

University of Maryland Commencement Speech, December 20, 2008

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Marissa Shirron, President Mote, graduating students, parents, friends, and University of Maryland faculty and staff, ***congratulations!*** We are gathered to recognize your accomplishments, and to look forward to our future, a future we can not predict but will nevertheless create together.

Many of you have reached this proud day by overcoming enormous obstacles. Perhaps you had no money. Perhaps you were the first one in your family to reach college. Perhaps you traveled thousands of miles from other countries to participate in our community. Perhaps your friends told you your dreams would not come true. But here ***you*** are. And in this historic year when we have learned the power of the simple words, 'Yes ***we*** can,' congratulations!

And we are here to give ***thanks*** to those who made this journey possible. We thank the citizens of Maryland, who have supported this wonderful school for 152 years. We thank those whose generous donations have supported the school and made scholarships possible. And we thank the families and friends who have supported your personal adventure here with love and money and friendship.

Did you know that archeologists have found little stones with letters from students to parents from ancient Egypt, and even 4000 years ago, students wrote to tell of their dreams and

complain about the food and ask for more money? So we join in a *very* long tradition.

Carl Jung said this: "When a man has a certain fantasy, another man may lose his life, or a bridge is built... Everything you do here -- all this, everything, was a fantasy to begin with, and fantasy has a proper reality. That is not to be forgotten; fantasy is not nothing. It is, of course, not a tangible object, but it is a fact, nevertheless."

On July 4, 1776, our Founding Fathers pledged their lives, their fortunes, and their sacred honor, as they wrote our Declaration of Independence, their dream for our future. So what matters today are your dreams, your fantasies, your words trying to become real. Dream great dreams, and see what you can do. Dream dreams that are worthy of you as a creative human being, dream of a life that shines with kindness, empathy, compassion, and generosity, and not just of owning shiny things.

So while you're thinking about that, I have a few observations from the world of science. When I was just 28, I had an idea, which was that it would be good to try to repeat my thesis experiment, which had failed the first time, using a NASA satellite. It seemed an impossible dream. But I found a good team, we sent in a proposal, our ideas were heard, and 15 years later our idea was launched into space. That's NASA's job, to turn fantasies into reality, and we're still doing it after 50 years. It's one of the reasons people love NASA, and why we nerdy people who work for NASA are happy with our jobs. So 17 years after our satellite was launched, I got a call from Stockholm, saying that our idea, our fantasy, had been a very

worthy one, and I got another diploma, from the King of Sweden.

I've been working all my professional life with an amazing team, the NASA team at Goddard Space Flight Center. We have the job of building what has never been built before, to discover what was never known before. It takes a lot of nerve to start, but at the core, this is a very humbling and awe-inspiring experience. So I have a few suggestions for you, from watching the way we work.

First, scientists have a really strict code of ethics. Maybe it's easier for us to keep to our code than for some people, because we know that we're going to be found out if we try to cheat mother Nature. It's not like an exam at the University, or over at Wall Street, where perhaps nobody will notice for a while. If I publish something that is wrong, my friends are going to find out. If I find out it's wrong before they do, I'll publish a correction, and I've had to do that once, for a mistake in algebra. For a scientist, there is only one easy path, the path of scrupulous honesty. Honesty is relaxing. There is nothing to hide and nothing to fear.

Another thing scientists do is to be skeptical of a lot of things. If I don't see how it works, I might not trust it. And if I can't explain it in words my grandmother can understand, I probably don't understand it either. And scientists have a very high motivation to find something that isn't right with the way we think. But being skeptical doesn't make us all real popular with people who are already pretty sure they know something, or who have a secret they don't want you to know.

I hope that your years here at the University have shown you how to be skeptical too. If I had a penny for every misleading advertisement in a political campaign or in the commercials for diet and beauty products, I'd own the entire planet Earth. So I urge you to be skeptical of sound bite politics, sound bite economics, sound bite science, and sound bite morality.

I have something else to say about working with the NASA team: We have to get things right, or our wonderful satellite is not going to work. When it comes to astronauts, if we don't get it right, somebody may die. You can't fool mother Nature. Our satellite doesn't care one bit if I think it's going to work. It only is going to act according to what we built. You know what that means? It means we have to get the engineering skeptics together too, the ones who can review our plans and our designs and tell us when we're about to make a big mistake. So for us at NASA, the most important people may just be the ones who tell us we're full of beans and disagree with us the most.

So we have to listen to our critics and figure out if they're right, and be our own best critics, and then act accordingly. It's easier to say than it is to do, because we all love our own ideas. But we have to get it right anyway. So when you are building your own teams, I urge you to include some people who don't agree with you. Don't let them stop you from your dreams, but they might be your most important teachers.

Our Founding Fathers thought this way too. They set up a Federal government in three parts with checks and balances, so nobody could make a big mistake without somebody finding out. They knew what didn't work, because they had read their history books, and they had fought for their rights from the

British government, and they set up an experiment in government that's now running a few miles south of here.

There's something else from science and engineering for you to consider. Nature and human society are full of what we call feedback loops. These are situations in which some system sends a bit of the output information back around to affect the input. The human body does that: if you eat enough, your body tells you to stop eating. The world of business does that too: if you see a market for a new product, and you build it, and it takes over the world, then by and by somebody else figures out how to build it too, perhaps with better features, and presto, you have competition. What this means for life is that nothing is ever simple for very long. If we say, let's save lives with antibiotics, isn't that great, let's do it around the world, then guess what happens? The bacteria figure out a way to survive by becoming resistant to our antibiotics. And now we're running short of new antibiotics to fight those bacteria.

Winston Churchill said it better. He said, "Victory is never final." So I am quite sure that there's not going to be an end to the need for experts on every subject you have studied here. Of course those experts are you! We're going to have to keep at it for the rest of history. Your life is not going to get boring, because the world keeps changing. You graduates are going to have to pay attention! You are going to be busy!

First, and most important, look around you and see what you love to do. What are **your** fantasies? If you're employed, congratulations! But life is too short for you to spend it doing something you don't want to do. Life is too long for you not to do what you want to do. So do what you love to do. If you can

see that direction and give it your whole heart, who knows what may happen for you?

I have been amazed at the creative power of plain ordinary persistence, to produce extraordinary results. Aim high, you might actually succeed!

Second, be an optimist, or a realist, or an idealist, or a skeptical scientist, but keep on going for what you love. They say an optimist is a person for whom the glass is half full, a pessimist is one for whom it's half empty, and an engineer is one for whom the glass is twice as big as it needs to be. But whatever, keep on going where you want to go. You can't see the other side of the forest before you go through it, so don't give up too easily just because you can't see how to do what you want.

Finally, remember that we are all in this together. Our families, our friends, the citizens of Maryland, our teachers, have all come together to get you, the graduating students, through school, because we know all our lives depend on it. This is our way of saying ***we love you***. In my opinion, we have just educated the most brilliant generation of students ever to walk the Earth. We're counting on you youngsters to run the planet, to make life better with science and technology and arts and literature and law and all the other areas you've studied, to manage global warming, to feed us when we're old, and to raise up the next generation to follow after you, as our ancestors did before us, and as our children's children will do tens of thousands of years in the future.

So, on behalf of all of us, to all of us, I say thank you, may all blessings come to you, congratulations, and good luck!