

Opt!ons



ENGINEERING SCIENCE – UNIVERSITY OF TORONTO



OPEN FOR DISCUSSION... A Message from the Chair

I am very pleased to be able to tell alumni that on May 13, 2008, the University approved that *Options* in Engineering Science be renamed *Majors* and that this change would be reflected on official student academic transcripts.



Currently, the transcript of an Engineering Science graduate shows the degree name followed by the Option choice in the following way:

BASc-Engineering Sci (Elect Opt)

where the Option selected for this example is the Electrical Option. The transcript will now be changed to read:

BASc-Engineering Science (Major in Electrical Engineering)

The Faculty agreed to make this change for EngSci students as a more effective way to tell the outside world, e.g. employers and graduate schools, and to give students proper recognition for the fact that their Option is in fact their major field of study within the Engineering Science Program. For students in the Faculty's other engineering programs, these decisions about major area of specialization are made when they choose their discipline, e.g. Chemical Engineering, in Year 1.

I want to assure any alumni feeling nostalgic that the word 'Option' will not disappear from our vocabulary at Skule™.

It will continue to be used to refer to the various choices EngSci students have available to them prior to entering Years 3 and 4.

Students were very supportive of this move and have expressed their appreciation to me on numerous occasions. Here is a sample reaction from one student:

"Congratulations and thanks for finally getting this change finalized. I do not think many Engineering Science students will realize the improvement this change has brought about until they begin applying to international positions. Thanks again for pushing for and succeeding in getting this change done!"

This issue of Opt!ons is very focused on some of our current students and recent alumni and the exciting things they were involved with over the summer of 2008. We also have shared some of the terrific feedback we received from alumni following the mailing earlier this year of our new Engineering Science brochure.

William R. Cluett
Professor and Chair
Division of Engineering Science

EngSci Alumni in Cambodia

BY CHRISTIAN MAXWELL (OT8 AEROSPACE)

In November 2007, Allie Simmonds (OT5 Biomedical) took on the leadership of a drinking water and sanitation project in Cambodia, in conjunction with the Centre for International Health run by the Faculty of Medicine at the University of Toronto. In this role, Allie was coordinating an evaluation of microbial and heavy metals contamination of dug wells in Kep - one of the poorest and most rural provinces in Cambodia.

In spring 2008, Allie came to the Division looking for an EngSci student volunteer to join her team. I was about to graduate, did not have any definite summer plans, so I applied and got the job! I was very excited to join the team in Cambodia for approximately ten weeks from mid-May to the end of July and get involved with international development and global health initiatives.

After I arrived in the field in Kep, I spent most of my time working on developing a clean water system at the Kep Hospital and helping to improve the general conditions at the hospital. Some of these projects were simple, e.g. we piped some sinks into the in-patient infirmary and we added an additional UV treatment for water in the maternity ward. Other projects were a bit more complicated, e.g. we added access ramps and a path from the in-patient ward to the latrines in order to make everything handicapped accessible.

The job satisfaction out here has a pretty quick turnaround. Before adding the handicapped access system, I saw patients having to make some pretty degrading walks to the latrines - some walking across the mud and grass whilst grasping their I.V. in the air and others being carried to the latrines by a tired relative. With the wheelchair (donated by CIH) and the ramps installed, I saw people reclaim a bit of their dignity. The locals were very grateful for our help at the hospital. To boot, Cambodians are some of the friendliest people on Earth. You can't walk more than 5 minutes without a local saying "hello!" or smiling your way.



The adage to engineer something from nothing is definitely true in Cambodia. Many basic building supplies and tools that we take for granted in Canada are either unavailable out here or too expensive to afford on our meager NGO budget. For me, this experience was like an EngSci Problem Set come to life.

I would like to thank Allie Simmonds for having come looking for a volunteer back in the spring and the Division for sponsoring my adventure.



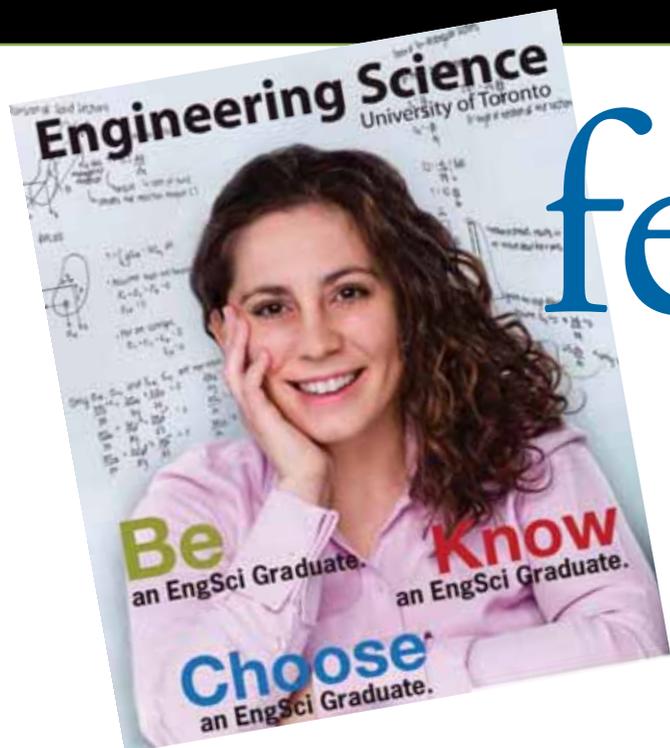
Christian
doing some
plumbing at
the Kep
Hospital



Sarah Hugh
(OT6
Biomedical)
meeting
children while
conducting
surveys in
Angkoul
village



Allie
(on right)
sampling a
new well in
Cham Karbei



feedback

“ Thanks for the brochure! In all my jobs I have used all the skills I learned in EngSci. All that math has come in handy! The best skills EngSci teaches are curiosity, problem solving and hard work. Combined with the deep background in math and science, this creates incredible value to most organizations. Not many other programs develop these talents in young people. ”

Gary Saarevirta (8T8 Aerospace)
CEO, Makeplain Corporation

“ I have just received the new brochure - very impressive! I was amazed to find that Isabel Bayrakdarian is an EngSci 9T7 graduate. Who knew? A great opera star studying EngSci! And on the same page with Isabel, Tom Brzustowski 5T8, four years before my graduation. The fact that Tom is a former president of NSERC meant a lot to me as a holder of an NSERC grant uninterrupted since 1970. Finally, on the last inside page, Mark Pearson 6T2. He was my best friend during the four years at U of T. ”

Juris Svenne (6T2 X-rays & Spectroscopy)
Senior Scholar
Department of Physics and Astronomy
University of Manitoba



“ I must say that I think the new brochure is fantastic. I am extremely impressed with the quality and I believe it will be an excellent recruiting tool. It was especially nice to see my friend and former classmate Joyce Poon featured so prominently!

In 2002 I began working towards my Ph.D. in cosmology at the University of Chicago. After two years I decided to take a risk and change the focus of my research to biophysics, a subject I knew nothing about. In fact, I had never before taken even an introductory biology course!

Fortunately, I remembered the advice I was given by another EngSci graduate many years ago: that the EngSci training is top-notch, and graduates have the ability to learn and adapt quickly to whatever challenge they face. The advice was good; in less than four years, I successfully defended my Ph.D. thesis. I feel very strongly that my experience as an EngSci student was key to helping me reach my research goals. ”

Dan Siegal-Gaskins (0T1+PEY Physics)
Postdoctoral Fellow, Mathematical Biosciences Institute
Ohio State University



“ I regularly receive EngSci literature in the mail and was recently delighted to see Professor Collins' photograph for two reasons: (i) because I learned that he was still teaching and I have always considered the CIV102 class that he taught to me in 1988 to be one of the best taught engineering courses of my career, and (ii) because I learned that others have recognized his good work through many awards. Congratulations and thank you to Prof. Collins. ”

Duncan Stewart (9T2 Physics)
Hewlett-Packard Laboratories
Palo Alto, California

Mark the Date!

We would like to encourage all alumni to join us for the **9th Annual Engineering Science Alumni Dinner** being held on **Thursday, March 26, 2009** in the Great Hall at Hart House. More information will be featured on our website in September 2008.



New alumni-funded admissions scholarship

We are tremendously grateful to the many EngSci alum and friends whose generosity helps current EngSci students. These contributions, unless otherwise directed by the donors, are pooled together and placed in the Engineering Science Trust Fund. We are delighted to report that this year the Fund was used to establish two new admissions scholarships.

Recently, the Faculty was the grateful recipient of a generous bequest made by an alumnus who wished to remain anonymous. He lived to the age of 90 and his gift was a way for him to share his success with others. With this gift, he hoped to help others achieve their dreams through access to higher education and asked that the funds be used as matching funds to establish admission scholarships.

Combining our anonymous donor's gift and the Engineering Science Trust Fund enabled us to endow two new admissions scholarships, named the Engineering Science Alumni Admission Scholarships. We owe a great deal of gratitude to our anonymous donor and all EngSci alums for the tremendous difference they make to our students. Thank you.

EngSci is on the move again

When EngSci moved into its new spaces on the second floor of the Bahen Centre when the building opened in 2002, we thought this might be our 'permanent' home. However, the Faculty has decided to move Dean Cristina Amon and her staff into the Bahen Centre in order to bring everyone under one roof. Dean Amon has arranged an exchange for new space for EngSci and fortunately we will not be leaving the Bahen Centre but moving to space that is to the south of the main Division Office rather than to the north.

This space exchange will result in a 25% increase in the space for our students and will give our students better access and our space better visibility on the second floor. In addition, we will now be at the heart of the Faculty with the Dean as our new neighbour!

The space exchange will begin in January 2009 and it is expected that the renovated new EngSci spaces will be ready for students in September 2009.

Remember this plaque?



Pictured at left is the K.B. Jackson plaque that is currently hanging in the EngSci student common room in the Bahen Centre.

This plaque has travelled quite a bit over the years from one EngSci home to another, and as noted above will be on the move again in 2009!

Ken Jackson was the Chair of the Engineering Physics program from 1941-1963. His sons Basil (5T6) and Peter (6T2) are both EngPhys alum and his eldest son Ron is a grad of MechEng (5T4).

When we installed the plaque in the Bahen Centre, we asked Dean Emeritus Ben Etkin (4T1) what Ken meant to EngPhys students that would have inspired the creation of the plaque, and here is what Ben had to say: "Ken Jackson was known as the 'father of Eng Sci' for about the first quarter century of its existence, including my years as a student. He was the faculty member to whom students came for advice, for counselling, for help. He was Eng Sci's advocate and defender in Faculty Council and elsewhere." This quote now appears as an inscription underneath the Jackson plaque.

Energized by Our New Energy Option

Mike Klassen (OT9+PEY) served on the working group back in 2006-07 that put together the new Energy Systems Option that kicks off this fall. He intentionally went on PEY in 2007-08 after his second year so that he could be part of the first class taking this Option. We caught up with Mike towards the end of his PEY term.



Why did you decide to pursue this new Option?

The Energy Option struck me as addressing one of the critical issues of the future. I found myself very much interested in finding ways to apply the knowledge gained in the foundation years to tackle broader and more complex global problems.

What have you learned from your PEY experience at Ontario Power Authority?

The Ontario Power Authority is a small government agency whose primary mandate is to produce a 20-year Integrated Power System Plan (IPSP). While it may be small in the number of staff, it is massive in the scope of its mandate, the knowledge of its employees, and the importance of its task. I've learned a great deal in my time at OPA about the high level structure, mechanisms, impending issues and emerging solutions within Ontario's electricity sector.

What courses are you looking forward to most?

The first is Terrestrial Energy Systems, which I anticipate will be a fascinating study of the earth as an energy system, and a chance to see both the natural and man-made flows and conversions of energy. The second is Energy Policy, where I

look forward to stepping back to study the subject from an outsider's perspective. In addition to the curriculum, I am interested to see the differences between the workings of the industry and the mindsets of the university community on some key issues. I'm looking forward to some good debates and discussions with my peers on their thoughts and ideas about the energy sector.

Why is the Energy Option a good fit for EngSci?

Energy is a leading edge field of research, and the field itself has an incredible breadth of opportunity. As well, I think there are numerous opportunities for collaboration - with other Options in the EngSci program, with other departments in the Faculty and with other Faculties within the university. Finally I think the initiation of the Energy Option is a strong step forward for the image of EngSci, as a tangible action supporting the concept of "Engineers for the World".

How would you define an "Engineer for the World"?

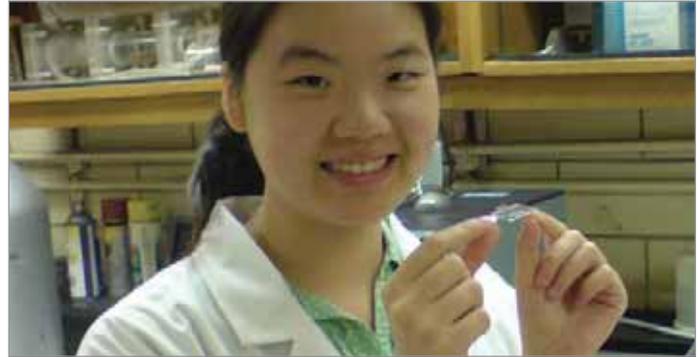
I consider an E4TW to be a person with a clear understanding of oneself in terms of values, gifts, strengths, weaknesses and perspectives. He or she is aware and informed of the larger theories, structures and workings of today's world - and is highly critical of the impact of these on individual people and the planet itself. The final key is that this person holds a belief that one's contributions make a significant difference, and makes a conscious and deliberate choice in terms of research areas and career paths to pursue.

My ESROP Experience

BY ROPHINA LI (1T0)

"Show me that it is possible, show me your achievement, and the knowledge will give me the courage for mine." Ayn Rand's quote from *Fountainhead* is the first thing that pops into my mind when I think about my EngSci Research Opportunities Program (ESROP) experience this past summer.

During my ESROP, I was working on investigating printed crossbar memories by building transistors using bi-stable organic materials instead of conventional silicon based ones. A layer of bi-stable molecules sandwiched between two layers of metal inks makes an organic transistor. The devices are paper-thin and very flexible, unlike most electronic devices that are prone to break. On the environmentally friendly side, they are highly energy efficient as they only need power to read and write. The manufacturing process could be reduced from a complicated batch process to a continuous one, so it's exciting to think that someday they might just be rolling off newspaper presses, on our clothing, on food packaging, etc.



Working in the Department of Materials Science and Engineering with Professor Keryn Lian, who has so much passion and patience for research, was truly inspiring. I remember having trouble making sense of a set of data one Friday during the summer, and being in awe in receiving the answer from her to my problem late that same night. It's this level of dedication that kept us all motivated in the lab. I don't think I could have asked for a better summer experience.



The True Meaning of Engineers for the World

BY JANE CHUI (1T0)

The Engineering Science E4TW fellowship was created in 2007 for a student finishing year 2 who demonstrates a passion for engineering and its role in society. This past summer, I was awarded one of these fellowships to work in Baton Rouge, Louisiana with Environmental Defense Fund (EDF) to help create a design competition to restore the Lower Mississippi River.

The coastal wetlands flanking the Mississippi River are important not only to migratory birds, but also to oil companies, many communities, and the seafood industry. Unfortunately, it is also the fastest disappearing land on earth. The key reason is that the process of deposition has long been disrupted by levees holding the river back from flooding while the processes of erosion and subsidence have continued. Without fresh sediment to replenish the sinking land, the marsh is being quickly washed away.

Early on, I was struck by the sheer amount of engineering that has been carried out by the U.S. Army Corps of Engineers, who have complete jurisdiction over the Mississippi River. The river has been dammed, straightened, and leveed to an unimaginable extent. It is almost ironic that because of past mistakes, any large-scale restoration effort will have to hinge on an engineering solution.

Building land is a complex problem with multiple stakeholders. However, almost all of the people working within NGO's like EDF and within the State Governor's office are policy makers and scientists. The niche seems wide open for engineers with innovative ideas and the ability to collaborate with different professions. Other than their suspicion that Canadians melt in hot weather, I was glad to have the opportunity to convince my co-workers that U of T EngSci students have what it takes!

EngSci in Singapore

In spring 2008, an opportunity presented itself for three EngSci students to do summer research internships at the National University of Singapore (NUS) in their Engineering Science Programme (ESP). Two of the positions related to the development of a solar powered golf buggy and were taken up by Carson McFadden (1T1) and David Wang (1T1). The other position was in the Plasmonics and Advanced Imaging Technology Lab and was filled by Geoff Frost (0T9). NUS recently started their EngSci programme and have been very enthusiastic about developing student exchange opportunities. In January 2009, two exchange students will be coming from ESP at NUS to study at U of T for the winter semester.

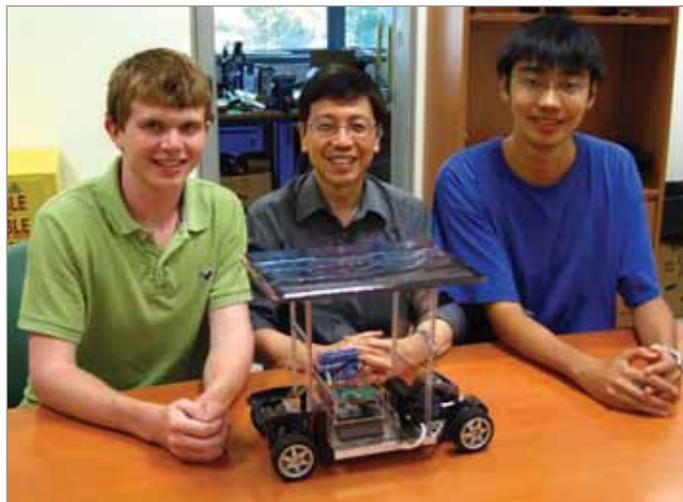
We caught up with Carson over the summer to ask him some questions about his experience in Singapore.

Tell us a little bit about your summer research experience.

- I really enjoyed my experience in Singapore. It was my first time working in a laboratory environment. Initially, it was a challenge adjusting from the regular classroom-guided environment to a project that required self-determined timelines and goals. However, I came to appreciate and benefit from the extra freedom the research environment provides in designing and experimenting. I also appreciated the open dialogue and support we received from the faculty I met across many disciplines, including individuals from outside ESP and NUS.

What sorts of things did you have the opportunity to learn about?

- Working on this project required that I gain new skills. On the energy front, David and I researched and gained knowledge of solar cell and various battery technologies. For the chassis design, we became familiar with computational engineering software and applying what we had learned to our design. In the lab, we had the opportunity to design circuits, use various fabrication facilities to create prototypes, and create and experiment with batteries.



Carson (left) and David (right) with Professor C.M. Wang, Director, Engineering Science Programme, NUS

What were your impressions of the EngSci students at NUS?

- Geoff, David and I met several incoming and current ESP students who shared their experiences within their programme and life in Singapore. It was interesting to share our own educational and cultural experiences with them too. I was most impressed by the drive and determination of the students we met from the NUS programme to become leaders in science and engineering, both in academia and industry. This is one of the common threads that I feel bonds all Engineering Science students, both here and at U of T.

Any final comments on this Singapore experience?

- My experiences here have widened my perspective into engineering and have given all three of us a unique opportunity to experience a different culture. I feel the professional experience and skills we have gained through this internship will be useful throughout our studies and careers. We want to express our gratitude to many people at both ends, namely Professors Wang, Balaya and Pickard at NUS, and Miranda Cheng, Director of the International Student Exchange Office at U of T.

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