

Graduate Profile, Aeronautical Engineering, University of Limerick, Ireland
ALISON O' CONNOR

MS. ALISON O' CONNOR

**YOUNG GRADUATE TRAINEE
EUROPEAN SPACE AGENCY (ESA)
NOORDWIJK, NETHERLANDS**

www.esa.int



Education and Training

- B. Eng. (Hons) Aeronautical Eng, University of Limerick, Ireland, 2008
- G.Dip Advanced Materials, University of Limerick, Ireland, 2009

Current Position

Title	Dates	Employer
Young Graduate Trainee	June 2009 - Present	European Space Agency (ESA), Noordwijk, Netherlands

Previous Positions

Title	Dates	Employer
Quality Engineer	June 2006 - Jan 2007	Lufthansa Technik Turbine Shannon, Ireland

"Home" Town(s)/County(s)

Limerick, Ireland
Leiden, Netherlands

Please describe your current job

I work as a graduate engineer at the European Space Agency (ESA), which has several sites all around Europe. I'm based at the largest site in Noordwijk, Netherlands. This site is called ESTEC and has over 2000 staff, the majority of which are engineers and scientists. This is where we decide what the next spacecraft is going to do and how we're going to build it. The type of tests they do here is amazing. We have a chamber that shakes the satellite really hard to make sure it won't break when the rocket goes off, and another that sucks all the air out (like in space) and then heats it up 100°C and cools it down to -170°C which are the temperatures we see in space.

In the aerospace industry the weight or density of a material is a controlling

factor because the heavier your aircraft/spacecraft is the more expensive it is to lift it off the ground. My work is based on titanium. Titanium is very popular in aerospace because it's structurally stronger and lighter than other materials like steel. However titanium doesn't like hydrogen and this is a problem for the space industry because we use hydrogen as a fuel. When hydrogen and titanium are close together (like a titanium tank, filled with hydrogen fuel) the hydrogen can embed itself into the titanium causing embrittlement. This means that the titanium becomes much weaker and breaks before we expect. After spending millions of euros on a spacecraft we'd prefer if it didn't explode! My job is to put a certain amount of hydrogen into the titanium and then test it to see if it becomes weaker or not. I get to spend 50% of my time in the laboratory and 50% of my time analysing the results. It's very exciting to think that my work contributes to the design of the next spacecraft.

Please describe your career path since graduating with your B.Eng. Aeronautical Eng.

After I graduated with my B.Eng in 2008, I was offered a position with a company involved in production. I knew from my COOP that production engineering wasn't my favourite subject but the recession was starting to kick in and work was scarce so I accepted the position. Unfortunately I was disappointed with the arrangement, the position was more about production management and I wasn't using any of the engineering tools I'd studied in college. After much debate I decided that I would leave the job and return to UL to take a Graduate Diploma course in Advanced Materials. The Grad-Dip was a one year taught postgraduate course. I studied metals, plastics and composite materials and did a thesis on polymer-clay nanocomposites. In December 2008 I heard about ESA's Young Graduate Trainee (YGT) programme and decided to apply. The purpose of the programme is to offer graduates one year of industrial experience working in the space sector. I applied for a materials based research project and the combination of Grad-Dip in advanced materials along with my B.Eng in aeronautical engineering gave me the extra boost to secure the position. I began working at ESA in July 2009. As part of the YGT programme I moved to the Netherlands full-time, and since my arrival I've visited many other European cities London, Barcelona, Paris, Berlin and now have friends worldwide from Canada to Australia.

What made you decide to study Aeronautical Engineering at UL?

When I was studying for the leaving certificate I really loved maths and physics so I tried to pick a career that embodied both of these subjects. I chose aeronautical engineering because I was interested in aeroplanes and how they

were designed. I wanted to understand why the wings had tips and why windows were round. I chose UL for several reasons. The most important was because it's the only university in the Republic of Ireland that offers aeronautical engineering. The second reason was that when I say I loved maths and physics I mean that I really liked them not that I was particularly good at them. I had to study extremely hard to get the C3 in higher level maths and I was worried that once I entered an engineering course I wouldn't be able to keep up. But I knew that UL had an excellent reputation for helping students that had difficulties with subjects. UL has a maths learning centre that students can visit to get help with any math subject, I will be eternally grateful to them - I honestly think I never would have managed without their help. The third reason is that Limerick is a great city with lots of amenities, but if you don't want to leave the campus you don't have to - everything you need is available within the Castletroy area, from supermarkets to cinemas.

Are you glad you did?

I am very happy that I did the aeronautical engineering course at UL. The course itself is well rounded and offers students introductions to all of the main engineering areas. It's much better to have an idea of all areas before you pick your specialisation. I believe that if I had gone to another university I wouldn't have had the same support that I had at UL. It's difficult to explain but I felt that the lecturers at UL really cared about their students. They very much want every student to pass exams and have great careers. They're very approachable so it's easy to talk to them if you don't understand a topic, and they'll take the time to explain it so that you can understand. Also there are so many different supports available to students like the maths learning centre, the on-campus doctors, the students union etc. UL is a great university but I think the kindness of the faculty give it that something extra.

What did you most enjoy about studying at UL - academically, and also non-academically?

For me the project work at UL was amazing. At the time I didn't really think about it, but looking back I realise just how much we learned from group projects and individual projects. The hands on learning approach combined with the 'work hard/play hard' mindset really helped me to focus. The group projects really taught me a lot about how the dynamic of the group can affect the project and how to work well with others; these are things that I still use every day in my career. I also found that the projects helped to bond everyone in the class it's a great way to get to know one another.

Where did you do your COOP?

I carried out my COOP at Lufthansa Technik Turbine Shannon (LTTTS). I spent the 8 months working in the office of Continuous Improvement. During my time at LTTTS, I learned about six-sigma and the lean approach to production engineering. To quickly explain: lean and six-sigma are tools used to improve a process by reducing the amount of waste. That waste can be anything from defective products to the time it takes the operator to find tools. As I had not graduated from my course I wasn't a qualified engineer, so I focused on promoting the use of six-sigma on the workshop floor. I organised competitions and questionnaires so that everyone could become involved in implementing lean and six-sigma. During my COOP I learned that I really didn't like process engineering at all. After the 8 months were up I knew for certain that I did not want to be a process engineer. The work experience was exceptionally impressive on my CV as a graduate; many of the top engineering schools in Europe don't expect or help their students to get positions in industry. When you're competing in a global environment against candidates from prestigious schools, it's then that the COOP placement really gives you that added edge.

What advice would you give school-goers considering choosing Aeronautical Engineering?

I would advise those considering Aeronautical Engineering to consider how invested they really are in the programme. Unless you are truly inspired by engineering then it is unlikely that you will succeed. Also you need to love maths and physics and be willing to work hard in these areas, if you are nervous about your abilities in these areas there is plenty of help available on campus so don't let that hold you back.

What advice would you give future graduates of Aeronautical Engineering?

The mistake I made when I graduated was to apply for every position I could find. There was this huge panic that all the jobs would be gone and I'd be left with nothing. I would urge new graduates to be more selective. I've found that you should sit down and really think about what it is you like doing, what area you're interested in, do you want to work in academia or industry, what you expect from an employer, and where you want your career to go. Once you've decided what will make you happy, then research companies that suit your needs to find a good match.

Only apply to companies that you want to work for, the application forms can take hours to fill in and if you do it quickly you're doing a bad job and will not get offered the position. Employers want to hire people who can show that they

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have an interest in their company specifically, so it's a waste of time applying if you're not serious - even if you got the position you most likely won't like it. There are some fantastic graduate programmes available globally so don't be anxious to look outside Europe - you can always say no if you change your mind or get offered a better position. If you feel that your B.Eng. is not enough to secure a position then consider doing a post-graduate course - the Graduate Diploma courses are only 1 year and can really benefit you as a candidate - many of the new graduate schemes are asking for post-graduate qualifications.

