On Wednesday, April 21st 2010, I gave a speech at my old high school. The speech was given in honor of the newest inductees into the Cum Laude Society – a privilege reserved for the top twenty percent of each grade level. There were faculty, students and parents present. This is what I said…

Thank you, Max. And thank you to Dr. Guffin and the rest of the faculty and staff, and to the parents and grandparents, and to you, the inductees? Congratulations, and thank you for letting me share this day with you.

The difficulty in giving a speech in front of a group of talented students is that there's not much I can say that you don't already know.

As an alumnus, I know you've been told about setting goals and taking responsibility. You've been taught that mistakes often lead to success and that inspiration is all around you. You've learned not to give up on dreams and it would be safe to assume you all live by a personal code – staying faithful to your roots and focusing on only the important things.

The truth is it is only with the passage of time that these lessons reveal themselves as keys to the human experience. It is only then, upon reflection, you'll understand what your teachers and parents meant so many years ago.

That said, I do believe there is value in repeating some of these lessons, but this time with a computer scientist's perspective on how technology might shape the bright future into which you are heading.

I am a Ph.D. student in computer science at the University of Washington and I do research in technology for developing regions. I spend most of my time building advanced hardware and software and applying it to very poor environments. I mostly work in East Africa and on tools that make healthcare delivery more efficient.

My current project is called Open Data Kit, and it's a free set of tools designed to replace paper-based systems in developing regions. Let me give you an example.

Most district hospitals in Africa have a large set of patients that they provide care to. As part of their mission, every person in this catchment area must be surveyed so the hospital can plan their interventions.

Usually, they use paper surveys, but in a large district it takes months to gather the data, move it to the city, type it into a computer without mistakes, and then do the planning. By the time that process is done, your sick patients will have died.

With Open Data Kit, you can send out health workers with phones and they record the data as they see the patients – in addition to text, they can even record audio, video, pictures and their GPS location. The data is sent wirelessly to the hospital over the cell network and made immediately available for clinical care. AMPATH, the largest HIV program in sub-Saharan Africa, uses Open Data Kit for this purpose.

What is strange about the work I do is that these interventions of technology often occur in places without running water or electricity. And yet in these very places you will find a farmer or a fisherman using a mobile phone to make a call or send a text message.

How is this possible? Well, we live in exponential times. That is, technological innovation is happening much faster than it used to and it's reaching the masses just as quickly. Let's start with some facts I pulled from Karl Fisch's Shift Happens video.

It took radio thirty-eight years to reach an audience of 50 million people. It took television thirteen years. The iPod took three, and Facebook took only two years to reach 50 million users.

With each technology come an explosion of information and a commingling of ideas. The practical implications of this are serious.

It means you must prepare for careers that do not exist, using tools that haven't been invented, in order to solve problems we can't foresee. It is my belief that the choices you make over the next few years should reflect this reality.

I want to convince you that to succeed in this new world, you must have a broad base of skills paired with a desire to work on truly difficult problems.

That broad base of skills starts here at Park Tudor, with teachers whose names are still familiar to me. Mr. Hauth, Mrs. Allen and Mr. Realey

sparked my love of computers by giving me a chance to work on the tech staff. Ms. Glassmeyer's sponsorship of the newspaper and yearbook gave me the space I needed to learn design. Mr. Nordby is the reason jazz brings me such joy. Even Madame Vote's French class came in useful – the few words I remembered landed me my long time girlfriend.

Ms. McAlear, Mr. Onstott, Mr. Dewart, Ms. Everett, the list goes on and on.

So the seeds have already been planted, but it is up to you to nurture them. Please do, but know that their influence is often subtle and unpredictable. If you are not aware of these seeds and how they affect your work, you won't connect the dots. Your colleagues who do will have a head start and a head start in exponential times can be big.

I mentioned earlier that you should only work on difficult problems and I want to explain how you know you've picked a difficult problem.

If the consequences of failure are personally terrifying you've probably picked a difficult problem. I understand this may be a harsh framing, but maybe an example will help explain why I use this description.

I did my undergraduate work at Butler and I finished at the top of my class – I was voted the most outstanding male student in 2004. I worked hard, but the truth of the matter is, I did not work on the hardest problems available to me. Never in my time at Butler was I terrified of failure. I was comfortable at being good at what I was doing. It never occurred to me try to reach some breaking point.

After Butler, I took a job at Raytheon as an engineer. I worked on weapons for fighter jets and submarines and as exciting as that sounds, the day-to-day work was suffocating. On the belief, that life had more to offer, I tendered my resignation and started applying to graduate schools.

It was in my first quarter at the University of Washington that I really faced my limits. One of the classes I took was algorithmic theory – essentially building recipes that a computer can use to figure things out.

At the graduate level, you work on algorithmic ideas that will make your head hurt. The faculty sometimes assigns literally unsolvable problems just to see what you come up with. Of course, they never let on that your homework stumped Albert Einstein, but I suppose that's the goal.

After the first exam in algorithms, it was clear that being a top student at Butler did not count for much. I was in a whole new league and I was scoring two standard deviations below the mean. I was failing – both intellectually and emotionally. I felt like an impostor.

I would love to say that I rose to the challenge and ended up with an A in the class, but I didn't. Sure, I doubled my efforts and got creative but I was at my limits. It was only through the patient tutoring of my friends that I barely passed.

To this day, I'm still terrible at algorithmic theory. But the experience of being terrible at something and not giving up taught me a fearlessness and optimism that I will never lose. I suppose I've had it in me all along, but it took a taste of defeat to bring it to the surface.

It is with that attitude that I went to rural Rwanda to build a system that could track HIV patients. It is with that attitude that I came back determined to apply the lessons I learned more broadly. And is with that same attitude that I wake up each morning bent on making the world a better place.

Exponential times require exceptional people – people who have a broad base of skills to solve truly difficult problems. Looking across this room, I know that the future is very bright indeed.

You might not know it now, but you are beginning a journey that will bring you closer to who you really are. I wish you the fearlessness and optimism it takes to change the world.

Thank you for this opportunity. Have fun and good luck!