

James C. Wyant: Lessons from a master entrepreneur

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Jim Wyant is an educator, an engineer, a scientist, and an inventor; but today I'm going to talk about his remarkable talents as a businessman and entrepreneur. As many of you may know, I was one of Jim's students and I went on to become his business partner in both WYKO and 4D Technology. Over the 43 years that we have known each other, I watched Jim at work and we had a lot of fun so here are a few stories and some lessons learned from Jim's amazing success in business.



Jim Wyant at 4D Technology circa 2002

Lesson 1: Why make a little when you can leverage the work of others to make a lot?

Jim's business sense shined early and he's always trying spot an opportunity to make money. As a high school student growing up on a farm in northern Ohio, Jim watched his friends who were making money over summer break by bailing hay for the local farmers. They were content to do backbreaking work for various bailing operations to make a little spending money, but not Jim. He looked at the situation, sat down and figured out that it was a volume business. The only way to make *real* money was by bailing a LOT of hay. So, he bought a used bailing machine, hired his high school buddies and finished off each summer having earned more than most of his high school teachers! When I first met Jim, he still loved farming and he owned a number of farms.

Lesson 2: Trust people and provide the right incentives

My first business experience with Jim happened during my third year as a grad student. Jim would occasionally give us little consulting jobs that were really tests to see if we knew what we were doing. Along the way, I solved a few optical problems, wrote some reports, and designed a few instruments, which must have met with Jim's approval because one day he approached me with an interesting proposal. At the time, Jim was making a fair amount of money selling his WISP software and consulting through a side-business called Wyant Measurements Systems. A customer had called looking for a large aperture, 10.6 micron interferometer and he invited me to his office to discuss the idea. His first thought was to hire a student to do the work and he asked me to come up with a price to do the design and build the instrument. It sounded daunting and I really had no idea what I was getting into but I remember thinking that I might be able to charge him around \$5,000 for the job, which at the time, was nearly as much as my annual salary! So, I felt timid about presenting that number to Jim.

In the meantime—and unknown to me, Jim started thinking more about it. He realized that his newbie grad student might make it so expensive that he'd lose his shirt on the whole deal so he came up with a

better idea. A few days later I went to his office nervous about the whole discussion, but Jim jumped right in before I could say anything. He said that he'd reconsidered the whole idea and that we should take the job as partners, come up with a price, and we'd split whatever we could make out of the whole thing. It was brilliant! We'd both be in the hot seat to figure out how to make this thing work and I'd have as much interest in it as he did to make sure that we didn't lose any money. Jim provided a lot of valuable input but there were times when I felt a little bit like one of Jim's friends bailing hay. Still, I learned a LOT about optical design, finance, and shipping a "product" in the real world to a real customer. We built the instrument and worked pretty hard to make it look like a "professional" product—and the customer loved it! In the end, we made a lot more than we expected so it worked out pretty well.

Lesson 3: Never leave money on the table--profit is what counts

Not long afterwards, Jim invited me into his office to tell me about a new inquiry and he said, "I'm not sure that we charged enough the last time around. They didn't seem even the least bit bothered by the price and I think that we should charge more." I laughed and admitted that I'd probably only made about \$2/hour for all the time I put into that first one! So, we bumped our price up and again the customer didn't blink. We refined the design and made it better for about three iterations and each time we raised the price, no one bat an eye. I think that by the time we started selling those things at WYKO, the price had finally stabilized at around double what we charged for the first one. Jim taught me to understand costs and market demand--and to avoid leaving money on the table!

At WYKO, those IR interferometers generated a couple million dollars in revenue, which led to a rule of thumb that we could always sell at least 10 of anything! And Jim would often remind us of that during product development brainstorming meetings. We learned that everything costs more than you expect and that getting the product margins right is critical to running a successful business.



That first 10.6 micron interferometer evolved into the IR3 system

Lesson 4: Hire good people and set high expectations

At WYKO, we came to realize that we needed more business expertise so we brought in a former executive from IBM named Ester Davenport. Not only was Esther experienced and very bright, she was a total "people person," and a delight to work with. After about two weeks, I had a meeting in her office and while she was showing me something on her computer, I noticed something odd. At the time, Jim

had a policy that we would only use Apple Macintosh computers for office work. As I watched Ester use the mouse on her new Mac, I noticed that she was holding it upside down. To move the cursor, she had to move the mouse in the opposite direction and I asked what she was doing. She explained that coming from IBM, she had never used a mouse so she went to Jim to ask where to get a manual. Jim glanced up and said, “The Mac is so easy to use that anyone who can’t figure it out without a manual isn’t smart enough to work here.”

Somewhat rattled, Esther quickly retreated back into her office. She told me that she sat looking at the mouse and figured that no one would design it with a wire coming out of the bottom right under your hand so she flipped it around and started using it that way. She was very proud that she had been able to master it so quickly and was a bit disappointed when I told her that she was using it upside down! Esther turned out to be a huge part of the WYKO story and we all loved working with her; but I always smiled whenever I watched her use a mouse. Jim often tested new employees and the Mac turned out to be Esther’s first swim out of the deep end. Jim knew that Esther could figure it out and he always treated everyone as if they were as smart and as hard working as he was.



Jim with WYKO employees circa 1988

Lesson 5: Lead from the front and ask the right questions

Jim always leads from the front. No one started earlier, no one worked longer hours, and no one set higher standards for themselves. At WYKO, Jim started every week with an 8:00 am staff meeting on Monday morning and everyone learned pretty quickly that it wasn’t a good idea to show up late or unprepared. He expected timeliness and he responded to data, analysis, and recommendations. He

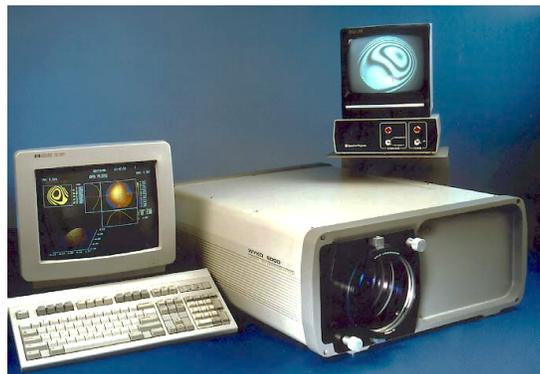
created a culture where everyone pushed themselves and he didn't do that using a lot of praise or compliments. In fact, it was memorable when Jim would declare, "This is absolutely fantastic!"

But Jim's biggest strength was often displayed in meetings about complex issues. When discussions swirled around details, concerns, and potential problems, Jim would often sit quietly only to stop the discussion with *the* one big question that went to the crux of the matter. It was usually the one question that swept everything aside to address the most important thing. While everyone in the room was working out how to move pieces on a flat chess board, Jim was quietly playing the game in 3D. That's a skill that goes beyond looking at the big picture and not everyone has it. His thoughtfulness and insights were key to his success in business.

Lesson 6: Competition is good: poking a bear, maybe not so much

Our most profitable product was a white light surface profiler that was being sold into the data storage market for measuring read/write heads and our customers couldn't get enough of them. Jim had invented a method of using optical coherence to measure topography over an unlimited depth that made our product better than anything else on the market. As soon as you start making real money, it will always spark competition and ZYGO eventually appeared at a trade show with a new white-light surface profiler. At first it wasn't very good, but eventually they improved it and started to take some of our sales. We looked at what they were doing and realized that they had found a pretty obvious way to design around our patents and that there wasn't anything we could do about it.

At same time, a lot of our customers were requesting a phase shifting Fizeau system so we made a decision to enter that market. Jim was very nervous about the Zygo patents so we produced a design and had our lawyer do a legal analysis to get an opinion about how well we had designed around the Zygo patent. His analysis indicated that our design was sufficiently different that (in his opinion) it did not infringe the Zygo patent. In fact, we eventually received our own patents for the new design and a new pellicle attenuator that went with it.



The WYKO 6000 Interferometer

Behind the scenes, the founder and CEO of Zygo, George Foreman was fuming. The Fizeau interferometers were their bread and butter and he felt that we had crossed a red line, so he hired a bulldog lawyer from a New York firm to go after us with the goal of putting us out of business. Without any warning, Zygo filed a patent infringement lawsuit against WYKO claiming huge damages. That fight lasted for over ten years and although Zygo won part of the case and WYKO won other parts, the entire episode had a bad effect on both companies. The legal costs on both sides were staggering and more

importantly, both companies became so entangled in the legal battle that it stifled technical innovation on both sides. The lawyers were the only clear winners.

Jim's insistence that we get a legal opinion before introducing our design was very wise! We came away with the lesson that it is always better to compete in the market, to steer a wide path around patent issues, and to avoid legal entanglements at almost any cost. Years later, we canceled an entire new product line because of the possibility of another IP fight with a competitor. Not long afterwards, that same competitor and WYKO were both acquired by the same company making us partners in the market and that was better for everyone.

Lesson 7: Time to move on: Create value and opportunities expand

After 15 years at WYKO, the challenges of running the business, dealing with the lawsuit, and preparing for future growth began to wear on everyone—particularly for Jim who bore the brunt of the stress. We could also see that since critical lateral dimensions in the disk drive industry were approaching the wavelength of light, our optical metrology products were eventually going to hit a wall. So, it made sense to merge with a publicly traded company named Veeco, a manufacturer of semiconductor process equipment. Jim, Esther and I flew to New York to sign the mountain of papers needed to complete the deal. I still remember Jim looking at me at one point saying, "This is either the smartest thing or the stupidest thing that I've ever done!" Fortunately, it worked out pretty well. Just remember that whenever you start a business, it's a good idea to consider an exit strategy. Your options expand if you've created lasting value in your business and Jim knew that right from the beginning. Healthy profit margins, a large IP portfolio, total sales and a broad customer base in a growing market all create value. Jim started WYKO as an optics company but its biggest market turned out to be in data storage where it played an important role in helping to delivery higher capacity, lower cost disk drives.



It takes a lot of paperwork to sell a company



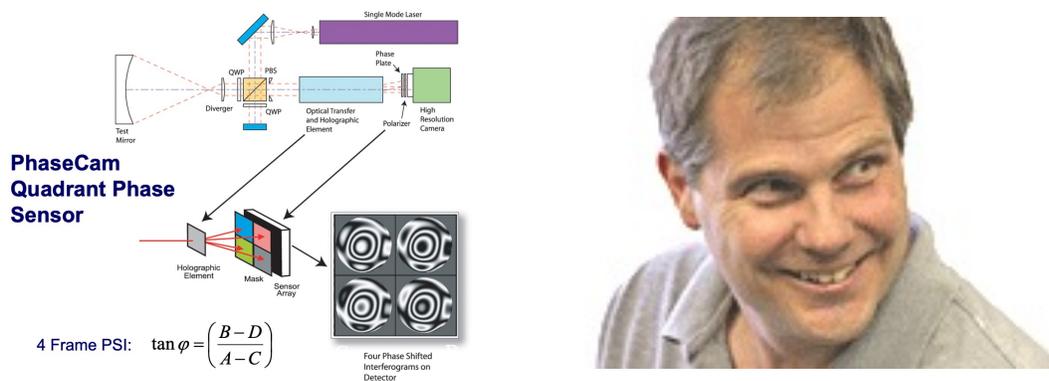
Esther Davenport, Jack Rein, Jim Wyant, Ed Braun, John Hayes on the day WYKO was sold



Jim looks up something while Esther has some fun

Lesson 8: Serial Entrepreneurs take risks, jump on opportunity and believe they can do better the next time

Near the end of 2000, I was an assistant research professor working on vibration insensitive interferometry at OSC and I attended a metrology meeting in Huntsville. That's where I first met James Millerd from a company called 4D Vision Technology. He gave a paper on a technique for making single frame phase measurements and I recognized right away that it was a really good idea. After I got back to Tucson, I met with Jim and told him that I thought that James and his partner Neal Brock had solved the BIG problem that we always had with our interferometers at WYKO—namely vibration. I thought that Jim would really like this idea and I set up a visit.



The original PhaseCam optics (left) invented by James Millerd (right) and Neal Brock

Jim and I flew to Irvine where we met with James and Neal in their office. They gave us a brief tour and we settled down in the lab for some demos. Jim and I could see that in spite of their best efforts to look bigger than they were, 4D was basically just a couple of guys in a big office space and we could see right away that they were struggling to get their business off the ground. Jim and I were very impressed with the technology and at the end of the day, we sat down at a table to wrap up the meeting.

Jim sat down, looked over at James, and said, "Ok...how much do you want?" James looked puzzled and said, "For how many? Do you want more than one?" Without missing a beat, Jim simply replied, "For the whole company." At first, James looked confused but he quickly shifted gears and started asking question about what Jim had in mind. We talked about the idea for another few hours before leaving. Jim had to work on me for the rest of the night but he finally convinced me that we should just split the cost and become partners again...and I finally agreed. I had seen an interesting idea but as usual, Jim had seen something much bigger. He saw smart guys, he saw a clever idea, and he saw an opportunity to have another go at the market with a new business. We formed a new company called 4D Technology Corporation and Jim, Neal, James, and I became the new shareholders. I'll leave it there and let James Millerd talk more about the 4D story.

Over the years, Jim Wyant proved to be an extraordinary entrepreneur, inventor, and businessman and I was very fortunate to share much of the ride with him. His amazing career impacted the field of optics, the disk drive industry, and many aerospace programs and through his leadership and donations he has helped propel the Wyant College of Optical Sciences into the future as a world class center of learning. We all owe him a debt of gratitude and I thank him for all that he taught me and for an amazing experience.