



National Higher Education STEM Programme

Call for project proposals for engineering activity

Deadline for Expressions of Interest: 17.00 on Tuesday, 28th September 2010

Deadline for Full Proposals: 17.00 on Friday, 29th October 2010

www.thelep.org.uk/national

www.raeng.org.uk/education/hestem

www.hestem.ac.uk

National HE STEM Programme (the Programme)

The National HE STEM Programme is a £21million, three-year initiative funded by HEFCE and HEFCW that began in August 2009. It aims to increase and widen participation in Science, Technology, Engineering and Mathematics (STEM) and enhance the skills and knowledge base of the workforce in these areas. The Programme will concentrate its support primarily on the disciplines of Chemistry, Engineering, Mathematics and Physics with associated benefits to the STEM sector as a whole.

The Royal Academy of Engineering (the Academy)

The Royal Academy of Engineering is supporting the National HE STEM programme through collaborations with the Higher Education Institutions to encourage the exploration of new approaches to recruiting students and delivering programmes of study in engineering. It will enable the transfer of good practice across the HE STEM sector, facilitate its wider adoption, and encourage innovation.

The Academy has received funding through the Programme to support engineering activity in England and Wales. Working in collaboration with the HEA Engineering Subject Centre, we are pleased to announce this invitation to HE staff involved in Engineering Education to bid for funding and support for development projects in support of the aims of the Programme. Proposals will be accepted from any Welsh or English HEI working in collaboration with the Programme partner HEIs and/or the Academy. The Programme will not seek to undertake short-term interventions, but will focus upon sustainable activities with the potential to achieve long-term impact within the Higher Education sector.

Project Themes

We invite proposals under three themes:

1. HE Innovation Projects including Employer Engagement

HE Innovation Projects

A HE innovation project must enable engineering subjects in HEIs to develop innovative approaches to teaching, learning and assessment that will make courses more attractive, enhance student engagement, improve retention, and enhance

graduate outcomes within engineering for students from all backgrounds.

Examples may include:

- Supporting the transition into first year courses
 - Developing important maths skills
 - Learning to learn in engineering
 - Student mentoring and peer assisted study schemes
- Developing active learning environments
 - Student-centred or Enquiry Based Learning
 - Design based learning
 - Team based projects
 - Student conferences, symposia, seminars and competitions
- Use of learning technologies to improve retention
- Professional development for academic staff
- Improving graduate attributes and skills
 - Employability, professional, academic and personal skills
 - Personal development planning
 - Working towards chartered engineering status

Employer Engagement

The Academy is committed to attracting innovation projects that involve engagement with employers. We are keen to increase the number of employers involved in supporting engineering teaching and learning. In support of this aim, we would specifically welcome HE Innovation projects that include an element of employer engagement.

Examples may include:

- Developing Foundation, BEng or MEng degrees with explicit employer links and content
- Employer involvement in engineering curriculum enrichment/enhancement and content development
- Working with employers to develop authentic learning experiences (Problem Based Learning, 'real' projects etc.)
- Engineering employers supporting more work experience programmes
- Engineering careers and networking activities
- Engineer Ambassador programmes
- Employer involvement in aforementioned, innovation, diversity and widening participation initiatives
- Other employer engagement activities

For further guidance and evidence of employer engagement, please refer to the 'Engineering Graduates for Industry' report and case studies:

- <http://www.engsc.ac.uk/graduates-for-industry>
- http://www.raeng.org.uk/news/publications/list/reports/Engineering_graduates_for_industry_report.pdf

2. Engineering for Society: Diversity and inclusion in engineering education

These projects should be aimed at encouraging and supporting participation in HE engineering courses by students from groups under-represented in engineering.

The Academy is committed to encouraging and supporting participation in HE engineering courses by students from groups under-represented in engineering (women, certain minority ethnic groups, those from lower-socio-economic groups, adult learners, students with disabilities). The proposal must therefore address issues of Inclusion & Diversity within the engineering curriculum, programme design, student recruitment and/or the student experience. We welcome a specific focus on supporting improvements in teaching and learning, attainment, retention, progression and the overall student experience.

Examples may include:

- Outreach activities designed to inspire under-represented groups
 - Schools' ambassadors scheme
 - Engineering summer schools, workshops, innovative open days
- Supporting transition into HE for under-represented groups
 - Orientation and induction
 - First-year curriculum design for inclusion and diversity
 - Student mentoring schemes
 - Socialising the learning through student groups
 - Academic support and skills development
- Celebrating the inclusion of under-represented groups in Engineering HE
 - Community based project work
 - Shared learning and experience programmes
 - Student choice in curriculum, projects and topics of study

3. Education Research

Research proposals must outline educational research that will inform innovation in the engineering curriculum, improve understanding of the student learning experience and contribute to the development of engineering pedagogy. We wish to encourage applied research, that is, research that aims to provide an evidence base or rationale for improvements in teaching and learning or the curriculum. The proposal should have a clear research question and methodology.

Examples may include:

- Factors that influence the choice of engineering as a career
- Transition issues for students entering HE, particularly for those arriving through widening participation initiatives
- A study of how students approach learning in Engineering or how their learning might be supported
- A meta-analysis of engineering pedagogy and how it might be improved
- An analysis of traditional (lecture, seminar, problems class, tutorials, design, practical work, work placements), and emergent modes of learning in

engineering (Enquiry Based Learning, Problem Based Learning, online learning, Conceive Design Implement Operate, Activity led learning, Personal Development Profiling), and the means of identifying good practice in these modes of learning

- The benefits to HEIs, employers and students of employer engagement and industry input to the curriculum, including the development of higher skills

Interdisciplinary and collaborative projects

Proposals for interdisciplinary projects, involving two or more engineering subjects, are welcomed. We also encourage project proposals that involve collaboration between a number of HEIs, or collaboration between HEIs and professional bodies or employers. It is axiomatic that these projects will involve a number of staff, and so consideration will be given to the relevance, credibility and contributions of the staff involved in the proposal.

Selection Criteria

In order to support the development of a strong, diverse and sustainable workforce that will meet the economic needs of the UK for the 21st century, the National HE STEM Programme aims to contribute to the development of a national Higher Education STEM sector which:

- Engages collaboratively to increase and widen participation,
- Promotes, supports and champions the STEM disciplines, and
- Is increasingly responsive to the skills needs of both employers and employees

To this end, the overarching criteria for selection of proposals are that projects will:

1. Support increasing and widening participation
2. Enhance the quality of engineering education and its graduate outcomes
3. Develop in students those skills needed by employers

The specific selection criteria for all proposals are given in the table below, with a further description of each criterion given for each of the project themes.

Selection criteria for proposals

	Specific criteria	HE Innovation including employer engagement	Engineering for Society	Education Research
1	Collaboration (see note 1 below) All activities should be built around partnership and collaboration, both within and across the STEM sectors.	<ul style="list-style-type: none"> • Extent of collaboration with colleagues • Projects that involve more than one member of staff are preferred • Staff may cross subject or professional boundaries • Credibility of project collaborators, including their past experience 		

	Specific criteria	HE Innovation including employer engagement	Engineering for Society	Education Research
2	Evidence informed practice Where possible, the Programme will build upon existing proven practice.	<ul style="list-style-type: none"> Should be based on credible evidence of good practice (literature or previous evaluated experience) 		<ul style="list-style-type: none"> Evidence of literature survey Established or credible research methodology
3	Sustainability All activities should be sustainable in the longer-term within Higher Education Institutions.	<ul style="list-style-type: none"> Evidence that the initiative can be sustained beyond the funded project Focus on pedagogy rather than subject development 		<ul style="list-style-type: none"> The research should lead to conclusions that will inform the engineering sector in developing further research or curriculum innovations
4	Institutional change Project outcomes should focus on enabling and enhancing further institutional change.	<ul style="list-style-type: none"> Evidence that the innovation can lead to further developments across engineering both within the host institution and across the sector 		
5	Transferability The outcomes should be of value to engineering programmes across the sector.	<ul style="list-style-type: none"> Potential breadth of applicability The extent to which the innovation may be adapted or adopted across other engineering subjects and other HEIs 		<ul style="list-style-type: none"> Outcomes and recommendations will be relevant across subjects and the sector
6	Value-added The activities of the Programme should not duplicate those of others, but work to bring added value to the HE sector.	<ul style="list-style-type: none"> The activities proposed should not be piece-wise developments, but should lead to true innovation. Developments should not be part of normal quality enhancement practices 		<ul style="list-style-type: none"> Evidence that the research is novel
7	Sharing (see note 2 below) Programme outputs and resources will be made freely available to the HE sector.	<ul style="list-style-type: none"> The project leaders should be willing to engage with the wider community, both during and after the project (within reasonable time and cost limits) 		
8	Project action plan	<ul style="list-style-type: none"> A clear and realistic action plan, with actions, responsibilities, and timescales clearly defined 		

	Specific criteria	HE Innovation including employer engagement	Engineering for Society	Education Research
9	Positive outcomes	<ul style="list-style-type: none"> • Clear description of how the curriculum or learning experiences of students will be enhanced • Clear description of how the engagement activities will enhance the student experience and employability 	<ul style="list-style-type: none"> • Clear description of how the project will lead to an inclusive learning environment • Clear description of the target student community or communities 	<ul style="list-style-type: none"> • Conclusions linked to recommendations for future curriculum development or outreach activities
10	Cost and other support	<ul style="list-style-type: none"> • The level of funding should represent good value for money • Evidence of funding or support from host institution (see <i>the nature and purpose of funding</i> below) • Evidence of funding support from any organisation external to the host institution 		

Note 1: For HE Innovation projects, collaboration refers to a single-subject, single institution project. Interdisciplinary and collaborative projects will have their own field for identifying the nature of the collaboration.

Note 2: Project leaders will be expected to contribute to the Programme's sharing activities (launch, interim seminar, closing symposium and case study). In addition, we are keen to support project teams that can identify other methods of disseminating their findings through conferences (both internal to their host institution and external across the sector), website contributions, publications or other means.

The peer review panel

The peer review panel will consist of 5-6 members including a HEA Engineering Subject Centre representative and members of the HE STEM Programme team from the Academy.

Submitting your Proposal

This will be a two stage process:

Stage 1 Expressions of interest (EOI)

- Before you start writing EOI, please contact the Academy on HESTEM@raeng.org.uk asking for an adviser. The purpose of this contact is to discuss your ideas briefly with the adviser and to receive initial

feedback.

- b) Then download the EOI form for submission from the following link:
<http://www.thelep.org.uk/national/calls/submittingproposal>
- c) This brief expression of interest **MUST** be submitted to HESTEM@raeng.org.uk (and not to the adviser's email). The deadline for submission of EOI is **17.00 on Tuesday, 28th September 2010**.
- d) Before submitting your expression of interest, you must seek approval from your line manager for the proposal.
- e) Feedback will be provided to anyone submitting an unsuccessful expression of interest.

Selecting an Expression of Interest

A selection panel will judge the expressions against a set of criteria. Consideration will be given to ensuring appropriate levels of activity (projects) in each theme (HE Innovation including employer engagement; Engineering for Society; and Education Research); across engineering subjects; and across the sector (England and Wales). However, the major determining factor for successful projects will be the extent to which they meet the criteria.

Stage 2 Full project proposals

- a) Successful applicants will be contacted by **Friday, 8th October 2010** and will be invited to draw up a detailed project proposal.
- b) Download the Full Application form for submission from the following link:
<http://www.thelep.org.uk/national/calls/submittingproposal>
- c) Full Application form **MUST** be submitted to HESTEM@raeng.org.uk (and not to the adviser's email). The deadline for submission of Full Application form is **17.00 on Friday, 29th October 2010**.
- d) The selection panel will again review the Full Application against the criteria given in this document.
- e) All the applicants will be informed the outcome of their application by **Monday, 15th November 2010**.
- f) Successful applicants will be issued a grant letter, which will form the basis of a contract between the Academy and the project leaders.

Please note that successful project leaders will be expected to:

- Meet with the Academy's advisers twice during the project;
- Present work in progress at an interim seminar;

- Present final outcomes at a closing symposium;
- Submit two interim and one end of project report; and
- Produce an evaluated case study for inclusion in their dissemination strategy.

Project leaders are also encouraged to publish outcomes of their work independently, and will be supported in this work.

Nature and Purpose of the Call

Projects will run for approximately one calendar year, beginning in January 2011. We would encourage small project teams (2-4 people) and we would expect outcomes to be achieved by January 2012. Successful project winners will be informed by **Monday, 15th November 2010** as mentioned earlier, so they can organise their work plans with their host institution. You should seek approval from your relevant line manager (subject leader, Head of Department, Head of School, etc.) before submitting your expression of interest.

Projects will vary in size and complexity, but typically will require funding at a level of £6,000. However, we would encourage interdisciplinary projects, project proposals that involve **collaboration** between a number of HEIs, and collaboration between HEIs and professional bodies or employers. For such projects, proposals will be accepted for funding at a higher level.

In addition to funding, you will receive support for your project in a number of ways. The Academy will organise a launch seminar for project holders in January 2011. We will also provide individual project support throughout the programme. You will be asked to present your work in progress to an audience in July 2011 and to make a presentation at a closing symposium in January 2012. Finally, you will also receive support in writing up a case study of your project for dissemination across the sector.

Note: You should contact the Academy (HESTEM@raeng.org.uk) before beginning your submission to discuss your proposal with an adviser.

Guideline to various Costs

The focus of this call is to support institutions in developing new practices that will enhance the learning experience of their undergraduate students. Hence, the project should have immediate value to the host institution. It is therefore expected that proposals will not be on the basis of full cost recovery.

1. Funding for staff time given to the project should be on the basis of hours or days of effort, and set at the replacement cost for these staff. The following figures are a guideline:

Replacement staff costs (including internal consultancy staff costs)	£50 per hour	£350 per day
External consultancy staff and employer involvement	£50 per hour	£350 per day
Research and other professional staff costs	£30 per hour	£210 per day
Administrative and technical staff costs	£20 per hour	£140 per day

2. Travel costs to relevant events and activities will be paid at standard rail fare rates, accommodation costs will be paid only for essential overnight stays, and such travel should be justified.
3. Equipment costs will only be approved if a clear case is made as to the essential requirement of the equipment for the innovation. Funding will not be provided for equipment that would normally be provided for the pursuance of teaching practice.
4. Costs will be provided for core staff development activities, where a case is made for these.
5. Costs will be provided for specific involvement of students, such as volunteer ambassadors, mentors, student focus group members. This will only be approved if the case is made for the continuation of essential student volunteer involvement after project funding ends.
6. The Academy will organise three support and reporting events during the length of the project and all the project leaders are expected to attend these events. The actual travel costs to these events will be reimbursed by the Academy on receipt.

In kind contributions

Host institutions will be expected to make a contribution to cover overheads including workplace accommodation, access to relevant teaching rooms and equipment, and core technical or administrative support (contributions in kind). Proposals will be stronger if they include specific reference to any additional forms of support approved by the institution (cost for involvement of staff not included in the proposal, access to specialist equipment, contribution to staff development or travel costs etc.)

Other Partners

The Programme is led by University of Birmingham and is operating in six different regions of the UK and Wales. Each of these six regions has a regional centre called *spoke HEIs* and their name and contact details are as below:

- **South-West England:** The University of Bath
HESTEM@bath.ac.uk
- **West Midlands and East Anglia:** The University of Birmingham
HESTEM@contacts.bham.ac.uk
- **North-East England:** The University of Bradford
HESTEM@bradford.ac.uk
- **North-West England:** Manchester Metropolitan University
HESTEM@mmu.ac.uk
- **South-East and London:** The University of Southampton
HESTEM@soton.ac.uk
- **Wales:** Swansea University
HESTEM@swan.ac.uk

There are three more professional bodies involved with the Programme as partners and their name and contact details are as below:

- The Royal Society of Chemistry
HESTEM@rsc.org
- The Institute of Mathematics and its Application
HESTEM@ima.org.uk
- The Institute of Physics
HESTEM@iop.org

You may wish to contact them for any interdisciplinary and collaborative projects.

Contacts

Any initial questions or queries regarding the engineering activity proposals should be addressed to the Academy, either by post to:

National HE STEM Programme Team
The Royal Academy of Engineering
3 Carlton House Terrace
London
SW1Y 5DG

Or by email on:

HESTEM@raeng.org.uk