

Commencement Address May 15, 2016
Department of Chemistry
School of Chemical Sciences-University of Illinois

Thank you.

I am very honored and humbled to stand here before you. 30 years ago, I was sitting with our bachelor's candidates – graduating with my own B.S. degree in chemistry from U of I! I have no idea who the chemistry commencement speaker was then. I assume that in 30 years you too will have no memory of me or what I say today. Therefore, I feel like I can say whatever I want! I was told I had 5 minutes – which means I can really only convey one or two main points.

Today is a special day. It is a day that the university stands still in your honor, graduates, as we celebrate you earning your degrees. After all the homework, exams, labs, lab reports, experiments that did not work, experiments that worked but not in the way we thought, the senior thesis, the master's thesis, the doctoral thesis – all of these represent hard work on your part, and also build on the work of many other Illini chemists.

For this Department of Chemistry is a top one in the world. We are ranked in the top 5 chemistry programs in the US. Our very first degree earner was in 1872 – John Davis, Bachelor of Science in chemistry. A graduating class of...one chemist! Presumably Mr. Davis started his studies in 1868 – only 3 years after the Civil War ended, one year after the university opened, and one year before the first periodic table of the elements was published by Dimitri Mendeleev of Russia. In 1872, chemistry was a wide open field.

Today, in 2016, chemistry is still a wide open field. Of all the scientists – biologists, astronomers, physicists, geologists – only chemists are the ones who make new things. We make new molecules and new materials every day. We make the stuff that dreams are made of – from components in integrated circuit chips - touch screens - fabrics and fabric softener – beer – wine – more beer! – sensor devices - pharmaceuticals – drug delivery agents – the adhesives behind Post It notes - Teflon. One of our alumni, Wallace Carothers, could be considered the first polymer chemist, who did his thesis work in Noyes Lab and then went on to invent Nylon and neoprene with a team at Dupont in the 1920's. Wallace's PhD advisor was Roger Adams, for whom Roger Adams Laboratory is named. Professors we have now on the faculty, some of whom are sitting up here, are world leaders in their own areas of either small or large molecule synthesis.

Some chemists, though, are not that great at actually making new compounds! They are good at measurement. And our Department of Chemistry has again produced outstanding world leaders in measurement. Some of the first NMR spectra ever taken were taken in the basement of Noyes Lab. Herb Gutowsky, on our faculty from 1948 to 2000, can be considered as the main person who used the physics of nuclear spin splitting in magnetic fields to figure out the chemical structure of small molecules in solution. And indeed, as our graduates know, NMR is a now standard technique in chemistry that you learn about in the sophomore year. More recently on our faculty was Paul Lauterbur, who shared the 2003 Nobel Prize in Physiology or Medicine for developing magnetic resonance imaging, MRI, which is based on the principles of NMR. Paul was on our faculty from 1985 until he passed away in 2007.

But the great thing about chemistry is even if you are a klutz in the lab, and are not very good at measuring anything – you can still be a chemist! You can be a theoretical chemist, meaning you can code – you can do calculations and simulations of electrons in atoms, or atoms in molecules, molecules in fluids, or even all the atoms in a single living cell, as some of our faculty do here with our Blue Waters Supercomputer. Again our past and present high-powered faculty are world leaders here, with several Nobel Prizes in chemistry among them.

I have been talking a lot about the faculty; but we faculty all know that we cannot do much at all without our students. The classroom is where you learn about chemistry; the lab is where you do chemistry. Graduates of our program are known as a high quality product, if you will, from the 50-100 companies that come recruit here every year. Our graduates go on to positions in the chemical industry, national laboratories, government, colleges and other universities. Graduates, you might not stay at the bench as a scientist – but as a scientist, you have been trained in ways that will benefit you no matter what your future career. All those lab reports and writing prepare you for careers in scientific publishing and journalism. All that data analysis prepares you for legal, economic and policy career paths that require a technical background. All that undergraduate or graduate level research has turned you into a person who persists in the face of failure and can get stuff done.

For now is an exciting time to be in science. We have major societal challenges ahead of us as well as fundamental scientific frontiers – and all the action is at the molecular level – which is to say, chemistry! How does the brain work at the molecular level? Can we pinpoint the molecular signatures of cancer, of Alzheimers', to enable cures, in this new world of

personalized medicine? How are we going to get sufficient food, clean water and clean energy for the planet? Can we create new catalysts to speed up chemical reactions and make the entire chemical industry more sustainable, safer, and less polluting? Can we make invisibility cloaks? Can we make electronics that function as well as they do now – but when we are done with them, put them in water and watch them dissolve? Guess what – these are all things that our students have been working on here at U of I. And I challenge you, graduates, to go out there in the world and make a difference. Do good work and make us proud. Chemistry is all around you... Use it well!