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Sir Denis Rooke OM CBE FRS FREng (1924-2008) *President of The Royal Academy of Engineering 1986-1991*

Sir Denis Rooke died on 2 September 2008 aged 84. His great technical achievement and lasting legacy was to build the UK's gas distribution network and unite the gas industry, making domestic gas a cheap and convenient fuel source for millions of people.

Sir Denis was elected to the Academy in 1977 and assumed the Presidency of the then Fellowship of Engineering in 1986, following Viscount Caldecote. His term of office saw the Fellowship acquire Grant in Aid status from Government, as well as industrial support - key factors in enabling the rapid ensuing growth into today's Royal Academy of Engineering.

As President, Sir Denis drove the development of the Academy's education programme, beginning the long-running connection with the Gatsby Charitable Foundation, and establishing the first Visiting Professors in the Principles of Engineering Design. He was also instrumental in fostering links between industry and academia, not least through the establishment of the now extensive programme of research chairs and fellowships, co-funded with industry.

His strength of character and personality was also key to the development of close links with SERC, the Science and Engineering Research Council – a link that continues today with the Engineering and Physical Sciences Research Council. Joint meetings chaired by Sir Denis at British Gas' Rivermill House were much enjoyed by the chairmen and members of the research council who greatly valued having such strong industrial recognition and support.

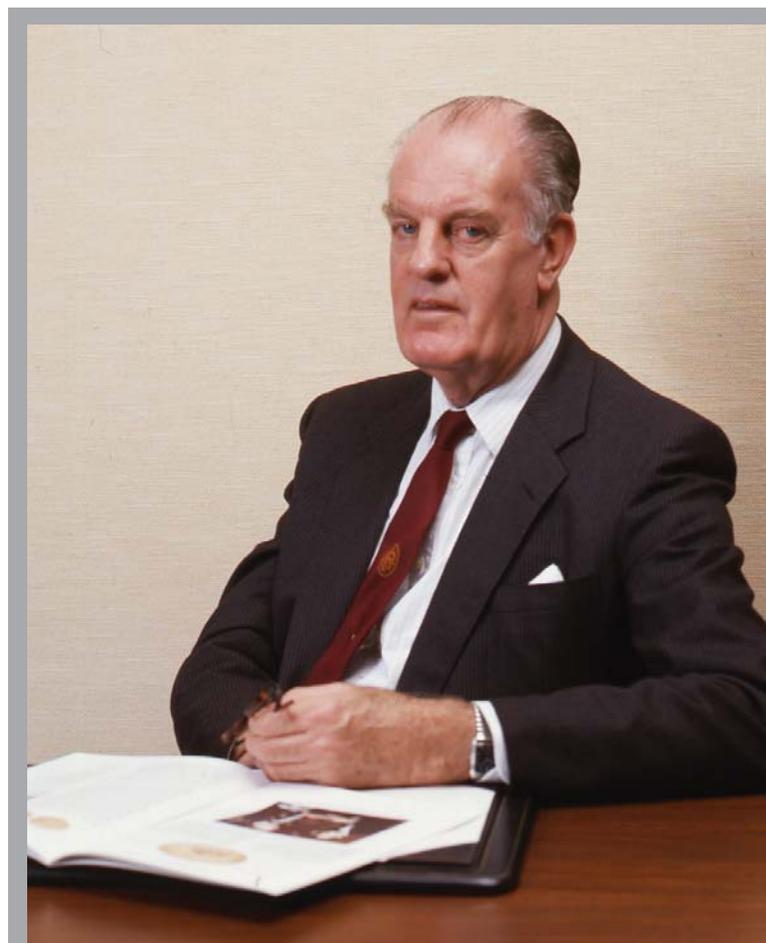
Sir Denis had a particular regard for innovation, long before it became a fashionable term, and was a strong supporter of the MacRobert Award for Innovation in Engineering. He was a proud man when a British Gas team won the Award in 1989 for its development of the 'Intelligent Pig', a method now commonly used for the internal inspection of pipelines. Such developments owed everything to the support given by Sir Denis.

After retiring from British Gas, Sir Denis devoted his talent and determination to engineering education, becoming Chancellor of Loughborough University in 1989. He served on many national advisory committees on both energy policy and education. He was Chairman of the Trustees of the Science Museum, Chairman of the National Museum of Photography, Film and Television in Bradford and Chairman of the Management Committee of the Royal Commission for the Exhibition of 1851.

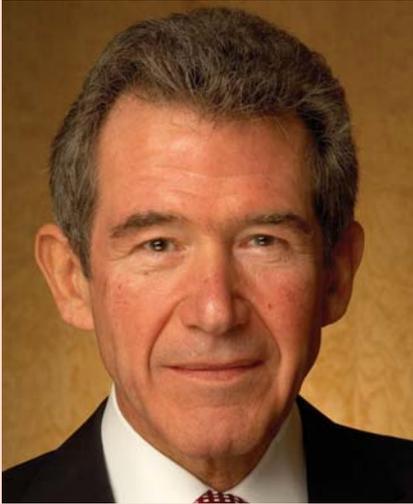
Awarded a CBE in 1970 and knighted in 1977 for his service to the gas industry, he won The Academy's Prince Philip Medal for engineering achievement in 1992 and the Royal Society's Rumford Medal in 1986. He also won the James Watt International Medal of the Institution of Mechanical Engineers, the George E Davis Medal of the Institution of Chemical Engineers and the Gold and Birmingham Medals of the Institution of Gas Engineers, together with numerous awards and fellowships from universities and colleges. In 1997 the Queen awarded him the Order of Merit, which numbers just 25 members and is the highest award ever made to one of our Fellows.

Today, The Royal Academy of Engineering remains committed at its core to the recognition and promotion of excellence in engineering. Through his leadership, Sir Denis brought distinction to the Fellowship and, no less so, to himself.

*Sir Denis Rooke OM CBE FRS FREng (1924-2008)
President of The Royal Academy of Engineering 1986-1991*



The President's column



Lord Browne

In July, the President, Lord Browne, welcomed Fellows to the first Annual General Meeting in the Academy's new home, Number 3 Carlton House Terrace. The following is an extract from his address.

As engineers, we know that engineering designs the future. The Academy's new building is where the future of engineering will be designed, debated and delivered. Engineers in all fields, from all around the world, will be welcomed here to discuss and find solutions to today's major challenges.

Our building will be a showcase for the best in new technology, where we talk to and work with the public whom we serve. We shall open our doors to young people – to show them what engineers can achieve and to inspire them to join with us as the engineers of tomorrow.

To make this vision a reality, we are pursuing a major development campaign. We plan to raise £15 million to realise the full potential of this building and £10 million to ensure that the Academy continues to make its mark in education.

Our new premises will help us raise the profile and increase the influence of the profession and ensure that the Academy makes its fullest contribution to public life and public policy. As a national academy, we offer the services of the unique body of

expertise and advice that is our Fellowship. We must continue to identify and elect the very best in the profession as our Fellows. We must also ensure that our Fellowship reflects the society that we serve – so we are looking at ways of casting our net more widely for more diverse candidates.

We are examining new ways of providing Fellows with the opportunity to lead or be involved in our work. Many areas of public policy require engineering advice: we are pressing home that message along with the offer of our Fellows' expertise to support the national strategy. If we are to succeed in tackling today's major challenges, the engineering dimensions of delivery must be designed into policy from the outset.

Tackling climate change, alleviating poverty, promoting the health and wellbeing of society – the big problems facing the world today are global and the solutions to them will depend heavily on engineering and engineers. We want to broaden the understanding of what the Academy does – and what engineers do – among politicians of all parties in Westminster, in the devolved assemblies and in the EU.

We want to ensure that we are talking to the public about the issues that matter to them and that's why we're undertaking more activities that create a dialogue with society.

While we are a national academy, we must also play our part on the global stage. With colleagues in the Institution of Civil Engineers, we are building a partnership with engineers in Africa to increase engineering capacity. We have launched a research programme with India and China, two of the fastest growing economies.

The Academy contributes to the health of society through work in areas such as synthetic biology, biomedical engineering and robotics in modern-day surgery. The winner of this year's MacRobert Award was Touch Bionics, whose pioneering bionic prosthetic hand is a compelling example of the human value of collaboration between engineering and medical research.

As part of our strategy to encourage the next generation of engineers, the Academy

is working with Government to increase the uptake of science, technology, engineering and maths subjects. The Academy is helping deliver the new 14-19 Diploma in Engineering that, from September this year, offers more students a way into the profession. Through the Academy's London Engineering Project, more than 15,000 young people – two thirds of them from an ethnic minority and around 40% girls – have enjoyed inspiring engineering experiences. We want our future professional engineering workforce to reflect modern society.

Financially, the Academy has had a challenging but manageable year, with a satisfactory turnout overall. We have had to use some of our reserves to pay for the lease and fit out of Carlton House Terrace. Our financial assets were revalued downwards following market conditions. Our total reserves were, therefore, reduced over the year by £3.4 million to £18.7 million.

The Academy continues to flourish under the Council's sound stewardship and forward-planning. I hope that our Fellows will continue to endorse and support our vision for engineering – making its mark at the centre of society and designing the future.

Meetings and visitors

The President has recently met:

Lord Sainsbury of Turville HonFREng HonFRS

**Professor William M Banks
FRSE FIMEchE FIMMM FRSA**
President, Institution of Mechanical Engineers

Professor Richard Darton FREng
President, Institution of Chemical Engineers

Mr John Loughhead FREng
President, The Institution of Engineering and Technology

Engineering for health

The Academy, in partnership with the theatre company Y-Touring, has received a grant of £255,000 from the Wellcome Trust and the Research Councils to develop and deliver a major public engagement programme on the use of information technologies, specifically those involving large databases of patient records, for health and medical research.

The project will raise public awareness and discussion on the impact of engineering on the nation's future health and wellbeing. A suite of activities will be delivered over a two year period, including the development and touring of a play, an accompanying debate series and provision of online supporting materials. The play will be shown to both young people and adults in schools, hospitals and science centres across the UK.

Technology has enabled an exponential rise in our ability to gather, store and share large quantities of data. However, the use of such systems in health services and for medical research is a multi-faceted and complex topic. The benefits for health include using the information to identify the causes of disease, help control epidemics, monitor drug effectiveness and provide better services. Nevertheless, there are many associated issues for both society and the individual, including those surrounding privacy, consent, accessibility and data security.



The cast from a previous Y-Touring production entitled 'The Projectionist', inspired by the Academy's report last year on Dilemmas of Privacy and Surveillance.

Media stories on such topics are hitting the national news on a daily basis and the expectation is that this will continue for some time to come. This project will encourage informed and considered debate, highlighting how advances in the field can benefit patients, while making time to investigate people's hopes, expectations and concerns.

The project will not only explore but will also gather audience attitudes on the use of patient record databases for health and medical research. The information will be collected using electronic polling, discussion workshops and a public conference. The findings will be used to inform appropriate stakeholders and policy makers of public views on the applications and implications of this potentially powerful, yet controversial, tool for improving health.

Martyn Thomas FEng, one of the project's advisory group members says, "the Academy is perfectly placed to provide a balanced, impartial and expert picture of the potential benefits and of the risks, so that the public can debate the ethical and political issues on sound foundations."

Contact: lesley.paterson@raeng.org.uk

AGM 2008

The Academy's 32nd Annual General Meeting was held on 7 July 2008. It was the first time that the AGM had been in the Academy's new building at 3 Carlton House Terrace, London SW1. The meeting was chaired by the President, Lord Browne, with 70 Fellows attending. The President gave a review of the year (see page 2) which covered the main developments that had taken place, including the move to Carlton House Terrace, the Engineering for Society policy agenda, and the increasing number of partnerships which the Academy is forging in order to increase its impact.

Six International Fellows, 44 British Fellows and four Honorary Fellows were elected. The Annual Review and the Financial Report and Accounts for the year ended 31 March 2008 were adopted. The AGM elected the following new Officers to Council: Professor Robert Mair (Senior Vice President), Professor Dame Julia Higgins (Chair, Awards Committee), Professor

Christopher Snowden (Chair, Engineering Policy Committee) and Sir John O'Reilly (Chair, Membership Committee).

The AGM approved changes to the Fellows' subscription rates and changes to the Statutes in respect of the maximum number of International Fellows should be put to the Fellowship in a postal ballot.

Following the formal business of the AGM, interesting technical presentations were delivered by three participants in Academy schemes. They were: Emma Kent of Buro Happold Ltd (a former Engineering Leadership Award holder), Dr Paul Greening of UCL (a participant in the Industrial Secondment Scheme), and Dr Robert Dorey of Cranfield University (RAEng/EPSRC Research Fellow).

Contact: ashley.thomas@raeng.org.uk

Obituaries

Professor Stanley Bowie FEng FRS FRSE died on 3 September. Before his retirement he was Assistant Director, Institute of Geological Sciences. He was also a Founder Fellow.

Sir Richard Morris CBE FEng died on 1 July. He was Chairman, Independent Power Corporation plc.

Sir Denis Rooke OM CBE FRS FEng died on 2 September. He was a Past President of the Academy.

Mr Alexander Sandberg OBE FEng died during August. He was a consultant for his own company.

Professor Bruce McArthur Sayers FEng died on 12 May. Prior to his death, he was Emeritus Professor of Computing Applied to Medicine, Imperial College London.

Dr Robert Sparrow FEng died on 23 June. Prior to his retirement, he was Director Research at British Rail.

Lord Donald Gresham, Baron Stokes of Leyland TD DL FEng died on 21 July. Before his retirement, he was Chairman, British Leyland Motor Corporation. He was a Founder Fellow.

Mr Wilson Binger FEng, International Fellow, died on 21 April. Before his retirement, he was Partner & Chairman, TAMS Consulting Engineers.

International news

Visit by Chinese Academy of Engineering

In June 2008, the Academy welcomed a delegation from the Chinese Academy of Engineering (CAE), led by its President, Professor Xu Kuangdi FEng.

Professor Xu, one of China's leading figures in politics and engineering, was presented with the Academy's International Medal by the President, Lord Browne, at the Academy Awards ceremony on 9 June. The International Medal is awarded occasionally to an individual resident outside the European Union for their outstanding and sustained personal achievement in the broad field of engineering, including commercial or academic leadership.

In the course of his very successful career in public life and academia, Professor Xu has managed to combine a commitment to engineering excellence with visionary and dynamic leadership. He oversaw the development of his national engineering academy with the same vigour and drive that he previously brought to the stewardship of one of the world's great cities during his term as Mayor of Shanghai. In 2003 he was elected Vice Chairman of the Chinese People's Political Consultative Conference.

Professor Xu is also the President of the China Federation of Industrial Economics and during his visit to the UK the Academy hosted a meeting between his delegation and the British Chambers of Commerce (BCC). Amongst the senior business leaders who participated in the high level discussions regarding China's economic prospects and UK-China trade relations was the BCC President, Peter Mileham.

The final event of the visit was the signing of a *Memorandum of Understanding* between the two academies, in the presence of the Rt. Hon John Denham MP, Secretary of State for Innovation, Universities and Skills, Lirong Zhang, Chargé d'Affaires at the Chinese Embassy, Fellows of the Academy and other distinguished guests. This document



Signing of the Memorandum of Understanding: (L-R) Lirong Zhang, Chargé d'Affaires at the Chinese Embassy; Professor Xu Kuangdi, President of the Chinese Academy of Engineering; Rt. Hon John Denham MP, Secretary of State for Innovation, Universities and Skills; Lord Browne, Academy President; and Peter Saraga, Academy Foreign Secretary.

provided for the strengthening of ties and the promotion of future cooperation between both Academies.

Before the signing, the Secretary of State spoke on the importance of UK-China cooperation in science and engineering, and Professor Xu emphasised the potential challenges and opportunities available in China and the need for reform of its higher education system to ensure the continued strength of its engineering base.

Overall, the visit marked an important chapter in the Academy's relations with the Chinese Academy of Engineering and established a path for future cooperation between the two academies built on mutual respect and understanding. A return mission by a delegation of Fellows led by the President, Lord Browne, will travel to Beijing in early December 2008. The visit will include a two-day workshop in Beijing on the topic of energy and climate change, followed by a visit to Shanghai.

Contact: shafiq.ahmed@raeng.org.uk

CAETS

In June 2008, the Academy co-sponsored an international Council of Academies of Engineering and Technological Sciences (CAETS) workshop on transport noise in Europe. The event was hosted by Professor Philip Nelson FEng at the Institute of Sound and Vibration Research at the University of Southampton.

Noise can adversely affect people by diminishing their quality of life and well-being and it has been estimated that as much as 20% of the EU population may be exposed to hazardous traffic noise levels. The workshop dealt with the key aspects of the community noise problem in Europe by assessing current and future technologies to reduce vehicle emissions.

The meeting took place over three days during which air, road and rail transport were addressed in turn. Professor Dame Ann Dowling CBE FEng FRS gave a well-received presentation on the first day entitled *Towards a silent aircraft*. Plans are now in place to extend the study to address global noise issues. The final report will be presented at the CAETS Convocation in Calgary in summer 2009.

Later in June, the Netherlands Academy of Technology and Innovation hosted the annual meeting of CAETS academies. The meeting began with a one-day technical symposium in Delft on sustainable development of the world's deltas, which will accommodate an estimated 70% of the global population by 2050. Amongst the speakers was Professor Roger Falconer FEng, who gave a presentation on the Severn Barrage.

Peter Saraga OBE FEng, the Academy's Honorary International Secretary, represented the Academy at the CAETS Council meeting held the following day in The Hague. Topics under discussion included engineering education and

relations with other international bodies such as UNESCO and the International Council for Science. A CAETS statement on delta technologies was also agreed and is available at www.caets.org.

Contact: hayaatun.sillem@raeng.org.uk

European engagement

European engagement lies at the heart of the Academy's international strategy. In particular, the Academy is keen to develop relationships with important EU decision-makers, to strengthen links with other European academies and Euro-CASE (the umbrella organisation for European engineering academies), and to integrate and complement the networks built up by individual Fellows in European countries and institutions. Since the appointment of the Academy's first European Policy Adviser in January 2008, significant progress has been made towards these objectives.

As reported previously, the Academy will host the first annual Euro-CASE conference in early November 2008. Eminent engineers from 21 European countries will gather at the Academy to examine the engineering solutions which could help the EU achieve its challenging 2020 renewable energy targets. Academy President Lord Browne and Dr Sue Ion OBE FREng will chair the conference, and EU Energy Commissioner Andris Piebalgs will deliver the keynote address.

The Academy has also submitted responses to several EU policy consultations – most recently on offshore wind energy in Europe



Professor Roger Falconer FREng speaking at the CAETS symposium on delta technologies in Delft.

and UK progress towards the Lisbon Strategy. The Academy's response to the European Commission's consultation on measures to promote offshore wind energy in Europe identified planning uncertainty as the greatest barrier to both offshore and onshore wind energy. It showed how planning difficulties caused supply chain, skills and financing constraints for new wind energy build. The response called for increased investment and cooperation at EU level in educating engineers with the skills needed to work offshore, a greater role for engineers in the planning of European transmission grid and renewable energy infrastructure, and EU level year-by-year forecasts for offshore wind build which would allow turbine manufacturers to plan appropriately for medium term demand.

The Academy's response to the Department for Business, Enterprise and Regulatory Reform's (BERR's) consultation on the UK's progress towards Lisbon Strategy targets for jobs and growth demonstrated how its portfolio of activities contributed to the delivery of the key National Reform Programme goals of improving the business environment, developing innovative products, services and processes, and defining an energy policy for Europe. The Academy called for a greater involvement of the engineering community in the policy-making process, and urged the Government to take a long-term view to boost jobs and growth through investment in science, technology and innovation.

Contributing to consultations such as these is helping the Academy to strengthen its contacts and raise its profile in the European Institutions and UK Government departments. It is now a participant in BERR's stakeholder activities on the Lisbon Strategy for Jobs and Growth and an active member of the UK stakeholder group for the European Institute of Innovation and Technology (EIT) hosted by the Department of Innovation, Universities and Skills (DIUS). In addition, Professor Julia King CBE FREng has recently been appointed to the EIT Governing Board and Professor John Wood CBE FREng has been elected Chair of the European Research Area Board (ERAB). The Academy will continue to work with these and other Fellows towards the realisation of its European objectives.

Contact: shane.mchugh@raeng.org.uk

Proactive International Fellowship Group

Last year, Council adopted the recommendations of the Membership Study Group led by Sir Peter Gershon CBE FREng with a view to ensuring that the Academy's UK Fellowship better reflects the diverse composition of the engineering profession. The Group subsequently made recommendations regarding the election of International Fellows, which were also accepted by Council.

One of the key recommendations was the establishment of a Proactive International Fellowship Group (PIFG), to be overseen by the International Committee, to identify outstanding candidates from a range of backgrounds, in strategic countries or subject areas. This group has now been established under the chairmanship of Dr Raj Rajagopal FREng. The PIFG will use a similar 'hub and spoke' approach to that recently adopted by the Proactive Membership Committee for stimulating the nomination of potential UK candidates for election, albeit on a smaller scale.

International Fellows, the most eminent engineers in their field from around the world, are a vital resource for the Academy and thus far they have not had a corresponding role in the activities of the Academy. The PIFG will require the support of Fellows, both UK and International, in order to succeed in its efforts to strengthen the pool of candidates for International Fellowship, who in turn will be able to help the Academy tackle the global challenges of the 21st century. To complement the work of the PIFG, the Academy is also seeking to enhance its engagement with International Fellows and provide opportunities for a more reciprocal relationship.

Contact: shafiq.ahmed@raeng.org.uk

Views of engineering employers sought

Engineering employers are being invited to go online to offer views direct to Parliament on the state of engineering in the UK via a new web-forum opened by the House of Commons Innovation, Universities, Science and Skills Committee. The forum runs from 17 September 2008 to 24 October 2008. Log on at: www.parliament.uk/parliamentary_committees/ius/ius_170908.cfm

Research news

Global Research Awards

The Global Research Award provides an opportunity for UK-employed engineering researchers from either industry or academia to travel on a research secondment overseas for up to one year.

Dr Andrea Cardoni of Glasgow University is seconded to the Instituto de Acústica at the University of Madrid for 12 months. There he will research on *Vibration Behaviour of Plate Transducers for Macrosonic Applications*. This research aims to improve the design of ultrasonic transducers for industrial and surgical applications, for example in surgical cutting tools.

Dr Nuno Gil of Manchester University's Business School will spend 12 months at Stanford University's Collaboratory for Research into Global Projects. There he will work on a project called *The Effects of Private Equity Involvement in New Infrastructure Development: Playing the UK Experience against an International Setting*.

Howell Istance of De Montfort University is seconded for 12 months to the University of Tampere, Finland where he will work on a project entitled *Gaze-based Interaction with Virtual Communities for Users with Motor Impairments*.

Dr Jinsheng Kang of Brunel University will research *Life-like Virtual Human and Crowds for Product Design and Environment Design* at the Center for Human Modelling and Simulation (CHMS) at the University of Pennsylvania. This research work will be a key step in developing Brunel's human modelling and simulation capability which will feed into its current expertise in engineering design.

Dr Peter Matthews of Durham University is seconded to the Intelligent Systems Laboratory at the University of Amsterdam for four months. There he will research *Agent Meta-Learning in Uncertain Domains*. This work will develop artificial intelligence methods in application to engineering design.

Dr Mike Smith of British Energy plc will work at the Australian Nuclear Scientific And Technical Organisation (ANSTO) for a total of six months, over two years in 2008 and 2009.

Dr Smith is a structural integrity researcher who will work with colleagues at ANSTO on *Synthesising Residual Stress Measurement and Modelling for Welds* using Australia's OPAL experimental nuclear reactor.

Professor Song Yan of the University of Bedfordshire will spend five months at Harvard University to work on a project called *Intractability Study of Number-Theoretic Cryptographic Algorithms and Cryptanalysis of RSA*. This research investigates the robustness of algorithms which underpin internet security.

Contact: robert.barrett@raeng.org.uk

Industrial Secondment Scheme

The Industrial Secondment Scheme provides funding to the UK Higher Education institutions to enable engineering teaching staff to spend three to six months in industry with a view to improving the quality and industrial relevance of the teaching of engineering. In the past three months, 11 awards were made:

- **Dr S Ali Shirsavar** of the University of Reading was seconded to Moog Components Group Ltd and Ridley Engineering UK Ltd
- **Dr Neil Vernon Taylor** of the University of Bristol was seconded to Reaction Engines Ltd
- **Michael Jones** of Bournemouth University was seconded to Siemens AG
- **Dr Patrick Foster** of the University of Exeter was seconded to Anglo-American plc
- **Dr Hussain Al-Khalid** of the University of Liverpool was seconded to A-One+
- **Dr Graham Schleyer** of the University of Liverpool was seconded to Shell Global Solutions (UK), Shell Technology Centre
- **Dr Devi Prasad Tumula** of Napier University was seconded to Faber Maunsell Limited
- **Dr Martin Crapper** of the University of Edinburgh was seconded to MWH UK Ltd
- **Dr Peter Fenn** of the University of Manchester was seconded to Wragge & Co LLP
- **Dr Darron Dixon-Hardy** of the University of Leeds was seconded to Leeds Bradford International Airport

- **Professor Andrew Day** of the University of Bradford was seconded to MI Technology Group Ltd, Leyland Technical Centre

There is no closing date and applications are accepted throughout the year. For more information visit www.raeng.org.uk/research/univ/secondment/

Contact: imren.markes@raeng.org.uk

Distinguished Visiting Fellowship Scheme

The Distinguished Visiting Fellowship scheme aims to enable access to global centres of excellence in engineering research and teaching, with a view to strengthening UK capacity and international standing. The scheme provides funding to UK universities to enable academic engineering departments to be hosts for up to a month to Distinguished Visiting Fellows from overseas academic centres of excellence.

The deadline for the first round of applications was 30 June 2008 after which 18 awards were made. Some 28% of the Distinguished Visitors were from the USA, 17% from China, 11% from Ukraine, 11% from Germany and the remaining from Australia, Belgium, Japan, India, Russia and Switzerland.

For more information on the awards visit www.raeng.org.uk/research/researcher/dvfs/award_holders.htm

For more information about the application process visit www.raeng.org.uk/research/researcher/dvfs/apply.htm

The deadline for the next round of applications is 31 October 2008.

Contact: imren.markes@raeng.org.uk



Distinguished Visitor Professor Tak-Shing Peter Yum of the Chinese University of Hong Kong during an RFID project demonstration at University College, London.

Microsoft Research/ RAEng Research Chair

In September 2008 **Professor Mounia Lalmas** was appointed as the Microsoft Research/RAEng Research Chair in Information Retrieval at the University of Glasgow.

Searching the web or other online resources is an essential part of our daily life and is often a preferred way of acquiring information. Over the past 30 years, research in information retrieval (IR) has led to various IR models, upon which different retrieval systems have been built. However, the rapid growth of online resources both in volume and complexity has imposed new challenges that traditional IR models, and conventional search technologies built upon them, are incapable of dealing with.

Professor Lalmas' research aims to make a revolutionary shift of the information retrieval paradigm by developing a novel and unified IR theory based on the Quantum Theory framework; to address the emerging challenges of context-sensitive and structure-aware searches.

The growth of context-sensitive information access systems and the proliferation of structured information sources make the need for Lalmas' research increasingly urgent. Areas in which it could help include the provision of efficient and effective learning and teaching, in the searching and browsing of web repositories, as well as in the use of cultural heritage collections and digital libraries.

Contact: robert.barrett@raeng.org.uk

Microsoft Research/ RAEng Senior Research Fellowship

Dr mc schreafel has been appointed as the Microsoft Research/RAEng Senior Research Fellow in *Supporting Work in Progress for Innovation and Discovery* at the University of Southampton.

Dr schreafel's research is in the area of Human Computer Interaction and seeks to investigate how to record ideas so that they can be easily accessed by a



Professor Mounia Lalmas, Microsoft/RAEng Research Chair in Information Retrieval

wide audience. In doing so, others can contribute – and adapt ideas – to another context, alter their work to prevent duplication of effort, or simply rediscover ideas that were not followed through at the time of conception and apply them at the later date, so avoiding the need for re-invention.

Contact: robert.barrett@raeng.org.uk

Annual Research Forum

Each year the Academy hosts a Research Forum to exhibit the work of a representative selection of recipients of our research awards. This year a capacity audience of over 140 came to the event which took place at The Royal College of Physicians on 19 September 2008.

The Forum provides an excellent opportunity for those engaged in engineering research, industrial sponsors and a host of other interested parties, including the Department for Innovation Universities and Skills, to network and to hear about the current direction of leading-edge research carried out under the badge of the Academy.

The invited speaker this year was Professor David Delpy, Chief Executive of the Engineering and Physical Sciences Research Council (EPSRC), who outlined their future plans in supporting research. He commented that while the UK engineering base is sound, its international impact is not as great as it ought to be. Although international competition in engineering is growing more rapidly than most other disciplines,

EPSRC's aim is to increase the UK's position by supporting ambitious research (and researchers) and by encouraging partnerships with industry.

Contact: robert.barrett@raeng.org.uk

Summer Soirée

Over 150 guests of the Academy went to the Rutherford Appleton Laboratory in Didcot, Oxfordshire, in June 2008 to explore the new Diamond Light Source synchrotron, the highlight of this year's summer Soirée. The event was held in association with the Science and Technology Facilities Council (STFC) and was attended by the Royal Fellow, HRH The Duke of Kent.

All guests were treated to an exhibition demonstrating the wide range of activities undertaken by the STFC, both in Oxfordshire and around the UK. It contributes to the economy through the development of innovative and commercially successful products and processes.

As part of the exhibition, guests were invited on tours of some of the major installations at the Laboratory. Those who visited the Diamond synchrotron learnt about how the new facility is aiding research into biology and medicine, the physical and chemical sciences and much more. Also featured in the exhibition were tours of the Central Laser Facility which is one of the world's leading environments for laser technology research; the ISIS Pulsed Neutron Muon Source which leads the world's research into the physical and life sciences; and the Space and Science Technology Department which is heavily involved in space research, both in the UK and internationally.

At the successful Soirée, Professor Wendy Hall, Senior Vice President of the Academy, said that she hoped the Academy's partnership with the STFC would "go from strength to strength in future as we pursue a shared vision to promote a greater awareness of the role of science and engineering in today's society and in shaping our daily lives."

Contact: amy.abbott@raeng.org.uk

Policy news

Making the most of workplace wisdom

Engineering projects frequently involve large teams of people working in different countries on activities that will go on for many years. The challenge of sharing knowledge amongst such disparate teams and retaining the lessons learned by project groups is one faced by many engineering companies. Engineering companies are also facing the exodus of a cohort of expert engineers nearing retirement, and it is essential that they capture that expertise and find ways of sharing it across the workforce.

At a meeting at the Academy on 16 June 2008, members of the knowledge management teams at Arup, BP and Rolls-Royce spoke about their strategies for retaining and sharing engineering expertise. All three speakers described the various ways that they captured knowledge – from regular discussion meetings to software for tracking design decisions. The right mix of technological solutions and opportunities to share lessons is the key to retaining valuable knowledge.

A transcript of the seminar and presentations from all of the speakers is on the Academy website at this address: www.raeng.org.uk/policy/knowledge_transfer/default.htm

Contact: natasha.mccarthy@raeng.org.uk

Robotic and computer assisted surgery

Robotic and computer assisted surgery originated in the mid 1980s. However, it is only recently that systems have become cost-effective enough to apply to a range of clinical application areas. On 24 June 2008 the Academy hosted a seminar examining robotic and computer assisted surgical applications and discussing their clinical benefits.

The programme featured a range of speakers and was jointly chaired by Professor Brian Davies FREng and Professor Tony Unsworth FREng. Speakers covered topics such as microsurgery, robotic neurosurgery, and computer-

assisted navigation in orthopaedics. Cost-effectiveness and practical implementation were also discussed.

The lectures were followed by a discussion session, where issues such as ethics, barriers and the potential of robotic technologies were debated. The results of the seminars and discussions left little doubt that robotic surgery will have a considerable influence on healthcare and surgery.

Contact: xameerah.malik@raeng.org.uk

Eco Towns: living a greener future?

In June 2008, the Academy responded to a Communities and Local Government (CLG) consultation on Eco Towns. The Academy welcomed the potential of Eco Towns to improve standards of housing design and increase the supply of affordable housing. However, the Academy expressed reservations about the overall scheme, not least that the proposals distract attention from the fact that more energy savings would be made by improving existing buildings rather than by building Eco Towns.

As there was no engineering expertise on the Eco Towns panel, the Academy was concerned that it would not be sufficiently qualified to address the engineering and technological considerations that strongly underpin the ultimate target of sustainability.

The perception that Eco Towns would attract economic activity merely by existing was not strongly supported by evidence from past developments. There were additional concerns about the use of innovative technologies; the proposals are receptive to the use of new technologies, without employing close engineering scrutiny or providing the financial structure to ensure that the systems will work.

In order to be successful, Eco Towns would require an appropriate level of investment for long-term monitoring and maintenance. The Academy recommended that the Government take responsibility for Eco Towns and their consequences in the long-term. In addition, zero-carbon developments should be monitored to validate their low-carbon status.

Contact: xameerah.malik@raeng.org.uk

Severn Barrage feasibility study

Following the successful briefing on the engineering challenges of the Severn tidal schemes, the Academy has been working with the major engineering institutions to provide an expert panel of engineers to oversee the current feasibility study being conducted by the Department of Business, Enterprise and Regulatory Reform (BERR). The feasibility study is expected to take two years and will consider a number of proposals for generating renewable electricity from the tides in the Severn Estuary.

As part of the feasibility study, a strategic environmental audit (SEA) of the main contending proposals is being undertaken by PB Power. The Academy and major institutions have also nominated an engineering expert to sit on the SEA where there is an important role to be played in balancing the fears of environmental damage with the real possibilities of the engineering and its effects.

On the feasibility study expert group are Professor Roger Falconer FREng, Tim Broyd FREng, Professor Chris Binnie FREng, Professor Peter Stansby FREng, Professor Chris Flemming FREng, Clive Baker and Derek Lumb. Professor Peter Guthrie OBE FREng also serves on the study's main steering board on behalf of BERR.

Contact: richard.ploszek@raeng.org.uk

The economics of renewable energy

The Academy responded to the Lords Economic Affairs Committee's consultation on the economics of renewable energy. This issue has particular resonance given the recent EU target for 15% of the UK's energy to be sourced from renewable energy by 2020 – a considerable challenge given that the level is currently less than 2%. The response noted that the main barriers to the deployment of renewable energy were capital costs, grid connections and the global procurement chain. It also pointed out that the engineering practicalities of delivering such a large increase should not be underestimated.

Overall, the response highlighted the fact that renewable energy must be part of a

clear and integrated energy policy along with other low-carbon technologies and demand reduction. It also noted that the UK was lagging behind the rest of Europe despite its rich resources of wind and marine energy.

Contact: alan.walker@raeng.org.uk

Carbon capture and storage

Following proposals by E.ON to build a new coal-fired power station at Kingsnorth (the first in the UK for 30 years) the Environmental Audit Committee carried out a short consultation on carbon capture and storage (CCS). The committee was of the opinion that allowing a new plant to run on coal – the most carbon-intensive of fuels – would damage the UK's chances of meeting its emissions targets and its ability to take the lead on climate change in the international agreement.

The Academy's response noted that the decision on Kingsnorth was unlikely to significantly affect the world's dependence on fossil fuels and that CCS was one of the few technologies with the potential to radically reduce emissions worldwide, particularly in expanding economies such as China and India. The response therefore stressed the importance of supporting the development of CCS and bringing it online as quickly as possible.

Contact: alan.walker@raeng.org.uk

Council news

Council held its third meeting of the year on 7 July 2008. Sir John Parker FREng, Chair of the Campaign Board, gave a presentation on the status of the fundraising campaign. The aim is to raise £25 million by the end of 2010. Of that sum, £15 million will be used to enable the master plan for 3 Carlton House Terrace to be carried out. The full complement of the development team is now in place and are providing support to the Campaign Board to drive the campaign forward.

The Chief Executive gave a progress report on the strategic review of activities currently underway. One of the issues highlighted was the importance of working with the engineering institutions to establish agreed positions

on technological issues of major public importance, such as energy policy.

Dr Scott Steedman FREng, Chair of the Communications and Public Engagement Committee, gave a presentation on the way in which the Academy is improving its policy and public engagement activities. Several work strands are in progress including developing a relationship strategy, a media strategy and forums for engaging the public on engineering policy issues.

Council approved the creation of the Diversity Working Group, with Professor Wendy Hall CBE FREng as its first Chair. The purpose of the Group will be to guide the Diversity in Engineering Campaign. It will do this by assessing the extent to which promoting diversity and equality is currently integrated into the policies and practices of the Academy, identifying best practice within similar bodies and developing an action plan to deliver a fully integrated diversity strategy.

Council reviewed the auditors' report on the accounts for the year to 31 March 2008 and judged that the report was satisfactory. Council also approved the remuneration for the auditors for the coming year.

A number of Council members stood down at the AGM. They were Professor Professor Wendy Hall CBE FREng, Dr Sue Ion OBE FREng, Professor Richard Williams FREng, Professor Michael Sterling CBE FREng, Professor Peter Gregson FREng, Christopher Hodge FREng, Professor Richard Holdaway FREng and Dr Michael Shears CBE FREng. The President thanked them warmly for the support they provided during their time on Council. New members of Council were also elected (for more details see page 3).

Contact: ashley.thomas@raeng.org.uk

Stop Press

Amendments to Statutes

In the postal ballot of the Fellowship in August and September 2008, the vote to increase the number of International Fellows was 686 in favour and 19 against. The motion will now be put to the Privy Council for final approval.

Public Engagement Fellowship scheme

Engineering has a profound impact on the health, wealth and wellbeing of the nation. Yet, all too often, the voice of engineers is not heard in policy discussions, public debates and other public engagement activities.

The fruits of engineering have many implications for society which need to be explored by all of its stakeholders, with both engineers and policy makers listening to each other and engaging with the wider public.

Launched in September 2008, the Academy's unique new Public Engagement Fellowship scheme will be open to excellent early/ mid-stage career engineers (from academia or industry) to explore engineering and society issues and to build dialogue and engagement with the public, policy makers and other stakeholders.

The successful Public Engagement Fellows will undertake a suite of activities that could include collaborating with social scientists to explore public views and attitudes on engineering issues; undertaking ethics case studies on specific engineering-related projects; shadowing schemes with MPs and civil servants or working with thinktanks to arrange public dialogue activities on technology-related issues.

The awards will give engineers the opportunity to design and pursue their own development plan along with the provision of support, including the setup of a mentoring scheme.

The closing date for applications is 5 December 2008. Please visit: www.raeng.org.uk/engagement

Contact: lesley.paterson@raeng.org.uk



Education programmes

The Academy's role as an influencer and guide in science, engineering, technology and maths (STEM) teaching in schools and colleges is growing nationwide as the Academy moves towards the centre of STEM education in the UK. Below is a report on the current education programmes being undertaken and the impact the Academy is consequently having on UK STEM education.

14-19 Diploma in Engineering

The Diploma in Engineering has launched with some 4,000 school and college students across England now studying for the new qualification. The largest launch, which was overseen by the Academy, has been in the London Boroughs of Lambeth and Southwark, where 150 students have begun studying for the Diploma.

The new associated qualification in maths for the Advanced Diploma was approved by the Oxford Cambridge and RSA Examinations board (OCR) in June 2008, finalising the required preparatory work prior to the launch in the current school term. The Academy also produced a series of maths exemplars putting the new maths curriculum into an engineering context. These include the maths behind search and rescue operations, in assessing the carbon footprint of escalators and in the design of underground storage tanks for hazardous liquids.

The new curriculum for the Diploma was developed by the Engineering Professors' Council, ECuk, the Academy and the

mathematics community. Only then was it approved by OCR, breaking new ground in how education reforms are governed and implemented.

DCSF/DIUS STEM Programme

Being uniquely placed to advise ministers within both the Department for Children, Schools and Families (DCSF) and the Department for Innovation, Universities and Skills (DIUS), the two Government departments responsible for education, the Academy has played a pivotal role in the production of the new directories of science and maths extra-curricular activities for schools known as the *STEM Directories*.

The need for a one-stop shop approach providing clear guidance about quality-assured support and resources available, and ways of tying these into the curriculum, was identified by the DCSF's *STEM Programme Report* in October 2006. The Academy's *Shape the Future Directory* provided the model for the series of directories which resulted.

Contributed to by STEM providers and teachers, the new *STEM Directories* provide teachers and lecturers of students of all ages with the best models of how to engage their students with science, technology, engineering and maths, providing the definitive source of enhancement and enrichment schemes and activities in STEM.

The launch of the directories took place at the BA Festival of Science in Liverpool and 60,000 copies of the suite of three *STEM Directories* have already been distributed with an online version to follow.

London Engineering Project (LEP)

The LEP is set to roll out nationally from July 2009 until July 2012. The Higher Education Funding Council for England (HEFCE) have confirmed that funding is in place for the planned roll-out to happen, with the LEP being partnered with its sibling projects in chemistry, physics and maths.

The London Engineering Project will bring its wealth of experience in widening participation (WP) to the cooperative national programme, being is the most experienced of all the project leaders in tackling gender, ethnic and socio-economic under-representation in higher education.

In addition, the Higher Education Funding Council for Wales (HEFCW) has signalled its intention to follow in the footsteps of HEFCE and fund a Welsh Engineering Project. A pilot project is already underway in Wales funded by HEFCW and delivered for the Academy by Technology Alliance Wales.

Barrow Engineering Project

The Barrow Engineering Project has employed local teacher, Brian Wood, to oversee what is currently the latest of the Academy's education programmes. Brian will coordinate the introduction of the project's menu of curriculum enrichment activities into Barrow-in-Furness schools and colleges to encourage young people to consider engineering as a career in an area of the UK where the availability of jobs in the sector is currently increasing.

Local companies including BAE Systems and BP, who are supporting the project, will be looking to these schools for their future employees.

News of Fellows

John Baxter has been awarded an honorary degree from the Robert Gordon University in Aberdeen.

Sir David Harrison CBE has been presented with an honorary degree from the University of York.

Peter Head OBE has received an honorary degree from the University of Bristol.

Professor Julia King CBE has been appointed to the Government's Committee on Climate Change.

Professor Brian Launder has been awarded the Docteur Honoris Causa by Paul Cézanne University, Aix-en-Provence, France.

Sir David McMurtry CBE has been made an honorary graduate by the University of Bath.

Sir Rob Margetts CBE has been appointed as the first non-executive Chair of Ordnance Survey.

Dr David Milne OBE has been made an Honorary Doctor of Science by Edinburgh University.

Dr Tribidesh Mukherjee has been given the IOM3 Bessemer Gold Award by Tata Steel.

Dr Ian Nussey OBE has received an honorary Doctor of Engineering degree from Glasgow University.

Chris Price was made OBE in the New Year's Honours list.

Professor Stephen Richardson has become the new Faculty Principal for Engineering at Imperial College London.

Professor John Wood CBE has become International Relations Adviser at Imperial College London.

The Best Programme

An external review of the impact of the Best Programme (the Academy's programme of extra curricula, undergraduate and post-graduate activities) is currently underway. The review is being overseen by Professor Neil Alford FREng and is being conducted by Professor Jonathan Osborne of King's College, London. Support is being given by Professor Peter Kutnick, also from King's College, London and Dr David Good of Cambridge University.

The aim is to draw together all the evidence of the impact that the Best Programme has had over the years. One of the priorities is to establish the additional value that has been brought to the component schemes of the Best Programme by being part of an established and quality assured continuum rather than operating in isolation. The review panel will report at the end of 2008.

Wacky races at the LEP

In July 2008, the London Engineering Project hosted its first ever solar-powered car rally. The car park at the London South Bank University was transformed into a race track for the event which was attended by youngsters from LEP schools. They converged upon the makeshift speedway to race their cars in less than ideal conditions. Cloudy skies threatened to spoil proceedings but the cars, which are also fitted with batteries for such an eventuality, did finally race and without the need for battery back-up.

Pupils from St Saviour's and St Olave's School for Girls in Southwark took both first and second places, fighting off some



LEP students at the solar powered car rally held at the London South Bank University in July.

tough competition from other 'drivers'. Members of the Science Museum's Punk Science team were on hand to compère and ensure a fair competition. Afterwards, they treated participants to their unique brand of science-infused live comedy.

The LEP's Ahmed and Shireen ended the day with an impressive display of motor-powered model rockets.

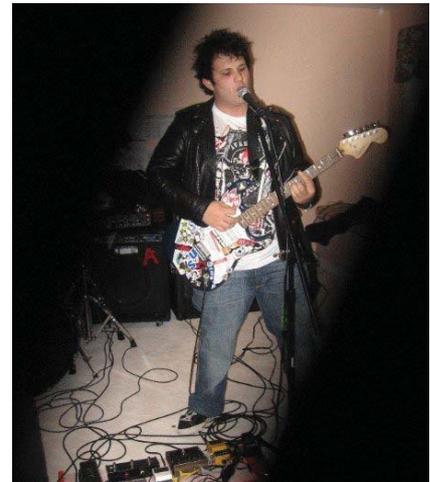
Contact: claire.mcloughlin@raeng.org.uk

Maths prizes for YINI students

For the first time ever, the Academy has awarded three prizes to students who have taken part in the Best Programme's maths course at the University of Loughborough. The course attracted 171 students this year and the three prize winners – Matt Taylor, James Partridge and Theresa Yong – all achieved top marks throughout and were each awarded £500.

Developed in conjunction with the Academy, the module provides the opportunity for students taking a gap year through The Year in Industry (YINI) to maintain and enhance maths skills developed at school and be well prepared for the mathematical demands of their university degree course.

James said, "I chose the Best Maths course as an ideal way to keep up my maths skills, some of which had already started to go rusty since leaving school. In doing so I have also been able to extend my knowledge further and this will put me in



James Partridge was one of three students to be awarded a prize at the Best Programme's Maths course at the University of Loughborough.

a better position when I start my degree in September 2008. I shall be studying for a MEng degree in electrical and electronic engineering at the University of Manchester. Ultimately I hope to work in applied research and development of digital signal processing and to achieve Chartered Engineer status."

Contact: claire.mcloughlin@raeng.org.uk

Technology Horizons Award

The prize ceremony for the third Independent-Bosch Technology Horizons Award essay competition was recently held at the Academy, with inspirational presentations from Bill O'Riordan FREng and Richard Noble OBE.

Students had to answer the question *How is technology and engineering driving change in a country of your choice?* There were two age categories and the winners were Christopher Cubitt (14-18) from Ilford County High School and Carmel Digweed (19-24) from the University of Sheffield who, coincidentally, both featured China. Their essays were published by *the Independent* and can be seen on the Academy website.

This year's essay theme is *How can technology and engineering provide innovative solutions for today's global challenges?* The closing date for entries is 31 March 2009 and there are great cash prizes for the shortlisted finalists. For more information visit the Academy website.

Contact: dave.rowley@raeng.org.uk

Work and art at 3 Carlton House Terrace

Over the past few months, the Academy has upgraded some of the facilities in Carlton House Terrace in order to improve the support for operational functions.

The old smoking room and adjacent store room on the north side of the first floor have been opened up to provide an office suite for the President with space for a PA to welcome visitors. This new facility is adjacent to the room which will eventually become the Fellows' room. We have also undertaken a complete redevelopment of the toilets on the first floor to provide suitable facilities for all visitors.

The work in all of these areas is in line with the proposed master-plan redevelopment. Carrying it out this year has allowed the Academy to upgrade facilities much earlier than would otherwise have been the case and to learn valuable lessons about developing the fabric of the building and selection of materials.

Visible progress has also been made in deploying the building's large expanse of bare white walls to promoting the Academy and our key messages. Within the theme of beauty in engineering, a small collection of new and existing artwork has been hung on the ground and first floors. In addition, Academy memorabilia and photographs of current prominent engineers aim to celebrate excellence and stimulate the interest of visitors.

Contact: dai.morgan@raeng.org.uk

Staff news

Carolee Summer-Sparks has joined the Academy as Corporate Partnership Manager in the Development Department. Prior to this she was the Senior Programme and Operations Officer at Washington Area

Women's Foundation in Washington DC, where she was responsible for funding organisations that focused on improving the lives of women and girls in that region.

Sylvia Hampartumian has joined the Academy as Assistant Manager, Awards. She has previously worked for The Anthony Nolan Trust, providing administrative support to the Operations Department.

Angus Dawson has left after nearly two years at the Academy as Assistant Editor, Publications. He will remain in London and is embarking on a career as a freelance designer of books and magazines.

Alex Pennington, Assistant Manager, Awards and Events, has left the Academy

to join Shocklogic Global Ltd, providers of systems and services to the events industry. Alex worked for the Academy's Events and Awards department for one and a half years.

Dominic Bryan has left the Academy to join Lidl UK Ltd as a Trainee District Manager in Cheshire. During his time as Assistant Manager, Engineering Programmes, he has contributed to the development of the Visiting Professors schemes.

Mark Yelland has started as Deputy Head of Hurlingham & Chelsea school. His new role includes the priority to raise attainment in SATS and GCSEs – something that he focused on in his last Deputy Head role at the London Nautical School.

Development news

The Academy's Development team is now complete. The team brings together a wide range of fundraising experience from across the voluntary and corporate sectors, nationally and internationally and is tasked with raising £25m for the Academy's 'Making Things Better' campaign.

In Spring 2009, the Academy will host a series of lunches where Fellows will have

an opportunity to hear about the campaign's progress from members of the campaign board.

Lunches will be held in London at Carlton House Terrace and regionally - further details will be sent out before the end of the year. Anyone wishing to attend should contact **Antoinette Carey** at antoinette.carey@raeng.org.uk or phone 0207 766 0657, to register their interest.



The Royal Academy of Engineering Development team, L-R: Dominic Geyer, Antoinette Carey, Carolee Summer-Sparks, Sarah Philbrick and Bernadette Benati. Photo: Barry Weekes

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