

# Response to the Innovation, Universities, Science and Skills Committee inquiry into engineering

## 1. Key Points

- For engineering to thrive in the UK, it is vital that the country has a strong science and maths base.
- The number of UK-domiciled students at undergraduate and postgraduate level in engineering has remained broadly static over the last ten years, at a time when student numbers generally have increased significantly.
- It is important that the different areas of engineering are able to work well together.
- Engineers are vital to the success of the UK's economy, and to our ability to innovate successfully.
- The Royal Society itself is taking a series of practical initiatives to promote engineering and engineering-based innovation in the UK.

## 2. The UK science and engineering base

For engineering to thrive in the UK, it is essential that the country has a strong science and engineering base. It is vital that sufficient numbers of people choose to study STEM subjects, including engineering, at university level.

## 3. Higher education trends in engineering

Our reports *A degree of concern?* and *A higher degree of concern* analysed trends in STEM subjects at higher education level in the UK. The analysis of engineering subjects revealed that during the period 1994/95 to 2004/05 the number of both first degrees and masters degrees awarded to UK-domiciled students in various engineering subjects remained fairly static. This is in a context of an increase of over 20% in the total numbers of first degrees awarded to UK-domiciled students in all subjects, and an increase of 65% in the number of masters awarded. PhDs awarded in engineering over the period were more volatile, however by 2004/05 numbers were broadly similar to 1994/95. Again, this was in the context of a rise of 63% in the number of PhDs in all subjects. Engineering therefore has not experienced the growth that some other subjects have seen.

UK higher education in engineering is highly international, with many non-UK students choosing the UK as a destination to study engineering. Compared to other subjects, engineering has one of the highest proportions of non-UK students at both undergraduate and postgraduate level. In civil engineering for example, in 2004/05 non-UK students accounted for 31% of undergraduates, 69% of masters graduates, and 59% of PhD graduates. The UK is clearly globally competitive in terms of attracting overseas engineering students to the UK, and the UK benefits greatly from this. However, an obvious follow-on issue that must be tackled is why some engineering courses are not as successful at attracting similar levels of demand from UK students.

## 4. Diversity

Engineering is diverse, comprising many different disciplines – including civil engineering, chemical engineering, pharmaceutical engineering, electrical engineering, structural engineering, and computing engineering. For engineering to have as strong an impact as possible it is important that these different areas within engineering are able to operate well together when necessary.

## **5. Innovation**

The value of engineers is increasingly recognised in all sectors of the economy, from traditional and high value manufacturing to economically important service industries, and cutting-edge areas such as biotechnology. The expert advice offered by engineering consultancy services is vital to major infrastructure and development projects in the UK and abroad. Engineers are highly prized by employers in non-engineering sectors because they offer particular skills. Engineering is highly applications-focused, which, for example, makes engineers particularly attractive to City employers for their highly developed problem solving and analytical skills. Elsewhere, their understanding of design principles in the development of processes and solutions makes them desirable to business services providers. Engineers are therefore contributing to the UK's overall innovation performance in a range of settings, in both STEM and non-STEM fields. They are playing an important role in the economy and society.

## **6. The Royal Society and engineering**

Since its foundation in 1660, the Royal Society has always been strongly committed to promoting the application of scientific knowledge. This remains a core value. For example the Society has recently established an Enterprise Fund to provide funding for the crucial early stages of commercialisation. The fund aims to support innovation and very early stage high risk research with potential for breakthrough discoveries and commercial application. The fund will be run on a commercial basis and will leverage the Society's unique advantages, including the outstanding technical and scientific network, the extensive policy activity and the flexible time horizons for investment. Engineers also take an active part in many Society schemes, for example our University Research Fellowship (URF) programme, conference grants and the Industry Fellowship Scheme.

The Society hosts an annual 'From labs to riches' event, aimed at promoting innovation and wealth creation in science, engineering and technology amongst a mixture of academic entrepreneurs, financiers, journalists and prominent industry figures.

We are taking specific steps to encourage actively the nomination of excellent engineers for election to the Society: candidates based in industry may require special attention.

We would welcome the opportunity to work further with the IUSS committee on any of the issues raised in this response.

## References

Royal Society (2006) A degree of concern? UK first degrees in science, technology and mathematics. Royal Society: London.

Royal Society (2008) A higher degree of concern. Royal Society: London.

Any enquiries about this submission should be addressed to:

Nicola Berkley, Science Policy Section, The Royal Society, 6-9 Carlton House Terrace, London, SW1Y 5AG

Email: [Nicola.berkley@royalsociety.org](mailto:Nicola.berkley@royalsociety.org) Tel: +44 (0)20 7451 2219 Fax: +44(0)20 7451 2692