



Engineering Professors COUNCIL

The voice of engineering academics

Annual Review May 2019

@EngProfCouncil

President's Report Professor Sarah Spurgeon OBE

IT HAS BEEN another busy year for EPC in what continues to be an uncertain landscape. The shockwaves of risk and opportunity following the Brexit referendum continues to shake us. We are still awaiting the outcome of Philip Augar's post-eighteen review of education which has focused on choice, value for money, access and skills provision. The need for EPC to represent the views of the entire engineering community within HE has never been more crucial.

One of the important ways in which we represent the community view is via our response to consultations. This year our work has included preparing responses to the Engineering Council's five-yearly Standards Review consultation, the Home Affairs Committee Post-Brexit migration policy inquiry, the OFS consultation on their new approach to regulating access and participation in English higher education, Research England's consultation exercise on the Knowledge Exchange Framework (KEF), the Department for Education's request for views on the Teaching Excellence and Student Outcomes Framework (TEF) and preparing an engineering subject community response to the REF 2021 draft Panel criteria publication.

We also lobbied the All Party Parliamentary Group on Diversity and Inclusion in STEM about the critical need to eliminate equality gaps in STEM education and we're working on a collaborative response across engineering to the Immigration White Paper.

We could not do this work without your support and we are well aware that members are extremely busy and that frequently time for responses is tight. I'd like to take this opportunity to thank you all for your support with this particular area of EPC work. The sheer volume of work being led from what is a relatively small EPC Executive Team is exceptional and I would also like to take this opportunity to thank our team who, under the excellent leadership of Chief Executive Johnny Rich, deliver so much to our cause.

EPC also seeks to provide our community with the data required to assess the position of engineering whether at national, institutional or departmental/school/faculty level and hence inform evidenced based decision-making. Our well established Engineering Enrolments Survey enables us to be agile, as the data gives a snapshot of the position across the community



As a community, we've developed a roadmap to ensure engineering in the future is more attractive, more inclusive and produces engineers that are fit to exploit future challenges and opportunities.

long before national figures are disseminated.

Our work in the data area this year has had an important focus on evidencing potential impacts on engineering HE research income following any Brexit outcome. We launched a briefing paper together with a wealth of exclusive data, broken down by regions and engineering disciplines. This is just one element of our on-going campaign to ensure the best possible prospects for our members whatever the outcome of Brexit.

The EPC has been leading the HE section of the *Perkins Review 2.0: A landmark report, Engineering Skills for the Future*, also known as 'The 2013 Perkins Review revisited' which was

launched on 30 January 2019 in the House of Lords. This work, led by the Royal Academy of Engineering and nicely timed to align with the highly successful Year of Engineering, revisits the 2013 Review of Engineering Skills by Professor John Perkins FREng. The new paper is the engineering profession's independent consideration of what has been achieved since the original report and what remains to be done. It highlights how the whole education system simply cannot produce sufficient engineers to support the UK economy. Numerous recommendations for government are made including relaxing the rules on how the Apprenticeship Levy may be spent, addressing the shortage of skilled teachers, and ensuring engineering higher education is well resourced and attractive to applicants in the event of changes to student funding.

The report specifically recommends that the UK must remain part of international partnerships to continue to attract students from the EU and the rest of the world and should extend opportunities for graduates to stay and work in the country after their studies. It also emphasises the need for top-up grants for engineering courses in the event of any cuts to tuition fees.

These findings chime with many of the themes to which the EPC has devoted our efforts. We continue to pursue our New Approaches to Engineering Education initiative, on which we are pleased to be collaborating with the IET. As a community, we have developed a roadmap to ensure engineering in the future is more attractive, more inclusive and produces engineers that are fit to exploit future challenges and opportunities. Further details are included in this Annual Review.

Many of our work strands will be reinforced within EPC Congress 2019 to be held at UCL from 13-15 May 2019 where our theme is 'Engineering change'. I shall look forward to seeing representatives of many of our EPC members at this event.

The EPC continues to go from strength to strength and I am enormously grateful to both the EPC team and the wider membership for their support during my term of office. I wish the incoming President Colin Turner every success and I am confident that we will see EPC further increase its influence and effectiveness in representing the views of all engineering academics moving forward.

The year at a glance

2018 was the Government's Year of Engineering and the start of RAEng's 'This is engineering' campaign. Sam Gyimah and Chris Skidmore became the fourth and fifth HE ministers in 5 years. The Government committed to raising R&D spending to 2.4% of GDP.

EPC events this year

- MAY 18: Annual Congress 2018 Fit for the Future, Harper Adams
- MAY 18: New Approaches to Engineering in HE: academic roundtable
- SEP 18: Engineering Ethics conference
- SEP 18: 'Experience Enhanced' launch: degree apprenticeships report
- OCT 18: New Approaches to Engineering in HE: Policy roundtable
- NOV 18: Recruitment and Admissions Forum
- NOV 18: New Approaches to Engineering in HE: Case Studies launch at Welsh Assembly
- FEB 19: New Approaches to Engineering in HE: Case Studies launch at The IET

Initiatives & campaigns

- Degree Apprenticeships
- New Approaches
- Brexit
- Engineering ethics
- Accreditation
- Engineering skills

Representation

Campaigns and consultation responses (some in collaboration with E4E):

- USS strike statement
- Subject-level TEF
- DfE Review of Post-18 Funding
- Women in eEngineering
- Engineering Standards: UK-SPEC
- REF 2021
- OfS: Access & Participation
- UKSCQA Degree Classification
- OFSTED Framework for Inspection
- APPG on Diversity and Inclusion in STEM
- KEF
- Teaching Excellence and Student Outcomes Framework

Annual Congress 2018: Fit for the Future

Congress 2018, hosted by Harper Adams University, boasted not only high-profile speakers like Dame Ann Dowling, but also comedy from Materials Engineer, channel swimmer and stand-up Anna Ploszajski. Not only did we hear about cutting developments in Agritech, we got to play with them too: exploring Harper Adams' world-famous 'hands-free hectare' and driving the latest and most robust off-road vehicles.

The speakers were enthralling, the networking was warm and lively, and the venue was surpassed only by the wonderful weather.

Congress 2018 was officially opened by EPC President, Professor Sarah Spurgeon. She urged that engineering HE should not invite others to "come and join us in our engineering box" but instead, we should "stamp down on the very edges of that box".

The theme of adaptation held through the three key pathways to practice: engineering education, working with industry, and accreditation. The line-up of speakers included land-speed record-breaker Sir Richard Noble, Harper Adams Vice Chancellor David Llewellyn, Towards Vision Director Dawn Bonfield MBE, Engineering Council CEO Alasdair Coates, CEO of Engineers without Borders UK Katie Cresswell-Maynard, Research England's Hamish McAlpine who is leading the Knowledge Exchange Framework project and many, many more.

The highlight of the Congress Dinner was the award of the EPC President's Prize to Dame Professor Ann Dowling, President of the Royal Academy of Engineering. The EPC also awarded the Hammermen Prize to Harper Adams student Jonathon Glen who, as well as excelling in his studies, has built a rally car with fellow students



which he drove to Mongolia in aid of mental health in farming.

The Congress also included the EPC's Annual General Meeting where the EPC adopted a Diversity & Inclusion Policy and elected our next President, Professor Colin Turner (University of Ulster). He closed the Congress proceedings before delegates at last embarked on a tour of the world's first Hands-Free Hectare.

Degree apprenticeships

Over the past couple of years, EPC members have made it clear that the EPC has an important role to play on the issue of degree apprenticeships: supporting members who are providing them and challenging the government and other agencies to ensure the policy environment is conducive to success.

With this in mind, we have launched a toolkit in 2016, a detailed consultation paper in 2017 and in September 2018, the EPC launched **Experience enhanced: improving engineering degree apprenticeships** – a high-profile policy paper making over 50 recommendations to Government, the Institute for Apprenticeships (IfA) and other stakeholders.

The landmark report, which was released at a sell-out event at the Royal Academy of Engineering, is the product of a long process of engaging members, PEIs, employers, RAEng, the Engineering Council and others to identify challenges and opportunities around degree apprenticeships and find practical solutions to ensure they can succeed for all involved – particularly the apprentices themselves.

The event was opened by Dr Hayaatun Sillem, RAEng Chief Executive, and speakers included Sir Gerry Berragan, Chief Executive of the IfA, and senior representatives of the Education and Skills Funding Agency and the Department for Education (DfE).

Following the paper's launch, the EPC held a productive meeting with IfA to discuss how our recommendations can be put into action.

We hope to also hold similar meetings with the DfE and politicians to pursue ideas that fall into their remits.

The Experience Enhanced report, our toolkit and other materials relating to degree apprenticeships, including a new link to a useful SQA leaflet comparing apprenticeships across

the UK, are all available on the EPC website. Since launching the report, the Chief Executive of the IfA asked the EPC to help them build better relationships with organisations across the engineering sector. As a result, a meeting with the IfA, the Engineering Council and the Professional Engineering Institutions will be held in June 2019.



New Approaches to Engineering in HE

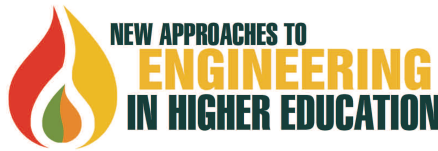
New Approaches is the name of the initiative we have been running jointly with the IET for the past couple of years looking at innovative pedagogies in engineering HE and other novel ways of attracting a wider and more diverse body of students and ensuring that they are prepared for the engineering challenges of tomorrow.

The starting pistol of New Approaches was fired with our international conference in 2017 and the influential publication of the proceedings.

Since then, we have distilled many of key messages into 'six facets' that are hallmarks of an innovative approach.

This year, we have held two high-level roundtable meetings, chaired by Prof John Perkins. At the first, senior academics, including several vice chancellors and deans, discussed ways of embedding new approaches into the management of their institutions and the design of programmes and curricula.

This led to a project to share some examples of good practice: we have compiled six case studies, each exemplifying the approach taken by a different university to one of the six facets.



At the second roundtable, held at Portcullis House, we were able to share these examples with a selection of influential individuals in the policy arena to encourage government and other stakeholders to understand the ground-breaking work of our members and to consider the policy changes that may make such innovation easier and more effective.

The New Approaches case studies were launched formally at events at the Welsh Assembly in Cardiff and at IET in London. Further details are available on the EPC website at epc.ac.uk.

The next steps for New Approaches will be a session at this year's Annual Congress at UCL and a further roundtable with an international perspective on UK innovations in engineering pedagogy from a global expert. Watch this space.

The year ahead

Forthcoming events

- MAY 19: EPC Annual Congress, 'Engineering change', UCL
- MAY 19: EPC Annual General Meeting
- MAY 19: Joint meeting of ACED, ICE and IStructE 2019
- JUL 19: EPC/IET Roundtable: International Perspectives on New Approaches
- NOV 19: Association of Civil Engineering Departments Annual Conference
- NOV 19: EPC Recruitment and Admissions Forum, UWTSd
- DEC 19: Association of Aerospace Universities Conference
- 2020: EPC Conference on Collaboration with Industry

New and continuing initiatives

- Brexit: new research on staff and student mobility
- Degree apprenticeships: changing policy
- New approaches to the relationship between universities and business
- Recruitment & admissions: groundbreaking new data and research on entry requirements
- Engineering ethics
- Building our new community groups for early career staff, visiting professors, pedagogy and others
- Working towards a new website with added personalised member services

Recruitment & Admissions Forum 2018

The annual Recruitment and Admissions Forum took place at the Hertha Ayrton STEM Centre, Sheffield Hallam University in November.

After a warm welcome by Prof Sir Chris Husbands, Sheffield Hallam's VC and TEF Chair, the forum was addressed by Helen Thorne MBE, UCAS's Director of External Relations, who shared the latest engineering application and admissions trends data with us, including a look at offer-making behaviours in Engineering.

The sessions then homed in on the four key strands tracking the student journey: attraction, recruitment, admission and retention. Each theme included both presentations and workshops, with time for discussion and



sharing best practice.

Our closing keynote speaker, Sarah Howls of the Office for Students, outlined the new regulator's access and participation arrangements in the new HE environment in England.

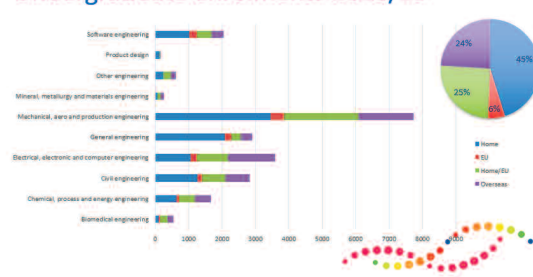
Enrolments survey 2019

The EPC Enrolments Survey canvasses EPC member institutions on the actual numbers of students admitted to their engineering courses within weeks of them starting.

This provides EPC members with benchmark and sector data well over a year before comparable data from HESA. With more responses than ever before, the survey reveals that:

- Overall enrolments seem stable.
- Mechanical engineering remains the sector superstar (official data shows u'grad numbers doubled in a decade).
- Civil engineering continues to strengthen.
- Software engineering has developed more prominence, but at u'grad level, it is proportionally the discipline most dependent on EU students.
- Software engineering had a stark

Undergraduate enrolments 2018/19



- female:male ratio in our sample – only Mechanical, aero and production engineering fared worse.
- The EU share of the undergraduate market contracted for non-Russell Group universities, while the domestic UK share expanded.
- Postgraduate engineering courses witnessed a much higher proportion of overseas enrolments, especially within the Russell Group.

Your EPC

Directors

- **President:** Prof Sarah Spurgeon OBE
- **President-Elect:** Prof Colin Turner
- **Honorary Treasurer:** Prof Jim Yip
- **Honorary Secretary:** Prof David K Harrison

Committees

- The Executive Board is chaired by the President and includes the Directors, elected and coopted members, the chairs of the sectoral groups (representing different engineering disciplines), the Congress Convenor and the executive officers.
- **Engineering Education and Employability Skills Committee:** chaired by Prof Henri Huijberts
- **Recruitment and Admissions Committee:** chaired by Dr Georgina Harris
- **Research, Innovation and Knowledge Transfer Committee:** chaired by Prof Alan Smith

Executive officers

- **Chief Executive:** Johnny Rich, j.rich@epc.ac.uk
- **Policy & Research Officer:** Stella Fowler, s.fowler@epc.ac.uk
- **Administration Manager:** Vicky Elston, v.elston@epc.ac.uk

The EPC would like to extend its thanks to the many individuals who have served on EPC Committees and working groups over the past year, contributing their time, expertise and enthusiasm.

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Initiatives

Brexit

Whatever your view of Brexit, it will have a significant impact on engineering HE. Indeed, it already is. Since before the 2016 referendum, the EPC has been publishing research and campaigning to protect members' interests.

Over the past year, in partnership with the Centre for Engineering Education (CEE) at UCL, we have published two papers analysing the shifting patterns of staff and student mobility. These were presented to a conference in Portugal and the SEFI Conference in Copenhagen.

In March 2019, the EPC published a briefing paper analysing the impact that Brexit – pretty much any version of it, let alone a no-deal version – would have on engineering research in the UK. Alongside the briefing, we have also released a wealth of other exclusive data on our website, broken down by regions and disciplines. We have also called on the Government to protect the UK's position inside international research partnerships.

We're delighted to announce that we have recently secured funding from the RAEng for a further project with CEE to delve deeper into the implications of Brexit for engineering students and staff from the EU.

Engineering ethics

The EPC was one of the organisers of a landmark conference hosted by the Centre for Inter-Disciplinary Ethics Applied (IDEA) at Leeds University bringing engineering ethics to life in education, professional development and industry.

The wide-ranging conference explored some of the big ethical challenges facing engineering today and in the future, and how engineers can ensure we adopt a moral approach to them.

Bringing together decision-makers from industry, HE, regulators and professional engineering institutions, the Conference resulted in a draft ten-year vision for engineering ethics which is now open for consultation. The EPC will be coordinating a response.

Impact and collaboration

The EPC unites the voices of engineering academics at all levels, making us louder and more influential.

We are louder still when we join with others whose goals we share. We've pursued initiatives and events in collaboration with many key stakeholders. This year we are also delighted to welcome **Primary Engineer** as a Partner. We've been able to help them expand their work to Wales and Northern Ireland.

Engineering skills

The 2013 **Review of Engineering Skills** by Professor John Perkins FREng, commissioned by government, was a landmark report, the first to review engineering education from primary schools to professions.

Engineering Skills for the Future – the 2013 Perkins review revisited is an independent report from the engineering profession which examines how much of a turning point the original report has proved to be and laying out an updated set of recommendations.

The EPC took the lead in drafting the chapter on higher education, where progress has been made in the last few years, but there is still much to do.

The report shows how, despite efforts by the government and engineering sector, the whole education system still cannot produce anywhere near enough engineers to meet the needs of the UK economy, especially with increasing reliance on home-grown talent post-Brexit.

The new recommendations including relaxing the rules on how the Apprenticeship Levy may be spent, addressing the shortage of skilled teachers, and ensuring engineering HE is well resourced and attractive to applicants (especially in the event of changes to student funding).

The report specifically echoes the EPC recommendation that the UK must remain part of international partnerships to continue to attract students from the EU and all over the world and should extend opportunities for graduates to stay and work in the country after their studies.

Accreditation

The EPC submitted a formal response to the invitation by Engineering Council Chief Executive Alasdair Coates to input to the current review that is being undertaken of UK-SPEC. We support the current UK-SPEC, but argue that the current problems with accreditation are down to the inconsistent implementation of the specifications by professional bodies. We have been invited to continue to contribute to the review.

The EPC participates actively in E4E (Education for Engineering) – the sector-wide group coordinating campaigns and responses on TEF, REF, grade inflation, immigration and much else.

Through our collaborative approach, the EPC's impact has been felt more widely. For example, our work on degree apprenticeships (see inside) is changing the practice of the Institute for Apprenticeships and the DfE and was drawn on widely by the Higher Education Commission's report to government.

