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University of New Mexico, School of Engineering
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Before I get started, I want to thank the Dean and the School of Engineering for giving me
this opportunity to speak.

When I first heard that I'd been selected to be the graduate speaker at this ceremony, I
thought to myself "Oh god, what could I say to my fellow graduates that could possibly be
new or interesting?" So, I did what any good graduate student would do - I started doing
research.

Not being much of a mathematician, I decided to start by collecting some data. First, I
borrowed the tapes for the past few convocations, and carefully studied their content. After
decomposing them into their thematic elements, I measured the intensity of the audience's
clapping as a function of each. I searched the World Wide Web for good speeches, partic-
ularly those given by famous people with a gift for words. I thought about sunscreen. I
studied famous quotations by famous dead people. I stayed up all night, several times, and
drank a lot of coffee.

After weeks of intensive study, in a blurry, sleep-deprived moment early this morning, I saw
it. I had one of those "Eureka!" moments that you always hear about, and all the pieces fell
into place. With my discovery (and a jumbo vanilla mocha double-espresso latte) in hand, I
began furiously writing my speech. Here is what I found. A good graduation speech simply
contains at least two of the following three elements:

1. a good, self-deprecating joke, often about engineers, mathematicians or physicists and
   their lack of common sense;

2. a heart-wrenching story of personal triumph over adversity; or,

3. a profound insight into the nature of life or learning.

Since I've already covered all three of those, here is the rest of my speech.

I think the world of engineering is changing.

The life of an engineer used to be a simple one. Mostly, we were asked to design machines
that accomplished specific, stand-alone tasks; hopefully in an efficient, safe, and cheap way.
That is, we built widgets. Small ones, large ones, simple ones, complicated ones. And, to
its credit, this kind of emphasis brought us many wonders of modern life. Things like the
skyscraper, the automotive and the bullet train. It also brought us things like the non-stick
frying pan, those little clippy things that hold your shoelaces in place and, one of my per-
sonal favorites, the "Hello, Kitty!: Island Adventure" game.

In some sense, building widgets is a solved problem. I mean, we're so good at building them that they'll even give you a degree in it at a university!

But, the future of engineering, I think, is in understanding how to design widgets that don't cause problems for us down the road. Certainly this means computers without heavy metals, zero-emission cars, and biodegradable DVDs. But, if we really wanted - if we had the political will - we could do all of these today. No, I mean something bigger than just designing our way out of pollution.

What I mean is that the most interesting and promising technologies of tomorrow are not new widgets themselves, but rather they are powerful ways of manipulating the world around us. Whether through computers or biology, these technologies amplify the effects of our actions tremendously. They also, however, amplify their consequences. When it's clear what these consequences are, we can design around them. But, when we're dealing with complex systems - by this I mean systems that interact with biology or that pervade society - it can be very hard to predict what consequences our actions will have.

The engineering of the future, I think, will teach us how to anticipate, and perhaps articulate, these consequences. To do this, engineers will likely need to draw on ideas from ethics, medicine, economics, privacy, and biology. Then, our task - and I don't think it will be an easy one - will be to understand how to design systems that manage and minimize those consequences. Nanotechnology, genetics, automated control systems, pervasive monitoring, and a world where everything is done via computer; these are the technologies of the future. These are the technologies of the present. Only if we learn how to design with them carefully, we can solve the big problems of our generation - things like carbon-free energy and ecologically sustainable growth, and even problems that we don't have names for yet.

This, I think, is what the engineering of tomorrow should be about. So, let us go forth and make it the engineering of today.

Thank you.