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## E-Bulletin June 2011

### This month's highlights from what's going on with the National HE STEM Programme...

The National HE STEM Programme is currently working to establish a series of **Practice Transfer Partnerships** in seven key areas targeted to bring longer term benefit to the HE STEM sector.

1. Diversity:
  - Gender & ethnicity
  - Disability
  - Socio-economic
  - Looked after children
2. Retention
3. Careers advice and guidance:
  - Undergraduate careers advice and guidance
  - Accredited Careers advice and guidance for schools and colleges
4. Strategic regional working with schools and colleges:
  - Initiating and supporting strategic change to university outreach practices
  - University Technical Colleges
5. Strategic university engagement with employers
6. Delivery of flexible curricula to enable workforce development
7. Proven outreach practices and interventions

The development of the partnerships follows on from a call that was issued shortly before Easter, which resulted in a total of 60 expressions of interest from across the HE STEM sector. Each Partnership has been targeted with a view to effecting change in practice within the universities involved.

Based upon the ideas and activities proposed within the submissions, the lead proposers of 16 of the expressions of interest received are currently working with members of the National HE STEM Programme Team to define and develop the specific activities of each Partnership. A number of the Partnerships are in the latter stages of their development and we will be announcing further details shortly.

We will be working with PTPs and other National HE STEM projects over the coming months in pursuit of a scheme, to be launched in the autumn, which will enable HEIs to 'adopt' Programme activities currently underway elsewhere, thus also supporting the aim of the Programme to transfer and embed its practices more widely across the HE STEM sector in its third and final year of operation.

[www.hestem.ac.uk](http://www.hestem.ac.uk) has now been redeveloped to comprise (among other things !) a [publications library](#) and [details of all National HE STEM Programme funded projects](#) and [upcoming events](#). Please do have a look and let us know what you think, and if you'd be happy to be added to our '[STEM experts directory](#)', please email me ([r.r.rosewarne@bham.ac.uk](mailto:r.r.rosewarne@bham.ac.uk))

## Other news from around the Programme...

### Activity area 1: Widening participation within the STEM disciplines at university level

All three calls for engineering activities via the [Royal Academy of Engineering](#) are now completed, as part of which it has funded five large-scale strategic Outreach projects across England and Wales. More information about the projects, including a short summary on each, is available at <http://www.thelep.org.uk/national/projects>. All project teams will submit a case study and a final evaluation report on completion of their project: Call 1 projects are expected to complete by October 2011 and the first set of case studies will be available soon afterwards. Call 2 and Call 3 projects will complete in December 2011 and March 2012 respectively. The Academy, in collaboration with the [Higher Education Academy Engineering Subject Centre](#), is organising two dissemination events – one on 13<sup>th</sup> September 2011 at Coventry University and the second on 15<sup>th</sup> September 2011 at the University of Bradford. These events are designed to provide an opportunity for all project leaders from RAEng funded projects to present their project work during dedicated poster and networking sessions. The day also involves two parallel workshop sessions on evaluating your innovation; writing a case study; disseminating your outcomes; and embedding your work for sustainability.

The [Institute of Physics](#) and National HE STEM Programme have produced a series of short careers video clips to illustrate the breadth of options available to those who study physics at A-Level and beyond. Each clip is 5 – 8 minutes long, designed to appeal to 14-16 year olds, and is linked to the GCSE curriculum.

The four clips are titled:

*Ultrasound in Physiotherapy: visiting Wolverhampton Wanderers Football Club*

*Energy Efficiency in Architecture: talking to architects from AHMM*

*Solar Energy in Research and Industry: accompanying a PhD student from Imperial College to Hawaii*

*Forces and Motion in Games Programming: developing video games with NaturalMotion*

To view and download the clips please visit: <http://www.iop.org/hestem/careerclips>

The IOP have also produced a [Guide to Good Practice in Public Engagement with Physics](#). This booklet helps an organiser produce a high quality public engagement activity by leading them through all phases of the process - development, delivery and evaluation. Rather than duplicating information already available in other good practice guides, the booklet consolidates information and signposts the reader to further sources of advice and support.

The guide is available to download from the IOP website (<http://tinyurl.com/3f938xk>) where red highlighted text denotes clickable links that take the reader through to the relevant websites. It is also available in hard copy. If you would like to receive a hard copy please email [hestem@iop.org](mailto:hestem@iop.org)

The University of Leicester is successfully recruiting to the Integrated Sciences degree programme developed in partnership with the IoP, and the University of Salford is also enjoying high application and recruitment rates on its newly repackaged undergraduate degree. Application numbers for the 2011-2012 year have increased 69% on the 2010-2011 figure.

The [London and South East](#) spoke are supporting the development of a toolkit of resources which will enable undergraduate ambassadors to work with pupils towards bronze level [CREST awards](#). Training will be provided for academic staff in implementing use of the toolkit, along with an example of embedding the activity within a

consultancy skills module for undergraduates. Pupils will be able to work towards a [CREST award](#) on projects to enable them to improve the quality of their school environment directly, with specialist skills and knowledge from their local university. A showcase guide of projects will be produced in addition to the toolkit, and resources from professional body partners and their pilot projects will be incorporated wherever possible. The spoke are also running a further poster based campaign in partnership with [the British Science Association](#) – [SuperLab](#) – which will offer science based communication training to academics in HEIs; and held a Physics outreach dissemination event on 13<sup>th</sup> May at the University of Surrey (in association with [SEPnet](#) and the University of Hertfordshire) to showcase two projects; Luggage Lab and SEPnet's GCSE Programme. "Luggage Lab" is a National HE STEM Programme funded project by which schools can gain access to easily transported thematic sets of physics experiments, supported by online resources. The aims are to expose students to the fun and challenge of learning physics in a practical setting using equipment they otherwise would not see or touch, to confront students with the conceptual underpinnings of university level physics, and to inspire them to continue the study of physics beyond A-levels into university. "Luggage Lab" was conceived and developed by a team from the School of Physics, Astronomy and Mathematics at the University of Hertfordshire, the Science Learning Centre East of England, and the Institute of Physics. The SEPnet GCSE Programme is a series of free activities designed to support the teaching of physics at GCSE. Through a combination of workshops in schools and activities on university campuses, SEPnet provides both students and teachers with the chance to try experiments and explore campuses to which they wouldn't otherwise have access.

In a recent funding call, to stimulate collaboration between school STEM Clubs and HEIs for sustainable benefit, the [Midlands and East Anglia](#) spoke has awarded contracts to five regional universities: Birmingham, Derby, East Anglia, Staffordshire and Wolverhampton funds in order to:

- work with eight local secondary schools to set up a 'Clubs Cluster' in partnership with [STEMNET](#) and the British Science Association
- run activities in 2011 Summer Term and throughout the 2011/2012 academic year
- encourage projects wherever possible in which participating pupils can achieve a CREST award
- Hold a 'graduation' style event at the respective HEI for participating pupils, their parents and teachers towards the end of the 2011/2012 school year
- Provide the National HE STEM Programme with an end of project evaluation report and evidence of the creation of a sustainable model of engagement.

The [North West](#) spoke is cataloguing widening participation and outreach initiatives across the region, thus complementing a general review of outreach, enrichment and enhancement provider services requested by the North West STEM Cohesion Group.

Work is under way on a new WP project at the [South West](#) spoke. Led by Professor Dave Harwood at the University of Plymouth, the project, entitled "Adult returner journeys through HE to STEM careers," seeks to provide exemplars of mature adult returners, many with non-standard qualifications, who have successfully graduated in STEM subjects at South West universities and progressed onto STEM-related careers. Case studies will be prepared and disseminated widely through existing online resources and will provide "role models" in order to stimulate interest in STEM subject degrees. You can find out more about the project on its web pages at:

<http://www.hestem-sw.org.uk/widening-participation/wp-projects/?p=44&pp=summary>

This new WP project joins ten other WP projects funded across the SW - see <http://www.hestem-sw.org.uk/widening-participation/wp-projects/> for overviews of these projects.

In terms of most recent successes:

- The Community of Practice for STEM Outreach Practitioners project  
(see: <http://www.hestem-sw.org.uk/widening-participation/wp-projects/?p=10&pp=summary>)

held a launch event at the University of Exeter on 23rd June. Attended by some 40 practitioners from across the HE, FE and the broader STEM sector, the event covered topics such as peer review of outreach, effective evaluation and the value of communities of practice

- The Bournemouth-led PAL & Transition projects held the first of four seminars at the University of Exeter on 7th June. Some 20 practitioners from across and outside the region attended to learn more about supporting student transition and induction to STEM in HE. A briefing paper summarising learning will shortly be made available to the sector. For further details, see:  
<http://www.hestem-sw.org.uk/widening-participation/wp-projects/?p=9&pp=summary>
- The 'Becoming a STEM Enthusiast' project at the University of Exeter has recently completed filming video vignettes of 16 STEM academics and 4 STEM students talking about the rewards, challenges and day-to-day experiences of learning and teaching within their discipline. These vignettes will be made openly available to the sector and used as motivational tools in outreach activities, as well as being used as a staff development resource. For further details, see:  
<http://www.hestem-sw.org.uk/widening-participation/wp-projects/?p=24&pp=summary>
- As part of the University of Bristol's Public Engagement Skills project, two workshops have been designed and delivered to upskill STEM academics in pedagogies used across STEM school curricula, so that HE practitioners are better able to devise effective outreach interventions in schools. A guide is also being finalised which captures this learning and will be freely available across the sector. For further details, see:  
<http://www.hestem-sw.org.uk/widening-participation/wp-projects/?p=16&pp=summary>

WIMCS (Wales Institute of Mathematical and Computational Sciences) in conjunction with the [Wales](#) spoke is hosting a one day workshop entitled 'Engaging with young people in STEM subjects.' This introductory interactive workshop is for HEI staff, who are interested in getting involved with outreach activities in STEM subjects in general and the EPSRC funded Maths on Tour school roadshows in particular. It offers participants the opportunity to extend their outreach skills and learn more about working with young people and teachers. Links to more details about the roadshows are available at <http://www.wimcs.ac.uk/outreach.html>. The workshop will take place on Friday 8<sup>th</sup> July 2011 from 10 a.m. – 3.30 p.m. at either Cardiff or Swansea depending on demand. To book your place, please email Alison Braddock at [outreachcoordinator@wimcs.ac.uk](mailto:outreachcoordinator@wimcs.ac.uk).

The Wales spoke is also funding the Reaching Wider South West Partnership to run STEM A-level enhancement events for targeted students in local FE colleges. This will consist of a two day residential experience for sixty Year 12 students, who will undertake practical laboratory based activities in chemistry, maths and physics at Swansea University. Students will also be given guidance on progression to HE via sessions led by university and careers staff; and will meet undergraduates currently studying these STEM subjects. It is hoped that this experience will extend students both academically and socially.

#### Activity area 2: Higher Education curriculum developments and enhancements of the student experience

All three calls for engineering activities via the [Royal Academy of Engineering](#) are now completed, as part of which it has funded 34 HE Curriculum Innovation projects of which 23 involve employer engagement, 16 Education Research projects of which 5 involve employer engagement, and 11 Engineering for Society projects of which 9 involve employer engagement across England and Wales. More information about the projects, including a short summary on each, is available at <http://www.thelep.org.uk/national/projects>. All project teams will submit a case study and a final evaluation report on completion of their project: Call 1 projects are expected to complete by October 2011 and the first set of case studies will be available soon afterwards. Call 2 and Call 3 projects will complete in December 2011 and March 2012 respectively. The Academy, in collaboration with the [Higher Education Academy Engineering Subject Centre](#), is organising two dissemination events – one on 13<sup>th</sup> September 2011 at

Coventry University and the second on 15<sup>th</sup> September 2011 at the University of Bradford. These events are designed to provide an opportunity for all project leaders from RAEng funded projects to present their project work during dedicated poster and networking sessions. The day also involves two parallel workshop sessions on evaluating your innovation; writing a case study; disseminating your outcomes; and embedding your work for sustainability.

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The IoP have developed a range of fifteen PBL modules suitable for adoption and adaptation by physics departments. Student versions of the modules are available to view and download on the IOP website at <http://tinyurl.com/6znsbo6> : module topics include electromagnetism, thermal radiation, frictional forces, mechanics and dynamics. To receive a lecturer's copy of the modules or ask questions please email [hestem@iop.org](mailto:hestem@iop.org) We recommend easing the transition to using PBL teaching techniques by attending a summer PBL workshop, which will be held in Leicester and directed by Derek Raine. For more details please visit <http://physics.le.ac.uk/PBLSummerSchool2011>

The IOP is also working in partnership with nine physics departments (Bath, Birmingham, Bristol, Cardiff, Exeter, Hertfordshire, Liverpool, Leicester and UCL) to develop and establish undergraduate [Industrial Group Projects](#) with industries local to the universities. The University of Durham are involved in an advisory capacity as they have been successfully running group projects for 20 years. The dual aims of this project are to promote stronger links between universities and employers and to match graduates' skills with employers' needs. Undergraduates will be working in groups to solve real industrial problems and gain valuable skills and experience as they are doing so.

At the [London and South East](#) spoke the University of Reading will be leading a regional action plan project entitled "Work placements for Maths and Stats undergraduates – identifying formats that provide real employability skills and determining appropriate assessment processes for degree level accreditation". The aims of this project are:

1. To **improve student employability skills** through employer engagement to set up accredited work placements, of a range of types, to be integrated within undergraduate maths and stats degree courses
2. To **establish a protocol for assessing and accrediting** work placement experiences and activities that will be embedded in the Maths and Stats undergraduate degree programme for up to 150 students each year and will be applicable, with customisation, to other STEM departments within Reading University and across HEIs.

The [Midlands and East Anglia](#) spoke are developing an innovative postgraduate qualification which may be offered to students upon graduation, integrated masters students before they commence year 4 of their studies, and those who wish to return to learning from the workplace. The programme will be short but highly intensive in nature and is designed to equip participants with the enhanced skills and competencies required by employers to ensure their aptness to become the next generation of STEM leaders.

Five curriculum development projects have now been launched across the [South West](#) region. A diverse range of activities are covered from developing a student-led employability audit tool-kit for HE STEM curricula to introducing context and problem-based learning into the undergraduate Chemistry curriculum.

View the full range of curriculum development projects here:

<http://www.hestem-sw.org.uk/higher-education-curriculum/hec-projects/>

The spoke's legacy project (funded to the tune of £150k) aims to increase and embed employer engagement in undergraduate STEM curricula at the University of Bath and more widely across SW regional HEIs. The project has three main aims:

1. Encouraging and enabling employers to provide more 'real world' experiential learning for STEM students through placements and employer-defined collaborative projects
2. Building upon and embedding existing good practice in relation to employer engagement in undergraduate curricula
3. Enabling equality of access and encouraging more students to become involved in work-related opportunities

If you would like to know more about the legacy project, please contact Dr Sarah Chatwin (SW Assistant Regional Director) at [s.l.chatwin@bath.ac.uk](mailto:s.l.chatwin@bath.ac.uk)

At Swansea University the [Wales spoke](#) have funded and helped to run a Pilot Mathematics Support Centre for students in the College of Engineering. This has seen the team working in close partnership with Dr. Paul Ledger. Postgraduates (trained by sigma) within the college have provided support on a drop in basis on Wednesday and Monday afternoons. Ten sessions were run which were attended by a total of 78 students, and this support package will now be offered out to other Welsh HEIs. For further information please email [outreach-hestem@wimcs.ac.uk](mailto:outreach-hestem@wimcs.ac.uk)

The spoke is also supporting a project at Cardiff University to enable STEM students to develop a set of 'enterprise skills' including skills such as business awareness, team working, problem solving and innovative thinking. Cardiff University's Enterprise Officer will work across STEM departments to develop and deliver a stand alone module to develop STEM students' commercial awareness and enterprise skills, in order to meet employers' identified requirements. STEM employers, entrepreneurs and innovators will be involved in the development and delivery of the module.

### Activity area 3: Upskilling the workforce

All three calls for engineering activities via the [Royal Academy of Engineering](#) are now completed, as part of which it has funded 34 HE Curriculum Innovation projects of which 23 involve employer engagement, 16 Education Research projects of which 5 involve employer engagement, and 11 Engineering for Society projects of which 9 involve employer engagement across England and Wales. More information about the projects, including a short summary on each, is available at <http://www.thelep.org.uk/national/projects>. All project teams will submit a case study and a final evaluation report on completion of their project: Call 1 projects are expected to complete by October 2011 and the first set of case studies will be available soon afterwards. Call 2 and Call 3 projects will complete in December 2011 and March 2012 respectively. The Academy, in collaboration with the [Higher Education Academy Engineering Subject Centre](#), is organising two dissemination events – one on 13<sup>th</sup> September 2011 at Coventry University and the second on 15<sup>th</sup> September 2011 at the University of Bradford. These events are designed to provide an opportunity for all project leaders from RAEng funded projects to present their project work during dedicated poster and networking sessions. The day also involves two parallel workshop sessions on evaluating your innovation; writing a case study; disseminating your outcomes; and embedding your work for sustainability.

The [London and South East](#) spoke are currently developing a collection of web-based resources in partnership with the department of electrical engineering at the University of Southampton. These are to be embedded in the current undergraduate curriculum and are also designed to be used to upskill the workforce in partnership with the [South East Electricity Substation Alliance](#). The resources will have standard text based components in addition to innovative virtual experiments and web delivered lectures.

Four projects within the [South West region](#) have been successful in receiving funding, namely:

- The Hydrographic Academy: Meeting the needs of the workforce and industry through innovative and flexible online distance learning (University of Plymouth)
- Get STEM working: innovation with employer and student engagement (Bournemouth University-led, multi-institutional)

- Progressing from labour market intelligence to HE level provision that is well supported by employers (University of Exeter-led, multi-institutional)
- Adult returner journeys through HE to STEM careers (University of Plymouth-led, multi-institutional)

In total, the projects involve 7 HEIs and several FE colleges. More information will be made available through the SW spoke website: [www.hestem-sw.org.uk](http://www.hestem-sw.org.uk)

The [Wales spoke](#) are supporting a project led by Bangor University in partnership with Aberystwyth University to support employees in the Photonics industry. The project will provide work-based learning opportunities at level 4 and above by University staff at Bangor and Aberystwyth. Working in partnership with the SEMTA Sector Skills Council, the Welsh Optoelectronics Forum and the Photonics Academy for Wales, HEI staff will work to identify the skills training requirements of SMEs. As many as 100 employees could benefit from the bespoke training programmes devised for the SMEs.

Swansea Metropolitan University (SMU) is also leading on the provision of a fast track level 4 progression pathway at both SMU and Glyndŵr University in engineering, science, and mathematics for people who already have experience in engineering, to commence in September 2011.

- To find out more about the Institute of Mathematics and its Applications, please email [hestemmaths@ima.ac.uk](mailto:hestemmaths@ima.ac.uk)
- To find out more about the Institute of Physics, please email [hestem@iop.org](mailto:hestem@iop.org)
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