was needed but accurate to the nearest decimal point—when an educated guesstimate, backed up with a checkout of the major purchased items, would have yielded a more timely and more useful result.

Lesson learned: Time is precious. Learn how to use it efficiently.

9. Integrity and trust: Integrity must be your guide star. Your performance must be trustworthy. Say what you’ll do—then do what you say. Don’t hide problems or mistakes. Mutual agreement is not necessary, but mutual respect is.

Lesson learned: Make integrity your middle name.
10. Communicating well is essential: Part of your success will depend upon how others perceive you. Your communication skills have a major role in your personal success as well as that of your team. Write well, speak well, and appear well. And if you can’t, there is still time to learn how. Your education does not stop today.

Lesson learned: Good communication skills are a lifelong investment and asset.

11. Be responsible for your own success: There is nobody more important than you in determining your success. Take charge and make yourself successful at whatever you decide to do. Set an example by your own actions. Take ownership of the work you do. Don’t accept mediocrity. Take initiative when necessary. Don’t keep a good idea to yourself. Create your own luck. Be passionate about what you are doing.

Lesson learned: Be all you can be—make yourself successful.

I hope my remarks are not perceived as lecturing to you. I am not interested in doing that. I am trying only to convey those specific attitudes and principles that I have found important to my success in hopes that they may be helpful to you as you transition from this great university to what you have chosen as the next step in your career.

In conclusion, I have a confession to make. When I entered the University in 1952, there was the men’s campus on River Boulevard and a separate women’s campus on Prince Street. Until the time when the two were merged, there were frequent forays to Prince Street for dates. Well, probably after a particularly hot date, and undoubtedly helped by suitable libation, I shinnied up a light pole for a souvenir to mark the evening. Integrity also means not to lie, cheat, or steal—and this event has been increasingly on my conscience ever since it happened. I felt that perhaps today is the time to make amends and I want to atone by giving back my ill-gotten souvenir to the University.

Lesson learned: It is never too late to act with integrity.

Good luck and good work—to all of you.