Western Faculty Profile: Dr. Robert Hudson

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No conflicts of interest declared.

Background

Dr. Robert Hudson is a Professor of Chemistry, cross-appointed to Biochemistry. He has been at Western for 19 years, coming here from what he calls “the usual path”. Professor Hudson completed his postdoctoral research at California Institute of Technology in the lab of Professor Peter Dervan “one of the giants of bioorganic chemistry”, where he was for just over two years. Prior to that he completed his undergraduate education, Master’s and PhD at the University of Toronto. His free time is devoted to family, martial arts (something he has been doing for over twenty years), and travelling.

Research Focus

Professor Hudson’s current research is quite varied and he characterizes it as being “bioorganic chemistry of nucleic acids and analogs”. He also collaborates with researchers at the Robarts Research Institute, working on development of MRI contrast agents, as well as PET imaging agents for looking at

diagnosis of diseases. Dr. Hudson’s main focus is nucleic acid chemistry: “we use synthetic organic chemistry as a tool to make molecules that might have interesting properties and try to develop applications for those molecules. [...] We focus on making nucleobase modified nucleic acids of various sorts and the modification principle that we use is making minimum structural modifications, so it can still be accepted into DNA structures like duplexes and triplexes and so on. [This modification] endows the nucleic acid analog with some new property, and the new property that we’ve been focused on is fluorescence, so that we can use these in fluorescence-based assays for looking at nucleic acid structure formation or deconstruction of complexes; we can look at sequences by hybridization with single nucleotide resolution. One possible application would be doing single nucleotide polymorphism typing [by fluorescencebased hybridization assays] rather than by sequencing. [...] [We are] developing tools in nucleic acid chemistry that can be applied in sensing, or diagnostics or even potentially as therapeutic agents

if we develop molecules that can have a potential for selective gene knockout or gene turnon.”

Background

Dr. Hudson’s interest in science started at an early age. He says “I remember that I went through a phase where I was really interested in pyrotechnics. At the time you could go to your local Shoppers Drug Mart and buy some saltpeter and sulphur and they had all these sorts of chemicals on the shelf to treat fleas or other things like that. So you could go and make your own gunpowder and all sorts of things that were dangerous for kids to be making. And I was interested in this sort of experimental type of chemistry from a young age.” Also, several school teachers continuously supported his interest in science; their demonstrations and stories about in-the-field experiences with chemistry contributed to Dr. Hudson linking his career with scientific research.

While Dr. Hudson is an organic chemist now, initially he started in a different field. “I guess I could say that I sort of poked around a little bit because I was trying to find what I was really interested in. I started university in chemical engineering and I did one year of chemical engineering. And I found that I really liked chemistry and not so much mathematics and sort of the applied end of things. I really liked both math and science while I was in high school, so it seemed if you combine those two – you get engineering. It seemed like a natural fit, but that 1st year was able to focus down my academic interest.” Thus, followed a switch to the Honors Specialization in Chemistry program at UofT. “That meant you had to carry four disciplines into your 4th year. For me it was inorganic, organic, analytical and physical chemistry. [...] You had to keep a very broad 4th year. So I was going through, still interested in the wide range of different chemistries and then I got the experience in the inorganic lab and that put me on a certain direction for a little bit of time.” In the summers after 2nd and 3rd year, Dr.

Hudson worked in Professor Poë’s Inorganic Chemistry lab, and after 4th year, he worked in the Xerox research center of Canada. “That was really interesting: fundamental studies on polymer chemistry but applied towards trying to solve a problem. And that got me really interested in research because up to that point, I thought I might want to become a teacher. And then, as I got more exposed to research and getting to play with your own ideas and creativity in the lab, I got more and more interested in pursuing research and then that just led to ‘where do you pursue research?’.” That led to grad school, so Professor Hudson returned to pursue his Master’s degree in the Inorganic Chemistry lab where he worked in the summer during his undergraduate studies.

However, this turned out to be not exactly what Dr. Hudson wanted to study. “I was getting a feeling that I wanted to make a change.” Around that time, a new professor was hired at UofT – Professor Masad Damha. “He was right on the forefront of this really exciting biotech revolution because the ability to synthesize and do chemistry on nucleic acids had opened a whole new area of research, of potential medicines, of biotechnology, and all sorts of things.” Entering this new and exciting research area was exactly the change Dr. Hudson was looking for. “[Professor Damha] accepted me into that area, and I had been there ever since. I drifted away a little bit, you always have to carve out your own, individual, unique research area. But it was always founded in what I learned from Professor Damha.”

“The lesson that this taught me is that you have to try things and find out what you like and what you don’t like to pursue, and go in the direction of your passions because that’s ultimately I think what will lead to you having a happier path. If you are doing something you like, and you usually like things because you are good at them, it all sort of snowballs from that point.”

Advice for Students

Professor Hudson gives this advice for students interested in research: “I would say that if students are thinking about research, [my advice is] to go get some experience, find a situation where you can do some research. And if you don’t like the first taste, try a different flavour. There are all sorts of different types of research. I think it’s easy to paint everything with the same brush strokes and say ‘I didn’t like doing research there, it’s all the same, therefore I hate research.’ I think you have to find where your passions are. If you really like Science, and you like thinking about things, and you like being creative, you get satisfaction out of working hard towards a goal, then research might be for you. But then you have to find out exactly what does that mean: ‘what type of research would I like to do’ because there are all sorts of different types. I am an experimentalist, so I like to get in the lab and I like to make things. I liked doing that my whole life, like when I was going to Shoppers Drug Mart and buying stuff to make things, it just got smaller – now I’m making molecules. But I really like the satisfaction of making something. Some people don’t like doing that: some people want to sit at a computer and do calculations or some people want to work with animals and do biological research – there are many different types of research, so find the flavour that you like.”

To read more on Dr. Hudson’s lab and research, please visit his website at:
<http://publish.uwo.ca/~rhhudson/>