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## Annual Academy Awards

The Academy celebrated its latest round of awards in grand style at Christ Church, Spitalfields in London on 5 June, 2007. Over 250 guests attended the event and were treated to an excellent evening in the company of some of the country's most eminent engineers. The Senior Fellow, HRH The Prince Philip Duke of Edinburgh KG KT, said after the event that "the atmosphere was one of excitement and enjoyment, and it was a very fitting environment to pay tribute to those who have contributed so much to the field of engineering."

Alastair Stewart OBE, broadcaster and ITV newsreader, was asked to be the Master of Ceremonies and his considerable skills ensured that the event fulfilled the expectations of all. The MacRobert Award is the UK's premier award for innovation in engineering and the evening began with an opportunity for guests to inspect the exhibits of the 2007 MacRobert Award finalists. The eventual winner was Process Systems Enterprise Ltd and the three other very worthy finalists were Intelligent Orthopaedics Ltd, Roger Bullivant Limited and Transitive Corporation.

The evening as a whole was a great success which, according to the President, Lord Browne, served to add to the "standing and reputation" of the Academy. Among the guests was honorary Fellow Sir David King HonFREng FRS, Chief Scientific Advisor to the government. Sir David commented later to Philip Greenish, the Academy Chief Executive: "What a wonderful and inspirational evening. I was particularly pleased to see a MacRobert winning team made up of brilliant engineers who came to this country from overseas, which shows just how open the UK is to people with innovative ideas from across the world."

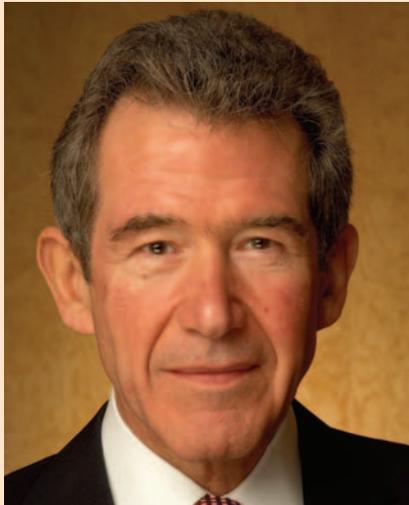
The winners of the Academy's other awards revealed the sheer strength of engineering in this country. Among the victors were Dr Johnny Ball who received The Public Promotion of Engineering Medal and Mario Iobbi, of Imperial College London, whose unique respiratory therapeutic device led him to win the ERA Foundation Entrepreneurs Award. The other awards (a full list of winners is included on page 3) ensured that both young and old, those with huge experience and those just beginning their careers, were recognised for their impressive achievements in the last year.

*HRH The Prince Philip Duke of Edinburgh KG KT  
alongside the 2007 MacRobert Award winners,  
Process Systems Enterprise Ltd*

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## The President's Column



Lord Browne

We are often told that we live in an era of globalisation. The concept embodied in the term 'globalisation' is not new – flows of people, knowledge and capital have always traversed national barriers. However it is true that the opening up of markets and developments in information and communication technology (ICT) have accelerated change at the global scale and deepened our sense of interconnectedness. In business, understanding the international dimension is accepted as being critical to success. I believe that this too applies to the Academy, notwithstanding the fact that we have a national remit.

The Academy's new International Strategy is an important document which brings clarity and focus to the Academy's international interests. It emphasises the need for us to view our priorities through an international lens, and to make full use of international networks and activities in working to achieve our objectives. The significance of this can be illustrated by considering how the Academy can make a difference in the areas I have identified as priorities for my term of office as President.

Taking climate change and energy first, it is clear that developing an effective national engineering response to this challenge both requires an understanding of the global context and must involve actions that affect other countries. Although the UK contributes only 2% of global carbon dioxide emissions, it is very much in our interests to take a leadership role in

promoting international action on climate change mitigation and adaptation. This is likely to entail leading by example, as well as engaging with those countries which will be the most significant emitters of greenhouse gases in coming years.

The second of my presidential priorities, poverty reduction, is an inherently international challenge. I am convinced that the impact of globalisation has been overwhelmingly positive but it has also been associated with some more sinister outcomes. These include the disruptive effects on those who are ill prepared for change and the exclusion of sections of society from the benefits of globalisation due to its uneven rate and reach. Engineers can help to minimise the number of people who become disaffected in this way – globalisation is only frightening for those who cannot see how they will gain from it. The task for the Academy is to promote awareness amongst decision makers worldwide of the role that engineering can play in reducing poverty through facilitating economic growth and sustainable development, and to form partnerships with engineers in developing countries which help to strengthen their ability to fulfil this role.

The disruptive effects of globalisation also have implications for my third priority area: health and well-being. One unwelcome development is that international terrorism now poses a significant threat to our quality of life. On the one hand, there is evidence that it has been fuelled by disenfranchisement from and resistance to the changes brought about by globalisation; on the other, many terrorist groups have taken advantage of developments in ICT to extend their global reach and conceal their operations. The Academy's recent report, Dilemmas of Privacy and Surveillance, highlighted the vital role of engineers in responding to these developments in a way that does not compromise people's trust or privacy.

Global issues such as climate change, poverty reduction and international security are shaping the future of our planet. Young people recognise this and the Academy's responses to these imperatives could be instrumental in attracting a new generation into engineering. Engineering is a global

endeavour with the potential to have a profound impact on the key challenges of our time. These problems transcend all national boundaries, and so does the knowledge required to tackle them. The Academy must reflect this in its outlook and actions if it is to succeed in repositioning engineering at the centre of society.

A handwritten signature in black ink, appearing to read 'J. Browne', written in a cursive style.

### Meetings and Visitors

The President has recently met:

**HRH The Prince Philip Duke of Edinburgh KG KT**  
Senior Fellow

**Mr Marcus Agius**  
Chairman, Barclays Bank plc

**Mr John Armitt CBE FREng**  
Chief Executive, Network Rail

**Sir Paul Judge**  
Chair, The Royal Society for the encouragement of Arts, Manufactures and Commerce

**Sir David King HonFREng FRS**  
Chief Scientific Advisor to HM Government  
Office of Science & Technology

**Lord Peter Levene of Portsoken**  
Chairman, Lloyds of London

**Sir Duncan Michael FREng**  
Trustee of Arup Group Ltd

**Sir John Parker FREng**  
Chairman, National Grid plc

**Mr Ian Ritchie**  
Founder of Ian Ritchie Architects

**Lord Sainsbury of Turville**  
Former Parliamentary Under-Secretary of State for Science and Innovation, House of Lords

**Mr Malcom Wicks MP**  
Minister of State for Science and Innovation, House of Commons

## Move to 3 Carlton House Terrace – update

As we go to print developments are continuing apace with the project to move the Academy to its new centre at 3 Carlton House Terrace.

The lease on 3 Carlton House Terrace was assigned to the Academy on 8 June and we now have custody of the building. We are finalising a “phase 0” building refurbishment programme which covers the basic works needed to get the Academy into the building and able to operate effectively. This will include improving the facilities available to Fellows with a dedicated area which will provide workspaces with IT and an informal meeting area. We plan to move into Carlton House Terrace in the autumn, with the aim of being operational there from 8 October.

Detailed plans are also being developed for more substantial alterations to meet the developing requirements of the Academy in full. These will provide a permanent,

purpose built lecture theatre for 150 people with supporting facilities in the basement; they will open up the main rooms on the ground and first floors as flexible space for functions, meetings, and exhibitions. They will also provide a modern, open plan working environment for the Academy staff and its partners which will provide the flexibility to accommodate project teams through all stages of their work. The alterations will be designed with the aim of underwriting the Academy’s sustainability agenda. They will be sympathetic to the history of this delightful grade 1 listed building, whilst meeting the needs of a forward looking organisation in the 21st century, and thus will provide an opportunity to showcase excellent contemporary engineering design.

A fundraising programme is being developed to support this major stage of the Academy’s development.

Meanwhile we may have found new tenants for 29 Great Peter Street who, subject to contract, will take over the lease on 14 October.

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## Academy Awards 2007 – the winners

This year’s awards were presented at Christ Church, Spitalfields and recognised technical prowess, innovative new designs and the achievements of the best engineers in the country.

The Academy’s flagship prize, the MacRobert Award, was presented by the Senior Fellow, HRH The Prince Philip Duke of Edinburgh KG KT, to Process Systems Enterprise Ltd for their gPROMS advanced process modelling software. The considerable innovation developed through this product made the Process Systems Enterprise Ltd team fitting winners. However, the three remaining finalists provided stiff competition and, despite not leaving victorious, all team members from Intelligent Orthopaedics Ltd, Roger Bullivant Limited, and Transitive were able to enjoy the atmosphere and present their products to all guests.

Dr Johnny Ball, the well-known and much loved TV personality, was presented with The Public Promotion of Engineering Medal by Kate Bellingham, the President of the Young Engineers for his long, active and positive involvement in the promotion of science, technology and engineering to young people, teachers and the general public.

The former Director of the The ERA Foundation, Sir David Davies CBE FREng, presented The ERA Foundation Entrepreneurs Award to Mario Iobbi, a PhD Research Student at the Department of Bioengineering, Imperial College London. He was recognised for his work in creating a new respiratory device which can provide better treatment for hospital patients, as well as reduce healthcare costs.

The Academy President, Lord Browne FREng FRS, handed out the Academy’s four prestigious Silver Medals to those who had shown outstanding contributions to British engineering, despite having less than 30 years in full time employment. Those to receive the medal this year were Professor Gehan Amaratunga FREng, Professor Nigel Brandon, Professor Christofer Toumazou, and Professor Christopher Wise RDI FREng.

Professor Philip Withers FREng was presented with the Education Innovation Prize by Lord Browne for the manner in which he made his excellent research into allowing the introduction of new materials into aerospace and nuclear applications available to schools and the general public.

There was also time throughout the evening to recognise some of the country’s leading young engineers. John Armstrong, Ahmed Kotb, David Lakin, Dr

Máire McLoone and Dan Mutadich were all recognised as the Academy’s Young Engineers for the year. Also, the President congratulated the Corporate Sponsors’ Young Engineers who included Dr Mike Colechin, Jacqueline Lemon, Luciano Pischedda, Saqib Shaikh, Steve Talbot and Folkert Visser.

The evening was sponsored by BAE Systems, BP, E.ON, Microsoft, National Grid and Rolls-Royce – without them the evening would not have been possible. The Academy is most grateful to these sponsors for their generous support.

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## Research News

### Research Chairs & Senior Research Fellowships

We are pleased to announce the establishment of two Royal Academy of Engineering Research Chairs and one new Senior Research Fellow:

**Professor Martin Trusler** of Imperial College London has been appointed the Royal Academy of Engineering/Schlumberger Research Chair in Oilfield Process Engineering. Professor Trusler's particular interest lies in the thermophysical properties of fluids and in developing fluid-property sensors and control systems for oilfield applications.

**Professor Jeremy Everard** of the University of York has been appointed Research Chair in High Frequency Signal Generation and Electronics, to be co-sponsored by BAE Systems. Professor Everard plans to investigate new oscillator and resonator techniques, supporting waveform generation electronics and measurement systems to greatly extend the current state of the art. This is research of vital industrial importance and will impact upon many types of electronic system, for example increasing accuracy for radar and Global Positioning Systems (GPS).

**Dr Bruce Grieve** of the University of Manchester has been awarded an Academy Senior Research Fellowship in the area of 'Biosensors and Remote Detection', sponsored by the sustainable agribusiness company, Syngenta UK. Dr Grieve's research will involve the development of novel biosensing and detection technologies for crop protection and parasite control.

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### Research Fellowships

The Royal Academy of Engineering/ EPSRC Research Fellowships are highly sought after appointments designed to support young engineering researchers in academia. This year we have been able to appoint 14 new Research Fellows, 75% more than in the previous round. They are:

- **Dr Sachi Arafat** (Glasgow University), 'Foundations research in information retrieval inspired by quantum theory';
- **Dr Richard Cobley** (University of Wales, Swansea), 'Pushing forward scanning probe techniques to meet the new challenges of optoelectronics and nanotechnology';
- **Dr Darren Cosker** (Cardiff University), 'Exploiting 4D data for creating next generation facial modelling and animation techniques';
- **Dr Dino Distefano** (Queen Mary University, London), 'Software Model checking with separation logic';
- **Dr Matthew Eaton** (Imperial College), 'Integrating design and uncertainty within a common modelling framework: applications to nuclear engineering';
- **Dr Ross Hatton** (University of Surrey), 'Hybrid nano-structured electrodes for organic photovoltaics';
- **Dr Ignacio Hernandez** (Queen Mary University, London), 'Halogenated organic mixed lanthanide and transition metal ion complexes for infrared optoelectronic devices';
- **Dr Vlado Lazarov** (Oxford University), 'Polar Oxide Interfaces: from fundamentals to spintronic applications';
- **Dr Martyn McLachlan** (Imperial College), 'Three-Dimensional nanosphere templating: A novel method for the preparation of nanostructured photovoltaics';
- **Dr Anna Peacock** (Southampton University), 'Fiberised semiconductor devices: a new platform for nonlinear photonics and applications';
- **Dr Richard Sandberg** (Southampton University), 'Numerical investigation of the hydrodynamic and acoustic fields of compressible axisymmetric flows';
- **Dr Andras Sobester** (Southampton University), 'Towards the 21st Century 'Whisper-Jet' – a Machine Learning Approach to Design for Fan Noise Deflection';
- **Dr Amanda Wright** (Glasgow University), 'New horizons in adaptive optics for life science research: adaptive microscopy'; and
- **Dr Shi Zhou** (University College London), 'Statistical topological studies on large-scale complex communication networks'.

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### Global Research Awards

Over the past three months three new Global Research Awards have been approved:

**Dr Xiaoyu Luo** of Glasgow University is seconded to the Courant Institute, New York University, USA, to conduct research on a project called, 'Developing a New Dynamic Model for Mitral Valves'. Dr Luo is a mathematical biologist who will apply mesh modelling techniques to the simulation of the human heart, to improve the design of artificial medical implants.

**Dr Ian Eames** of University College London will spend four months at the National Technical University of Athens, Greece to work on a project to examine, 'The Effect of Phase Change on Dispersed Turbulent Multiphase Flows'. Dr Eames' research in this broad area of fluid mechanics addresses a range of industrial problems involving particulate-laden gases, eg dust laden air from combustors and engine exhausts.

**Mr William Carson** of the Cambridge Computing Laboratory at Cambridge University will conduct research at the University of Porto, Portugal on a project for the 'Analysis, Design and Optimisation of Iterative Detection and Decoding Systems'. This work will develop powerful error correcting, coding and decoding schemes, and their application to broadband fixed wireless access (BFWA) systems.

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### Leverhulme Trust Senior Research Fellowships

Each year the Leverhulme Trust funds Fellowships which allow mid-career researchers to take up to one full year's research sabbatical. This year's Fellowships have been awarded to:

**Dr Mark Biggs** (Edinburgh University), 'Prediction of dynamics of proteins on solid surfaces over macroscopic timescales';

**Dr Caroline Fitzpatrick** (University College London), 'Solar Treatment of Humic Substances in Drinking Water Sources';

**Dr Simon Gill** (Leicester University), 'Multiscale models for strain-controlled diffusion problems with applications in nanoengineering';

**Dr Catherine Holt** (Cardiff University), 'Using motion analysis techniques and objective classifiers to characterise mechanisms of human movement and postural control: Applications in Orthopaedics and Neurology';

**Professor Angela Seddon** (Nottingham University), 'Development of Infrared-Transmitting Optical Fibre Devices and Systems for Applications in Surgery and Diagnosis'; and

**Dr Michael Ward** (Birmingham University), 'Q control of micro resonators in an aqueous environment'.

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## Annual Research Forum

Each year The Royal Academy of Engineering hosts a Research Forum to exhibit the work of a selection of our incumbents. The Forum includes presentations by researchers who have been awarded funds under one of the Academy's research schemes. The event itself provides an excellent opportunity for those engaged in engineering research, industrial sponsors and a host of other interested parties, to network and to hear about the current direction of leading edge research carried out under the badge of the Academy. The event is held annually at the Royal College of Physicians, Regent's Park, London. This year's event will be held on **Friday 28 September**.

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## Industrial Secondment Scheme

The Industrial Secondment scheme provides funding to UK Higher Education institutions to enable them to release engineering academics to industry

for three to six months with a view to improving the quality and industrial relevance of the teaching of engineering. Three new awards were made since March 2007:

**Professor J R Banerjee** from City University received an award for a secondment at Marshall of Cambridge Aerospace Limited to develop a finite element model of the fuselage structure of A400M Flying Test Bed for Airbus Military and to use this for prediction of vibration levels and the evaluation of mitigation schemes;

**Dr Paul Greening** from University College London received an award for a secondment at Ove Arup & Partners Limited to work on the use of dynamic test data for the improvement of future Finite Element modelling and on the inclusion of non-structural elements in modelling dynamic response of structures; and

**Dr Steve Love** from Brunel University received an award for a secondment at Hutchison 3G UK Limited to work on the evaluation of a new range of technology services and process solutions to improve customer experience for new and existing Hutchison 3G UK Limited Customers.

For more information visit [www.raeng.org.uk/research/univ/secondment/](http://www.raeng.org.uk/research/univ/secondment/)

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## Industry Into Academia Fellowship Scheme

The Industry into Academia Fellowship scheme provides funding for suitably qualified company employees to spend three to six months in a UK university engineering department, providing exposure to the latest research in electro-technology relevant to the company's current and planned activities.

The scheme aims to encourage companies to benefit from the latest developments and advances in electro-technology produced by UK universities and to foster continuing relationships and improved links between industry and academia.

The awards made in 2006-07 are as follows:

**Dr David Summers** from Systems Engineering & Assessment Ltd was

seconded to the University of Nottingham to work on modulated light camera research in the applied optics group; and

**Dr Margaret Varga** from QinetiQ was seconded to the University of Oxford to work on liver and colorectal cancer analysis technology and tools.

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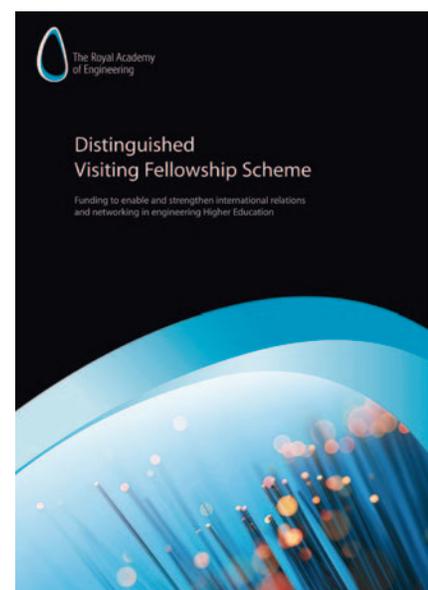
## Distinguished Visiting Fellowship Scheme

This new scheme provides funding to enable academic engineering departments in UK universities to be hosts for up to a month to Distinguished Visiting Fellows from overseas academic centres of excellence.

The aim of the scheme is to access global centres of excellence in engineering research and teaching with a view to enabling and strengthening international relations and networking in engineering Higher Education.

There are two rounds of applications. The deadline for the first round of applications is the end of June 2007. The deadline for the second round of applications is the end of October 2007. For more information visit [www.raeng.org.uk/research/researcher/dvfs/](http://www.raeng.org.uk/research/researcher/dvfs/)

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## Policy News

### Philosophy of Engineering

Two pursuits characteristic of engineering research and practice are involvement in design and the management of complex systems. These rich and controversial concepts raise deep theoretical issues and thus were explored in a Philosophy of Engineering seminar on 26 March on 'Systems Engineering and Engineering Design'.

John Turnbull FEng discussed the nature of engineering systems, drawing particular attention to the fact that the public are part of the wider 'system' the engineer must deal with, arguing that the engineer must therefore be sensitive to social values. Professor Maarten Franssen of the University of Delft discussed philosophical issues in the modelling of complex systems which include notoriously unpredictable human agents as variables. Dr Chris Elliott FEng spoke on the principles for designing systems effectively, and Professor David Andrews FEng called for a philosophy of engineering design to underpin the design process – drawing on examples of naval design.

The Philosophy of Engineering seminar series has proven to be very successful – demonstrating the fascinating philosophical and social issues raised by modern engineering. The next seminar in the series is to be held on 11 July on Artificial Intelligence and IT, and will explore the philosophical issues raised by engineering developments in these areas – especially the development and expansion of the Internet.

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### Home Affairs Select Committee

Increasing concerns about the level of surveillance and personal data collection in the UK has led the House of Commons Home Affairs committee to open an inquiry entitled 'A Surveillance Society?' The inquiry was prompted by the findings of a report of the same title, commissioned by the Information Commissioner's office and published in November 2006.

The committee requested evidence on the impact of increased CCTV surveillance, the construction of a national DNA database and greater sharing of data. The committee was keen to learn whether there were sufficient safeguards on the collection and use of personal data and whether technologies could be developed to better protect data.

The Academy submitted a response based on its report *Dilemmas of Privacy and Surveillance*, published at the end of March, and also supplied committee members with copies of the report. This is an important issue; the level of public interest was made evident by the media response to the publication of the report – including a front-page article in the *Metro* on the launch day. The Academy will be holding a briefing meeting on 19 July on 'The Security of Personal Information', following up on a number of issues dealt with in the report.

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## International News

### International Strategy

Engineering policy and practice have long been international in nature and are becoming increasingly so. The challenge for the Academy is to ensure that its objectives and actions take full account of the global context. In recognition of the growing importance of the international dimension, the Standing Committee for International Activities has developed an International Strategy for the Academy. The purpose of this Strategy is to set out the Academy's vision for its international activities and provide a means of prioritising its international engagement. It will also advance progress towards the Academy's Strategic Objectives and the President's Priorities by enabling more effective leveraging of international networks and activities.

The vision underpinning the Strategy is that the Academy should become recognised as an international exemplar of best practice in promoting engineering's position at the heart of society, with the global reach to enable it to influence the agenda of the worldwide engineering community and act as an invaluable partner to the UK Government. Towards this end, the Strategy introduces:

- A clear approach to prioritising the Academy's international engagement which has been applied to define the countries, activities and organisations of highest strategic importance;
- A commitment to ensure that the international dimension is represented in all relevant Academy activities;
- Proposals to improve the mechanisms for engaging Fellows, including International Fellows, in international activities and review the processes by which International Fellows are elected; and
- Specific targets by which progress towards the objectives in the Strategy can be assessed.

The Strategy will be updated and revised over time to reflect changes in the Academy's overall strategy. Full details of the Strategy can be found on the Academy's website.

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## Engineering Grand Challenges

Over the last few months the Academy has had the opportunity to reflect upon the 'Grand Challenges' for Engineering during the next 100 years and beyond. This exercise was triggered by an initiative of the US National Academy of Engineering (NAE) which, with the help of a committee of eminent experts, including the Academy's Immediate Past President Lord Broers FEng FRS, will select the 20 greatest challenges and announce them in September 2007.

The Royal Academy of Engineering has taken the opportunity to contribute to the NAE project and, at the same time, to conduct a horizon scanning exercise in its own right. Fellows of the Academy, Research Fellows and Chairs, Visiting Professors and Industrial Secondees were invited to submit their ideas. Numerous contributions were received and their quality was such that a very stimulating discussion ensued among the Working Group tasked by the Academy with selecting the best ideas to submit to the NAE. The Group is chaired by Sir Duncan Michael FEng and consists of Fellows and Academy Sponsored Researchers from a range of disciplines.

Complex issues such as climate change, energy and sustainability featured highly

in the discussion. However, the Working Group chose to concentrate on more specific issues that were perceived as playing an instrumental role in addressing these topics. The paragraphs below provide a succinct description of the challenges chosen by this Academy. A paper discussing each subject is currently being prepared for submission to our sister Academy in the US.

**Ethics** to develop a genuinely aspirational ethical ethos in the engineering profession.

**Education** to raise the profile of the engineering profession among the public and the young in particular, and to ensure that engineering education is matched to current and future need.

**Energy & Environment** to provide affordable and sustainable energy and to adopt a holistic approach to the management of complex infrastructural networks and communication systems.

**Brain Science** to address the complexity of the brain as a problem of reverse engineering and to develop computers capable of dealing with tasks that challenge human intelligence.

**Health & Wellbeing** to develop surgical devices capable of treating defective cells and bio-molecules from within the body; to provide large scale production techniques and facilities for rapid and cheap vaccine manufacturing; and to enable the production and distribution of clean water worldwide, including to underdeveloped regions.

**Digital World** to manage the growing information load and guarantee security of cybermarkets; to optimise the use of Information and Communication Technology and ensure widespread provision of the skills necessary for utilising it.

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## International Policies and Activities of the Research Councils

The Academy submitted a memorandum to the House of Commons Science and Technology Committee's inquiry into the

international policies and activities of the Research Councils and Office of Science and Innovation (OSI). The Academy argued that it was essential for the UK to have a clear and effective strategy for global engagement in science and engineering. Although broadly supportive of the approach being taken by the Research Councils, the Academy identified various areas where improvements could be made. These included the coordination of strategies at the national, European and international levels and the communication and marketing of opportunities for international collaborations and the benefits arising from them. In addition, the Academy called for more creative approaches to international partnerships focussed on innovation and a more inclusive approach to the development of international science policy by the Government.

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## Lloyd's Register Educational Trust Lecture 2007

The annual Lloyd's Register Educational Lecture was this year given by Academy Fellow, Professor Roderick Smith FREng. Some 200 people attended the lecture which was entitled 'Carpe Diem: the Dangers of Risk Aversion'.

Professor Smith revealed his concerns that the UK is becoming a culture of risk aversion by identifying the attitudes of individuals and governments to risk in the funding of health care, in the provision of infrastructure, and in society's reaction to global threats such as terrorism. He ended by saying the scientific community should measure risk appropriately and present the results with focus and clarity to society.

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## International prizes

On 16 April, the Academy hosted a delegation of prize-winning Chinese S&T journalists for a briefing on sustainable buildings delivered by Arup Director Alistair Guthrie. This was followed by visits to City Hall and 30 St Mary Axe (otherwise known as 'the Gherkin'), organised by Arup and the Foreign and Commonwealth Office.

The European ICT Prize is the most distinguished European award for innovative products and services in ICT. It is organised by Euro-CASE on behalf of the European Commission. In March 2007, a British company, Transitive

Corporation, was awarded one of the three 2007 Grand Prizes of €200,000 for its 'QuickTransit' hardware virtualisation technology. The other two Grand Prize winners were Telepo (SE) for Telepo Business Communication Solution and TREVENTUS Mechatronics (AT) for ScanRobot. Professor Bill O'Riordan FREng served on the ICT Prize panel and Sir John O'Reilly FREng and Professor Danny McCaughan FREng on the Executive Jury.

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Below: A member of the Transitive team collects their European ICT Prize trophy.



## Education News

### Education Innovation Prize 2007

This year saw Professor Philip Withers FREng, Professor of Materials Science, University of Manchester, and his team, become just the second recipients of The Royal Academy of Engineering/Nexia Solutions Education Innovation Prize. This prize was initiated to recognise contributions by organisations and individuals to Engineering Education, and is focused on the innovation in the approach taken to teaching the subject.

Professor Withers and his team won the £10,000 prize for their research into accelerating the introduction of new materials and new manufacturing processes into aerospace and nuclear applications and making it accessible to schools and the public.

The team were able to construct a 3D image of a jet engine using high energy X-rays which was then made available to all. The transferral of this complex technology to the public arena has allowed everyone who is interested to take a virtual 3D journey through a jet engine.

School students have benefitted enormously from both this and a number of educational tools that have developed from it. Foremost amongst these are a set of materials-based playing cards, an on-line 'Internet Microscope for Schools' and a PC-based challenge where students can design their own engine to see if it will take off efficiently.

This project was developed in collaboration with Rolls-Royce and it has received praise from many quarters. Indeed it has been exhibited at the Royal Society Summer Science Exhibitions in both London and Glasgow and was selected for the Queen's 80th Birthday Science day at Buckingham Palace.

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The **Fellows' newsletter** is now online, to view it go to:  
[www.raeng.org.uk/about/fellowship/newsletter.htm](http://www.raeng.org.uk/about/fellowship/newsletter.htm)

## Engineering in the 21st Century

An Academy working group chaired by Professor Julia King CBE FREng has delivered a report, *Educating Engineers for the 21st Century*, on the future of UK engineering. The group cited evidence gathered from over 400 companies and 88 UK university engineering departments which suggests that a major shortage of high quality graduate engineers could lead to the UK to slide into insignificance as an internationally competitive nation.

Despite total university admissions for all courses rising by 40 per cent between 1994 and 2004, there is serious concern over the fact that admittance to engineering courses over the same period has remained stagnant. The challenge now, the report says, is both to encourage more students to enter engineering and to modernise the university courses in order to keep up with the ever-changing needs of industry.

The study group highlighted the growing pressure from the rapidly developing economies of nations such as India and China. These growing economies, the report says, are producing enormous numbers of graduate engineers to meet the industrial expansion. The report states that it is now up to mature economies, such as the UK, to keep up with these nations, and that this could only happen if engineering education is refined for the new century.

Professor King's team believes that with new types of engineering rapidly becoming hugely important to industry, UK engineering education must adapt to suit the modern needs. The group concludes that, while this is achievable, there will be a cost; indeed it is estimated that funding per university student must rise by 50 per cent if UK engineering is to retain its historical reputation for excellence in engineering into the 21st century.

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## News of Fellows

**John Armit CBE** has been made the new Chair of Olympic Delivery Authority for the London 2012 Olympic and Paralympic Games.

**Dr Alan Begg** has become Senior Vice President of SKF Group Technology Development and Quality.

**Professor Sir Timothy Berners-Lee OM KBE** was awarded the Order of Merit by the Queen in June.

**Professor David Delpy** has been made Chief Executive and Deputy Chair of the EPSRC.

**Nigel Gee** has had a new building at Southampton Solent University named after him.

**Professor Thomas Kelly** has been employed in the new post of Professor of Nuclear Decommissioning Engineering at Manchester University's Dalton Nuclear Institute. He took up the position in May 2007.

**Professor Adrian Long OBE** has been awarded an Honorary DSc by City

University London and Fellowship of the Transport Research Foundation.

**Professor Norbert Morgenstern** has been awarded an honorary Doctor of Science degree by the University of Alberta.

**Dr Adam M Neville CBE** has been awarded the Gold Medal of the Concrete Society and was elected as Honorary Member of the Brazilian Concrete Institute.

**Dr Ian Nussey OBE** has been awarded the University of Warwick's Chancellor's Medal.

**Professor Andrew Palmer** has been named as the the Keppel Chair Professor in the Department of Civil Engineering. He has also been awarded an Honorary science degree from Clarkson University, New York.

**Professor David Payne CBE** has received the IEEE 2007 Photonics Award.

**John Weston CBE** has been appointed Non Executive Chairman of Insensys Ltd.

**Professor John Vivian Wood CBE** has been appointed as the next Principal of Imperial College's Faculty of Engineering.

## Council News

Council held its second meeting of the year on 16 April. Council had set up a Study Group in 2006 to look into the membership process and how best to increase the number of nominations from under-represented sections of society. Council approved the recommendations of the Study Group which included the setting up of a new Proactive Membership Committee and an additional member of staff to undertake candidate research and further support membership activities. Council asked the Study Group to come up with an appropriate implementation plan.

Philip Greenish reported on the Engineering for Society initiative. Work is underway with the ETB and institutions on defining the engineering brand, to improve public attitudes to engineers and engineering. A round table of experts is working on Climate Change and Energy. The aim is to prepare a paper which would justify and seek funding for a study aimed at identifying optimal routes to carbon reduction.

Council was updated on the Academy move to 3 Carlton House Terrace. A master plan for the building is being developed which the Academy will work towards as funds permit. As part of the funding, Council approved the taking out of a £2 million bank loan which is repayable over 20 years.

Council approved the awards of Academy medals and prizes for 2007. Council also approved the names of Fellows to serve as Officers of the Academy and the names of candidates for election as Fellows, International Fellows and Honorary Fellows, these recommendations will be put to the AGM on 4 July 2007.

Chris Price, Honorary Treasurer, presented a revised budget for 2007/08. This included the effects of the closure to future accruals of the defined benefits staff pension scheme, and the likely move to Carlton House Terrace in the autumn.

Prior to the Council meeting Dr David Grant, Chairman of the Education and Training Committee, and staff gave a presentation on the work of the Education Department during the past year.

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## Annual Regional Public Lecture

The Academy's 7th Annual Regional Public Lecture was given by Professor Geoff Tomlinson FREng, Pro-Vice Chancellor (Research) and Director Rolls-Royce University Technology Centre in Materials Damping Technologies, University of Sheffield. His subject 'Next Generation Materials for Reducing Vibration in Aircraft Engines' attracted a wide audience of Fellows, students and other professionals. Kindly hosted by Professor John Perkins CBE FREng, Vice President and Dean of Engineering and Physical Sciences at Manchester University, thanks are again due to Dr John Bramley FREng for organising this valued annual lecture and dinner event.

The event also provided the opportunity to confer three of this year's six Excellence in Engineering Teaching Prizes. These £10,000 prizes look to reward the most able lecturers who have chosen to remain in the higher education sector during the early years of their career. The winners were Dr Sherri Johnstone, Dr Andy Hunt and Ms Elena Rodriguez-Falcon, respectively from Durham, York and Sheffield universities.

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*Professor Geoff Tomlinson FREng with his fiancée, Jill Knosley at the 7th Academy Annual Regional Lecture.*

## APEG update

APEG has enjoyed three highly successful events this year. On 30 January, Tom McCarthy, Vice-President of Bechtel, gave an insightful presentation on the subject of 'UK Infrastructure: Delivering major projects on time'. Mr McCarthy rejected the argument that UK businesses were incapable of delivering major infrastructure projects on time and to budget.

On 21 March, Peter Head OBE FREng, Director of Arup, gave a fascinating presentation on the planning and development of the Dongtan Eco-City on Chongming Island in Shanghai for the client Shanghai Industrial Investment Company. The event was particularly well supported by MPs – an indication that the environment is high on the political agenda.

The APEG Annual Dinner took place on 25 April in the House of Lords. The 67 members who supported this event listened to speeches from Bill Olnier MP and Lord Haskel, respectively the Chair and Treasurer of APEG, and from the Rt. Hon. Margaret Hodge, Minister of State (Industry and the Regions), Department of Trade and Industry. The Minister highlighted the success of British engineering and manufacturing and the challenges facing the sector.

APEG has a full programme of events lined up for the rest of the year. For further details about APEG, please see: [www.apeg.org.uk](http://www.apeg.org.uk)

## Publications Received

**The Outspoken Dr Miller**  
By Dr Kenneth Miller CBE FREng

## Education Programmes

### The 14-19 Specialised Diploma in Engineering

Nine out of ten young people in the UK give up school science at the age of 16. In doing so, not only do they limit their career options but also the economy is starved of people with more advanced technical skills.

It is clear that the UK suffers from an acute problem with progression in science and hence engineering and technology. Not enough students are making a successful transition between Level 2 (GCSE level) and Level 3 (A Level and its equivalents) science-based study.

The new 14-19 Specialised Diploma in Engineering is designed to overcome this by offering a distinct pathway where Level 3 studies flow more naturally from Level 2 studies. This smooths one point of transition, with the anticipated effect that success with a Level 2 diploma in engineering will then provoke students to opt for the Level 3 programme.

Apart from dealing with issues of transition in school science, the engineering diploma also introduces engineering as a curriculum option in schools. This has been tried before with the Engineering GCSE, but that failed to make progress in most schools because the curriculum was considered dry and over-theoretical by pupils. Having a more engaging engineering curriculum as part of the school day must be welcomed, as it ought to break down popular misconceptions about engineering in the minds of young people, ie that engineering is dirty, poorly paid, only for men and the like.

Despite natural concerns over the introduction of yet another initiative in our schools, there is a degree of excitement around the engineering diploma. The Academy is involved at two levels: at a national level it has contributed advice on content and output standards while, at a local level, the engagement has been much deeper.

The engineering diploma runs as a pilot in a few local authorities from September

2008 with a phased national roll out thereafter. The biggest 2008 pilot will be in the London boroughs of Southwark and Lambeth where the engineering diploma will be delivered alongside the Academy's London Engineering Project. This has only just been announced and it marks the culmination of an 18 month national competition to determine where the engineering diploma will take hold first.

In Southwark and Lambeth the engineering diploma will be delivered by a partnership of seven schools, two FE colleges and one university (London South Bank University). All three levels (1, 2, and 3) will be delivered from the start, so time to get ready is short. There are just 15 months in which to set the syllabus, produce the teaching materials, train the teachers and recruit the students. A rather tall order, but worth it if we see many more young people opting for engineering in the capital at a time when the city is desperately short of skilled people to undertake the many major projects planned or underway – the 2012 Olympics, upgrades on the tube network, Cross Rail, sewer renewals, new electrical networks and new housing in the Thames Gateway.

Success with the engineering diploma depends on recruiting a strong cohort of able students. This depends in turn on putting a compelling proposition to potential registrants. In Southwark and Lambeth the proposition looks good.

Firstly, local employment opportunities in engineering have never been better. Work is varied and interesting, and pay is good. Secondly, the diploma in Southwark and Lambeth will be delivered in an innovative way which should prove attractive to learners. Fundamentals of maths, English and ICT will be delivered in schools in the conventional way. However, much of the principal engineering learning will be delivered by visiting staff from Further Education and the most advanced engineering material will be taught in Higher Education. As a result, the student experience will be very different from the conventional.

In addition to innovative delivery, the content of the course is carefully balanced. At Level 1, students get only a taste of engineering one day a week, leaving their options open for the rest of the time.

At Level 2, half the week is spent on the diploma and half studying maths, English, science and ICT GCSEs. So successful Level 2 diploma students reach the age of 16 with more maths, science and computing skills than their peers. This can only be a good thing for those interested in an engineering career. Finally, at Level 3 the diploma becomes a full time course for students.

It is at this full time Level 3 where there has been some controversy recently. There has been concern voiced in the press that the Level 3 engineering diploma will be insufficient preparation for engineering degree courses. The concern hinges on the level of maths provision within the course. Representatives from the Academy, ECuk, the Engineering Professors Council and the HE Academy Engineering Subject Centre are working on this now and mechanisms are already emerging whereby the maths content of the course can be boosted.

The period running up to the launch of the engineering diploma in September 2008 promises to be a very busy one. However, with the outcome being the creation of clearer pathways into engineering for more young people, the effort should be worth it.

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### Shape the Future

The Academy is always looking at new and interesting ways to promote engineering as an exciting career to young people. First year Oxford engineering undergraduate Tsz Fok couldn't understand why so few UK students were interested in engineering and science. He therefore decided to do something about the problem and applied to NESTA for an *Ignite!* grant for his idea of a case study booklet aimed at young people in schools and colleges.

With the support of the Academy, who helped identify prominent engineers to feature in the booklet, it was published under the *Shape the Future* banner during National Science & Engineering Week in March. Engineers featured included Academy Fellows Wendy Hall CBE (Senior Vice President), Peter Head OBE, Sir James Dyson CBE, Professor Sir Michael Brady, Professor Sir Michael Sweeting, Dr Alex Moulton CBE and Honorary Fellow Lord Sainsbury of Turville.

Tragically Tsz was killed in a bicycle accident just weeks after publication, but his family and friends have asked that the booklet is still used in memory of Tsz's passion for engineering and everything else he undertook with great success during his short life.

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## National Science & Engineering Week 2007

This nationwide event was designed to get as many people, especially school pupils, to participate in hands-on activities. The Academy, London Engineering Project (LEP) and Best Programmes added to the list of events, which totalled over 3,000 for this first year that engineering has been included.

The LEP organised exciting hands-on activities for local schools, including Science Circus for primary pupils and Future Fuel for Year 9 and 10 secondary students. Added to this was a full day of Go4SET organised by the Engineering Development Trust which challenged teams of Year 9 students to devise a water conservation system. After school each day, pupils were given the opportunity to go to the cinema to see a thought provoking film about engineering.

The Smallpeice Trust organised whole-day events throughout the week for schools in London, South Yorkshire and Warwickshire for students in Year 9 about to make their subject options for GCSE. Working in small teams the students had to put on their design hats to come up with answers to engineering challenges.

The Academy also partnered the University of Southampton in a series of events over nearly three weeks including family days at the National Oceanography Centre and its Boldrewood campus where they could fly an Airbus A380 simulator, identify and feel parts of a (pig) body and build electronic circuits. There were also lectures by the RNLI and a science presentation entitled 'Life, Water and the Planet'. The festivities were rounded off by Professor Kathy Sykes who showed local students the importance of science and engineering and that it is them who will *Shape the Future*.

The teachers were also involved with placement days at science and engineering companies around the country under the *Shape the Future* –STEPS at Work programme. These included the BMW Research Centre, Jodrell Bank, London Eye and Stagecoach Manchester.

The week was a huge success, with over 660,000 people taking part.

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## Bringing engineers and society together through drama and debate

Engineers will be taking the stage alongside able bodied and disability athletes to debate the impact of engineering on the modern Olympics with school pupils. The 'By Design Group' has won over £25,000 to enable engineers to discuss the evolution of sporting performance through technological advances and the associated ethical implications.

This is one of 15 projects funded in the first round of the Academy's *Ingenious – engaging citizens; engaging engineers* grants scheme. In addition to raising public awareness through imaginative formats, a particular objective is to encourage dialogue between citizens and engineers on both the applications and implications of engineering in society.

Other funded activities include the making of a schools' online drama production to stimulate debate about engineering, surveillance and civil liberties, the



Jennie Hillis, Science Museum, London

*Philip Greenish takes part in a public debate on engineering and the 'Big Brother' society at the Science Museum's Dana Centre, one of the organisations awarded an Ingenious grant.*

development of an ethics training course for engineers, and the installation of a striking arts piece at the Science Museum's Dana Centre to inspire discussion on how engineering impacts on our lives and bodies.

Martin Earwicker FEng, Chair of the *Ingenious* grants panel says, "We want to see contemporary engineers engaging in real discussion about the 21st century engineering challenges they are addressing."

A full list of the Awardees is available from [www.raeng.org.uk/engagement](http://www.raeng.org.uk/engagement)

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## Development appeal

At the initiative of Fellows working at Rolls-Royce, a proposal was made for Fellows connected currently or historically with Rolls-Royce to make gifts to the Academy's Building Fund and for Rolls-Royce plc to match this fund with support for specific educational activities.

The goal for the Fellows is to raise enough monies for a room in 3 Carlton House Terrace to be named after Charles Rolls and Sir Henry Royce who, one certainly thinks, would have been Fellows had the Academy existed in their day. The Fellows have committed nearly £85,000 to date.

Rolls-Royce plc has commissioned the Academy to develop and deliver learning materials for (particularly new) maths and physics teachers throughout the country that set maths and physics within an engaging engineering context and make these subjects more interesting to the students. This work complements the Rolls-Royce Science Prize, an annual awards programme which rewards and promotes teamwork in science teaching throughout the UK and Ireland.

We wish to express our very warm thanks to the 18 Fellows who have so far made personal donations and to Rolls-Royce for this very welcome support of the Academy.

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## Events

A selection of forthcoming events. For the full events programme visit [www.raeng.org.uk/events](http://www.raeng.org.uk/events)

4 July 2007

### Annual General Meeting

The Royal Aeronautical Society, London W1J  
Contact: [faye.whitnall@raeng.org.uk](mailto:faye.whitnall@raeng.org.uk)

11 July 2007, 2.00pm

### A Philosophy of Engineering Seminar: AI and IT – Where Engineering and Philosophy Meet

Chair: Professor Wendy Hall CBE FREng  
Speakers: Professor Nigel Shadbolt FREng, Professor Igor Aleksander FREng and Dr Ron Chrisley, University of Sussex  
Location: TBC  
Contact: [natasha.mccarthy@raeng.org.uk](mailto:natasha.mccarthy@raeng.org.uk)

19 July 2007, 3.00pm

### Academy Briefing: The Security of Personal Information – A Follow Up to the Report 'Dilemmas of Privacy and Surveillance'

Chair: Professor Nigel Gilbert FREng  
Speakers: Dr Martyn Thomas CBE, Consultant, David Birch, Consult Hyperion, Tom Ilube, CEO Garlik, 4th Speaker TBC  
29 Great Peter Street, London SW1P  
Contact: [natasha.mccarthy@raeng.org.uk](mailto:natasha.mccarthy@raeng.org.uk)

13 September 2007, 4.00pm for 4.30pm

### Lecture Series in Mobile Telecommunications & Networks: Technological Steps to Future Mobile Communications Networks

Chair: Professor Michael Walker FREng  
Speaker: Professor Gerhard Fettweis  
29 Great Peter Street, London SW1P  
Contact: [jacqueline.cox@raeng.org.uk](mailto:jacqueline.cox@raeng.org.uk)

25 September 2007

### Fellows' Visit: Magnetic Resonance Imaging

Sir Peter Mansfield Magnetic Resonance Centre, University of Nottingham, NG7 2RD  
Contact: [faye.whitnall@raeng.org.uk](mailto:faye.whitnall@raeng.org.uk)

8 October 2007

### Academy moves to 3 Carlton House Terrace

10 October 2007

### Hinton Lecture

Royal Society, 6-9 Carlton House Terrace, London, SW1Y 5AG  
Contact: [amy.abbott@raeng.org.uk](mailto:amy.abbott@raeng.org.uk)

5 November 2007

### New Fellows Dinner

Drapers' Hall, London EC2  
Contact: [amy.abbott@raeng.org.uk](mailto:amy.abbott@raeng.org.uk)

## Staff News

**Dr Liz Read** has joined the Academy's Education Programmes team as the Education Innovator for the London Engineering Project. Liz joined from Coventry University where she was a senior lecturer. She will be working closely with University College London.

**Shafiq Ahmed** has joined the Academy as Assistant Manager, International Affairs. Prior to this, Shafiq was completing a DPhil in Materials Science at the University of Oxford.

**Dr Loredana Santoro** has left the Academy to join the Institute of Systems Biology at Imperial College as Operation Manager, Research and Administration.

## HM The Queen's Birthday Honours 2007

### Commanders of the Order of the British Empire (CBE)

**John Patrick Cheffins FREng** – Chief Operating Officer, Rolls-Royce. For services to Industry.

**Dr Roger Urwin FREng** – Lately Group Chief Executive, National Grid plc. For services to the Energy Industry.

After more than seven years service in the role of Pre-University and Undergraduate Programme Manager, **Dr Peter Revell** left the Academy on the 8 June to work on a number of other projects. His contribution to the development of the Best Programme was significant.

**Craig Clarke** is leaving the Academy to take up a place at Roehampton University, where he will be studying English Language & Linguistics.

## Obituaries

**Air Marshal Sir Geoffrey Ford KBE CB FREng** died on the 1 April. Before his retirement he was the Secretary of The Institute of Materials.

**Dr Harry Jack FREng** died on the 16 April. Before his retirement he was Technical Director, Davy Morris Ltd (Davy Corporation).

**Dr Keith Kent FREng** died on the 29 March. Prior to his retirement he was Director of Quality Assurance Technical Support, MOD.

**Sir George Macfarlane CB FREng** died on 20 May. He was Controller, R&D Establishments & Research, MoD, before becoming a Board Member at British Telecom plc. He was a Founder Fellow.

**Mr Linley Ollier FREng** died on the 8 June. He was Formerly Chairman, Allott & Lomax, Consulting Engineers.

**Mr Desmond Pratt FREng** died on 15 December 2006. Before his retirement he was Research Fellow at Courtauld's plc.

**Professor John Webb FREng** died on 2 April. He was Emeritus Professor of Applied Geochemistry, Imperial College London.

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