FUTURUM PODCAST

Transcript

Electronics Engineering with Professor Peter Gammon

Professor Peter Gammon is an electrical engineer and senior research fellow at the University of Warwick in the UK. Peter shares how he became an engineer and explains the difference between power electronics and electronics engineering.

01:07: I am a professor of power electronics at the University of Warwick. Power electronics is an interface between your computers and the energy sector, in general. How do we get energy from anywhere – renewable sources – and get it to your computers, your houses or electric vehicles? How do we make electric vehicles work? How do we make phones work? That's the kind of research I'm involved with in the University of Warwick.

01:45: **How is power electronics different from electrical electronics?**

Power electronics is about moving energy around. So, how do we get energy that we produce off in the North Shore in our renewable turbines to where we need it in our homes and electric vehicles? With more regular electronics, you might think about how fast your computer is going to be. How can we get more power for our laptops? How do we make our phones work? But, actually, we're talking about energy and how you move energy around. So, when we're trying to make electric vehicles, we'll store a lot of energy in batteries but we need to use those batteries in a motor, so the power electronics sits at the interface between that stored energy in a battery and the useful energy we're going to use, the electricity we're going to use in the motor.

02:42: **What did you want to be when you were younger and how has that evolved to your career currently?**

From a very early age, I wanted to do all sorts of things like most kids, like become a spaceman and an athlete – being a musician was a large part of my teenage years – but without any skills towards those. For as long as I can remember, I actually wanted to be an engineer, without having much of a definition of what an engineer was. I was always good at maths and from a young age I was told if you're good at maths, you can be quite good at being an engineer – you can make things, you can design things. I wasn't a kid playing about with radio sets and taking things apart. I just had this almost nebulous idea from a young age that I wanted to be an engineer. It was really the maths that drove that from a young age.

03:34: There were apprentices long before me, but at the time, when I was a teenager, there weren't many apprenticeships about. I finished school at 16. I didn't then go on to college and A-levels, but I went to work for a company, which was BAE Systems. I was learning how to do engineering, how to be an electronics engineer at day release in a college, and that gave me hands-on experience of how to work in a workplace, alongside the educational side. Now, these days, you have a whole wealth of what are called 'degree apprenticeships', where you can learn to be an electronics engineer. There are so many variations of engineer that you can take a degree apprenticeship almost straight out of school or college, depending on how the course is structured, and get hands-on experience of the workplace whilst also learning. The traditional routes of degree, college and university are one route, but that shouldn't be a barrier if you think, at 16 or even 18, that you'd rather stop the educational path and jump into a work environment. You can have this halfway house – do both.

05:07: After my apprenticeship, I then jumped into university. I actually changed path again. Never be afraid of changing path. I wanted to do one thing when I was 16 but, by the time I was 19, I wanted to go to university – I wanted to have that experience. I wanted to learn more, so I changed path at that point and went into the more academic route of university. But every route is available and you've got to think about what suits you best at the time, not worrying about too far in the future. You've got to think about what suits you at that point and potentially finding that path later.

05:54: **What would you say is more valuable, your education or your experience?**
Both, to give you the politician's answer! You need a foundation and I'm thinking from a very young age that the foundation that you get from English, maths and science is a cornerstone to everything. To be an engineer, you can't think that it's all about physics, chemistry and maths. You need English as well, to write reports. The underlying foundation of having good knowledge, a good solid base, is very important.
But then, I would say that later on, all that probably takes second priority to the experience that you get along the way.

06:42: People stress a lot about what degree to take and my philosophy is that it doesn't technically matter that much. It goes back to that point: do what you like. Do what interests you now because you can always jump into something else later. You can always retrain. What's important is that you go to university, and you get the experience, ... not just the piece of paper – this isn't box ticking – but get the ability to show that you can learn to a certain level, that you've got a way to think. You're learning ways of thinking. And similar with the apprenticeship, what that teaches you is a way to work. Nobody teaches you how to get out of bed in the morning and go to work! And then work and concentrate from 9 – 5. You don't learn that in a classroom. You don't learn about delivering something by a deadline or being answerable to a manager, so all of these are incredibly important life skills, which you don't learn at university. You learn around the outside of university or after university. So, both: you need the foundation, but you can't discount life experience. The university of life!

07:58: **What are some misconceptions that you've come across?**
Electronics engineering is sometimes seen as quite academic, unobtainable and overtechnical. You can broaden that out from electronics and electrical engineering to materials science and physics, because they all overlap. It's such a broad church that you could be doing something in semi-conductor devices as I do – we're in a clean room with our bunny suits on, making things with equipment. Or you could be writing programs. Or you could be working in JLR – Jaguar Land Rover – in a car factory designing new power systems. It's so diverse.

08:48: Another misconception is that it's something of a non-diverse workforce. Traditionally, it's a very male dominated area. This is changing, this is antiquated, this is the past. This is as irrelevant now as the Romans are! It's now a really diverse space where diversity is wanted, is needed, is essential, so your background should never be a barrier to being an engineer. Your abilities as you perceive them should not be a barrier either. If you're interested in TESLAs because they're cool, if you're interested in phones, if you're interested in programming and Raspberry pi and maths and all of that stuff, then you can do it.

09:55: **What advice would you give to students to start improving their life careers, starting now?**
I would honestly say, whether it's electronics engineering or science or anything else in life, just do those things that interest you. If you can afford to do so, if you've got access to it through school, I would start playing with things like Paspberry Pis, because they're fun, not because you want to learn something, or you're really dedicated to learning coding. It might be that you can get that Raspberry Pi to do something cool, like make some animations, play some games, do some simple stuff, just rewarding stuff that means you put in a bit of an effort and see the result. You might be getting a car to move around a track. Whatever it is, Raspberry Pi is a versatile thing you can play with. Just do it because you're interested in it and then take what comes later around that passion. That would be my advice.

11:02: The barriers are often not as high as you think they are. There is a route, there is a path. Things are not unobtainable. The mountains may be high, but there's always a route up them. You might start sitting here at 14, 16, thinking "How on Earth do I get to a job at 38 or 40?", but it's all a path. The barriers are not as high as you think!