

## CASE STUDY

# Sophie Harker

Aerodynamics engineer  
at BAE Systems



### How did you get to where you are now?

As a child I had always been good at, and enjoyed, maths but didn't know what I wanted to do with this skill. That was until I went to the Kennedy Space Centre when I was 16 years old and decided I wanted to be an astronaut! A few years later I got the opportunity to meet Dr Helen Sharman, the first Briton in space, and it was Dr Sharman who first introduced me to the world of engineering. Up until that point I genuinely thought that an engineer was someone who came to fix your washing machine or check the boiler, as that was the only exposure to the word 'engineer' I'd ever had. I don't come from a science or

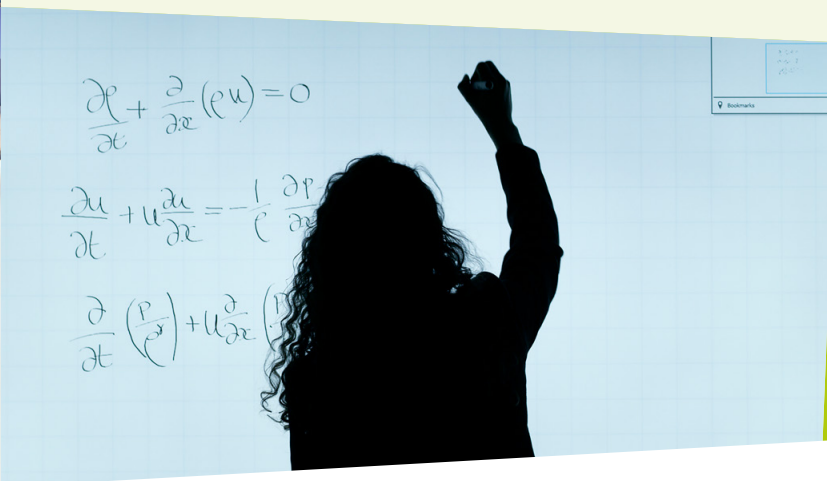
engineering background (my mum is a teacher's assistant and my dad a carpenter) so that one moment with Dr Sharman dispelled the myths I held about engineering and gave me the inspiration I needed.

After finishing my A levels in Maths, Further Maths, Physics and History, I went to the University of Nottingham to study an integrated maths master's degree. Here I focused on applied maths topics, such as fluid mechanics and electromagnetism, to help me transition into engineering once I had graduated. Between my third and fourth years at university I decided I needed some real-world engineering experience to make sure that engineering really was the career for me and so I applied for an internship at BAE Systems. For three months I worked on developing an app for the armed forces.

I had such an amazing time as an intern for the company that I decided to apply for the graduate scheme after completing my master's degree. On the graduate scheme I completed four 6-month placements across the company, including a secondment to Reaction Engines Ltd working on the Skylon spaceplane. When I finished that scheme I stayed with BAE Systems as an aerodynamicist working on future concepts for military combat jets and hypersonic aircraft. I now work as part of Team Tempest investigating the technologies that will be required to keep the aircraft flying in the future.

### What challenges do you face on a day to day basis?

I work at the forefront of aerospace technology and therefore I am looking at solving problems



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few others in the world have investigated. Having to persevere and motivate myself to continue investigation, even when hitting a dead end, is the biggest challenge I face but it is also what makes my job so exciting and important

### **What is the biggest difference you noticed between work and university in terms of engineering?**

As I studied maths, as opposed to engineering, at university it was quite a big transition into industry once I graduated. The biggest hurdle I had to overcome was getting to grips with the specific aerospace terms that the industry use. Now, the biggest difference I have found is the safety aspects of engineering. At university the focus for me was in understanding the problem and working out a solution. In industry, this is also important but the focus on safety has to be incredibly strong in order to make sure the products we engineer are not only suitable for use but also safe.

### **Real life example of engineering applied to your work.**

Engineering is applied every day in my work space! As an aerodynamicist, the problems

I investigate are whether an aircraft concept is going to fly or not and then, if it does fly, how far, how fast and what can we do to improve its flying abilities? This often involves a combination of maths, physics, software and systems engineering skills.

### **How do you approach these problems?**

Aircraft are incredibly complex machines so the 'problem' of designing and building one is broken down into smaller and smaller chunks until you reach a problem that's small enough to be solved by an individual or small group of people. Once you solve one of those smaller problems, you move on the

to the next one and continue to do so until you have a fully operational aircraft that can take-off, fly, land and do it all again.

### **What would your advice be to someone who aspires to be like you?**

The best advice I can give someone is to find what you're really passionate about, and then follow that through. Engineering is a vast, open career space that can take you anywhere. You can work on whatever gets you excited, be that space and aviation like me, or perhaps green energy or even food engineering! It is all possible if you follow through on what you are passionate about.



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