

*Speech to Student Chapter of Society of Women Engineers at a Cornell University recruiting event – part of an effort to increase DS&T's diversity hiring and encourage more women to stay in engineering, March 2009*

I am happy to be here this morning – reliving what turns out to be a very distant past. A little over 30 years ago, I was arriving at college to study with an SWE scholarship. I was studying to be a structural engineer – because I had an uncle who built one of the bridges over the Mississippi River and I thought it was amazing to build something - to create what was not there before – something functional and to my eye beautiful.

I wasn't planning to work in the 'behind the curtain world' of applying technology to the intelligence mission – but I've never regretted for a moment the happy accident that started me on that path.

I started out in industry, I have worked for the Navy, and I joined CIA in 1995 – or 14 years ago. I know that I am talking about long timelines that probably do not feel real to you at this stage of your life – but believe me they pass quickly and the best that I could wish for you is that you will find your career in engineering as full as I have.

Engineering and the business of intelligence have made for a wonderful career. I've had matchless experiences, been present at the making of history, and found intellectual challenge. I have climbed on the launch pads at Cape Canaveral, crawled in, through and under submarines, stood in the middle of room sized holograms, and had the opportunity to work with the country's best minds. What I haven't been is bored.

A career in engineering involves great responsibility, the decisions you will make will count. At the DS&T we have a full spectrum of engineering experiences – from folks working hands on at the bench with timelines measured in hours to large projects that involve thousands of people. Both have challenges...

At the bench with a handful of hours – it's just you – you have to have the knowledge or the insight to solve the problem you've been handed. There is no time to get anyone else – you are of necessity the expert. In our parlance these officers are doing operational or field engineering. And they work miracles. They reverse engineer circuits and codes. From fragments they piece together the signature of a bomb maker. They are geniuses at what we call 'geometrically disadvantaged' antennas – cramming antennas into places no antenna was meant to function. For any of you who are old enough to remember – they are the McGyvers of this generation or perhaps the mythbusters, manufacturing solutions from duct tape, paper clips and chewing gum when they have to. As the name implies they frequently operate in the foreign field – and many of them are young women just like you.

In large programs involving people and contractors spread across the country – you face the challenge that everyday hundreds of people are making decisions about your program – to change a vendor, or a part, or a material, to drop a test or a quality control check to gain back some schedule or budget margin, to change the design margin and trade performance for reduced risk.

The people managing these large programs are our rocket scientists – as the name implies they build and launch satellites. They push engineering frontiers, building systems that operate in environments where there is no wall plug for power, no HVAC system for temperature control and no real ability to go back and service the system if it breaks. They are masters of complexity.

Most of our engineers carry the responsibility to make decisions that balance cost, schedule performance and risk. You will carry the responsibility to make similar trades in your career and to ‘speak truth to power’ as you do it. You will be asked – Will your idea work? Is it working? Can it be built? Can it be built on schedule/within budget? What are the risks? Your professional integrity in addressing these questions will determine the long term success of your career, as well as your ability to respect yourself and sleep well at night.

As engineers you will often have to communicate to people who do not really speak your language. As intelligence officers at CIA we are strongly encouraged to speak other languages and I am often tempted to try and get calculus or physics – especially the laws of physics counted as a foreign language – as we are often asked to do things that – by the laws of physics – or occasionally just physically - are not possible.

It is tempting on those occasions to cross your fingers, wish hard and promise to deliver what is so badly wanted. This is where ‘speaking truth to power’ comes in again. The art form we practice as engineers is knowing when the seemingly impossible is really just this side of possible. New insights can bring something across the line, new technology can move the line, and sometimes sheer will pushes us over it.

Just as I did not intend to enter the intelligence business, I did not have a long term plan to end up in senior management. A career in engineering lead to a universal truth most of us discover along the way – it all starts with people. So if I started out wanting to build things, I am now spending much more of my time building teams and organizations.

When you find yourself in a similar position someday – be a thinking, thoughtful leader. Be self aware but not paralyzed by your own shortcomings – acknowledge them and build teams to complement the strengths and weaknesses of each member.

Keep Learning – change assignments or positions in order to learn something new, or when you feel it is getting too easy or too comfortable, getting stale is the sure path to irrelevance.

Don't be bored – whenever you reach the point where you are no longer learning or contributing – find some other way you can add value to the enterprise and grow. In our work at CIA that opportunity is very real – we work across the technology spectrum, with activities that span from field engineering and ops to satellite launches. We get the hardest problems to work and the challenges and thrills of success are very real.

Adapt your style but not your principles – your integrity and principles are the foundation upon which your career rests.

Have it matter – ask yourself if I don't do this tomorrow will anyone notice?

Be driven by something outside yourself – family mission, your values – it will help you keep perspective when things don't go as planned or as you wish – and they will.

Be considerate of others

Seek out opinions and viewpoints that are different than your own

Find common ground where you can

I'll close with one final thought - responsibility, speaking truth to power, the weight of decisions, professional integrity – these are weighty concepts to put on your shoulders – but I'm doing so because it matters what you do. Engineers build bridges, buildings, airplanes, systems that people and society depend upon. Engineering was applied to design the roof above our heads today – and we are grateful that it was done with integrity.

If scientists uncovered the principles of electricity – engineers built the systems that generate and deliver it and make it so we can flip a switch on that wall and have light, that we can set a thermostat and have heat, or log onto the internet via wireless connections.

Look around at what you can do as engineers – it is a noble endeavor- and it is fun. Thank you and may you all enjoy long and rewarding careers in engineering.