EDITORIAL

FOCUS ON PHYSICS

Dr Scott Steedman

The UK needs 124,000 engineers and technicians every year to meet industry needs.

In the 2018 edition of its excellent report *The state of engineering*, EngineeringUK predicts an annual shortfall of nearly 50% in meeting this target. This challenge is not new. In 2012, the Royal Academy of Engineering's report *Jobs and growth* recognised a similar shortfall. Professor John Perkins CBE FREng, then Chief Scientific Adviser at the Department of Business, Innovation and Skills, reported in his 2013 *Review of Engineering Skills* that businesses were having to 'make do' with talent from other disciplines or from abroad.

A critical issue for the engineering profession in the UK is that too few women choose engineering as a career. EngineeringUK's 2018 report suggests that only around 12% of those working in engineering or related roles are female. This is at the bottom of the league table of European countries, where percentages closer to 20% are more common.

Studies show that young people are lost to engineering at each successive stage during their higher and further education. Perkins described this as a 'leaky pipeline' of talent that the nation could ill afford to lose. He made a series of recommendations aimed at encouraging young people to stay with engineering.

In January this year the Academy published a follow up to the 2013 Review, again led by Professor Perkins and supported by the wider professional engineering community. The 2019 report, *Engineering skills for the future*, recognises that there has been good progress in some important areas, such as the extraordinarily successful *This is Engineering* campaign on social media (see 'This is Engineering!' *Ingenia* 74). *This is Engineering* has now notched up more than 30 million views in the target age group of young people since January 2018. In addition, commitment from government and support from industry have transformed technical and vocational education, with substantial apprenticeship reforms, new T-level technical qualifications set for delivery in 2020 and new content in the GCSE curricula for computing and design and technology.

Yet one particularly fundamental barrier remains. The proportion of students studying A-level physics has risen slowly since 2012, from 7% to 8% of the annual cohort of boys and from 1.6% to 1.9% of girls, but these percentages remain well below the numbers for A levels in biology or chemistry. The continuing shortage of specialist teachers is an important factor and too few schools have suitably qualified physics teachers, but cultural issues among young people and their parents also affect the choice of A-level subject.

The good news is that last year maths was the most popular A-level subject in the UK and a healthy proportion (39%) of candidates are female. Down in the mid-ranks, physics sits alongside geography in popularity, ahead of sociology and behind art and design.

What sets A-level physics apart from these other subjects, including biology and chemistry, is that it is dominated by boys. Fix that: get girls into physics, and a significantly larger and more diverse pool of talent will open up that may become inspired to choose engineering as a career.

The profession has done much of the homework already. The report from the Institution of Mechanical Engineers, *Five Tribes: Personalising Engineering Education*, published in 2014, described the different audiences that need to be reached. More than 600 organisations are running initiatives to inspire young people and interest them in a scientific or engineering related career, so there is no shortage of volunteers (although there is an urgent need for more coordination). The introduction of a 'careers leader' in schools in England as part of the *Careers Strategy* published in 2017 by the Department for Education is also a welcome development.

However, above all our campaigns and communications should focus on physics. With the exception of physics, science subjects have successfully attracted female students. Making physics as attractive for girls as biology or chemistry could deliver rapid success, even break the mould, as *This is Engineering* has demonstrated can be done. The sky is the limit. Look no further than the recent announcement of the promotion of Air Marshal Sue Gray CB OBE FREng, to become the most senior female military officer in the British Armed Forces (see page 41), to see what's possible when inspiration calls.

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