



ELECTRICAL & ELECTRONIC ENGINEERING | EDITORIAL

Women into Engineering: An interview with Kim Cave-Ayland

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Additional information is available at
the end of the article

Figure 1. Kim Cave-Ayland.



1. What made you decide to be an engineer?

Curiosity! How do you get from electronic components to robots with complex behaviours? Engineering struck me as an interesting career, and if you're going to spend a good proportion of your day working then it might as well be interesting.

2. Could you tell us about what you do as a plasma control engineer at the UK Atomic Energy Authority (UKAEA)?

At UKAEA, we perform research into fusion energy by creating miniature stars on earth. We have two machines, called tokamaks, and my main role is to build one of the critical control systems for one of our fusion experiments. This experiment, called MAST, is presently undergoing a major upgrade and my system will use large electromagnets to precisely position the superhot gases that we require for fusion within the tokamak.

I chose to pursue a career in control engineering because it's a broad field of engineering and I love to learn. As such, I consider myself really lucky that I'm able to get involved with a range of different projects in addition to my main role. I'm responsible for planning the final integrated testing of the MAST experiment's sub-systems before it starts operating next year. I've been asked to manage some further enhancements to the machine's control systems—something that is completely new to me and a large learning curve. And I'm also heavily involved with UKAEA's diversity and inclusion initiative.

3. What do you enjoy most about researching and developing a safe, low-pollution power source, or working in engineering more broadly?

I enjoy the breadth of work that I can get involved in—everything from modelling complex electrical systems and programming logic circuits, through to running experiments with physicists, and driving diversity and inclusion within the organisation.

I love the fact that I learn something new every day; it's a fascinating place to work. And the icing on the cake is that I can tell people that I make stars!

4. Who or what inspires you?

I'm not inspired by any one person or thing. I love to collaborate with other people and I'm most enthused by colleagues and friends who work hard and play hard, and those who are able to stay positive and cheerful through challenging situations.

5. In 2017, the Women's Engineering Society named you as one of the Top 50 Women in Engineering Under 35. Congratulations! Firstly, what did this award mean to you? Secondly, how important do you think it is to highlight female success in engineering?

Thanks! I guess the award helped to put into perspective how big my achievements have actually been. It's very easy to get lost in day to day struggles—especially when you're learning new things and out of your comfort zone—so it was something which prompted me to take the time to see the positives.

It's so important to highlight successful women in engineering. As a country, if we want to attract more talent into engineering, then we need visible role models. The more role models there are, the more girls will be able to see that engineering is something that they could do and be successful at, and the more parents will realise that engineering is a career that their daughters may be interested in and encourage them down that route.

6. Outreach work is clearly very important to you, as seen with your participation in the Born to Engineer campaign video which won the national category in the Bristol Festival, by the British Science Association. How did you become involved with this initiative?

I was lucky enough to attend a fantastic communication masterclass at work. The course was run by the production company Screenhouse and we worked with two producers, a voice coach and Maggie Aderin Pocock (presenter of *The Sky at Night*) to learn to better communicate our science and engineering work to an audience. I remember that Maggie told us all to “Be an opportunist in everything in life”.

Figure 2. Kim and other winners of *The Telegraph's* Top 50 Women in Engineering.



Figure 3. Kim being interviewed by the BBC's Science Editor David Shukman.



A few months after that course, I thought back to Maggie's words and responded to an opportunity that I previously wouldn't even have considered taking. The Institute of Engineering and Technology had offered to fund two films in a series—the “Were you born to engineer?” videos—and were looking for young, enthusiastic engineers who wanted to tell people about what they do. I thought it would be a great opportunity to spread the word about the fusion energy research that we do at UKAEA, so I responded. To cut a long story short, my description of how we make stars captured the imaginations of the production company, and it all went from there.

7. On your LinkedIn, you describe yourself as a “proud role model for Women in Engineering”. What does it mean to you to be a role model for young female engineers?

I consider myself to be one of the lucky ones. My dad is an engineer so it was always something I knew about, and I went to a girls school where the barriers for studying maths and physics were reduced. I love having a job which lets me continuously learn and contribute to one of the world's greatest challenges—low carbon, sustainable energy—and it's really important to me to show young people that these opportunities exist, that they're within their grasp, and that engineering is a fantastic career.

8. When working or researching in engineering, have you noticed a gender imbalance? How has it affected you?

It's pretty hard not to notice! On the whole, I'd say that so far it has worked to my advantage. I'm very visible within the organisation and colleagues have almost always been helpful to me. I have a lot of support within senior staff (that I have worked hard to earn), and I don't think that would be quite the same if I wasn't a woman.

Figure 4. Kim took part in the “9% is not enough” campaign.



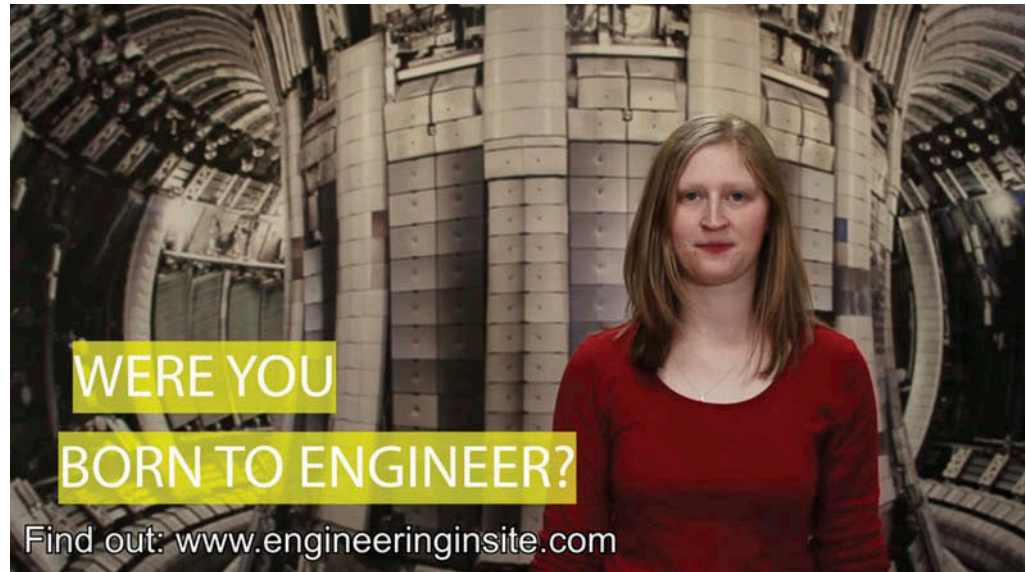
9. As a woman in engineering, have you ever had to overcome any gender barriers? What do you think is the reason for these barriers existing?

Besides overcoming the obvious barriers of getting into engineering in the first place, it's difficult to put a finger on others. There have been a lot of examples in the media over the past year which show that our society and language is still surprisingly male-orientated, and often it's lots of small things that stack up—words and phrases here or there may seem trivial but they serve to reinforce unconscious biases. I think the recent gender pay gap

Figure 5. Kim with colleagues in the control room of the MAST Upgrade experiment.



Figure 6. Kim appeared in a national careers film for the “Born to Engineer” campaign.



stories show that this isn't an issue which is specific to engineering but more the consequences of unconscious biases within our society which start to influence us at a surprisingly young age.

10. Why do you think engineering is often perceived as a “male” occupation or area of interest?

I think it's purely historical, it takes a long time to change societal norms. We still very much have a pink/blue divide when raising children and it will take a long time to change that.

11. The conversation around women in STEM subjects, engineering in particular, has been ongoing for some time. What more, in addition to existing initiatives, needs to be done in order to address the balance of women and men in engineering?

In my opinion, we need to more effectively educate teachers and parents. At the moment, many of them just don't know much about engineering, and that it's a creative and professional career path. The other side of the coin is that industry needs to now be actively adopting good practices and challenging its cultural norms in anticipation of an increased pipeline of women in the future.

12. Do you have any advice for young women starting out in engineering?

Always try hard, always believe in yourself, and always ignore anyone that tells you that you won't be good at something.

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