Welcome to the fifth edition of the Trinity Engineering Newsletter. As ever we in the School are happy to keep you abreast of the recent news and developments whether you are a recent graduate, a graduate of longer vintage or just a friend of the School.

Professor Brian Foley  
Head of School

On the academic front, the major achievement of 2013-2014 has been the successful delivery of the first Year 5 for the M.A.I degree. As many of you will be aware, an accredited master’s degree is now a mandatory requirement for chartered membership of Engineers Ireland and for compatibility with European qualifications. The 5-year M.A.I programme is our response to that challenge and our next step will be to put it forward for professional accreditation in 2015.

The other major development over the past year is the gathering impetus behind the E3 project. This project, as reported elsewhere in this Newsletter, is aimed at a new purpose-built building for the School – in conjunction with the School of Natural Sciences. Planning, in terms of numbers of students and staff and space requirements is at an advanced stage. Much effort will relate to building design and fundraising, about which you will hear much more as the project develops.

I am also pleased to bring you news of the inaugural John Fitzpatrick Memorial Lecture which took place on 20 February last, where we launched the John Fitzpatrick Memorial Medal, awarded to the best overall student in the M.A.I. year.

So, enjoy your catch-up on our activities and do not hesitate to contact us for further information.
Provost Interview

The Provost, Dr Patrick Prendergast discusses his time in the School of Engineering and shares his ambitions for engineering in Trinity.

Why study engineering?
I chose to study engineering because I was good at the subjects that I believed fed into engineering such as maths, physics and the sciences. I had read some books on civil engineering and my father would have told me about things related to civil engineering. My father had a haulage business and machinery often broke down and needed to be fixed, so I would have seen that type of work going on and on occasion, I would have even helped out. It was an engineering environment in the ‘home place’, as we would say in Wexford! But in considering to study engineering, I did feel that it was a qualification that could enable change in the world. I felt that engineers had an influence in society and how we live and that’s why it was attractive to me to come to university to study it.

What did you enjoy about studying engineering in Trinity?
I had always liked the idea of studying engineering through the two general years. In fact, that was one of the reasons for coming to Trinity. If I was required to specialise on day one, I would probably have opted for civil engineering, because that’s what I knew. But when I had the chance to study the various subjects, I found that mechanics interested me most and I quickly decided that mechanical engineering was the thing for me.

Do you recall your undergraduate dissertation?
My dissertation focused on linear vibration isolation and Professor Henry Rice was my supervisor. In fact, I was one of his first students, as he himself had just joined the Faculty at the time. He gave me a project of designing a device to isolate vibration. I found it challenging but I really like building things. I welded the machine together myself and went off down to Smithfield to buy the motor, which was actually a windscreen wiper motor. We connected it to a beam, the beam was mounted on non-linear springs and that was my final year project.

Following your Ph.D in Bioengineering, what do you see as key highlights that’s have taken your through on your path to Provost?
I learned a lot working as a post doctorate in the Netherlands while on the Marie Curie Fellowship from 1993-1995. I worked with a really great research group of around 30 researchers and that was where I saw international science in action. A lectureship came up in Trinity in 1995. There weren’t many people being hired at that time and I thought that if this lectureship is coming up, I had better apply for it. I soon received a research grant of 400,000 Irish punts. That was a very considerable grant back then and it really allowed me to hit the ground running in developing my research route. Before long I had a couple of post doctorate and Ph.D students and we began to receive more grants from FP4 all the way up to FP7.

What was the trigger for moving into academic leadership?
The establishment of the Trinity Centre for Bioengineering and an all-Ireland Master’s programme in bioengineering was a great success, and my role in this gave me a taste for academic leadership. In 2004, the then Provost, John Hegarty, asked me to be Dean of Graduate Studies. In 2008, I was then asked to be Vice-Provost. This was a new role which encompassed Chief Academic Officer and Vice-Provost, and together we established that education and research could be welded together if you like, into an ‘academic mission’ for the benefit of all of College.

In 2011 you were elected Provost, the first engineer to hold this role, what difference does an engineer bring to this role?
Engineers are fundamentally problem solvers. At the end of our first week as undergrads we were given a list of problems to solve so you quickly get into the idea that engineering is all about setting yourself a task and solving it. I hope that I have brought that approach to the Provostship.

What are your ambitions for engineering in Trinity?
Engineering is becoming even more important in our society and the world, as a profession and discipline and indeed as a way of thinking. I want to see engineering grow as a discipline and develop further. Whilst the discipline of engineering has served well for the creation of curricula for universities, now the changes taking place in the wider world requires an engineer to be educated in a broader way not just singularly in one individual discipline. Trinity is ideally poised because of its multidisciplinary nature and in the collegiate nature of the campus to respond to these new challenges of engineering education. I know that my colleagues in engineering are doing just that. E3 will be a critical part of how we further develop engineering - particularly across energy, design, environment, water, and bio-engineering, E3 – the Engineering, Energy & Environment Institute - will be a landmark new structure which will house Engineering and the Natural Sciences. E3 will advance research that addresses Ireland’s economic priorities, contributing to growth, competitiveness and job creation.

In E3 project, the engineers and natural scientists will be locating in a new shared E3 complex. What can Engineering learn from Natural Sciences?
In a way we all have a lot to learn from each other. Just as many problems of the world need collaborations within the engineering disciplines so too do they need collaborations with scientists. None more so than addressing how we’re going to make sustainable, life on our technological planet. This is the great challenge of humanity – human beings are not going to stop using and developing technologies. In fact we will use and build more and clearly we need to do this in a sustainable way.

From the perspective of our natural scientists, they have a specialist understanding of the environment; of geology and raw materials, of plant science and zoology – all of which are under varying pressures across this planet – particularly in relation to impacts on climate change and bio-diversity.

Here in Trinity, our engineers and natural scientists will co-locate in a new E3 facility, and together we will answer the questions as to how we can develop a sustainable technological planet. After all, the evolution of organic life and the evolution of designed artefacts share some commonalities.

The public expect that new technologies will be compatible with sustainable life on the planet. Let’s see what we can do together as engineers and scientists! Energy and the environment are the areas where the great challenges lie. There is a substantial overlap between the natural world and energy environment. Through E3, we will strive to be leaders in this field. Through E3, we will still be teaching engineering, geography, geology etc. but we’ll do it within a development that sustains research into energy and the environment.

Finally, do you miss being at the research bench and in the lab?
I miss engineering research which I always enjoyed and I had my successes in the field but there are many new challenges as Provost and new problems to be solved. Fundamentally I’m using the same part of the brain as I always used and I’m really enjoying it.
Boeing Vice-President delivers first John Fitzpatrick Memorial Lecture

The Inaugural Professor John Fitzpatrick Memorial Lecture in honour of our late Professor of Mechanical Engineering was recently delivered in the Museum Building by Bernard Hensey, Vice-President, Fleet Management at Boeing and 1986 Trinity Mechanical Engineering graduate. This special event brought together engineering alumni, friends, colleagues and family of John and those working in the engineering and aviation industries.

Professor John Fitzpatrick, FTCD, MRIA, was appointed Professor of Mechanical Engineering at Trinity in 1994, a post he held up until his untimely passing in 2012. He was originally appointed as lecturer in 1980 in the newly formed Department of Mechanical and Manufacturing Engineering. He established a world-class reputation for teaching and research in engineering in Trinity, with a special focus on flow-induced vibrations and attendant noise.

Bernard Hensey’s lecture, entitled ‘Design and Operation of Aircraft for the 21st Century’, outlined current technical developments in commercial aviation and the story behind the establishment of Boeing. He also focused on John’s enthusiasm in the establishment of world-class research in engineering at Trinity and its link to the emerging aerospace business in Ireland over this period. Bernard is a member of the Trinity Engineering School Development Board, originally established by John.

The Provost of Trinity, Dr Patrick Prendergast, launched the John Fitzpatrick Prize in the form of a memorial medal at the lecture. The medal was designed by Professor David Taylor and Mr Gerard Byrne from the School of Engineering and will be awarded annually to the best Engineering student in year 5 of the new M.A.I programme. The new M.A.I will become the main professional training course run by the School. Approximately 60% of the students in the current year have taken up the M.A.I option.

The medal’s design reflects John’s lifelong fascination with fluid flow and noise generation. It is loosely based on the results of an experiment to demonstrate turbulent flow, but rendered in an abstract fashion so that it can be interpreted more generally as a natural phenomenon in the process of being recorded and studied. There’s a sense of the classic Celtic spiral form too, recalling John’s pride in his Irish heritage.

The lecture concluded with a presentation of some archival photographs and explanatory commentary by John’s colleague Prof Henry Rice – the company then withdrawing to a reception in the foyer of the Museum Building.
Introducing E3!

E3, the Engineering, Energy and Environment Institute, will be a major new initiative by the Schools of Engineering and Natural Sciences in Trinity College Dublin, across research, teaching and innovation.

The overarching vision of the E3 Institute is:

To be a world reference point for the investigation of evolutionary and engineering principles, and how they together determine the state of our world; and from this understanding, to invent, discover and guide optimal human and technology interventions that improve a world of constrained resources through innovation, entrepreneurship and education.

E3’s vision will be supported by outstanding resources of scholarly excellence through teaching, research and innovation in a set of key disciplines and specialisms across engineering, science and technology, working also in partnership with colleagues in our Schools of Business, Computer Science and Physics. E3 will also have research connections with our leading research institutes of CRANN and TBSI.

The core research themes that define E3 are energy, engineering design, raw materials, the environment, and telecommunications and networks which includes the research work led by CTVR.

For the successful delivery of a joint strategy of this scale, it will be necessary to accommodate the School of Engineering and the School of Natural Sciences together in purpose-built accommodation, which will be located in the south-east corner of Trinity College Dublin. This accommodation will consist of new building and the repurposing of adjacent granite buildings, protecting Trinity’s architectural heritage. This new proposed student and research accommodation, will also allow for the increasing needs for ICT related studies and research.

For the first time the School of Engineering will come together in this new building, allowing the School to increase its intake at undergraduate and post-graduate level, reflecting the demand by both industry and prospective students for an engineering led education. The E3 complex will also provide exceptional facilities for students and researchers.

Through these research themes, E3 will address how we can develop a sustainable planet in an increasingly technological world. Engineers, scientists and technologists will together answer this challenge, bringing together their particular insight, skills and experience.

Our ambition, as the School of Engineering is to increase our student intake and expand our research capabilities. This growth in graduates will be critical in the context of the key priorities for the Irish economy and the continued demand by world leading technology companies for skilled employees. As Ireland comes into a new phase of growth after a deep recession, the School will respond by educating for the future a new cohort of highly qualified engineers, boosted by a new facility and by the continuation of our research-led teaching remit.

For further information on E3, please contact Brian Foley, brian.foley@tcd.ie If you are interesting in learning more about how you can support this project please contact Clodagh Memery, clodagh.memery@tcd.ie

The Brazilians are here!

In 2013/14, the School of Engineering accepted 29 Brazilian students as visiting students under the Science Without Borders scheme (SWB). This is an ambitious educational programme operated and funded by the Brazilian government that aims to send over 100,000 Brazilian students abroad to study science, technology, engineering, and mathematics fields by 2015. The programme provides funding, support and/or full scholarships for a range of academic initiatives.

These SWB students were spread across all streams of Engineering with 12 opting for the Engineering with Management programme. Many have opted to remain on campus over the summer months to carry out internships within their schools.

Feedback from the students and from staff in the School has been very positive. Some of the group participated in the Trinity-Stanford Design collaboration and attended the Design workshop in Stanford as part of their studies.

Trinity looks forward to welcoming 99 Brazilian undergraduate students for the 2014/15 academic year, a significant number of whom will join the School of Engineering.

Brazilian students at Trinity Hall
Secondary school girls from Dublin and Wexford spent two weeks this summer designing robots, making solar-powered cookers, and programming LED lights as they took part in a programme at Trinity College Dublin designed to open their eyes to the possibility of an exciting career in engineering.

The programme’s primary purpose is to increase the number of girls studying engineering at university by providing high-quality, enjoyable, hands-on experience of the reality of engineering. Secondary school girls between transition year and fifth year arrive for two weeks in ‘Year One’ of the programme and then return for another two weeks for ‘Year Two’ when they are between their fifth and sixth year. This year’s programme represented the seventh year it has been in operation at Trinity.

There are three core philosophies at the heart of the programme: It is provided free of charge, involves working closely with secondary schools to encourage students, and actively targets those with no more than a passing interest in engineering at such early stages of their education. So far, it has been a tremendous success.

Hannah O’Shaughnessy, from Gorey Community School, Co. Wexford, was pleasantly surprised. She said: “I didn’t really know what engineers did before the camp, but now I feel I have a much better idea and it is definitely something I’d consider when I go to college.”

Aoife O’Shea, from Our Lady’s School, Terenure said: “I had some idea about what engineers do from my brother, who is studying engineering, but I had no idea it was so broad and that you can do so many different things and still be called an engineer. I think my favourite activity was the ‘egg-drop’ where we had to design and build a device to get a raw egg safely to ground when thrown from the top of the building. That was lots of fun!”

AMBER (Advanced Materials and BioEngineering Research) is a Science Foundation Ireland and industry funded Centre which provides a partnership between leading researchers in material science and industry. Professor Danny Kelly from the School of Engineering is one of ten founding Principal Investigators of AMBER, where he manages the biomaterials platform of the Centre. The centre is jointly hosted in Trinity College Dublin by CRANN and the Trinity Centre for Bioengineering, collaborating with University College Cork and the Royal College of Surgeons in Ireland. The centre aims to deliver internationally leading materials research that is industrially and clinically informed with outputs including new discoveries and devices in ICT, medical device and industrial technology sectors. The centre was officially launched in October 2013 and currently has 20 industry partners, 28 Investigators and 89 researchers.

Further information is available from www.ambercentre.ie.
The annual Trinity Week began on Monday, 7th April in Front Square with the announcement of new Fellows and Scholars by the Provost, Dr Patrick Prendergast. Warmest congratulations from the School to Dr Tony Robinson of the Department of Mechanical and Manufacturing Engineering who was elected to Fellowship this year. Congratulations also to the four Senior Freshman Engineering students elected to Scholarship - Áine Esther Cahill, Brian Fallon, Jonathan Lynn and Kris Vanhoutte.

Dr Tony Robinson is an Assistant Professor in the Department of Mechanical and Manufacturing Engineering at Trinity College Dublin. He joined the academic staff at Trinity in 2004 and now leads a team of researchers in the Fluids and Heat Transfer Research Laboratory investigating topics of basic and applied thermal sciences. His current research covers a broad range of topics spanning the fundamental physics of nucleate and convective boiling to off-grid electricity generation in developing countries.

Trinity Centre for Bioengineering (TCBE) Ph.D student, Tariq Mesallati, was awarded the 2014 Engineers Ireland Biomedical Research Medal in January, 2014 for his research paper titled ‘Tissue engineering scaled-up, anatomically accurate osteochondral constructs for joint resurfacing’ which focused on treating osteoarthritis. Tariq was presented with an Engineers Ireland medal and a cheque for €1,000 sponsored by Depuy. TCBE researchers received numerous awards at this years’ 20th Annual Conference of the Bioengineering Section of the Royal Academy of Medicine in Ireland (RAMI), which was held in Limerick.
Revolutionary Snowboard Invention Wins Irish James Dyson Award for Trinity Duo

Two Trinity Engineering students have won the Irish James Dyson award for their DIY snowboard invention

Alberto Cañizares and Aoife Considine developed a new system of binding technology for snowboards called Boundless, which offers a 360 degree rotational attachment between the snowboard and binding. The system enables quick unlocking, adjust and re-locking without the need for a screwdriver. Boundless also allows snowboarders to sit comfortably on chairlifts so they do not have to hang their legs at awkward angles which can lead to injuries. Aoife and Alberto worked on this solution as part of their third year Engineering Management module in Trinity. They will receive €2,400 from the James Dyson Foundation and progress to the international stage of the award and have the opportunity to compete for the €35,000 prize.

“The School of Engineering fosters creativity in the students by running group based design projects at all stages of the Degree. What places Trinity among the best in the world at teaching design is that the students work with real users on real problems and make tangible prototypes that are evaluated by these same end users,” commented Dr Gar Bennett, Assistant Professor in Mechanical Engineering Design.

TCD Provost Dr Patrick Prendergast elected to Royal Academy of Engineering

The Provost of Trinity College Dublin, Dr Patrick Prendergast, has been elected as a Fellow to the Royal Academy of Engineering. He is among 60 new Fellows to the academy and joins some of the UK’s most accomplished engineers from academia and business.
Trinity College – Stanford University Design Collaboration

Last year, a team of Trinity Engineering students collaborated with a team of students in Stanford University as part of the world-renowned ME310 Design Innovation programme (sponsorship by SAP, Palo Alto). This year Professor Kevin Kelly mounted a new project-based course in the M.A.I Engineering with Management programme – 4E5 Innovation in Product Development. In a strong endorsement of last year’s engagement, this year saw two projects in collaboration with Stanford – one sponsored by SAP, Dublin, and the other by Panasonic, Palo Alto, and a further ‘local’ project with Spinal Injuries Ireland. These projects see the students address real world problems from a user-centred perspective, applying the paradigm of engineering design thinking to create innovative solutions.

Professor Kelly explained: “Engineering design thinking complements the traditional ‘structured’ design process that engineers follow, by really focussing on empathy with the end-user so that the ‘real problem’ is correctly identified. Henry Ford famously said that if he gave his customers what they said they wanted, he would have tried to build a faster horse. By really involving the user in the design and by spending so much time understanding their perspective we can then harness our technical know-how to deliver innovative solutions that meet a real customer need. It is about much more than the clever idea – we have to actually make it work!”

The SAP and Panasonic student teams travelled to California for ‘Expe’ in June – an annual event in Stanford attended by over 500 guests, where the ME310 students display their product prototypes.
24 Engineering Students Recognised on the Dean of Students’ Roll of Honour List, 2014

Trinity College Dublin is proud of the extracurricular activity undertaken by some students. The Dean of Students’ Roll of Honour serves to celebrate and recognise over 730 students for volunteering in clubs, societies, publications and the wider community. These students volunteer in extra-curricular activities both inside and outside of College, in local, national and international communities. A full list of students from the School of Engineering who were recognised for their contributions to the Colleges’ clubs and societies and the wider community is available at www.tcd.ie/Engineering/news-events/RollofHonour2014.php

School of Engineering student wins Best Paper at 17th Sir Bernard Crossland Symposium and Postgraduate Research Workshop

The School congratulates Ph.D student Rudi O’Reilly Meehan for winning the Sir Bernard Crossland Bursary for the best paper presented at the 17th Sir Bernard Crossland Symposium held on 28th and 29th April, 2014 at NUI Galway. His paper was titled “Enhancing Heat Transfer by the Examination of Flow Structures in the Wakes of Sliding Bubbles.”
Robbie the Robot

Robbie the Robot team members: Rob McDowell, Professor Kevin Kelly, Michael Culleton, Mark Culleton, Conor McGinn and Adam McCreevey

Joanne’s infectious can-do spirit and willingness to embrace technology has seen her overcome many obstacles. However, many everyday tasks present significant challenges – prompting her to wish for a robot that could ‘pick up things I drop like my pen, knife, fork…’ Professor Kelly said “The research in autonomous robots and gripping technology that we were engaged in at Trinity seemed an ideal match for what Joanne was asking for”. A donation of €50,000 was given by the United Nations to fund the design and construction of a prototype robot. The result is “Robbie”. In its default kneeling position it can interact easily with Joanne as her head is approximately the same height as the robot’s head. This position also allows the robot to bend at the waist to pick up things without falling over. Small objects like phones or pencils can be picked up with an extensible arm, on the end of which is an inflatable ‘hand’. Further funding of €50,000 has been received and Professor Kelly and his team are busy planning the next stages in this exciting and ambitious project.

School Hosts HDMGlobal Board Meeting

Interview with HDMGlobal Chairman Martin Snaith (1968)

Last year, I approached Professor Margaret O’Mahony to host a Board Meeting for the international consortium HDMGlobal, the company responsible for marketing the economic road evaluation model HDM-4. Once we agreed to TCD as the venue, Professor Brian Foley, current Head of School, and Michael Slevin, the School Administrator, picked up the baton in superb form and arranged that the Printing House would be our venue. It was a great choice both to take our meeting numbers and indeed at one point a presentation made to us by the Alumni Association in support of the excellent “E3 Development” (mentioned elsewhere in the Newsletter). All “aids” to a successful two-day meeting were there, including very well prepared refreshments. This ultimately led to the sale, to date, of over 1,800 copies of this model for use by governments, road agencies, aid agencies, consultants and universities in over 100 countries with over forty training courses provided worldwide. For more information on organising such events, please contact Michael Slevin at maslevin@tcd.ie and for information on HDM-4 visit the website www.hdmglobal.com
ALUMNI INTERVIEW
Bernard Hensey
(B.A.I., 1986)

1. What are you doing these days? Why did you choose your current career?
Currently I am the Vice President of Boeing Fleet Management business based in Seattle, USA. I didn’t exactly choose my current career it sort of chose me; I was working in Ireland as an entrepreneur and an opportunity came to set up a new business for Boeing in China. I did that for a few years and then Boeing asked me to come the US.

2. Where did your love of Engineering come from?
I was a keen sailor when I was a teenager and I used to work making dinghies in the summer and this lead to appreciation of applied technology and engineering.

3. What are the big opportunities for Ireland in the field of aviation and engineering?
The aviation industry is changing fast and there are a number of opportunities emerging in which Ireland will play an important role: Leasing and Low Cost Carriers will be the biggest opportunities and particularly Long Haul Low Cost Airlines. These businesses will drive a demand for engineers at all levels.

4. What are your fondest memories of studying engineering at Trinity College?
Having a beer in the Lincoln Inn while waiting for lab experiments to finish!

5. Which Trinity lecturer had the greatest impact on you?
John Fitzpatrick who sadly passed away last year. John combined a sharp intellect with a love of life and he showed the importance for engineers to be involved in all aspects of life and society.

6. What is your favourite recollection of being a student at Trinity?
The diversity of the student base, I was friendly with Arts, Science and Law students and it was great to be integrated into a wide student body. The location of the college in the heart of the city combined with great people is a unique combination.

7. What do you enjoy most about your regular visits back to Trinity College?
Seeing the progress being made at the University in many areas.

8. Who would you invite to your dream dinner party and what would be on the menu?
Bill Murray, Jennifer Maguire, Sergey Brin, Sheryl Sandburg, Elon Musk, Kylie Minogue and my wife. Fresh fish from Howth.

Sarah Conway wins the Maurice F. FitzGerald Prize

This prize was instituted in 1961 by a bequest from Anna Maria Fitzgerald and is awarded annually, where sufficient merit is shown, on the nomination of Trustees based on the results at the final examination for the degree of B.A.I. at Trinity College, Dublin. Candidates must have achieved distinction during the engineering course and be making satisfactory progression of their knowledge in the profession of engineer.

Sarah completed the Computer Engineering undergraduate degree course with the highest overall average result in her class and was awarded a Gold Medal as well as the Wright and the MacNeill prizes. She is currently working towards a Masters in Computer Engineering (M.A.I.) which involves significant research in the field of computer vision, an area concerning the processing, analysis and understanding of images.
Remember. The power of a legacy in Trinity

There's an old saying that the true meaning of life is to plant trees under whose shade one does not expect to sit. When you leave a legacy to Trinity however big or small, you're planting a tree which will grow to provide shelter to many. You’re empowering ground-breaking research which will benefit people in Ireland and all over the world. You’re supporting students from all backgrounds to access a Trinity education. You’re helping preserve our unique campus and heritage for new generations.

When you remember Trinity in your will, you join a tradition of giving that stretches back over 400 years – and reaches far into the future. For more information about leaving a Legacy to Trinity, please contact Eileen Punch.

T. +353 1 896 1714
E. eileen.punch@tcd.ie
www.tcd.ie/development

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Get connected with Front Gate Online. Update your details, search and contact fellow alumni, register for events, join the career network and other groups, all in one place! Register today!
www.tcd.ie/alumni/frontgateonline

Get Involved

Trinity has a long tradition of outreach and community engagement. To find out about the numerous ways you can get involved with Trinity both at home and abroad, see
www.tcd.ie/alumni/volunteer

Upcoming Events

Christmas Commons
3 December 2014

Christmas Homecoming
22 December 2014

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www.tcd.ie/development
School of Engineering
Trinity College,
Dublin 2, Ireland.
Phone: +353 1 896 1142
Email: engineering@tcd.ie