



# Guelph Engineering Society



Report on the Professional Engineers of Ontario Student Conference at the University of Toronto, November 2-4, 2007.

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## ***1. Purpose of Conference***

This annual conference is designed to engage engineering students to think about their future and how they can take an increasingly active part in it. Its purpose is mostly educational, which is achieved by a series of speakers. The conference educates the delegates on the Professional Engineers of Ontario (PEO), what it means to be a professional engineer and a variety of topics that are discussed by the speakers and aimed towards a central theme. The theme for this year's conference was "How engineers improve the quality of life". Each of the topics addressed by the individual speakers was related to this theme. The conference is also aimed to allow students to network with other students, faculty and engineering businesses.

## ***2. Personal Goals for Conference***

I wanted to attend this conference because I wanted to learn more about the PEO and becoming a licensed engineer. I also was very interested in the speakers at the conference and about meeting students from other engineering schools, to learn about different programs and disciplines within engineering. I wanted to bring back my information on the PEO and networking contacts for my fellow Guelph students.

## ***3. Summary of Events***

### INTRODUCTION SPEECHES

- Introductions were given on Saturday morning by Manoj Choudhary (PEO Student Liaison Coordinator) and Dr. Grant Allen (Vice-Dean, Applied Science and Engineering, University of Toronto)
- Introduction to conference and welcome
- One important point taken from Dr. Allen was that leadership and communication skills are very important skills to impact changes to sustainability

## WHAT DOES IT MEAN TO BE A PROFESSIONAL ENGINEER?

*George R. Comrie*

- The main factors to being a professional at any job – competence (must know what doing), responsibility (must take responsibility of own work) and judgment (must use judgment in implementing book learning)
- The Canadian system of professional self-regulation is unique – some countries have no established engineering profession at all
- The public is entitled to rely on our opinions and advice
- Benefits to us as engineers to acquiring Professional Engineer status includes the title of “Professional Engineer”, exclusive scopes to practice, set admission standards and standards of practice, prestige, recognition for societal contribution and public trust
- I thought that it was a good opening to the conference and gave a good overview of the advantages and uniqueness of the PEO

## REHABILITATION ENGINEERING

*Tom Chau – Keynote Speech*

- Tom Chau has completed extensive research in the field of children’s disabilities
- His speech identified the fundamental problems for a disabled child to be communication, preference (identifying whether they are happy about something or do not like it) and environmental control (use of toys, computers, etc.)
- His presentation included many pictures and videos of actual children that they have worked with, who have a variety of disabilities
- The rehabilitation technology that they have been able to implement was incredible and I thoroughly enjoyed this presentation
- I thought it was a really interesting and motivation way to start of the speakers, since it showed a very obvious way in which engineering applications can improve the quality of life for many people, which was the theme of the conference

## ROLE AND RESPONSIBILITY OF ENGINEERS IN GLOBAL SUSTAINABILITY

*Bryan W. Karney*

- Bryan’s presentation discussed how our success has trapped us, for examples how our population growth has caused increase stress on our resources
- He identified seven rules of sustainable engineering – Design it better, build it better, maintain it better, monitor it better, rehabilitate it better, rebuild it better, understand it better

## ROBOTICS AND AUTOMATION

*Andrew Goldenberg*

- Began his presentation by showing pictures of robots that we know from movies (for example, bionic woman, star trek, etc.)

- Identified that robotics is a union of engineering science, technical know how and practical experience
- Discussed the history of the Canadarm and robotics in general
- Mentioned that robotics has recently been changing into new applications, such as medical surgery, biotechnical, security and military
- Personally, I didn't find this presentation really applicable to my studies; however I did find some parts interesting. I liked how he started off with engaging the audience by mentioning the movie characters and he ended his presentation with some really interesting video clips of robots moving in different landscapes and being used in military settings. I also thought that his discussions on robotics use in biotechnology could be applicable for the biological engineering students at University of Guelph.

#### ENGINEERING SUSTAINABLE CITIES

*Chris Kennedy*

- As a professor at the University of Toronto, he mostly discussed his class about sustainable cities and the design project that his students complete to design a portion of the city that is being built by Lake Ontario. He ended by presenting some of the students design solutions that he has seen over the years
- In addition, he presented a lot of information about sustainability
- From a study comparing greenhouse gas emissions from a high density (apartment complex) and low density (subdivision) housing – 3.3 tons/yr vs. 8.6 tons/yr (respectively) mostly due to increased travel emissions
- Similarly, rural areas have substantially higher GHG emissions because of the travel into the cities
- One of the things that I found most interesting is how he discussed the alternatives to consider for sustainable designs. It is easy to say that you would just design the city with all positive technology. But when you actually get into it, you do have decisions to make (like solar panels, green roof or rainwater harvesting for a rooftop application) and making these choices is very involved and requires a lot of system calculations
- Identified design objectives for sustainable cities to be:
  1. Design for reduced demand
  2. Utilize solar energy
  3. Exploit waste energy
  4. Import energy from renewable sources
  5. Reduce losses
- Overall, I thought his presentation as incredible interesting and well presented.

#### IMPACT OF AVIATION ON CLIMATE CHANGE

*David W. Zingg*

- This presentation discussed the impacts to our environment from aviation, in three forms – noise, local air quality and contribution to climate change

- Growth in air travel is projected at 4-6% per year and efficiency improvements through technology is projected to be by 1-2% per year – therefore, very unsustainable
- Therefore, although it is not a large percentage of emissions currently, it is projected to be in the future and since substantial changes will take time, we should begin redesigns and increasing research now
- Presented ways of improving efficiency to be in three categories – operations (fly at optimum altitudes, full flights, contrail avoidance), airframe technology (advanced materials to decrease weight, aerodynamics) and propulsion technology (improve efficiency, alternative fuels)
- Suggested that by 2050 we can reduce CO<sub>2</sub> emissions by a factor of 3, NO<sub>x</sub> emissions by a factor of 10 and the net effect on climate change by 4-8 times and that beyond 2050 we will have to look at alternative fuels (synthetic jet fuel, biofuels, liquid hydrogen)
- Overall, his presentation was very good, really interesting
- Good message was that we need to be thinking into the future so that we can be designing and researching better technologies now so that when the current minor problem becomes a larger one in the future, we will be prepared.

#### **4. Evaluation**

##### *i) Conference Organizers*

I think that the conference was run really well. I thought that it went very smoothly, schedules were pretty much kept. Social events were organized well; meals were really good and set up efficiently. I also thought that the speakers were really good and all tied into the theme of the conference.

##### *ii) Delegate*

I felt that I learned a lot from this conference. I thoroughly enjoyed the series of speakers and gained a lot of information from them. I think that the conference was a great learning experience for me. I also think that I learned about the PEO and about becoming a licensed engineer, through some of the introductory speeches and literature that was given upon check in.

I think that I represented the University of Guelph in a professional and mature manner and was able to meet many other students and discuss with them their engineering experiences.

I think that if I were to attend another conference, I would try to meet more people and network more with the speakers and representatives from the PEO or engineering companies at the conference.