**Let Us Salute Scientist Citizens**

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Address to the College of Natural Sciences Convocation
The University of Texas at Austin
Saturday, May 23, 2009

Good afternoon. I'm the guy who gets to give you 10 minutes of advice that is so memorable, and on such an important occasion, that – I absolutely guarantee – you won't remember a single word I say! This is the kind of festive collective amnesia that commencement speakers depend on. I know you won't let me down!

Much more important than who I am, is who *you* are: From today forward, you are University of Texas graduates! Your University, your parents and friends are very proud of you today. The Tower is going to be illuminated tonight in your honor. And parents, I'll tell you a secret that we don't tell the graduates: it's in your honor, too.

But you here are all more than graduates. There's something much more distinguished about you all. You are all *scientists*.

Maybe some of you don't feel that the label *scientist* fits you. "Sure I majored in biology, but that doesn't make me a scientist."

Let me tell about the word, "scientist," which is not, as you might surmise, from Greek or Latin antiquity, but was first used only as late as 1836. At the annual meeting of the British Association for the Advancement of Science (a word that already existed), there was a debate on "any name by which we can designate the students of the knowledge of the material world". The word, "philosopher" was felt to be too broad. The word "savans" was thought a bit too conceited. [1] Then the great generalist William Whewell proposed the word, "scientist".

The word was instantly rejected, because it was too much like two existing words that nobody there wanted to be confused with: “atheist” and “economist”! [2] (How little things change.) Also proposed were two approximate translations from the German, which came out “nature-peeper” and “nature-poker”. In the end, however, the word “scientist” was the one that stuck.

You don’t need a Ph.D. to be a scientist. What you need is, as the quotation suggests, to be a student of the knowledge of the material world. You all are that, or you wouldn’t be here today: You all have the ability to assess facts and solve problems about the natural world by thinking logically and quantitatively. That’s something very special and very valuable in today’s world. I welcome you into this select branch of the fellowship of educated women and men!

When Dean Rankin was about to OK the demolition of the old bio labs last year, she needed to be absolutely sure that everyone was out of the building. So, naturally, she picked three Dean’s Scholars to do the final check: one from physics, one from biology, and one from mathematics. These three personally checked every room in the whole building. And, disturbingly, they found two undergraduates still inside. So they stood across the street waiting for these last two to come out.

After a few minutes, three people came out.

The physicist, who knew something about data analysis, said, “It’s experimental error – we must have counted wrong.”

The biologist, who knew something about undergraduates, said, “No, they must have reproduced.”

The mathematician, who knew something about negative numbers, said, “If one of them would just go back into the building, then it will be empty.”

OK, if you laugh at that story – or even groan it it – then you’re the person I’m talking to now. The rest of you, just relax and enjoy the mood of this wonderful, festive occasion.

I had the honor, recently, of being named by President Obama to his Council of Advisors on Science and Technology, and I had the opportunity to hear, personally, the President’s list of areas in which, he felt, science and technology are going to have an important impact on policy decisions: Number 1: the economy, where new high-tech industries must be part of the long-term solution. Then, energy, climate, environment, health care, math and science education, nuclear non-proliferation and international security.

What strikes me about this list is that every item is going to require, in our democracy, a broad national consensus. And at the same time, every topic has highly technical aspects that profoundly affect the outcomes.

This is where your country and your planet need you: Whether or not you plan to go on now, or at some point, to further education in science, you are all now already scientist citizens. You will be *opinion leaders* on scientific issues among your non-scientist family, colleagues, and friends. People will turn to you, at home, in the workplace, in your private lives, and ask you, about some issue, “hey, should I believe this?” or, “hey, what do *you* think?” At these moments, you have, in a very real way, the power to change the world. I hope that you enjoy such moments – you’ve worked hard for them. But because knowledge really is power, your special status also implies some significant responsibilities.

Your first responsibility is to learn about the facts behind the issues, and seek the evidence behind the facts. You understand far better than most of your peers that truth emerges not from asserted facts, but from the constant questioning and testing of asserted facts.

Darwin, whose 200th birthday we celebrate this year, had a nice way of putting this: "False facts," he said, "are highly injurious to the progress of science, for they often endure long. But false views, if supported by some evidence, do little harm, for every one takes a salutary pleasure in proving their falseness."

That is also a part of your responsibilities as scientist-citizens: Take just a little bit of that "salutary pleasure" in correcting people who have their facts wrong. (Of course, you should do this in the nicest possible way!)

Your next responsibility, after you understand the facts, is to take positions on issues yourself, principled position based on the evidence. Then, you have the responsibility to communicate your position to everyone who will listen to you. Oliver Wendell Holmes, Jr., characterized democracy as a marketplace of ideas. Let me tell you something relevant today about that marketplace: it's recession proof! If you invest in it, you always get a good return. We need you, scientist citizens in the marketplace of ideas.

Finally, I want you each to take away one additional responsibility. It's not what you may think. It's not, "be good to your parents" or "help the less fortunate," although those are two worthy goals. It's this: You have the responsibility to *fail*.

"Wait, did he say that right?" Yes, I did! If you don't fail, sometimes, in some things that you try, then you're not aiming high enough. As scientist citizens, you understand more than most people how to titrate success and failure. Aim for success of course. But also try for just enough over-reaching to get the

calibration right. If you don't do this, then you'll never know how much of your talent is being wasted by aiming too low.

And, right now, the world can't afford to let you waste any of your talent, not one bit of the amazing talent – mostly wearing funny hats – collected in this room.

Fellow nature-peekers and nature-pokers! You will shape the future. We salute you!

*References*

[1] Danielson, D., "Scientist's Birthright," Nature, vol. 410, p. 1031 (April 26, 2001).
[2] Ross, S., "Scientist: The Story of a Word," Annals of Science, vol. 18, no. 2, pp. 65 – 85 (June, 1962).