

**Steven Chu**  
**Pomona College Commencement 2011**  
**May 15, 2011**

President Oxtoby, trustees, faculty, family, friends and most importantly, the class of 2011, thank you for letting me share this wonderful day with you.

To the new graduates: Congratulations on your achievements. I feel especially honored to be chosen to speak at this commencement, the 47th anniversary of Pomona's discovery that the number 47 is special. I agree. I was conceived in 1947.

On this special year, there is additional pressure to say something memorable, something that will be remembered 47 years from now. Hah, you say! Most commencement speeches are forgotten in less than 47 hours....but wait, I have a plan. Normally, commencement speakers are like a corpse at an Irish wake: We are needed for the ceremony, but nobody expects us to say much.

In honor of the number 47, I have decided to structure my remarks after Charles Dickens' "A Christmas Carol." In the book, we see Ebenezer Scrooge as stingy, sour and self-centered ... the stereotype of, for want of a better word, a "Scrooge." But there is another, younger Ebenezer, who is gregarious, good-willed and generous. What determines the ultimate fate of Scrooge were visits from the "Ghost of Christmases, Past," "Present," and "Yet to Come." In my "Commencement Carol," I will remind you of the times, 47 years ago. We will also see a view of the Present, and glimpse at a world 47 years, Yet to Come.

The Ghost of Commencements, 47 years ago, reveals a civil rights movement in full stride. Martin Luther King, 35 years old, became the youngest Nobel Peace Prize recipient. The U.S. and the Soviet Union were in a nuclear arms race and a space race. Seven years earlier, the Soviet Union launched Sputnik into Earth's orbit. America was shocked. We had taken our technological leadership for granted, but Sputnik made it clear that our German rocket scientists were not as good as the Soviet's German rocket scientists.

Sputnik's launch was seen as a threat to our national security. President Eisenhower could have focused on defense funding, but he took a longer view. A few weeks after Sputnik, he responded by calling for increased education of scientists and engineers and a stronger commitment to basic research. Less than a year later, Congress passed the National Defense Education Act to improve math and science education at all levels. In 1961, President Kennedy challenged our nation to land a man on the moon within a decade.

President Kennedy's call to action inspired America's youth. When we landed the first men on the moon, the majority of engineers in NASA's Mission Control were in their 20s. The atmosphere at Mission Control was electric.

"We were given this impossible dream by President Kennedy, and we were living it. We were doing the kinds of things that engineers would kill for ... [and] surprised we were getting paid... As long as we had enough money to make things meet, that's all we needed."

I, too, am a product of our nation's response to Sputnik. I was supported in summer science research programs in high school and college, and with National Science Foundation graduate and postdoctoral fellowships.

The Ghost of Commencements, Present reminds us that we live a time that is no less stressful, no less exciting, and even more critical. We are recovering from the worst recession since the Great Depression. The unemployment rate is still high and many of you may be worried about finding a job ... but you're not alone. Your parents are also worried.

Globalization has opened new doors, but it has also increased competition. Our troops are fighting in Afghanistan. Unrest is sweeping through the Middle East, North Africa and Asia. Science is telling us that our carbon emissions are changing our climate and endangering our planet.

There is an ancient Chinese curse, "May you live in interesting times." According to the authoritative source of our times - Wikipedia - it appears the expression may have an English origin. Regardless of the origin, it still resonates today – but not as a curse. Interesting times are filled with risk, but they are also filled with hope and possibility. The times of greatest challenge provide the greatest opportunities.

The Ghost of Commencement, 47 years, Yet to Come brings us to the year 2058. You're here at your Class reunion. To paraphrase Simon and Garfunkel, "Can you imagine, years from today ... how terribly strange to be seventy?" The awkward and embarrassing moments of your youth have faded – except for the stuff you were dumb enough to post on the Internet. To the delight of Pomona, you fondly remember your halcyon college days. Many of you will have children; some will have grandchildren.

Here is my plan to help you remember my speech: I ask you to write in your college yearbook how your life will unfold in the next 47 years. Write down what the world will be like and your role in shaping its destiny. Make a note that the Secretary of Energy inspired you to do this. I know it is a cheap trick, but it's worth a try. You've got to do this today ... before you forget what I've said.

Here are two visions of the future. In one future, Europe and Asia, most notably China, lead in clean energy technologies. In 2058, the United States is a laggard. Industry leaders, clinging to the old way of doing business, convinced Americans that putting a price on carbon is a job killer. Without the voices of concerned citizens and leaders, our transition to clean energy was delayed. While there were some government policies that encouraged investments in energy efficiency and clean energy, they were erratic, inconsistent and largely impotent.

The vast majority of our solar modules, wind turbines, and electrical distribution equipment are imported. Our economy has been eclipsed by China. The price of oil is \$278 a barrel, and while electric vehicles are widely used, most are imported. After decades of a national strategy that is best described as "Hope for the best, plan for the best," we lost our economic advantage.

The world's carbon emissions continued to rise with "business as usual," but by 2058, the full dangers of climate change are obvious. Many of the warnings of the climate scientists in 2011 have come true, and the few who survived the 20 year funding drought are despairing, "Too

little, too late.” Floods of the century, including our current flood, now average once a decade. Scorching summer droughts threaten our agriculture, from Kansas to California. Fierce hurricanes in the preceding decades had devastating impact on the Gulf.

Because of climate change, some of the world’s most fragile economies in Asia and sub-Saharan Africa have collapsed. The intense storms, rising sea levels and growing deserts have resulted in tens of millions climate refugees and deaths.

There is another, happier version of the 2058 Pomona Commencement. The nation passed a set of measures that led the world on a sustainable energy path. As a result, major investments in modernizing our energy infrastructure generated unprecedented job growth and prosperity. Knowing that oil prices were likely to keep rising with each passing decade, we diversified our sources of transportation energy. We now lead the world in the development of electric vehicles, advanced biofuels, and the most efficient cars and trucks. Most of our energy is renewable, based on technologies invented and built in America. American agriculture is still the most productive in the world.

The carbon emissions of the United States and the rest of the developed countries is one fifth of what it was in 2011. The world carbon emissions peaked in 2050, and it now appears that the worst risks of climate change were avoided. While there are still significant impacts, the world is economically robust enough to adapt to climate change.

Scrooge asked the Ghost of Christmas Yet to Come, “Are these the shadows of the things that Will be, or are they shadows of things that May be?”

As you well know, our fate lies not in the stars, but in ourselves.

Let’s return to the Present. For most of my adult life, my central focus and professional joy was doing physics. Like people at NASA’s Mission Control, the money didn’t matter as long as I had enough to make ends meet. During the 26 years I was at Stanford and Bell Labs, I don’t think I ever took more than a 3 or 4 day vacation simply because I didn’t want to take vacations. As I began my downward spiral from professor to administrator to government bureaucrat, I now need vacations.

You may wonder why someone like me would ever consider leaving the life of a professor at Stanford to become the director of a national laboratory, or to leave academia to become Secretary of Energy. Despite the trials and tribulations of running a large bureaucracy and being part of the political world, I feel privileged be where I am. Why? Because I believe that the energy and climate challenge is one of the most pressing problems that the world has to solve.

What needs to be done? We have to plan for where the world will be in the coming decades, not in the coming election cycle. When the great hockey player, Wayne Gretzky, was asked how he positions himself on the ice, he replied: “I skate to where the puck is going to be, not where it’s been.” America should do the same. Wishing to return to the past is not a good plan.

There is an upside to the energy and climate challenge. Many European and Asian countries recognize the opportunities in clean energy and are moving aggressively. Although the United States built the first electricity transmission system, China has the highest voltage and capacity

transmission lines. We built the first nuclear reactor, the first solar cell, and the first modern wind turbines, but technological leadership has moved to Europe and Asia. While we've fallen behind, we can and must rise to the challenge.

Half a century ago, as Sputnik orbited the Earth, we revved up the great American innovation machine and won the space race. The stakes are much higher in today's sustainable energy challenge. Today, all nations need to be the part of the solution and all nations will benefit.

In my final part of my commencement speech, I have to fulfill a sacred obligation; give you advice you didn't ask for. My advice is simple. Do something.

Do something you love. Give it your all. You don't want to be like Peter Gibbons in the movie Office Space. One of the Bobs tell Peter, "Looks like you've been missing a lot of work lately..."

To which Peter replies, "I wouldn't say I've been missing it, Bob! ... The thing is, Bob, it's not that I'm lazy, it's that I just don't care..."

Life is too short to go through it without caring deeply about something.

Do something that matters. Do something that matters beyond your immediate world. When you are old and gray, and look back on your life, you will want to be proud of what you have done. The source of that pride won't be the things you have acquired or the recognition you have received. It will be the lives you have touched and the difference you have made.

You have had the opportunity to stretch your intellectual wings, the privilege to wonder, to think, to create. With this privilege, you have the responsibility to recognize the opportunities and seize the moment. Invest the time to learn more about what's at stake, and then act on that knowledge.

There are great economic and business reasons to invest in a sustainable future, but for me, the bottom line is not the bottom line. For me, what we do about climate change is a deeply moral issue.

The world is deeply interwoven in space and time. As Martin Luther King wrote in his "Letter from a Birmingham Jail" 48 years ago, "We are... tied in a single garment of destiny. Whatever affects one directly, affects all indirectly." Above all, we must value and protect the most innocent members of our society, the children of the world yet to be born.

I end my remarks with the astrophysicist, Carl Sagan. He wrote of an image taken by Voyager I as it was leaving our solar system. In this picture, Earth appears as a pale blue dot of light embedded in a rainbow of light.

"Look again at that dot. That's here. That's home. That's us. On it, everyone you love, everyone you know, everyone you ever heard of, every human being who ever was ... lived [on] a mote of dust suspended in a sunbeam.

"... the Earth is the only world known so far to harbor life ... Like it or not ... [this] is where we make our stand.

“... this distant image of our tiny world ....underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known.”

To this message, I add an ancient Native American saying: “Treat the earth well: it was not given to you by your parents, it was loaned to you by your children.”

You, the class of 2011, live in interesting times. Carpe Diem. America's youth, 47 years ago transformed the world. Today, you have the opportunity to do more than just change our world; you have the opportunity to help save it.

Congratulations. Go out and celebrate, but before you do, spend a few moments writing in your yearbook about how your life and the world unfolded, 47 years from today. After that, go out and Do something.

Do something that you love.

Do something that matters.

Do something for the children of the world, yet to be born.

Do something to preserve and cherish our pale blue dot.

## **About Steven Chu**

Steven Chu is Secretary of the U.S. Department of Energy. As Secretary, he is charged with helping to implement an ambitious agenda that includes increasing investment in clean energy, reducing the country's dependence on foreign oil, addressing global climate change and helping to create new jobs. Prior to his appointment, he was director of the Department of Energy's Lawrence Berkeley National Laboratory, where he focused on alternative and renewable energy. He is particularly known for his research in cooling and trapping atoms with laser light, for which he was a co-winner of the 1997 Nobel Prize in Physics. His research covers the areas of atomic physics, quantum electronics, and polymer and biophysics. He holds 10 patents and is the author of more than 250 scientific and technical papers. Chu has served as professor of physics and applied physics at Stanford University, professor of physics, molecular and cell biology at the University of California, Berkeley, and head of the Quantum Electronics Research Department at Bell Laboratories.