

Our year so far...

Events

- Annual Congress 2015 hosted by the University of Salford
- Annual Recruitment and Admissions Forum

20th Anniversary Student Awards

Congratulations to winner Tim Butterfield of the University of Sheffield and runner-up, PhD candidate Adrian Mallory of the University of Edinburgh.

Submitted responses and evidence to:

- Royal Academy of Engineering's Dowling Review of Business University Collaboration
- Department for Business, Innovation and Skills' consultation on Postgraduate study
- House of Commons Science and Technology Committee's inquiry on the science budget
- HEFCE's consultation on : Future Approaches to Quality Assessment
- Department for Business, Innovation and Skills' Inquiry into quality assessment in Higher Education
- House of Commons Science and Technology Committee's inquiry on the influence of EU membership on UK science

Published

A report (in collaboration with the Campaign for Science and Engineering) on the role of EU membership on UK science and engineering research – more of which on page 2.

Currently underway

- Working groups on developing new models in contextual learning in response to Perkins Review recommendations
- Developing a position statement for the Teaching excellence Framework proposals
- Participating in grant award panel for HEFCE Conversion funding pilot



this issue

President's report **P.1**

New report – the role of EU membership **P.2**
in science and engineering research

Spending Review 2015 **P.3**

Recruitment and Admissions Forum **P.3**

IMEchE Design Challenge **P.4**

Working with the engineers of the future **P.5**

Addressing the Engineering Skills Challenge **P.6**

Future events and membership round-up **P.7**

President's Report

It's been an eventful few months in the UK university sector since I took over as President at our very successful [annual Congress at the University of Salford's Media City](#) site in April. A major topic of discussion was as you might expect ...the REF (I was a panel member, along with EPC Committee colleagues Professors Alison Hodge, Sarah Spurgeon and Tony Unsworth, and so we were able to share our insights and experience). We also welcomed back Professor John Perkins to update us on progress with the implementation of the recommendations of his 2013 Review – more of which later. Our student prize, which we award at Congress and give the winners the opportunity to present their work, was again popular this year and I'm delighted to say we're repeating it in 2016, supported again by the Incorporation of Hammermen of Glasgow – please do encourage your students to enter – the closing date is 11th April 2016 and full details are available on the website.

Next year, we will be holding two major events: we will be separating our Annual General Meeting from Congress, with the AGM being held on 6th April in London and Congress in September (5th/6th) in Hull. The theme for Congress will be 'Art and Engineering' and will coincide with the Amy Johnson Festival commemorating 50 years since the death of this pioneering aviator. We'll be in touch with the details in due course.

Back in science policy world, there seemed little rest for civil servants over the summer when we, in common with our network of HE representative groups seemed to be dealing one major consultation per week – sometimes more! Of particular interest to us were the House of Commons Select Committee Inquiry on the Science Budget and the HEFCE Quality Assessment consultation to which EPC responded on behalf of members (we're always grateful for your input and you can read our submissions here: <http://epc.ac.uk/responses-to-consultations/>). These were, however, but a mere rehearsal for the Green Paper and the Chancellor's Autumn Statement. The Green Paper contains news of the much-anticipated Teaching Excellence Framework and the EPC's Engineering Education, Employability and Skills sub committee has been leading a number of internal consultations with members with the aim of developing a position on this important issue. There's still time to have your say and you may do so here: <http://epc.ac.uk/the-teaching-excellence-framework-tef-have-your-say/>

As I mentioned earlier, progress with the Perkins recommendations continues with a number of EPC Committee members leading work on areas ranging from incorporation of work experience into degree programmes and the implications for professional accreditation to working with UCAS and others on the provision of better information for teachers and schools.

My very grateful thanks to Simon Hodgson for leaving the Council in such good shape – new members, new projects and an even stronger profile – and our congratulations as he takes up his promotion to Pro Vice-Chancellor (Research and Innovation) at Teesside University. It only remains for me to say that I'm very much looking forward to a strong turn-out at our Annual General Meeting in April, when I will have the honour of presenting this year's President's Prize for outstanding contribution to engineering education to Professor Sir William Wakeham who will be sharing with us his hot-off-the-press recommendations from his review of STEM degree provision and graduate employability. Until then, may I wish you a restful Christmas break.

Professor Stephanie Haywood

In September, Dr Joanna Scales joined the EPC and CaSE on a 3 month policy internship to explore the role of membership of the European Union on UK science and engineering research

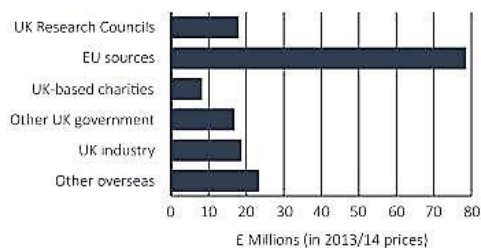
Said Joanna, the report contains evidence and insight gained from our data analysis and interactions with the science and engineering community. We also used the report to make our contribution to the House of Lords Inquiry into EU membership and UK research – the first of the evidence sessions was being held as we went to print with this newsletter - and we will watch with interest to see the outcomes of the inquiry.

“Ahead of the UK’s upcoming EU referendum, we hope that this report will add to the growing body of research on the role that EU membership plays in UK science and engineering research. This role is complex, ranging from the funding the EU provides for UK research through to the reach and impact that is facilitated through ease of movement of skilled people and industry-university collaboration.”

Dr Joanna Scales, EPC-CaSE policy intern

Examining the figures, overall, the UK is a net contributor to the EU, but it is a net receiver of EU funding for research; receiving €8.8bn between 2007 and 2013. Moreover, the importance of EU funding to research is growing (Figure 1), with half of the increase in UK university engineering research funding over this period coming from EU government sources. In an environment of

Figure 7. Contributions to the increase (£164.1m) in engineering research grants and contracts income to UK HEIs 2007/8 - 2013/14



financial strain it is clear that the EU has provided a valuable source of funding for a sector which provides a significant contribution to the resilience of the UK economy and to the benefit of the wider public. As part of this project we also conducted a survey to capture the views of the research community. We were delighted with the number of responses we received: many thanks to those EPC members who contributed. The results of the survey were overwhelmingly positive, with 93% of all respondents agreeing that EU membership benefits UK science and engineering research. The report finishes with a number of case studies which really bring the numbers to life. Sincere thanks go to colleagues from the universities of **Kent, Leicester, Aston, Plymouth, Birmingham and Coventry** for sharing their experiences.



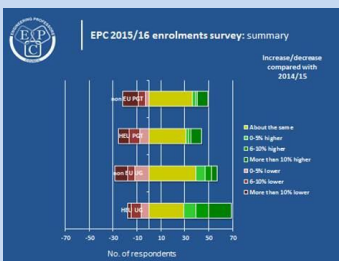
The report in short...

- The UK receives a significant amount of money (€8.8bn between 2007 and 2013) from the EU for science and engineering research.
- Some regions of the UK are more dependent than others on EU funding to maintain research capacity and infrastructure, and as a result could suffer disproportionate adverse impacts if this source were to be withdrawn.
- The ability to attract academic staff to the UK through free movement of labour is important, particularly in science and engineering.
- The role and benefits of EU membership to UK research is considered by researchers to be broader than just the funding for research that EU projects bring to the UK. The improvement in quality, reach and impact, facilitated by EU collaboration and coordination, helps to solve “Grand Challenge” problems in a way that would be much harder for any one country to achieve alone.
- Engineering received 15% of all research grants and contracts to UK HEIs, but 20% of the funding from EU sources, in 2013/14.
- The income to HEIs through research grants and contracts for engineering research increased by 22% between 2007/08 and 2013/14. Nearly half (48%) of the increase in income for engineering research can be attributed to EU sources.
- Considering ALL subjects, 8.5% of academic staff on fixed term contracts were funded by EU government bodies, and 2.1% by other EU sources but in engineering, EU funding appears to be particularly important as 18% of FTE engineering academic staff on fixed term contracts were funded by EU government sources and 4% by other EU sources.

EPC Enrolments Survey 2015/16

Another fantastic response to our call for early enrolment numbers – this year 62 member institutions responded covering 91 engineering departments.

What the survey told us was slightly less encouraging – if not unexpected – particularly in respect of postgraduate student numbers given that 2015/16 is the first year that undergraduates who had paid £9k tuition fees would have been available to study at Master's level. Over four fifths of respondent departments said that their postgraduate (taught) intake was about the same or lower than for 2014/15 (for both home and overseas students). Nearly a fifth said their postgraduate overseas student numbers were more than 10% lower. That said, Russell Group institutions seem to have been more resilient to this downturn, particularly in relation to overseas postgraduate students, with over three quarters reporting an increase or "about the same".



Members can access the full survey presentation (along with the other presentations from the Recruitment and Admissions Forum) at: <http://epc.ac.uk/recruitment-and-admissions-forum-2015/> and access all the latest data on applications and student numbers at: <http://epc.ac.uk/services-2/>.

Spending Review 2015

Among the headline figures, the Government has committed to protecting the £4.7 billion science budget in real terms up to 2019/20.



25th November saw the much-anticipated revealing of the Chancellor's Autumn Statement and the announcement that the government will protect the £4.7 billion science budget in real terms over the Parliament – good news. Also for higher education:

- HE maintenance grants will be switched to loans
- There will be real terms protection for the overall budget for STEM subjects in higher education and also for STEM subjects, tuition loans will be extended to students wishing to do a second degree from 2017-18.
- The government will provide new financial support through maintenance loans for part time HE students, tuition fee loans for higher level skills in Further Education and new loans for postgraduate Master's degrees

Of particular interest to engineers:

- Support will be provided to secure launch funding to create a new [university in Hereford](#) focused on engineering in 2016
- Commitment of £18 million to the Excellence in Precision Agriculture Innovation Centre, which will be partly headquartered in Shropshire. This will be one of four agri-tech centres, which will develop new engineering technologies to increase the productivity and sustainability of UK agriculture

[For more – see the Universities UK blog](#)



Recruitment and Admissions Forum 2015

The annual Recruitment and Admissions Forum took place at the Institution of Mechanical Engineers on 11th November convened by Professor Mike Bramhall from Sheffield Hallam University.

Colleagues from Primary Engineer, IMechE, the Baker Dearing Trust and Sheffield Hallam University joined delegates to share details of their activities to encourage the study of engineering. We then spent some time considering the emerging routes and alternatives to the "traditional" undergraduate degree, ably stimulated by a presentation on Higher Apprenticeships at JCB, given by Miles Pixley, JCB's General Manager - Technical and Professional Development. This was followed by an update on the Royal Academy of Engineering's Engineering Talent Project presented by Dr Rhys Morgan and Fiona Samson. Last but by no means least, Dr Geoff Parks of the University of Cambridge and Chair of the EPC's Entry to Engineering in HE Advisory Panel gave a presentation on numerous and complex changes planned across the devolved administrations on Entry Level Qualifications. As is customary now, Executive Director Susan Kay delivered a presentation on the results of the EPC's 2015/16 early survey of enrolments (both postgraduate taught and undergraduate) to engineering at member institutions. You can see a summary of the results in the panel and the presentations of all the speakers may be downloaded from the Members' Portal on the website.

Institution of Mechanical Engineers Design Challenge Final, 2015

A thrilling day of competition took place between seven universities at One Birdcage Walk on Friday 2nd October 2015. Four regions were represented by teams of students from Southampton, Teesside, Sunderland, Central Lancashire, Liverpool John Moores (LJMU), Brunel and Middlesex universities in the final of the IMechE Design Challenge.

According to a strict technical brief, each team had designed and built a device to climb a pipe carrying a section of chain (an increasing load) and descend in the fastest time. After scrutineering, scores for this dynamic test were accompanied by those awarded for a design review and each team's poster and presentation. In a dramatic photo-finish between Liverpool John Moores University (LJMU) and Teesside University, LJMU emerged victorious. The team was presented with the David Ball Trophy, named after the founder and Chairman of the Design Challenge.

Dr David Ball CEng FIMechE Eur Ing, who posed questions to teams at the final along with Dr Colin Brown, IMechE Director of Engineering, explained the premise of creating a mechanical engineering competition for first-year students:

"We set up the IMechE Design Challenge to complement university education, and because first-years lacked a tailored IMechE competition to engage with. The Challenge provides an opportunity for practical application of the theoretical knowledge that students gain at university. We want to encourage graduates to be people who can think for themselves, and find effective engineering solutions when faced with a challenge or problem."

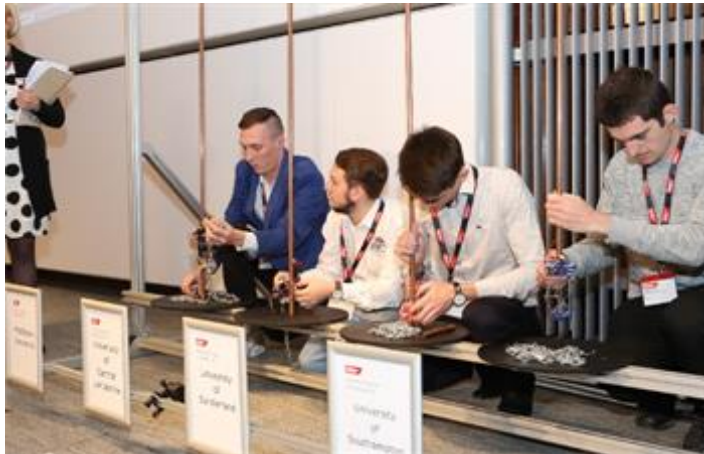
Members of the winning team from LJMU, Huw Davies-Cooke and Jamie Bowers, said, "The competition required us to be creative and think outside the box. We will need such skills to solve the engineering problems that we will face in our careers. Also, we were pushed out of our comfort zones, doing a formal presentation in front of the other universities, judges and members of industry, to justify our decisions and calculations. We really enjoyed the competition socially and academically, and also observed how people from other universities approached the same problem but with different outcomes."

The judges included Dr Helen Meese, IMechE Head of Engineering in Society and Neil Hinchliffe, Business Development Executive and Defence Liaison Officer. Dr Jack Mullett, Senior Lecturer, Department of Maritime and Mechanical Engineering, Faculty of Engineering and Technology, LJMU, was the team's academic supervisor. He said the Design Challenge provides "an excellent learning experience for all those who participate". He praised the technical ambition of the competition, as well as the demands of the design, presentation and poster, and the value of peer-to-peer learning and teaching across teams and regions, adding:

"I believe that this is all part of being a great engineer: the ability to take on difficult or unsolved engineering problems that require the application of fundamental scientific principles and theoretical understanding. Then figuring out how everything works together in the system through an engineering design process to produce real, unique, practical and reliable solutions."

David Ball continues to work hard to extend the reach of the Design Challenge. More UK regions will be taking part in the 2016 regional heats, enabling additional universities to participate. David said that the winners of regional heats displayed a consistently high standard, but that making mistakes simply provided further opportunities for learning.

"When you speak to the teams after the event, when you ask them if they could start again with the benefit of hindsight, you find that they have observed and gained knowledge from their actions and choices. If they had the chance to do it again they would do things differently – and that's learning."



The IMechE Design Challenge

The Institution of Mechanical Engineers run a Design Challenge for first year Engineering Undergraduates which simulates the requirements of a professional Engineer and helps them to learn how to apply the knowledge they are absorbing at University. There are Regional Competitions each year and the winning team from each Region compete in the National Competition.

Since it began in 2007/2008 it has grown considerably and there are now 8 regions of the UK involved with some 30 Universities participating, and it is also taking on an international dimension. Earlier this year the first Design Challenge in Shanghai took place, which is due to be repeated in 2016.

"We want to encourage graduates to be people who can think for themselves, and find effective engineering solutions when faced with a challenge or problem."

The competition is open to teams of up to five 1st year engineering students and introduces them to problems where the solution is limited by both cost and time. It also encourages team-building and exposure to the real world of engineering.

A competition for second-years is being piloted in the Greater London Region in March 2016. Following feedback from that event, it is expected to be rolled out nationwide.

If your university is not yet involved, you can find out more about the IMechE Design Challenge at
<http://www.imeche.org/knowledge/industries/manufacturing/design-challenge-competition>

Starting them young...

Recognising that many young people in the UK don't really know what an engineer is and have not considered engineering as a career option, Dr Emma Carter, who has just secured her first lectureship at Sheffield Hallam University, set about making her contribution to fixing the problem...

As one of the 2014 winners of the [EPC's public engagement award scheme, Engaging in Engineering](#), Emma has now completed a series of 11 short films which feature real engineers explaining some fascinating areas of engineering.

“The aim of the films is to encourage children, especially young women, to consider engineering as a career and can be used in schools as lesson starters, at home or as material for university engineering outreach events. They're aimed at older primary school (Key stage 2) and younger secondary school (Key stage 3) but a lot of adults seem to enjoy watching them too!”

Each film is between 3 and 5 minutes long. They are freely available to view, embed into another website, or download from the following links:

YouTube
<http://bit.ly/1P2mOKc>

Vimeo: good for downloading
<https://vimeo.com/engeniustfilms>

Facebook: good for spreading the word— just hit Share !
<https://www.facebook.com/EngeniustFilms>

Twitter: @EngeniustFilms will tweet new film uploads and related re-tweets

As the **Scottish Engineering Special Leaders Award** opens its doors to entries for the fourth successive year, The Leaders Award and the **University of Strathclyde's Department of Mechanical and Aerospace Engineering** have teamed up to showcase to children aged 5-19 how their ideas can become reality through the engineering process. The Scottish Engineering Special Leaders Award asks children to respond to the question: “If you were an Engineer in Scotland, what would you do?” Having researched engineering and interviewed a professional engineer, participants find a problem and offer their solution – writing a ‘Pitch’ letter to support their entry.



Final year MEng students at the University of Strathclyde must complete a group project, working with a client to agree a brief, often to design and manufacture something for a specific purpose. This project is designed to assess both how the students work together, and also with a third-party, as well as their ability to plan and deliver a complex project.

For the first time this year, The University of Strathclyde has been able to offer a project working with The Leaders Award, one of the [Primary Engineer Programmes](#). Having chosen this project, five students from the Department of Mechanical and Aerospace Engineering have been tasked with selecting, developing, and manufacturing one of the ideas from last year's competition, ready for a grand unveiling at the awards evening of The Scottish Engineering Special Leaders Award 2016. Throughout the project, the students will engage with a variety of audiences, complementing presentations to pupils, parents and industry with regular online updates across social media and via a dedicated area of [The Leaders Award website](#). A key challenge and development opportunity for the students is the need to explain the design process to school children in an engaging way. This will hone their communication skills and give them an opportunity to explore innovative ways to communicate what inspires them about engineering to a varied audience.

If you want to find out more about Primary Engineer and its range of programmes or find out about how you or your students can get involved email: info@primaryengineer.com



EPC 20th Anniversary Student Awards 2016 in collaboration with the Incorporation of Hammermen of Glasgow

As Steph said in her President's Report, we're once again offering our student prize for 2016. Your representative should have received details. Please do encourage your students to enter (there's both a team and an individual prize). More details from:

<http://epc.ac.uk/20th-anniversary-awards-2016-back-to-the-future/>

An engineering deep dive: addressing the Defence Engineering Skills Challenge

Recognising the criticality of the situation, the Defence Board, in the latter part 2014, instituted a review of engineering across the four services, the so called 'Engineering Deep Dive.' The Deep Dive identified numerous activities related to engineering across the four services; however, further work was required to improve co-ordination of this activity. More could be done by Defence to inspire young people in the study, of STEM subjects recruiting performance could be improved, and more done to retain personnel once recruited. Greater effort was also required in ensuring that the make-up of the services represents the society we serve, which coupled with the right inspiration could go some way to addressing the skills shortage. In order to take forward these recommendations a Defence Engineering Champion, Air Vice-Marshal Julian Young, was appointed, supported by a quad-Service team of six. The work of the team is broken down into six work-streams covering the employment cycle and beyond of our engineers: attract, recruit, train, develop, retain and

"The STEM skills shortage is now well known; however, its impact upon Defence may be less well understood. The challenge to Defence is compounded by myriad factors: nationality requirements, physical fitness, security clearance, and leadership ability, all resulting in a reduced pool of talent from which we can draw."

transition. The "attract" work-stream seeks to inspire young people to study STEM subjects irrespective of whether they are later employed in Defence. Having identified and shared good practice we are in the final throes of completing the Defence STEM Engagement Strategy which aims to increase support by Service personnel for STEM activities in consort with our strategic partners: **STEMNET, Tomorrow's Engineers, and Primary Engineer**. Other activities have been focused on a review of engineering governance, identifying the measures in place, sharing good practice and identifying the gaps. The past few years has seen a push to 'professionalise' our engineering cadres through greater emphasis on the attainment of professional registration. Originally financed by the individual, the plan is for the services to pay for these in the future. Additional work, currently in the conceptual phase, is focused on a **Defence Skills Passport** aligned with a more flexible career pathway, allowing personnel across the Defence Enterprise – military, civil servant, industry and academia – to pursue more diverse careers in the future, where employment in one part of the enterprise is subsequently recognised within the others. There's still much more to be done. For example, we will be undertaking a comprehensive review of the Defence Technical Officers and Engineer Entry Scheme and reviewing our policy with respect to the employment of engineers in the Reserves. We have initiated research in order to better understand the motivations of our Service engineers: why they joined, what their motivations are, and what we can do to keep them in the Service for longer? Meanwhile, work related to the train, develop and transition workstreams are yet to be fully scoped. While we will not have addressed all of the issues in the currently funded two year life of the team, our aim is to have laid the foundations required to deliver a resilient, agile, engineering human capability to meet the Defence requirements of the future.

We know that many EPC members are involved in defence engineering research and of challenges associated with that, particularly in relation to recruitment of staff and students. Wing Commander Andy Willis C Eng FIMechE of the Defence Engineering Champion's Team talks about the impact of a shortage of engineering talent on the armed services...and what they're doing about it...



Perkins Review of Engineering Skills

It's now just over two years since Professor John Perkins published his review of engineering skills and established four task and finish groups to take forward his recommendations.

The EPC has been leading on a number of the recommendations arising and we were delighted to be acknowledged by the Minister for Higher Education, Jo Johnson in response to a question in the Commons in the summer:

"Employer engagement in higher education is also a matter for the engineering sector itself and I applaud the initiative shown by the engineering profession, in particular through the work of Education4Engineering and the Engineering Professors' Council. Both...have brought engineering employers and universities to work together in response to the Perkins Review of Engineering Skills, for example to improve the visibility of employers on campus to ensure that students are aware of the exciting opportunities available in the engineering sector."

Our work continues, particularly on developing and sharing innovative approaches to contextual learning and this is being carried out through two task groups led by Professors Simon Hodgson and Mike Sutcliffe.

We were also pleased to see in September, the [results of the HEFCE postgraduate funding pilot](#) and will be going to share excellent results of the engineering-focused programmes it encompassed.

Get involved...



...there's a number of ways in which you can get involved...

Higher Education Green Paper

You still have until 8th January to have your say on the proposals contained in the HE Green Paper published back in November. In particular, if you have views on the Teaching Excellence Framework, please let us have them at: <http://epc.ac.uk/the-teaching-excellence-framework-tef-have-your-say/>

Vacancies on Committee for 2016/17

There will be two positions on the EPC Executive Committee coming up for election in April. Please do consider standing and play a part in shaping our future. For details of how to put forward a nomination, please see <http://epc.ac.uk/our-committee/>



Date	Venue	Location	Notes
13th January, 2016	PHEE/ PHOMME (EPC Sectoral Groups) Joint Conference	IET, Savoy Place	Mechanical and electrical/electronic sectors To register: http://epc.ac.uk/phee/
6th April, 2016	Engineering Professors' Council AGM	Senate House University of London	All welcome

Members

The following universities/organisations are all current members of the Engineering Professors' Council. For university members, membership provides all academic staff in engineering departments with access to EPC resources and initiatives. Our team of only 2 part-time but highly flexible staff collaborate with you and a whole host of other organisations to ensure we're delivering value for your subscription. If you have ideas about other information and support you'd like to receive from us, please let us know.

Royal Academy of Engineering
University of Aberdeen
Aston University
Bangor University
University of Bath
University of Bedfordshire
Queen's University of Belfast
University of Birmingham
Birmingham City University
Bournemouth University
University of Bradford
University of Brighton
University of Bristol
Brunel University
The University of Cambridge
Cardiff University
University of Chester
City University
Coventry University
University of Derby
University of Durham
University of East London
University of East Anglia
Edinburgh Napier University
University of Edinburgh
University of Essex
University of Exeter
Glasgow Caledonian University
The University of Glasgow
Glyndŵr University

University of Greenwich
Harper Adams University
Heriot-Watt University
University of Hertfordshire
The University of Huddersfield
The University of Hull
Imperial College of Science, Technology and Medicine
Keele University
The University of Kent
Kingston University
The University of Lancaster
Leeds Beckett University
The University of Leeds
The University of Leicester
The University of Lincoln
The University of Liverpool
London South Bank University
Loughborough University
Manchester Metropolitan University
The University of Manchester
The University of Newcastle-upon-Tyne
The University of Northumbria at Newcastle
The University of Nottingham
The Nottingham Trent University
The Open University
Oxford Brookes University

The University of Oxford
The University of Plymouth
The University of Portsmouth
Queen Mary University of London
The University of Reading
The Robert Gordon University
The University of Salford
Sheffield Hallam University
The University of Sheffield
The University of Southampton
Southampton Solent University
University of South Wales
Staffordshire University
The University of Strathclyde
The University of Surrey
The University of Sussex
Teesside University
University of Wales, Trinity St David
University of Ulster
University College London
The University of Warwick
University of the West of England, Bristol
The University of the West of Scotland
The University of Westminster
The University of Wolverhampton
The University of York

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