

ENGINEERING LIFE



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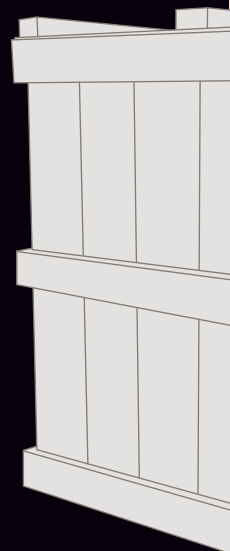
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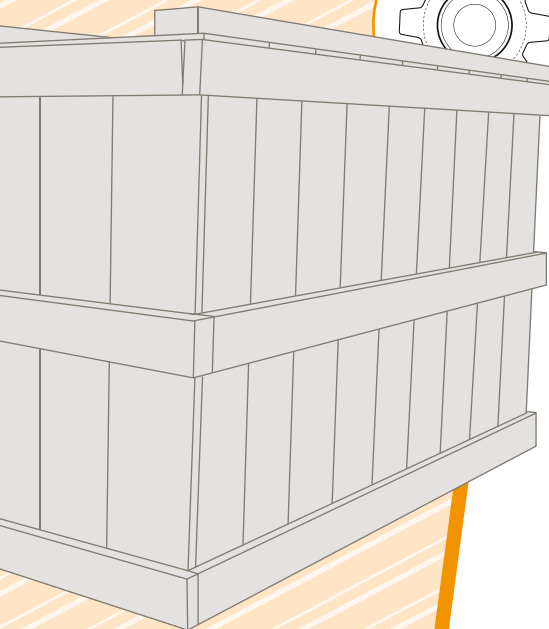
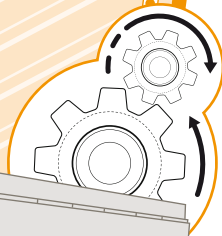
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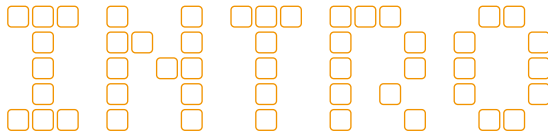
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Welcome to the new look Engineering Life magazine.

We have pulled out all the stops to highlight the mix of lifestyle choices and careers experienced by a diverse range of young professionals. From speaking of life in far flung destinations, to helping develop expertise in the third world to holding your dinner down on the wild seas, each one of the engineers featured show how they have used their qualifications as the stepping stones to an exciting, challenging life. They show that engineering is an ideal career that allows you to express your individuality, travel with your qualifications, make a difference in the world and be well-paid too!

As I think the stories will illustrate, naturally curious people who love solving problems are perfect for engineering. Generally engineers are a key member of a project team, so natural leaders and good communicators shine in this profession.

After a few years experience, you could find yourself in the boardroom making strategic decisions and doing a spot of number-crunching – that's where the maths will come in useful! It even comes in useful when figuring out how to keep a team motivated on the high seas. Alternatively you could also find yourself changing direction later in your career, like I did,

with engineering providing an ideal platform for other professions like IT, business, politics and management.

In 2006 over 6,000 students applied for 220 courses in all types of engineering in Ireland's institutes of technology and universities. The choices include a wide range of level 6, 7 & 8 courses available all over Ireland, with each engineering qualification route having a role to play in the success of our economy.

As is clear from the articles to follow, once you have qualified as an engineer it's not all technology, physics and maths. Engineers

who can see the 'big picture' and, make decisions using their emotional intelligence as well as their IQ, are highly valued and are also increasingly sought after by employers.

This profession is a virtual passport to the world.

Consider that electricity and energy saving systems are universal but if you study Irish law, you can only practise in Ireland. Through international agreements, Irish engineers are eligible to work in many countries including Australia, Canada, Hong Kong, New Zealand and South Africa. Getting involved in a career in engineering



and technology can be challenging and creative as well as analytical. It's also well paid. A recent salary survey conducted by Engineers Ireland revealed that graduate engineers earn approximately €29,000 during their first year, which can rise to €33,488 in the second year of employment.

And with 94% of Irish engineers in a recent survey confirming they are happy with their choice of career, we have to be doing something right! So find somewhere to relax, enjoy the read and be genuinely inspired by some real people who have used engineering to fit, and feed, their lifestyles.

Margie McCarthy,
Chartered Engineer, MIEI
STEPS to engineering Manager



Vital Statistics:

Name:

Margie McCarthy

Qualification:

BE Civil, from University College Cork

Job:

STEPS to engineering Manager

Career Highlights:

Studied renovation of 18th century buildings for final year project. Worked as a graduate on the canal end of Croke Park. Worked with Aer Rianta Technical Consultants in Dublin Airport on runway and carpark design. This involved learning air traffic control language to control communications between aircraft, air traffic control and site vehicles working near the active runway. Became an Environmental Engineer working on water supply. This included network modelling, public consultation and even discussing water quality with mothers worried about their babies' bottles.

Travel:

9 months globetrotting: US, South America, New Zealand, Australia, Bali, Hong Kong and South East Asia.

Outlook:

Changed career to manage the STEPS to engineering programme. Feel strongly about how diverse engineering is, and how that message needs to be conveyed to young people who are looking to make a real difference in the world and for a way to express themselves creatively and innovatively in their careers.

The future:

Who knows what's next!



HAVE C-ENG WILL TRAVEL!

Chartered Engineer (C Eng) Gillian Sisk has found that her twin passions for bridge design and travel are the perfect combination. Now a resident of Sydney (for the time being, at least) and inspired by that city's famous bridge, she's playing her part in building the future infrastructure of Australia and keeping her wanderlust satisfied.

***So you obviously like travelling,
how did that get started?***

Well, sunnier climes, the buzz at airports and boarding flights to new places and just immersing myself in other cultures has always interested me. I'm addicted to travel programmes and as I listened to friends who had done the "Big Year" away talk of their experiences, I could feel the yearning to travel grow.

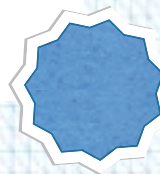
***Did the need to travel strike before
or after college?***

They say that engineers have a natural curiosity, I would agree, but not just in the usual 'how do things work' way but also in a 'what a big world I want to experience it all' way. The itchy feet started early when, having graduated from Cork Institute of Technology, I made the first jump to Cardiff, Wales. It became my home away from home while obtaining my degree in Civil Engineering and a PhD in structural design at Cardiff University. The freedom of a new beginning with no ties and the sense of adventure this experience gave me always stayed fresh in my mind, so when I returned to Ireland I knew I wasn't ready to pack my travelling boots away.

So where did your wanderlust take you?

Ironically, my first port of call was to return to Dublin where I spent a number of years in bridge design with J.B. Barry & Partners and Roughan O'Donovan. During my time there I was involved in the design of bridges throughout the project journey, from concept to detailed design to contract documentation stage. I was also involved in the bridge design of some of the larger road scheme projects, including sections of the N3, N7 and N11. In addition I managed to gain some site experience supervising the construction of a five span concrete bridge over the Dublin-Belfast Railway Line.

Each year I went on longer and longer holidays to the US and Europe and increasingly I heard more and more friends speak of spending a year here and 18 months there with stories of wild times! Meanwhile, back home at the ranch so to speak, as we all approached the 'sensible' age of house-buying and settling down, Dublin fast became reduced to conversation about mortgages and commuting distances. Something I wasn't quite geared for yet! Finally, after three great years in Dublin, I received Chartered Engineer status and felt it was as good a time as any to travel.





GILLIAN AT HER SYDNEY OFFICE

So straight to work elsewhere?

No, no, there was a languorous period of sarongs and sunshine off the coast of Malaysia first and when I arrived in Australia in October 2003 I had just my profession, my backpack and a working holiday visa. I was travelling with three close friends and we decided Melbourne was as good a destination as any. We found a great apartment, with the balcony to become the scene of many late night yarns over Australian fine wines watching the sun go down. We furnished it with many visits to the Salvation Army, and not enough can be said in praise of that organisation!

But with the rude awakening provided by rent bills and no income, the job search started soon. The visa offered to Irish citizens limits your time at any one job to 3 months. Even with that constraint from the very outset it was relatively easy to get work as an engineer, particularly with my experience and the fact that I was Chartered.

How did you find your first job in Australia?

Through a work agency, I started my international career in Connell Wagner as a structural engineer within a week of commencing the job search. It was exciting to be involved in the challenges of bridge

design in another country and to know I would make a contribution to Antipodean infrastructure. Enjoying my experience with Connell Wagner I took up the offer of sponsorship with my agency, which allowed me to stay for longer than the 3 month limit on the working-holiday visa.

So you settled on surfing in Melbourne instead of mortgages in Dublin?

No actually, after six months, it was time to move again! We wanted to experience as much of this new country as possible so we dropped everything back to the Salvation Army and hit the long and winding roads of Australia. What an experience; camping with friends in a small car with a tight budget seeing the east coast!

When I reached Sydney, I knew I had found somewhere where the eternal travel itch might subside for a while. Again, with engineering behind me, I found getting work relatively easy, ending up with the luxury of choosing between two offers.

Wanting to first see how I settled in Sydney, I worked with sponsorship through a management agency, which enabled me to go contract with various companies. I felt this was a safer option, where I could go travelling again, or indeed go to another company. However, I started with Sinclair Knight Merz in July 2004 and I have been with this company since. Inspired by the lifestyle and the famous Sydney Bridge, I decided to stay and am currently sponsored by SKM. The long-stay visa is valid for four years, during which I have to stay working for SKM. This is the only real constraint, I can leave and return to the country as often as I like.

What's bridge designing like – Aussie style?

I work on a whole range of designs and projects including The Albury–Wodonga Bypass, which is a 22km of new highway bypassing the town of Albury on route between Sydney and Melbourne.

I am also involved in the design of a bridge, located in the inner Sydney suburb, which is an important link for road traffic between the

Eastern Suburbs and the Inner West, for pedestrians travelling and for carrying utility services across the railway corridor. Due to the location of the bridge, the operation of the trains below it and the services that travel over it are supported from the bridge, the technical aspects of producing the design of the bridge form only a small part of the successful delivery of the project. A large element of this project is project management and coordination.

Really to sum up I am loving my time here, the opportunities are great, engineering has enabled me: to travel; to settle in the wonderful city of Sydney; to own my own place in this great city; and, probably most importantly, to meet Jaime, another big reason for me staying put in Australia!

You travelled over with friends, was everyone so lucky?

Well, many of my friends from other professions have had to leave Australia because they couldn't obtain sponsorship or weren't

eligible for permanent residency. Achieving a qualification in engineering was the best stepping stone for my career, offering me choices that other professions wouldn't. With my ambitions to see the world, the global shortage of engineers worked to my advantage and made it easy to work in most countries.

In the future there is the option for me to apply for permanent residency and eventually citizenship should I choose to go down that route. Who knows, my feet might get going again but it is all about having the choice and with engineering you have plenty. Having been lucky to meet someone over here that I want share my life with means that time will decide on my, or our, further travels or not. Right now I am happy!

The opportunities I have had since I arrived in Australia have been great. I am busy, enjoying my career and lifestyle and the work is rewarding and exciting.





the INVISIBLE FIREMAN

Our cityscapes are changing. Skyscrapers and neck-breaking towers are no longer just the reality of the Big Apple and Hong Kong. The tower has finally come to Ireland and it is here to stay. The term 'High-rise' has been an ugly word in Ireland for so long, reminding us of the 1950's and 1960's solutions to social housing. Nowadays however there is an emerging beauty to the mix-match aspect of heights and styles, with towers becoming the architectural icon of our generation. With Irish developments onboard like the U2 tower in Dublin city centre, these icons have injected a new power of rejuvenation into our city skylines and allowed the imaginative creation of urban communities like no other structural realisation.

While the structural design of these buildings is a feat in itself, a whole other challenge lies in the provision of adequate services and safety measures for the future inhabitants. Following the harrowing pictures of people struggling to escape the inferno of the Twin Towers, we are all too aware of the importance of the ability to 'get out fast, get out safe'. Cue: applaud the work of the Building Services Engineer. While all elements of engineering design strive towards life enhancing elements, it is the building services engineer who is responsible for each buildings safety measures and with the introduction of apartment living and the industrial boom in Ireland, the building engineering group is a growing area of opportunity.

Sean Dowd, a chartered building services engineer, is an Associate Director with PH McCarthy Consulting Engineers. According to Sean it is his job "to make safe the buildings in which we work, live and relax. I can do that by ensuring there are adequate evacuation routes provided with fire alarms, emergency lighting, sealing of service openings, a whole range of systems to help keep fire away from the occupants of a building."

Escape routes

Most people will have experienced fire engines rushing past them, the foreboding emergency sirens growing louder and dimming out again, however fire fighting isn't all about emergency services. Building design has a large role to play. "When a fire starts in a building, the first thing I want to provide the people inside with is alternative ways to get out. I do this by designing the building in fire compartments so the fire is contained within an area for a sufficient time

to allow occupants to escape. If one escape route is affected the aim is that people will have another route to take, this includes all areas of a building including the top floor to the basement car park."

Die Hard!

Of course the most effective way to get people out quickly is to give them immediate warning. When designing fire alarm systems, Sean considers the type of building, what it is made of and what the building is used for. For instance if the building is a paint factory it will have different highly flammable areas to an office block, full of computers and paperwork. By allowing detectors for both heat and smoke, Sean traditionally designs a system that will give immediate warning to the fire department by phone link. "If you have ever seen films like Die Hard, you will have noticed when the fire fighters arrive they have an alarm panel at the entrance to the building indicating where the fire is, well part of my job is to design the layout of the alarms and the system that relays the message to that panel."

Nobody ever realises how important it is to have emergency lighting, until they are in a fire situation. The quicker your escape the higher your survival chances. Emergency lighting will play a key role in your successful escape. As part of his design, Sean will ensure that emergency lighting, illuminating escape routes, are easily recognised. Part of the design is ensuring the lighting will stay alive while normal power supply has disappeared.

Another key element for services design is to include outlets for smoke evacuation.

"We aim to provide the best situation possible for occupants to escape, therefore we need lighting to indicate a way out and ventilation systems to ensure smoke is escaping from the evacuation route and not choking them. Good visibility is essential and we can only provide that by getting rid of the smoke," says Sean.

Another element of the building services design includes provision of water hydrants to allow an immediate water supply to the responding fire fighting vehicle. "I have to consider every element of the fire fighting process, to ensure they have ease of access to both the building and the water required to kill the fire."

Hazards are all around us in every building we live in, including lightning, a naturally occurring hazard caused by the discharge of static electricity to gas pipes, which are generally routed through a building in ventilated spaces to ensure that gas will not build up in voids if leaks occur. Even the materials some bed linens are made from can be dangerous to us in a fire situation.

You'll never notice

"I love designing and creating safety measures for new situations," says Sean. "With the ever-increasing number of higher buildings and the increased publicity around evacuation tragedies, I am more and more aware of the consequence and importance of my chosen profession. The most interesting element is, strangely enough, that the design work I am responsible for is hopefully something you will never have to notice, but if you do it will help to save your life."



perfect chemistry

from ucd to harvard,
laura dillon means business

As a student, Laura Dillon was hesitant about being pinned down to a specific career path but when she found what she was looking for, her engineering education proved invaluable. Within 5 years of graduating with a degree in chemical engineering she has worked as a business analyst in London advising the CEOs of some of the worlds largest companies, she has worked on projects in Dubai and Australia, she's climbed Mount Kilimanjaro and she's even found the time to convince the World Bank to invest in Mozambique's horticulture. Now Laura is undertaking a Masters in Business at Harvard Boston, USA. Here she recalls her journey.

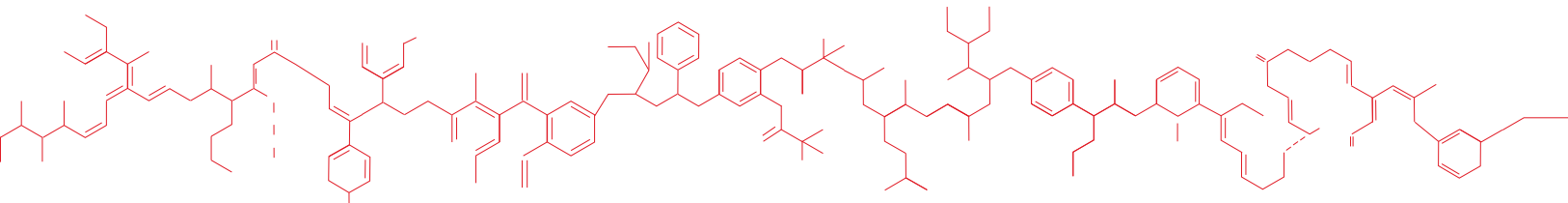
• Little did I think when I started studying engineering in UCD back in 1997 that I would end up where I am today! Looking back I suppose it was logical that I should study engineering – but it took a while to figure that out. Before filling out the CAO I considered a range of options from medicine and law to accounting and finance and even actuarial finance. I did all the aptitude tests and was told – yes, you are strong at numbers, but you could really study anything, which wasn't too helpful in narrowing the decision down. After much deliberation and anguish, the time came to fill in the CAO form. I had spoken with many different people who all had very valid but differing views, but when I finally made my decision I thought about what subjects I really liked studying at school and where my core skills lay. I was strong in the quantitative areas and considering I liked studying maths, physics, chemistry and accounting, I wanted to continue studying some of these subjects at university.

• I settled on chemical engineering in UCD and I've had no regrets since. I had a wonderful group of classmates and made life-long friends. Some of our most enjoyable experiences were a class trip to Edinburgh, the annual engineering ball and engineering day every year. The course was four years long and, between my 3rd and

4th year, I spent three months as a student intern for Pfizer Pharmaceuticals, a leading international pharmaceutical company which operates a manufacturing facility in Cork.

This was invaluable to really experience what working as an engineer entailed. I was involved with the building of a new plant for Pfizer, so I had the opportunity to work with senior chemical engineers and learn from them. It was also great to be able to put the theory I had learned in college into practice, but also emphasised to me that I wanted more diversity and a broader perspective.

When I returned to UCD for final year, it was time to start thinking about career opportunities. I attended many company presentations and



was taken aback by the number of companies, particularly in the business and finance sector, that wanted engineering graduates to work for them. I met a lot of interesting individuals and am still surprised that they wanted to speak to me – an engineer with no business training! The view that consultancies and banks took was that they could teach me all the necessary business and finance skills during their graduate training programmes. They were more concerned with finding strong logical thinkers with an aptitude for problem-solving, which engineering certainly did teach me. They all shared the same perspective on employing engineers – they wanted smart people, and believed that engineers had a strong thought process and were trained to think in a very structured way.

I considered both the traditional chemical engineering jobs and working in investment banking, but the idea of business consultancy appealed the most. I was lucky to receive offers from a few large companies and in the end decided to go work in London for a great consultancy firm. On my graduate training programme with the consultancy there were 30 people and over half of us were engineers. Imagine – a business consultancy firm employing mainly engineers! This was the first time that I was really aware of the huge opportunities that existed for me as a qualified engineer.

In London I lived with three of my chemical engineering classmates and one of my electrical engineering friends – four of us worked in

strategy consulting and one in banking. The strategy consultancy sector involved working as a business analyst on a team advising CEOs and managing directors of some of the worlds largest companies, helping them with growth strategies, profitability issues, new market entry initiatives and many other exciting projects. I was amazed at how transferable all the skills were that I learnt as an engineer - the structured approach to problem solving, using Excel to do numerical calculations, working together as a team on projects, having a strong work ethic and thinking about practical implications of theoretical solutions.

I had two fantastic years in London, working on projects in the UK, Australia, Dubai and Ireland. While working there I heard of Technoserve, a company which aids the economic sustainable development of rural areas in Africa and Central and South America. This sparked a huge interest in me and I decided to go and do some volunteer work with Technoserve in Africa, which was an astonishing experience.

I spent four months in Mozambique as a volunteer business consultant using both my business and chemical engineering skills. Whilst there, I led a team on a project funded by the World Bank to assess the “Feasibility of Horticulture in Mozambique”. This demanded both the project management skills and technical skills, for which my chemical engineering degree had been excellent preparation. I worked with agronomists, freight experts, farmers, many other NGOs,

flower growers and many great African people! As a result of the work we have done, the horticulture and farming sector in Mozambique is growing and the World Bank have now invested in the region.

On returning from Africa and many adventures, including climbing Mt Kilimanjaro, I went to work for one of the largest UK retail banks – Halifax Bank of Scotland. Again I was able to use my analytical engineering skills combined with the business skills that I had learnt over the previous years. This was an amazing 18 months and really emphasized to me the importance of the teamwork skills that engineering had taught me.

In early 2005, with my experience and career path to date, I knew it was time to obtain more formal business training to back up my 4 years practical business work experience and my engineering degree. I applied for a Masters in Business Administration (MBA) at Harvard Business School, Boston, USA and, thankfully, I was accepted. I have just finished my first year! The opportunities that all these experiences have given me are amazing – I worked for a private equity firm (investing in privately owned businesses) in London for ten weeks last summer and then with NTR in Dublin for four weeks, looking at renewable energy investments. Now I’m back in Boston to complete my masters degree. As for the future, whether it will be in private equity or business consulting, I hope to continue my challenging career to date and my own business one day.

making a difference



A serious challenge facing mankind in the 21st century is the need to provide universal access to water and sanitation. In the developing world, where water shortages are most severe, 1.1 billion people lack access to clean water and 2.4 billion lack access to sanitation.

With such a large proportion of the world's population deficient of such basic provisions it is clear that the skills, expertise and innovation of the engineering community is required. In recent years many Irish engineers have been playing their part in tackling such challenges in the Developing World. Darren Hanniffy from Birr, Co. Offaly is one such engineer.

A deadly hurricane

In autumn 1998 Darren had just graduated from NUI Galway with a degree in Civil Engineering, when he heard John O'Shea, CEO of GOAL, give a talk on the devastation wrought by Hurricane Mitch in Central America. Hurricane Mitch was the most deadly hurricane to strike the Western hemisphere in two centuries and the flooding and landslides that followed claimed 11,000 lives in Honduras and Nicaragua, as well as leaving thousands without a home. GOAL had sent out a team of specialists to help with emergency aid, but they were seeking many volunteers to help them implement long-term development plans for the area.

Darren was inspired by John's talk and volunteered immediately afterward; he says "I had always been interested in humanitarian and development work, but I suppose I didn't fully understand what it was about, apart from the idea of missionaries going overseas to help poor people. When I heard John speak, I realised I could use my engineering skills to go out to Central America and join a team who were going to make a difference."

"I spent a period of 6 months with GOAL in Honduras responding to the hurricane damage. Shortly after I had returned to Ireland, I realised there was still more that I could do so I went back for another year. A large percentage of the people there were homeless and the water and sanitation systems were completely destroyed. First we worked in small groups with skilled labourers



Darren checking water purity in Uganda

implementing the basic infrastructures required by the people in the region. Later we trained larger segments of the population so they could work with us and they were paid as part of a 'food for work' programme. This was really important because the people took ownership of the programme and they were very proud - everybody likes to earn what they receive."

When Darren finally returned to Ireland he enrolled for a Masters in Environmental Engineering at Trinity College Dublin. He recalls, "Although I had developed excellent project management skills during my time abroad, I was apprehensive that my new skills would not be relevant, that's the reason I returned to college and I got a part time job with a construction consultancy, N.J. O'Gorman & Associates Ltd. My boss was fascinated to learn about my development work and he offered me the job. I spent 2 years doing the course and during that time I was exposed to a number of lecturers who turned out to be very experienced development engineers that had worked throughout Africa, so I very quickly got back into the development issues and learned more about them."

Journey to the unknown

After completing his Masters, Darren was made a full-time member of staff with N.J. O'Gorman & Associates Ltd. Having developed a strong relationship with GOAL, it wasn't long before he offered his services to them again and he received great support in doing so from his employers. In 2004, he headed to a town called Kalongo in Uganda and has been there several times since. "My journey took me from Dublin to Nairobi in Kenya and on to Kampala, the capital of Uganda. I flew across the flat barren land, crossing the White Nile and on to the North of the country to Kalongo. The town itself is situated at the foot of a prominent rock that rises to an elevation of 2,000 feet over the town and overshadows it. The airstrip is located on the edge of the town and is the only means of access."

"GOAL had set up a camp there to provide emergency aid and services to over 30,000 people who had been displaced as a result of conflict in the area. The Lords Resistance Army (LRA) in North Uganda was creating a lot of trouble and was brutally killing many people, and as a result thousands were seeking refuge in Kalongo. My job was to oversee the provision of essential water and sanitation infrastructure for the town. Due to the chronic overpopulation there was a severe threat of a cholera epidemic. Cholera is a water-borne disease and can be lethal and a lack

of adequate hygiene and sanitation contributes to this problem. Following an initial inspection of water sources in the area, we discovered that a water source for the town's main hospital was contaminated. So we set about rectifying this immediately. I also oversaw the construction of essential sanitation facilities."

"There were many people in Kalongo who had lost their land and their homes, who had seen their family killed or abducted. With a small investment of time and money, we were able to provide access to clean water, latrines, and efficient waste disposal. In a camp for those displaced by conflict these small things can make an incredible difference. The work that GOAL does in Kalongo and other regions like it in Africa and throughout the world has very visible and immediate benefits. It is incredibly satisfying to be part of a team like GOAL and to know that you can use your skills and apply engineering solutions to problems and make a very real difference in the world."

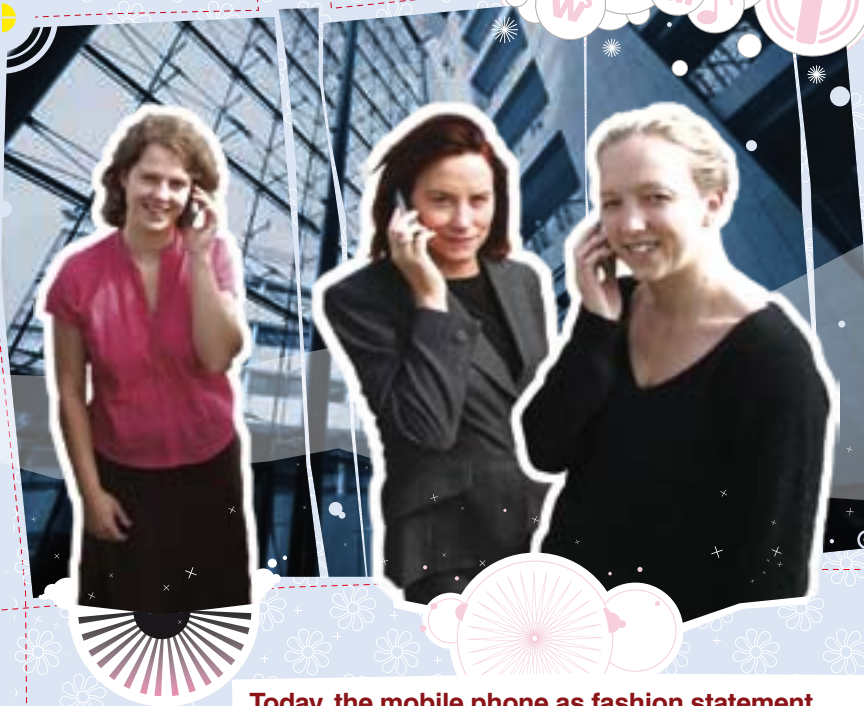
Having departed Kalongo, Darren has kept in contact with the GOAL team who are continuing the programme. He is now an Associate Director with N.J. O'Gorman & Associates Ltd in Dublin, where he specialises in project management. He is also a member of the Engineers Ireland Developing World taskforce who have signed into action a Protocol agreement, whereby a significant number of Irish engineering employers have committed to support a greater involvement of the engineering industry in the development world in association with Concern, GAOL and Trócaire.

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TEXT IN THE CITY

Every day's different at Vodafone's Dublin HQ



Today, the mobile phone as fashion statement, multi-media entertainment centre, and working-day standby is omnipresent. Engineering Life spoke to Deirdre Behan, Sheila Kavanagh and Glenda Stanley about their experiences designing, developing and marketing an icon of the noughties.

The trio gathered for the interview over coffee and muffins at the in-house café in their well-appointed Vodafone HQ (itself as sleek an example of imaginative design as a Motorola SLVR) in South Dublin. Deirdre's been with Vodafone for six years: "It's a great place to work. Our offices here in Sandyford have every amenity, from a gym to a newsagent's. And socially, with lots of young people working here, there's a great buzz and camaraderie. I joined the company as a Product Design Engineer when the mobile sector was taking off in 2000 and I've been lucky enough to watch the technology thrive and grow in those years."

One of the most energising aspects of the work is its variety and the constant stream of new challenges. In her six years with the company Deirdre's had the opportunity to work in several different roles, broadening her experience and enhancing her CV. "I've worked in Technology Strategy and Technology Planning. Now I've returned to the Products and Services division where I'm focusing on budgetary issues and gaining a broader overview of the business from a strategic financial perspective."

Never boring

Deirdre's colleague, Sheila Kavanagh enjoys her role as Head of Transport Networks: "The thing that I like most is the flexibility. You're also very well rewarded for your efforts. The working atmosphere is very good - there's a good feeling all around, genuinely. You go to work in the

morning with a tingle of excitement, every day is different. You're never bored."

Million dollar deals!

No wonder. Last year, for example, Sheila led a team which finalised a €10 million deal with ESB Telecoms to provide Vodafone with the added network capacity required to grow its business and drive cost improvements. "This agreement forms part of our long-term plans to ensure that we continue as Ireland's leading operator for many years to come."

This year she's working to advance the roll out of 3G services and functionality: "Your mobile is now fully integrated. It can incorporate entertainment such as TV and music downloads, you can access broadband for work or games - we're constantly seeking out new services to add to the package. It's exciting work and you're making people's lives easier and more fun, in practical, measurable ways. "Increased GAA content, Premiership coverage and the development of bigger screens for video calls are just some of the services she's particularly excited about: "With the latest innovations, you can access everything from global TV to a local DJ streaming music to our phone."

Always engaging

Five years at Vodafone, Glenda Stanley, of the trio is, relatively, the new girl on the block. A UCD graduate, she now works as a Project Manager in Sandyford. A lot of her time is spent

liaising with companies outside of Vodafone such as Alcatel and ESB, leasing dual fibre optic capacity: "Contrary to the clichéd view of the engineer, much of my time is spent engaging with people, at weekly meetings and site visits."

Sheila chimes in here, pointing out that Vodafone invests a lot in training its people and personal development, the famous "people skills" are a very important part of the training programmes: So much of your work is dealing with people, so courses in negotiation and effective communication are essential and very valuable."

But it's not all work and training. Maintaining a healthy work-life balance is encouraged. Glenda herself took a year out to travel: " My year away in Australia really broadened my horizons and when I came back to work I found it had given me a new perspective and refreshed my whole approach."

Working for a company of Vodafone's scale has great indirect benefits, the women agree. "Because Vodafone has so many bases internationally, there's a great diversity of employees so you're constantly learning about new cultures and being opened up to fresh perspectives," Sheila explains.

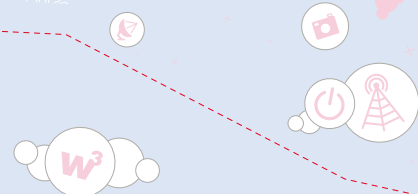
"When you're on a conference call, it can often involve fifteen other countries spread across the world."

Frequently flying

Vodafone have a number of Centres of Excellence globally including countries such as Germany, Italy and Ireland which also offers the opportunity for travel to some of the most exciting cities in the world. The technology is mobile and so are the employees.

Deirdre values the opportunities to exercise creativity: "Whether you're designing a cutting edge technology or devising a partnership strategy, the emphasis is always on originality and imagination, coupled with effectiveness, of course."

Leaving the sleekly designed Vodafone HQ in Sandyford, you're left with the distinct impression that not only is technology changing at a rapid pace in twenty first century Ireland, so is the nature of work itself with successful engineers like Sheila, Deirdre and Glenda in the vanguard of this revolution.



SAILING THE SEVEN SEAS



They say that engineering is a qualification that enables you to travel, but one young engineer took that statement to the limits.

Imagine being numb with cold as biting 70m.p.h. winds sting your face whilst you lumber about the deck of a boat fighting 50-foot waves. Imagine being thrashed about that deck, wall after wall of freezing water pummeling as you clutch to the shroud wires for dear life. Imagine doing this without respite for five consecutive weeks at a time over a period of 10 months. Welcome to Global Challenge - the world's toughest and most dangerous yacht race. Sound like fun? Well for one engineer this was a dream come true!

On Sunday 3rd October 2004, 12 identical 72ft ocean racing yachts sailed from Portsmouth,

intending not just to survive those conditions, but to race through them. Each yacht was crewed by 18 ordinary men and women led by a professional skipper. Every single crew member was setting out to push themselves to the limit and to have the adventure of their lives. Among them was Jason McLeod, a young automation engineer from Waterford.

Prior to embarking upon the 10-month journey that would be a life-altering experience, Jason received a Bachelor of Technology and an MSc in Process Control from Waterford Institute of Technology (WIT). For years Jason had



Jason with Skipper Dougie

dreamed of participating in the Global Challenge, "when I was 16 I met a French sailor who had circumnavigated the globe and I suppose he planted the idea in my mind."

Whilst the decision to compete in the Global Challenge was easy, the actual preparation for the event was not. Jason spent four and a half years training and during that time he invested €86,000 of his own funds by the time of project completion. "When I left college I worked as an automation engineer with a company in Cork and after a few years decided to work as a contractor. Although the business was lucrative in comparison to what many graduates from other professions would have been earning, I still had to work hard and save as much as possible. It was a huge investment both financially and socially but I figured it was worth it."

Disaster strikes!

Disaster struck when two weeks prior to the race, Jason was beset with a back injury. He endured two weeks of intense physiotherapy in Cork and Dublin and just about made the start line for the race. "I was still in a great deal of pain when the race began but, somewhat naively, I hoped it would dissipate." But it didn't.

For the first leg of the challenge Jason spent 21 days cooking and cleaning in the galley whilst

the crew above board encountered a force 12 hurricane, battled the biggest waves of their lives and were struck by lightning. "To be on the boat was a dream come true, but there I was confined beneath deck whilst the rest of the sailors lived the experience. It felt a bit like being in a prison cell and the physical pain, together with daily injections for my back was very tiring."

Jason was on the verge of withdrawing from the race, but his saviour was to come in the form of a chiropractor and some Argentinean beer. The crew had completed the first leg of the journey and landed in Buenos Aires. Jason had received extensive physiotherapy on the stopover but to no avail. The night before they were due to set sail on the second leg to New Zealand, Jason was trying to work up the courage to tell the crew he was going to have to leave when he met a chiropractor; "He looked at my back and told me I'd slipped a disc but it seemed unlikely that he could fix it properly because my back was too tense. I asked would having a drink help and he said it would, so I snuck out of the hotel to get some beer. The cardinal sin in yachting is drinking before you sail. If I had been caught, I would not have been allowed back on the boat." Fortunately for Jason the excitement was finally about to begin, with his back condition eliminated, he was now ready to encounter one of the most hazardous sailing routes in the world.

"Our yacht, Spirit of Sark, was the first in the race to round the infamous Cape Horn and enter the Southern Ocean. Cape Horn is notorious as

a sailors graveyard with firece winds, massive waves which break on the continental shelf of South America. We spent 37 days at sea battling through those conditions and we were incredibly chuffed to reach New Zealand first to win that leg."

Recording-breaking

Not only did Jason's team win, they also broke the Challenge record for the fastest passage by 3 hours and 17 minutes. The 3rd leg of the race took the team to Sydney where they arrived in a disappointing 6th place. Not to be deterred they set off on the 4th leg toward South Africa determined to win again. "We were racing in what is statistically one of the windiest places on earth. The wind on that leg averaged 30-45 knots for three weeks solid. This really took it out of the boat and the crew. We were also hit by freak waves that destroyed the protective guard wires in our fore deck." In spite of this Spirit of Sark was first to cross the line and they were dubbed "Kings of the Southern Oceans" at a prize-giving ceremony in Stellenbosch near Cape Town.

In early May they left Cape Town to head for Boston. Unfortunately, Spirit of Sark lost ground in the second half of the leg arriving to Boston in 6th place. However, according to Jason the crew had achieved some of the best spinnaker sailing of the race, "we were regularly holding up the Flanker, a heavy weather kite in 35knots of wind."

On the 6th leg of the race Spirit of Sark took 4th place and as they set off on the final leg Jason and his crew had high hopes for a podium

position. "The last leg from La Rochelle to Portsmouth was short but definitely not sweet. We were engaged in a 24-hour duel with a yacht called Save the Children, ferociously trying to maintain our position when another yacht quietly slipped past us both."

A hothead - not any more!

Spirit of Sark took 4th position in the overall race but Jason was far from disheartened; "Retrospectively, I wouldn't change a thing. That race was the most amazing experience, a complete learning curve that helped me develop new life skills. I used to be a bit of a hothead, but not so much anymore. That's what sharing a confined space with 17 other crew members teaches you! The skills I acquired as an engineer guided me through the challenge, because although it required physical fitness it was more about the psychological approach. One of the things engineering teaches you is how to take a methodical, logical and systematic approach to tasks no matter what they may be. This is what carried us through in completing many of the arduous tasks on the yacht. Away at sea, you exist in a world where you have very little control and must endure the harshest of the elements and it is reassuring to have some solid skills that you know you can fall back on."

Jason currently works in Dublin as an automation engineer with Wyeth Biopharma, a leading international biomedical company.

Wherever the wind blows



Following her dreams of making the world a better place led Kenyan-born, Khilna Dodhia all the way to Dublin where she now works as an engineer with Airtricity analysing wind resources.

In Kenya, I used to live beside the Indian Ocean coast and it was a very hot environment. Since Kenya lies on the equator, daytime temperatures in most parts of the country are consistently warm all year. Before I was thirteen, air conditioning in cars was still a novelty and it was essential to keep car windows open. Unfortunately though, along with any breeze came lots of black fumes from the exhaust pipes of other cars. This wouldn't be a common experience in Ireland but you can imagine that it isn't pleasant. I had already learnt about the effects of such fumes on our environment so, at the age of thirteen, I decided that I wanted to help solve the pollution problems of the world. The first question was 'how?'

When I was 15 I left Kenya and went to Brighton College, a boarding school in England where I studied for my A-Levels. I then went to Cambridge to study Chemical Engineering. The name is somewhat of a misnomer. A Chemist is someone who creates the end product on a laboratory scale, whereas a Chemical Engineer designs the processes to make this end product on an industrial scale.

Exciting discoveries

Through chemical engineering, I thought I would learn how to improve processes and products that have an effect on the environment, such as in the oil industry, and that in this way I could work towards reducing pollution. However, Renewable Energy caught my attention whilst carrying out an environmental project at university. This was a more exciting field for me than improving processes. It meant new ways to produce power by almost completely avoiding the pollution involved with fossil fuel power generation. I knew then that this was the avenue I wanted to pursue in terms of my career.

The course was challenging but I enjoyed it. During the four years at University, I worked every summer holiday in different fields and countries. This included working in research in Switzerland, at an investment bank in London and in the oil fields of Texas, each of which

taught me a variety of useful skills. When I graduated I went to Spain for a year to learn Spanish and teach English. Then I returned to my family in Kenya. Whilst there, I worked within the Marketing and Human Resources departments of a manufacturing company. After a year, I felt ready to embark upon my chosen career and decided to undertake a Masters in Renewable Energy.

The Masters course I studied is run by the European Union Renewable Energy Centre (EUREC) based in Brussels and it was conducted over the course of 15 months. There were three parts to the course: the core, where a foundation is taught on renewable energies, the specialisation in one such renewable energy and the placement in another organisation for 6 months. I chose to study the core in the south of France, wind specialisation in Athens and to have my placement with Airtricity in Dublin. Airtricity is a leading global renewable energy company, currently developing and operating wind farms in the Ireland, Britain and the United States.

Today I am still working with Airtricity where I specialise in short-term wind power output forecasting - which sounds like a mouthful! Basically, this involves looking at how much electricity is going to be produced in the next 0 to 60 hours by our wind farms. This has several uses, which include trading wind power, scheduling maintenance of the wind farms and scheduling the combination of power plants. This means dealing with the internal Trading department, internal Operations and Maintenance department and the national grid operator (EirGrid), all of which have very different needs.

The trading department needs to know how much power they can sell on the market and balance the risks involved, e.g. how much they think the market price is going to be, how much demand will there be for electricity at that time and how uncertain is the wind power forecast. Therefore the accuracy of the wind power forecast is very important.

The Operations and Maintenance teams require information on current wind speeds and the power output. When the wind speeds are high, it may be difficult to work with certain items of equipment e.g. cranes. Also, if the power output is going to be high, it is more logical to sell the power at that time and carry out maintenance in a low power output is low. Then the grid operator needs to know the power output so that they can schedule other power plants to try to best meet the changing demand of electricity.

Black art of forecasting

Forecasting is becoming an increasingly important topic in the wind industry to assist in the growth of wind power. There is still much work being carried out in forecasting and it is a black art in many ways. It's extremely interesting since there are no right or wrong answers and there are plenty of different avenues to be investigated. I feel I can add to the global forecasting knowledge using the experience of our own wind farms. This is something, which, even after graduating from my first degree, I never would have thought I would have the opportunity to do. In many established industries, the possibility of discovering new things is more limited.

As part of my job I get to travel to international conferences on wind and renewable energy,

and as well as keeping up-to-date on the latest happenings within the industry, it's a great opportunity to meet people from a variety of nationalities and cultures. The wind industry, although extremely diverse and large, is at the same time close-knit, so I see many familiar faces in conferences where forecasting is featuring.

The wind industry is more open than many other industries in terms of collaboration. Despite the standard competition between different companies and organisations, which exists in almost all industries, there is a sense of wanting to improve the technology as an industry so that wind power can grow all over the world. Working together and sharing the knowledge is the only way to do this.

Within 3 months of starting my job I had the opportunity to travel to Spain and now I regularly travel between Spain and the UK. I am in touch with researchers and other companies based all over the world. The top 4 countries for installed wind power capacity would include Germany, Spain, Denmark and USA with India, China and other markets also growing rapidly which gives you an idea of the global nature of the job.

Airtricity's growth and expansion into different countries offers plenty of opportunities to work around the globe and in different areas. The engineers in the company all come from many different backgrounds including Electric, Mechanical and Chemical and they work across different departments such include Operations, Construction, Finance and Trading. There's just so much choice!

VIRTUAL REALITY ABOUNDS

When John Foody was 17, he knew that he was addicted to problem solving. What he didn't know was what he was going to do in college. Here he tells us how he unraveled the mystery and found happiness in a world of yoga, levitating ping-pong balls and exotic travel – well, sort of!

I've always been obsessed with figuring things out. In school I really enjoyed any subject that involved that approach, but when it came to choosing a subject to study after the Leaving Cert, I was at a loss about what to do.

It turns out the answer wasn't loafing around, pondering the eternal "how should I know?" It involved a lot of research; talking to people in various professions and attending as many open days as possible. After that it didn't take too long to discover that electronic engineering was the subject for me. What I found really appealing about it was that, apart from satisfying my obsession with problem solving, the career opportunities are diverse and creative - electronic engineering can take you anywhere from working the medical field to the entertainment industry.

The course I decided on was a 4-year degree in Electronic Engineering at NUI Maynooth. The first 3 years were primarily focused on theory whilst in my final year I had an opportunity to work on a major project of my own choice.

My selected project involved a web-cam, a computer, a fan and a ping-pong ball. The objective was to control the height of the ping-pong ball floating in a tube via the fan, by randomly pointing to where you wanted it to levitate. To successfully accomplish the project I had to apply some of the theory learned during my first three years but I also had to consult a range of different experts, from computer scientists and physicists to technicians and a carpenter in order to answer all the questions I encountered with the project. Before this I had never really thought about the importance of people skills in engineering because as an engineer you work not just with other engineers, but also with a whole host of people from other professions.

I enjoyed working on the project so much that directly after graduating I joined collaborative academic research team set up between the Computer Science Department at NUI Maynooth and the School of Physiotherapy and Sports Science at UCD. With the team, I have the opportunity to work alongside a dynamic group of people from various different academic backgrounds; there are three physiotherapists, a number of yoga instructors, two computer scientists, a physicist and a biomedical engineer.

Together our team is working towards creating a virtual reality computer game that will benefit people suffering from many conditions such as hypertension, anxiety disorder and chronic pain by improving their capacity for mental and physical relaxation.

The ultimate game

Exercises such as Tai Chi and Yoga are known to have many therapeutic benefits including enhancing posture and reducing chronic pain and hypertension. By focusing on Yoga the aim of the game is to help a patient enter a state of mental and physical relaxation by wearing a special suit and interacting with a computer to master the art of yoga. Ultimately the game will be used for a vast array of exercise therapies, but

the main focus at the moment is on yoga. The suit we have developed is a lightweight garment that can capture the movements of the wearer and send this information to the computer. The suit also monitors the patient's breathing rate, muscle activity, sweat rate, heart rate and the alignment of body segments and feeds this data back to the computer. Whilst wearing the suit, the player must imitate physical postures displayed on the computer screen and simultaneously maintain a relaxed and controlled breathing pattern.

The computer will monitor the player's movement and posture and provide feedback and instructions to them by reproducing an image of the their body on screen. The quality of movement and posture, and degree of mental relaxation will determine the player's performance. All of the communication between the player and the computer will be wire-free.

The work that the team does on this game can be divided into three sections: there is the hardware needs involving the suit, the rules concerning what is good and bad yoga and the game itself. My involvement is primarily on the hardware side. I've developed a motion-capture sensor for use in the suit. This sensor avails of the earth's magnetic and gravitational forces in order to measure angles of rotation. I've integrated two such sensors with a prototype computer

game, meaning I put two sensors on my arm, wave my hand and the avatar (skeleton) on the screen waves back at me. It was a great feeling achieving that. There's still a lot to do, but we're making progress.

Increase air miles with research!

Working in the academic research environment involves a lot of self-motivation and dedication. As well as conducting research and collaborating with a team there are opportunities to teach and explain your concepts and work to others. The main 'perk' is conferences - I'm preparing to give a presentation for one in New York at the moment. So far, with help from the team, I've published three scientific papers on the computer-game.

Essentially presentations at conferences involve writing up a particular portion of your research work for assessment by international peers. If it is considered to be of high quality then you get to attend and present your work to the international scientific community at some exotic location. The trick is to find a conference coming up in Hawaii that is really relevant!

As a researcher I'm still learning, enjoying myself immensely, feeding my problem-solving habit and getting paid for it. If I could give advice to anyone about his or her future career I would say the most important thing is to always remember that if you enjoy what you do, you never work a day in your life.



A MILLION MILES FROM A CLICHÉ

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Dr. Caitriona Lally's engineering career has not turned out quite as she expected. Today, she finds herself in a people-centred environment, concentrating on ways to improve the quality of life for people with vascular diseases. Drawing on a broad range of skills, including communications, marketing, training and mentoring, as well as her innate problem solving and technical ability, she holds a role that encompasses lecturing and research in her chosen field of biomedical engineering.

We visited her at her office in Dublin City University (DCU), where she was busy planning lectures, tracking the latest research developments in her field and thinking about the draft of her next proposal for funding research... and that was just Freshers week!

Caitriona was always interested in engineering. After leaving school she decided to study Mechanical Engineering of her degree at University of Limerick. She says, "the course was fascinating, it encouraged my interest in biology and through it I realised that I could develop my skills in order to help people in a very real and practical way."

Caitriona had the opportunity to see biomedical projects first hand as part of the course. She did work experience placement with Howmedica International in Limerick. Howmedica is a major manufacturer of surgical implants for the total replacement of hip and knee joints, they also make precision instruments and devices used in operating theatres throughout the world. Caitriona says, "It was amazing to see the impact of engineering work in its application directly to a person's well-being."

The critical path

The particular products I saw being developed were hip and knee prostheses. Witnessing the entire development process involved that convinced me biomedical engineering was the path I wanted to follow. "Caitriona continues: "I found that whilst mechanical engineering was not ultimately the discipline I wanted to pursue, it was extremely useful because it drew me toward what I really wanted. Moreover, like any basic engineering degree, it was sufficiently broad in its scope that it also provided me with a strong foundation for my subsequent degrees and my career."

"Actually, one of the most reassuring and encouraging aspects of choosing to study engineering at third level is the way in which it opens up your career options rather than confines them. The range of options available is huge and no one should pay any attention to preconceived notions about engineers. The reality is that the career potential is so diverse. An engineering background enables you to do almost anything – make a difference with research and design, develop products, business acumen- whatever you want."



“We are now in an age where heart disease is on the rise, but engineering is playing its part to combat the disease and to improve the chances of those affected by it.”



After receiving her degree, Caitríona continued on to pursue a Masters and a PhD in biomedical Engineering. Since then her research has centred on biofluid mechanics and cardiovascular solid mechanics. She is focused particularly on medical device design for cardiovascular diseases. Caitríona explains “We are now an age where heart disease is on the rise, but engineering is playing its part to combat the disease and to improve the chances of those affected by it. My research is concerned with medical devices called stents. Stents are metal mesh tubes and they are inserted into narrow arteries to hold them open. Nowadays most stents are “drug eluting” which means they can control the release of medical drugs straight to the site of the problem.”

“Many of the stents used in medicine today were created and developed in Ireland - in fact, over 80% of the worlds stents are made in Ireland. There are plenty of opportunities for anyone who wants to have a career in biomedical engineering. There are now 15 of the world's top 25 medical device companies operating in Ireland. For my research I collaborate with Medtronic Vascular in Galway, who are one of

the leaders in the industry. This is a very useful partnership because the involvement of Medtronic allows for the use of medical devices and equipment that would simply not be available to me in any other way.”

In March 2004, Caitríona took up a lecturing position in the School of Mechanical & Manufacturing Engineering at Dublin City University, where she continues to carry out research in the area of intravascular stents and arterial tissue mechanics. “This role involves lecturing for approximately eight hours a week which allows me to work with and encourage the next wave of engineering students,” she says.

Banish those stereotypes!

Banish from your mind any stereotypes of a researcher isolated and hidden away in a laboratory. According to Caitríona one of the most stimulating aspects of her work, one that might not be widely realised, is the extent to which she interacts with a great variety of people - from students to senior academics and medical clinicians and also from state funding assessors to multi-national executives. “Clearly, any researcher must dedicate sufficient time to solid research work, but you also have to develop your communication skills. Funding for research projects won't fall into your lap. Persuasive writing skills, convincing presentations, effective networking with the leaders in your field to ensure you're aware of the latest innovations and discoveries – all of these are key weapons in a successful researcher's armoury. You need to be able to work with, and communicate effectively with people from widely differing scientific, business and international backgrounds. For me this is one of the most satisfying aspects of a career in biomedical engineering and is a million miles away from the clichéd image of an engineer.”

o **over 80% of the worlds stents are made in Ireland.**



... RESISTANCE IS FUTILE ...

What happens when engineering and entertainment collide? How about the creation of a new and unrecognisable Ireland that has fallen prey to evil command in an era where the presence and power of technology pervades? Welcome to the world of The Resistors!

// THE SCENE: A ravaged wasteland called Cybernia... This is Ireland after the apocalypse. The country has been infiltrated by malevolent hackers who rule the land and control all computer systems. Fighting against the hackers' rule is a team of four teenagers: Sonia, Luc, Amber and Dig. Under the moral guidance of their professor, the teenagers utilise special skills, which aid them in their mission to defeat the hackers. They must also overcome various physical challenges. The Resistors! is a cutting-edge animated action series conceived by team of leading games animators and programmers across Ireland, Europe and North America. Dubliner Tarun Maitra, a Computer Science graduate of Trinity College, is one of the lead 3-D modellers involved in the series. Here he tells us all about the development process involved with such a project.

// "I joined the team during the storyboarding phase," says Tarun. "The concepts of the

characters and the storylines had been developed on paper and were at the stage where they required initial visualisation. The storyboarding involved modelling and designing the sets of Cybernia and the characters themselves. I was primarily involved with designing the sets. 3-D modelling is quite an intricate and detailed process. It is also time-consuming to execute, but it involves a lot of imagination and creativity to precisely realise a vision of a futuristic landscape dominated by technology yet to be invented!"

// The Resistors! is being created using an advanced production model with a dispersed production team. Tarun says, "Whilst most of the team are located in Dublin in the CTVR centre in Trinity, some are based across North America and Europe. For the pilot episode of the series we worked with Chris Derochie, a leading international animation expert who has worked with companies like Disney and he was based in



California. So for production meetings we relied on a host of networked communications such as Skype, video-conferencing and production management software. This meant it didn't matter where in the world you were, the work was conducted easily with input from all the relevant people."

// To design the sets and characters, the show's animation team took advantage of the very latest in motion capture hardware and lighting, focus and speech synchronization plugins. Tarun says, "we employed the newest technologies to deliver a high-quality visual aesthetic so that the show could easily compete with offerings from some of the main studios. This was particularly important because television is so sophisticated nowadays. Everything is focused on having the highest production values possible. The Resistors! will be broadcast on the Irish channels but it will have to compete with many international programmes for its audience."

// Prior to joining the Resistors team, Tarun worked on a project to build a virtual model of Dublin City for the web. Recalling the work he says "The Virtual Dublin project was conducted with the Interaction Simulation and Graphics Lab in Trinity. The project involved taking pictures of Dublin's cityscape and then using a 3-D modelling tool to shape the virtual buildings. The goal of the project was to create an immersive virtual urban

environment capable of running in real-time on domestic hardware. Further work will involve using the urban simulation to model traffic congestion and crowd motion and to integrate with handheld devices for guiding purposes."

// Cybernia's landscape in The Resistors! has incorporated many Irish landmark buildings including the Central Bank, Civic Offices, Four Courts and TCD, which Taurin and his colleagues modelled for the Virtual Dublin project. He says "it was great to be able to reuse some of the work I had previously done and render it in a completely different context. Cybernia is an imagined Ireland of the future, so it made sense to take some iconic landmarks of the present and visualise them as remnants of a lost world in the future."

// In addition to the 3-D modelling for The Resistors!, Tarun had the opportunity to be involved with many other aspects of the show. "It was an all round experience where I got to contribute to the marketing drive for the show, which involved designing posters and promotional material for the publicity as well as creating the proto-type for the website," he says. "I also had the opportunity to record a short voiceover track for one of the shows, this was a great fun. The voice tracks for the characters were primarily recorded using drama students in the sound studio of TCD's Electronic Engineering Department.

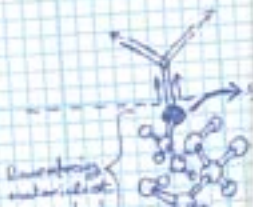
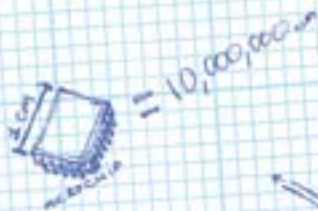
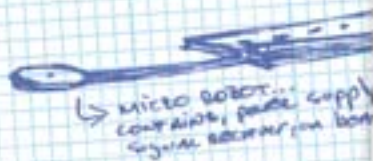
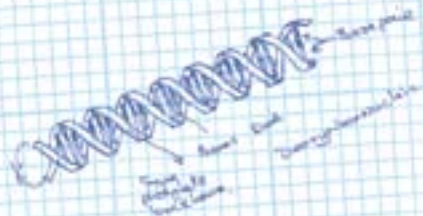
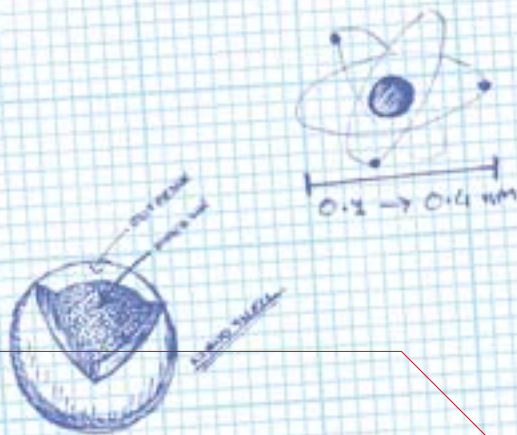
// Whilst the effects soundtrack and incidental music were recorded in the Electronic Engineering Department, there were also some other contributions to the soundtrack. Tarun says, "we employed some major musicians to contribute to the soundtrack, one of whom was Paul Hartnoll formerly of Orbital. Paul is the composer of the The Resistors! theme tune. A few years ago he wrote a version of the "Doctor Who" theme tune with Orbitol. He's also composed for the soundtrack of "Mean Girls, The Beach and many other Hollywood blockbusters."

// So how does Tarun feel about having the first series of The Resistors! completed? "It's a wonderful achievement for me" he says. "It's been great to have the opportunity to work with such a multi-disciplinary group; we had animators, engineers, technicians, writers, actors, researchers, musicians, producers and many others involved with this show in Ireland and abroad. You make many friends and get exposed to other ways of thinking and working in a group like that. You also really learn what teamwork is all about. At the end of the day when the show is finished it looks seamless but you know there were so many components and people that were integral to the overall production process."

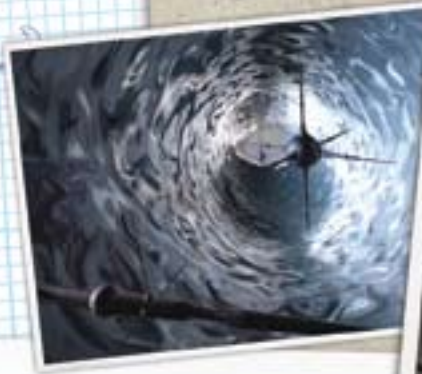
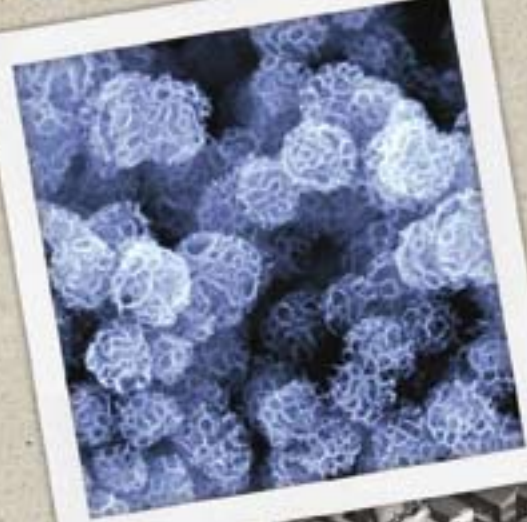


WANT TO MAKE IT BIG?

Well think small
Think very, very small!!



Nanotechnology



Engineering is virtually synonymous with diversity.

As technological innovations multiply, the challenge and scope of engineering becomes broader. Nanotechnology is a perfect example of a technology that your parents never even dreamed about, but which has the potential to change all our lives in a myriad of ways. As an engineer you could be involved at the very concept of a discipline that has the potential to reshape the future. If you've only seen the word "nano" as sleek branding for an MP3 player or the science bit in a shampoo ad, read on as Engineering Life outlines the enormous potential of this new science and introduces CRANN (Centre for Research on Adaptive Nanostructures and Nanodevices), whose researchers are working at the forefront of this technology.

So you've heard the term but what exactly is nanotechnology?

Nanotechnology is concerned with objects ranging in size from about 100 nanometres downwards. This involves working with individual atoms and molecules or minute particles.

By the time you have finished reading this sentence your fingernails will have grown by about a nanometre. A nanometre is one million times smaller than a millimetre or one billion times smaller than a metre. A human hair, for example, is about 80,000 nanometres wide.

Nanotechnologies involve the design, production and application of devices and systems by controlling shape and size at the nanometre scale. In fact, by creating nanometre-scale structures, it is possible to control the characteristics of a material such as its melting point, magnetic properties, and even colour, without changing the material's chemical composition.

What is nanotechnology used for?

Nanotechnology is being used in products all around us. Today most computer hard drives depend on nanotechnology for increased storage capacity.

Golfers such as Tiger Woods and Padraig Harrington use nanotechnology enhanced golf clubs. Nanocomposite materials used in the clubs give them low density and high strength thus improving the player's performance. The club will hit the ball further and straighter.

A well-known cosmetic manufacturer of anti-aging creams has developed a cream with nanotechnology. The cream contains liposomes, i.e. 'nanospheres', containing an anti-aging product called pro-retinal A. These liposomes can penetrate deep into the epidermis and release the anti-aging product. A similar technique is being developed in medicine where active agents are trapped in a 'nanopore';

this would be used in drug-delivery creams, for example.

Already there is clothing available in the shops that contain 'nanocomposite' material that is stain and wrinkle-resistant. Some bandages now incorporate nanotechnology into their design. These bandages contain an antimicrobial barrier dressing using 'nanocrystals' of silver, which increases their surface area and makes them more effective in treating burns and wounds.

Nanotechnology is set to revolutionise medicine in the future. For instance, NASA is working on a cure for cancer that will depend on nanotechnology. Their researchers are developing nanotechnologies called "nanoshells" which can be activated by light. Their development aims to protect the health of astronauts in space, which will also detect and treat cancer and other diseases on Earth.

**Want to know who's involved?
Well, for example, meet CRANN**

CRANN is a flagship centre for research in Ireland and one of Europe's leading nanoscience centres. CRANN is a partnership between three foremost Irish Universities, Trinity College Dublin, University College Cork and University College Dublin, along with a number of high-tech industry partners. CRANN is based on the campus of Trinity College Dublin, in a custom designed and constructed building. The centre houses world-class facilities with ultra-low vibration laboratories to allow highly sensitive measurements of nanoscale structures, and state-of-the-art clean rooms where even particles of dusts are carefully filtered out to allow high-purity fabrication of these tiny objects.

What type of projects is CRANN involved in?
CRANN's research interests range across chemistry, physics, clinical medicine, biochemistry, bioengineering and neuroscience.

One of CRANN's main interest areas is in manipulation of spin i.e. replacing electrons as the information carrying agent in electronic devices. Research groups in CRANN are looking at the dynamics of spin, and investigating novel structures to test spin based devices. The new science of spin electronics will deliver smaller, faster devices with novel properties with reduced energy dissipation.

Miniaturisation of devices to the nanoscale is another area of current interest, specifically the chemistry and material properties of nanoscale systems that have potential applications in the areas of devices and sensors.

To find out more about the research being carried out in CRANN check out their website www.crann.tcd.ie or contact Keelin Murphy, Education & Outreach Manager, at crann@tcd.ie.

Finally, what are the possibilities for nanotechnology in the future?

The engineers and scientists involved in nanotechnology are pioneering technological advances, working in supportive, strong teams dealing with challenging and hugely rewarding work.

The possibilities of jobs in nanotechnology are endless if you consider the vast range of applications already being pursued by industry. "Small" is definitely going to be huge!

Nanotechnology is really set to revolutionise every area of our lives from medical care and entertainment to the way we work. For anyone who wants to become involved in shaping the future of nanotechnology, the only requirements are a curiosity about how the world works and an engineering or science qualification.

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Further information and Prospectus available from:

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- Or perhaps you are more interested in music and would like to create software to automatically write out the notes played in a piece of music?

All of these projects (and more!) are part of the vibrant and diverse research community at the Department of Electronic Engineering, Cork Institute of Technology. If you are interested in pursuing a career that will allow you to turn your ideas into reality through the use of technology then consider our undergraduate course which will lead you to where you want to be.

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For further details please contact:

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Cork Institute of Technology

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Where can I study engineering?

Institutes of Technology

Athlone Institute of Technology
Cork Institute of Technology
Dublin Institute of Technology
Dundalk Institute of Technology
Galway-Mayo Institute of Technology
Institute of Technology, Blanchardstown
Institute of Technology, Carlow
Institute of Technology, Sligo
Institute of Technology, Tallaght
Institute of Technology, Tralee
Letterkenny Institute of Technology
Limerick Institute of Technology
Waterford Institute of Technology

Universities

Dublin City University
University of Dublin, Trinity
University College Dublin
National University of Ireland, Maynooth
University College Cork
University of Limerick
National University of Ireland, Galway
University of Ulster (Jordanstown)
Queen's University Belfast

The disciplines of engineering:

Aeronautical
Biomedical
Biosystems/Food/Agricultural
Building Services
Chemical
Civil
Computer Software
Electrical
Electronic
Manufacturing/Industrial
Mechanical

Important information:

To study engineering at level 8 (honours degree) you need at least a C3 in honours maths and at least one science subject. If you want to study engineering at level 6 or 7 (certificate and ordinary degree) you will need a grade C3 or higher in ordinary level Maths or a grade D3 or higher in higher level Maths. It is possible to study for a level 8 engineering qualification once you have completed levels 6 & 7.

There is a huge demand for engineers and technicians in industry, both here and overseas. Ireland is set to become a top 5 global economy in the next 15 years, but there is a need for a 7% increase in the number of engineering professionals and technicians to achieve this target. This is all very good news for anyone considering an engineering course.

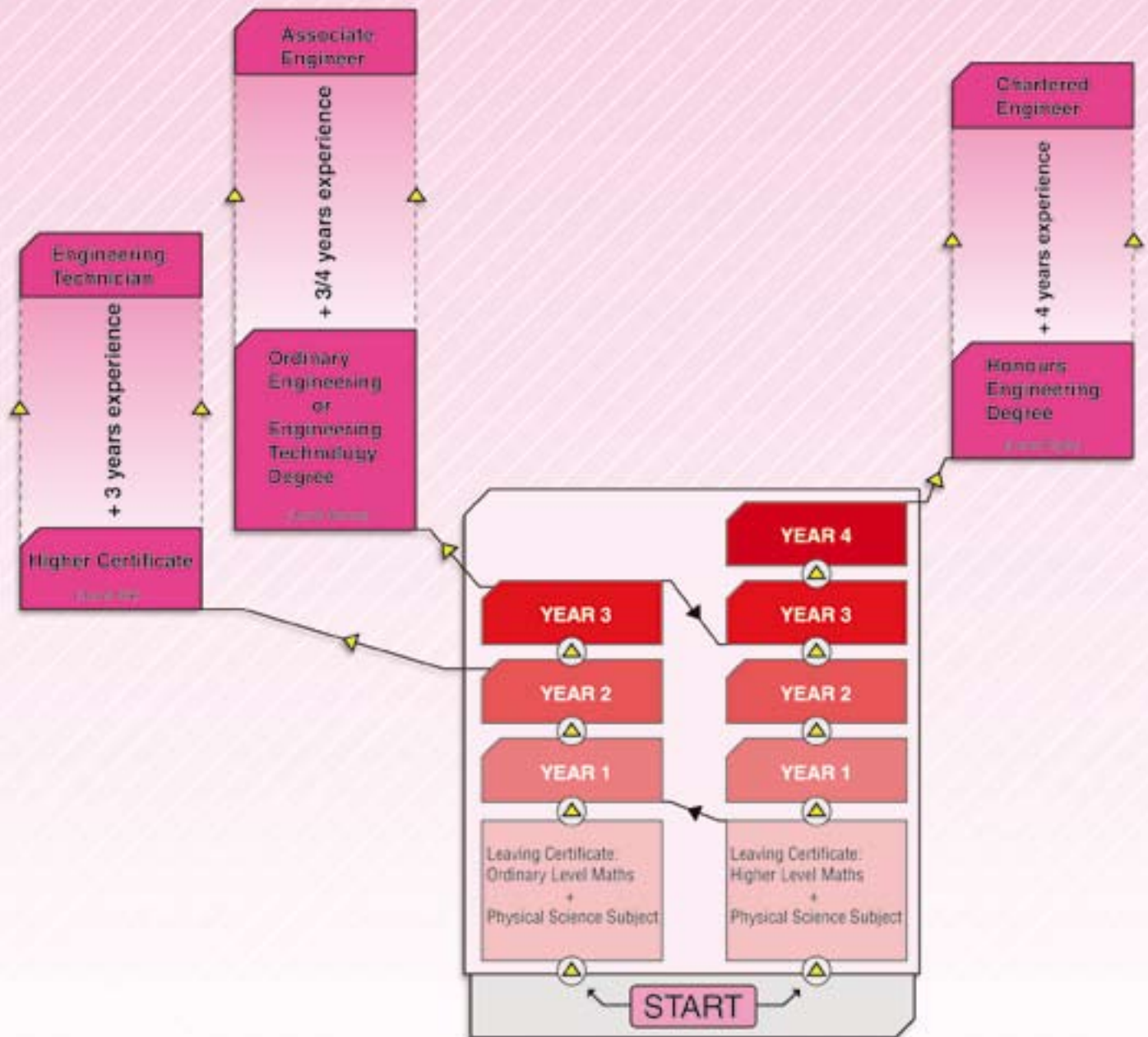
Recent international developments in Europe and the US are such that the educational standards for professional Irish engineers will be raised over the coming years, from Honours BEng (level 8) to Master Degree (level 9). So far UCD, CIT and a number of other universities and ITs have introduced new programmes to meet those standards.

Students are encouraged to apply for engineering programmes accredited by Engineers Ireland. A list of accredited programmes is available in the student section of www.engineersireland.ie.



For more information on any of the disciplines or the courses and what they entail, logon to www.steps.ie or email at info@steps.ie. We have detailed career sheets on each discipline to help explain what career paths are available.

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www.steps.ie

An informative website if you want to find out more about careers in engineering.

www.areyouupforit.ie

A funky website where you can take the “future: could this be you?” quiz and be in with an opportunity to win loads of great prizes including a chance to be a sound engineer at a music festival

www.discoverychannel.co.uk/extremeengineering

This is the coolest site ever! – well that’s if you’re interested in how to go about designing the seemingly undesignable!

www.engineergirl.org

Read some of the profiles, and explore the careers section to help you decide the type of engineering for you!

www.goal.ie

Read about the great work being done in the developing world

www.globalfuture.com/nae20greatest.htm

Lists the top 20 engineering achievements of the 20th century

www.howstuffworks.com

This site is for those who have wondered what genetic engineering is or how fiber optics work.

www.powerofone.ie

Learn how you can play your part in the battle against climate change

www.weekofwonder.ie

Find out more about a Week of Wonder a festival that celebrates engineering and technology



