

University of Illinois Commencement Speech (Department of Chemistry) May 17, 2009
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Thank you very much for the kind introduction. Would you mind repeating that to my children? On a personal note, I have two teenage children plus and minus 1 year of high school graduation. While they are the loves of my life, they are also at times my toughest critics. So far the only true way that I've been able to impress them is by revealing that, among my responsibilities as a Biotech CEO, I have the authority to declare snow days.

Professor Zimmerman, Faculty, Families, Friends and the Class of 2009-- What a thrill and an honor it is for me to be able to come back to campus, to speak to you today, and to participate in this celebration of academic achievement.

Graduates— I'm confident the education and training you have received from this institution will serve you extremely well. My brother and I both graduated with chemistry degrees from this department, and though I didn't confer with him prior to today (we don't speak the same language—he's an inorganic chemist) he's inspired me to borrow and to twist a Groucho Marx line... "I'm not sure I want to be considered an Alum of a college that would have me as a commencement speaker..."

While I'm sure a number of thoughts and emotions are sinking into all of you after such a long and tiring race to the finish—one thing you should be proud of is having crossed the line successfully in one of the best chemistry departments in the world. For me, the Illinois degree was a ticket into a strong graduate program and later became a critical part of the pedigree that earned me my first job as an organic chemist in the pharmaceutical industry.

I've met very few of you in this room, yet I feel like I know you. I know the standards of excellence the department maintains; I know the rigors of the curriculum you've powered through; I know how many sleepless nights you've spent wrapping up the thesis or preparing for finals—and I know, because I've experienced them countless times—the recurring nightmares you will have that you overslept on exam day.

I also know that your picking science wasn't an easy route. A recent documentary, "2 Million Minutes", offers a sobering view that Americans are gradually losing competitiveness in our global economy in large part due to an ever-decreasing focus on math, science, and engineering in our high school education. Two million is the number of minutes you spent during 4 years of high school, and with any luck for your parents, college. By choosing to spend that time on science, you've already told to me a lot about your ability travel a difficult path and to accommodate, perhaps savor, deferred gratification. You are now new ambassadors for the sciences, and I hope you have the inkling to promote interest in science to future generations.

While I know a lot about what you've just accomplished, I can only begin to know all of the ways in which you will individually apply your education in the future. For some, it may be off to an academic appointment, or off to graduate or medical school. For others it may be off to your first job in industry, and for others, things may not quite yet have fallen tidily into place. Is chemistry something I really want to pursue long term? Will there ever be a good job market out there? What's next?

Regardless of your next steps I'd like to share three reflections that may in some way be helpful.

First: In Difficult Times Harvest Your Perseverance and Tenacity

So here's the synopsis:

Global recession

Unemployment nearing 10%

Inadequate research funding

Recent memories of an unpopular presidency

A difficult aftermath to a difficult military conflict

What I just described was the current state of affairs when I was an undergraduate here in the mid 70's, and the past president was Nixon, and the war was Viet Nam. Maybe it's because cable TV news and the internet didn't exist when I was a student (we relied on the *Daily Illini*) or maybe because I'm a parent now, but... it does feel even more ominous today than it did then. That said, America did dig out. Much of that recovery had to do with the perseverance of individuals and of a nation. Perseverance and tenacity will enable prosperity again.

There's an impressive contemporary author whose day job happens to be as a faculty member at Harvard Medical School and a surgeon in one of its teaching hospitals. His name is Atul Gawande, and he has written a couple inspiring books that I can highly recommend. One is called "Complications— a Surgeon's Notes on an Imperfect Science" and the other is called "Better—a Surgeon's Notes on Performance".

While the topics he covers are substantially medical in nature—but written for the lay reader— there are strong parallels to other fields as well, and his observations are absolutely fascinating. He shares many throat-gulping lessons in: attention to detail, preparedness, practice, tenacity, and perseverance. He states "There have now been many studies of elite performers—international violinists, chess grand masters, professional ice-skaters, mathematicians, and so forth—and the biggest difference researchers find between them and lesser performers is the cumulative amount of deliberate practice they've had" and that "the most important talent may be the talent for practice itself".

President Calvin Coolidge had an interesting take on this: "Nothing in the world can take the place of Persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination alone are omnipotent. The slogan 'Press On' has solved and always will solve the problems of the human race."

I take no pleasure in telling you this on your graduation day, but you'll never be the smartest person. I certainly never was, but it's amazing what perseverance and tenacity can provide in terms of a compensatory pathway. Plus, with a little skill, I found that you'll be able to hire plenty of people smarter than you later in your career.

Skill can be taught; tenacity cannot. You have it; harvest it; express it vividly.

Second: Create Big Value

Several years ago I was involved in setting up a collaboration with a leading Japanese pharmaceutical company that was interested in licensing an antibiotic drug candidate that scientists at my company had discovered. The deal was eventually signed, and after exchanging pleasantries at a ceremonial meeting, their CEO told me with the aid of a translator something that I will never forget. He said “your company is small, but your value is big”. Those nine words could not have more succinctly characterized that moment and all of the months and years leading up to it.

Everybody knows intuitively that creating value has, well, value... but the part of the process that people often miss is that to be truly successful, you need to create value that is disproportionately larger than your size. This holds true whether you are a solo performer or whether you are a Fortune 100 company. This is part of the reason so many company mergers ultimately fail: in the short term the value of the assets is increased, but the size and complexity of the company do as well. The overall size is bigger, but the ratio is the same.

Whether you're building a company, running a research group with scarce grant money, working on tasks in your new job, or doing volunteer work—always asking yourself how to squeeze out more success per unit of input will keep you on the good side of that quotient and will make you work smarter. I caution you though— it sometimes may make you lose your hair.

Disproportionate value creation is NOT a violation of thermodynamics, but it's not always easy. It is, however, easier if you think about it each and every day.

Third. Convert Mistakes Into Nutrients

Since what I'm about to tell you happened 30 years ago, I trust that the statute of limitations has expired, and I can now speak freely.

How many people have heard of the late Professor Melvin Calvin? He was the 1961 Nobel Prize winner in chemistry, and was a faculty member at the University of California, Berkeley, Chemistry Department. His work help to elucidate "the path of carbon in photosynthesis"— known as the “Calvin Cycle”.

I'll make a very long story short. Suffice it to say there was a bit of a flood in my lab sometime late one Saturday night. Very early Sunday morning I was awakened by a call from campus security, and within 10 minutes I was at the scene... along with the Berkeley Police and Fire Departments who informed me that my research advisor, the late Henry Rapoport, was on the way. I discovered that in addition to the lab, my mentor's office was flooded and so was Melvin Calvin's.

Rapoport could tell I was visibly shaken... actually fearing for my life, and in a rare moment of 1st-year-graduate-student-empathy he had a piece of advice for me as we were hanging out his oriental rugs to dry in the California sun... “It's a good thing this happened this year, not later.”

I wasn't sure of the full meaning of this until some time later when my thesis defense rolled around, and I saw who was on my committee... I was certain my brief career in science was about to come to a cataclysmic close. I was compelled to prepare, to prepare, and to prepare some more. I had the best post docs grill me. I was willing to convert to all major religions...

Winston Churchill once said "There is nothing more exhilarating than to be shot at without result." Mercifully, that sums up what happened in my exam. After this event— or because of it—, my lab skills became sharper, my mistakes became more sophisticated, and I had a new level of vigilance that stayed with me for the rest of my career. The mistakes and repairs I had made in the process leading up to that big day were unexpectedly valuable.

There is simply no good time to flood out the offices of a Nobel Prize winner and your mentor, but I do have two words of advice: think sabbatical!

Regarding your future mistakes— make them early if you can; learn from them; and move on in a better way.

So sum up... Mistakes, Tenacity, and Disproportionate Value Creation— use them wisely.

In closing, I'd like to say that I feel truly blessed because, quantum mechanics notwithstanding, I've been able to apply so much of what I've learned along the way. For me, the constant in several different work environments has been the chemistry-driven pursuit of new drugs and their subsequent development. Looking every day for molecules that may someday make a difference in human health is both gratifying and fun, involves working with really smart people, *and* pays your bills. Scientists often think I'm a businessman and people in business often think I'm a scientist. That's a dual citizenship I wouldn't trade for anything.

Graduates-- you now have a new slate. What will your formula be?

Thank you and, again, congratulations!