



June 2010 Scientist of the Month

Dr. Allan Dolovich – Associate Professor of Mechanical Engineering, University of Saskatchewan



Dr. Allan Dolovich has been teaching and conducting research at the University of Saskatchewan for over 19 years. He was born and raised in Winnipeg where his parents Sam and Tania nurtured his fascination with mathematics and science. It was this love of mathematical problem solving which led Dr. Dolovich to enter the Mechanical Engineering program at the University of Manitoba, receiving his Bachelor degree in 1984 and his Masters in 1986. He then moved to Ontario where he received his Ph.D. from the University of Waterloo in 1990.

For most of his research career, Dr. Dolovich has been developing methods for improving the performance of engineering calculations by computer for a number of mechanical and biomedical applications. These include determining the safety of structures and machine parts, as well as modelling the forces in skin during plastic surgery. Recently, he has focussed on a new direction – Research in Engineering Education – with the goal of improving how mathematical topics and problem solving techniques are taught in university classes. In particular, he is exploring new ways of teaching and applying rigid body dynamics – the study of moving parts under the action of forces. This subject is essential to mechanical engineering practice because it provides the basic knowledge for analyzing a variety of systems including automotive engines, robots, and satellite tracking systems, to name just a few. Three-dimensional analyses can become especially complicated and the objective of this research is to establish an approach which is general but, at the same time, reasonably straight-forward to apply.

This work has already received recognition, with Dr. Dolovich being named a Teaching-Learning Scholar of the Gwenna Moss Centre for Teaching Effectiveness (2009-2010). He has also received several other teaching awards throughout his career, including the inaugural College of Engineering Teaching Excellence Award in 1997, the Saskatoon Engineering Society Educator of the Year Award in 2003, a University of Saskatchewan Student Union Teaching Excellence Award in 2003, and, in 2010, the inaugural Provost's

Award for Outstanding Teaching in the College of Engineering and the Master Teacher Award at the University of Saskatchewan.

What, or who, inspired your decision to become a scientist or to work in your area?

I was most inspired by my father who, by profession, was a pharmacist. At an early age I spent numerous hours going through his university chemistry books just for enjoyment. My Dad was also a whiz at mathematics and would delight in helping me with my homework and discussing mathematical topics. Above all, he was a natural engineer – it seemed he could design and build just about anything. This love of science and teaching set a wonderful blueprint for my career plan.

What is the most interesting thing you have ever learned or discovered?

I've especially enjoyed learning how a few fundamental principles can be used to solve a wide variety of problems. While I first encountered Newton's Laws in high school physics, it is only within engineering that I have discovered how these same laws can be extended to the analysis and design of bridges, engines, aircraft, and almost an endless array of other structures. My current research follows that same approach and looks for methods to solve complicated problems with just a few fundamental principles.

Of what accomplishments are you most proud?

Professionally, my students' accomplishments bring me the greatest joy. For example, when our University of Saskatchewan Space Team took first place in a NASA design competition, I took great pride in the fact that my colleagues and I had taught much of the science they needed to do the job. I love hearing the success stories of our graduates and, each year, it is a privilege to see and contribute to our students' intellectual growth and development.

Were there any obstacles in your education or career, and how did you overcome them?

I have certainly encountered many set-backs. For example, I know what it is like to leave an examination feeling utterly disappointed with my performance. Also, during my Ph.D., I "reinvented the wheel" many times before coming up with something worthy of a doctorate. In fact, there are still many days when my work seems to take a step backwards. I believe, however, that a key to overcoming set-backs is found in a lesson I learned from my Ph.D. supervisor. He emphasized that it takes more than intellect to be successful in science and mathematics. It also requires commitment, discipline, and persistence. Even if we can't always be moving forward, we can keep our focus and push forward towards our goals.

What is a typical (work) day like?

Most days, from the moment I wake up, I start thinking about the lecture(s) I will be giving that day. I try to think of current events that might be relevant to the theory I will be teaching, whether it be a bridge collapse or the latest shuttle launch. This continues right up to class which usually lasts 50 or 75 minutes. Afterwards, I am a bit tired from expending significant energy in the classroom, and I spend a “cool-down period” in my office, checking my e-mail and corresponding with students and other professors. The remainder of the day can be a mix of activities. It can include: helping undergraduate students who drop by my office for advice on their assignments or design projects; working on a technical article for a scholarly journal; meeting with graduate students or research assistants to help them with their analyses; and/or attending a meeting in support of administration in the Department, College, or University.

What advice do you have for future scientists?

In my opinion, each person is a unique individual with a particular set of gifts. Some people are especially creative in developing new theories. Others are meticulous in performing experiments of the highest quality. I would advise young scientists to be true to their abilities and pursue career paths accordingly. I would advise them to go with their strengths, even if it seems to contradict what is currently in vogue. In my opinion, the advancement of science and engineering is optimized if we embrace diversity and make our best contributions in line with the talents we have been given.