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Enhancing National Capabilities

The Academy encourages and supports links between academic research and industry. Its programmes develop and enhance excellence in engineering teaching and research and enable engineers to continue their own professional development.

ENHANCING EXCELLENCE IN ENGINEERING TEACHING AND RESEARCH

Research Chairs and Senior Research Fellowships

The Academy's schemes to support Research Chairs and Senior Research Fellowships (SRFs) were established in 1987. Both provide joint funding with industry and other research organisations to support strategic research in UK universities. The appointments are normally for a period of five years.

The industrial funding is an important feature of these schemes and it is encouraging to note that in the last year every pound funded by the Academy attracted about fifteen pounds from industry and other third party sources. The current appointments for Research Chairs and SRFs are detailed in the annex.

During 2006-07, seven new Research Chairs were appointed with four more under active consideration at the end of the year. Three new Senior Research Fellowships were appointed with one further appointment pending, to bring the total in both schemes to 36. Three SRFs are jointly funded with The Daphne Jackson Trust, which enables highly qualified men and women to return to their research careers in science, engineering or technology after a career break due to family commitments. These appointments usually last for two years. Although most appointments are supported by industry, a number have been jointly supported with other

organisations. Two chairs were jointly supported under the Engineering and Physical Sciences Research Council's (EPSRC) Innovative Manufacturing Initiative. These have both now completed their final year.

The Leverhulme Trust Senior Research Fellowships

These Fellowships provide a chance for mid-career engineering academics to be relieved of their teaching and administrative responsibilities to concentrate on full time research for a period of between one term and one academic year. This joint scheme is now in its third year and a further seven Senior Research Fellows were to be appointed at the year end.

In October 2006 the Academy invited over 20 Leverhulme Senior Research Fellows from the British Academy, the Royal Society and The Royal Academy of Engineering to take part in a symposium, the theme of which was 'What is successful research?'. Professor Wendy Hall CBE FREng chaired the meeting and introduced the two guest speakers, Baroness Onora O'Neill, President of the British Academy and Professor Martin Taylor FRS, Vice-President of the Royal Society. The particular value of this meeting was the opportunity to learn about the experiences of researchers from the diverse interests represented – backgrounds ranged from archaeology and art history, to materials science and nanotechnology. Feedback was uniformly positive and a follow-up event will be hosted by the British Academy in October 2007.

Research Fellowships

The Academy established the Research Fellowships (formerly Post-Doctoral Research Fellowships) scheme in 1998 and it has since achieved wide recognition within the academic community; it attracts a significant number of applicants.

These Fellowships, which are funded jointly with EPSRC, are aimed at outstanding researchers from all branches of engineering who are about to finish their PhD, or have up to three years post-doctoral research experience. The scheme provides funding for five years to encourage the best researchers to remain in engineering research in UK universities or industry. Research Fellows are provided with the opportunity to establish an international track record, and they are assisted by having a greatly reduced teaching and administrative workload. The Academy appoints one of its Fellows as a mentor to each Research Fellow to offer advice and facilitate industrial contacts.

Fellowships are awarded annually and 155 applications were received in the 2006-07 round, making it comfortably the highest total since the scheme began. Fourteen new Fellowships were expected to be awarded at the year end, bringing the total number of awards under the scheme to 51 (see annex). An encouraging aspect of this scheme has been its ability to attract female researchers who account for just over 27% of all Research Fellows in post.

Global Research Awards

The Global Research Awards scheme is designed to encourage engineering R&D networking around the world. It allows research engineers from academia or industry to work with leading technology organisations overseas for between three and 12 months. The Academy funds 50% of the total agreed costs of the visit up to a ceiling of £40,000. During the year 15 new Awards were made, with additional engineering researchers continuing to receive support for secondments begun in previous years.

Industrial Secondment Scheme

This scheme provides a valuable opportunity for engineering academics in UK Higher Education Institutions (HEIs) to benefit from a period of industrial experience which is relevant to their teaching activities. The secondments enable the development of new case study material and the planning of new teaching modules and courses. They also help initiate or strengthen the links between the host organisation and the university department. During the year, 17 awards were made to a wide variety of organisations (see annex for details) covering most engineering disciplines.

Industry into Academia Fellowships

The purpose of this scheme, helped by funding from the ERA Foundation, is to provide an opportunity for two employees in the electrotechnology sector to be seconded into academia each year, making it a reversal of the Industrial Secondment Scheme. During this, the second year of the scheme, Dr D Summers from SEA Ltd was seconded to the University of Nottingham to work on research in the applied optics group. Also, Dr M Varga from Qinitiq was seconded to the University of Oxford to work on liver and colorectal cancer analysis technology and tools. This experience

has demonstrated that this pilot scale activity is attractive to participating organisations and has considerable potential.

Visiting Professors in Engineering Design for Sustainable Development

This scheme continues to develop case study-based teaching material showing how the issues of sustainable development are addressed using conventional engineering theory and working knowledge. Integration of sustainable development into the engineering curriculum is progressing and has been reinforced by the integration of development competencies into the Engineering Council UK's accreditation requirements. However, initiatives to update the curriculum are constrained by the influence of the Research Assessment Exercise; this has significantly reduced the importance of teaching in comparison to research.

Visiting Professors in Principles of Engineering Design

This scheme has proven a very effective model for partnership between academia and employers to help to provide a link between the engineering curriculum and engineering practice. The scheme retains a constant number of 120 visiting professors.

During 2006, a major workshop was held at Churchill College Cambridge, which reviewed the role of design education as a major link between academia and industrial practice. Outputs from the workshop were fed into the Academy's study '*Educating Engineers for the 21st Century*' and will also be used for planning the long term future of Visiting Professor schemes. One action will be to link into the recommendations of the Treasury sponsored Cox Review, by developing new Visiting Professor

posts in universities that have Product Innovation Centres.

Visiting Professors in Integrated System Design

This scheme is now in its third year of operation and has admitted 16 universities. During the last year, a working party produced a booklet called *Creating Systems that Work: Principles of Engineering Systems for the 21st Century*. Meant as a guide and resource book for students, educators and practising engineers, it will be made publicly available at a launch during the second quarter of 2007.

ENABLING POSTGRADUATE AND PROFESSIONAL DEVELOPMENT

Engineering Professional Development Awards

This scheme supports the Academy's commitment to enhancing the potential of UK industrial engineers. Financial assistance is offered towards the cost of appropriate development programmes linked to an organisation's business plan or strategy.

A revised scheme marketing strategy, coupled with more publicity in the media concerning the importance of continuing professional development, led to a record 98 companies submitting applications from which 72 received awards totalling £315,000. These awards generated a further £2.7 million in third party, indirect expenditure by the companies themselves. The selected company training programmes involved a total of 2,106 engineers, with the companies being comprised of 70% high tech small and medium enterprises (SMEs) and the remainder being small business units of large companies.

International Travel Grants

This scheme enhances the national potential of engineering research and recognises the excellence of young

researchers by providing funds to facilitate overseas travel. This enables aspects of research to be done at facilities not available in the UK. It also allows for the delivery of papers at international conferences, where individuals are also able to establish networks with key global players from their particular area of engineering expertise. The International Travel Grants continue to meet a real need in academia, evidenced by the 1,356 applications submitted in 2006 from which 905 awards worth a total of £487,000 were confirmed. The visits supported have been to more than 100 countries and involved subjects at the cutting edge of technology, including stem cell research, computer-human interaction, biometric data recognition and renewable energy.

In terms of impact, 90% of awards have led to the establishment of ongoing research networks with the potential for technology transfer and funding into the UK. The scheme's web-published newsletter *The Delegate* has been instrumental in establishing an online 'technology-transfer community', which has generated more than 250 requests for awardee reports and contact details during 2006. In qualitative terms, news articles on awardees have appeared in *The Independent* and *The Daily Telegraph*, as well as coverage by regional newspapers.

Sainsbury Management Fellowships in Engineering

This scheme seeks to enhance the national potential of UK engineering industry by providing chartered engineers who have complemented their technical training and knowledge with an MBA degree from a top eight international business school. Over the past year 11 Fellowships were awarded, bringing the total number awarded since the start of the scheme to 237.

ERA Foundation Engineering Teaching Prizes

Launched in 2005, six prizes a year worth £10,000 each are funded from a generous donation by the ERA Foundation. The prizes are for distinguished lecturers committed to promoting engineering as a rewarding career and establishing links between education and industry. The three winners based in the north of England received their prizes at the Northern Fellows' Annual Lecture and Dinner Event held at the University of Manchester on 15 March 2007.

ERA Foundation Research Student Development Fellowships

Launched with the backing of the ERA Foundation, this scheme is aimed at PhD and EngD students. The five awardees each received £5,000 to fund a personal development and training plan. They can also apply for a further prize of £5,000 on completion of their higher degree, by demonstrating an intention to pursue a UK research career in education or industry.

The Panasonic Trust

The Trust seeks to enhance the national potential of UK industrial engineers by providing funds from its Awards scheme to facilitate technical updating and re-skilling through part-time Masters courses. Its complementary Fellowship scheme recognises the potential of newly graduated engineers and their aspirations to specialise in developing technologies by providing funds to enable the study of full-time Masters courses in subjects related to sustainable development and the environment. The Trust is administered by the Academy.

In 2006 the Panasonic Trust Awards scheme granted a total of £34,000 to 56 industrial engineers. This brought the total number of awards made through this initiative since its inception to 1,198. All awardees

received additional financial sponsorship from their employer, with most securing industrial funding as a result of their receiving support from the Trust.

The Fellowship scheme assists recent engineering graduates to undertake a full-time Masters degree course in environmental studies or sustainable development. The scheme entered its ninth year and was once again oversubscribed with quality applicants. In 2006 the £8,000 Fellowships were awarded to seven recipients (see annex for details). In addition, the Panasonic Trust awards gold medals to those who achieve a distinction or equivalent pass through either the awards or Fellowship schemes. In 2006, nine such medals were awarded.

The Panasonic Trust Project Presentation Prize was instituted to mark the 20th Anniversary of the Trust. A prize of £1,000 and a gold medal is awarded to the student who delivers the best final project presentation on a course associated with the Fellowship scheme. In 2006 the recipient was Jane Wickham from the MSc course in 'Renewable Energy: Sustainability and Technology' at the University of Reading, who spoke on the assessment of carbon dioxide levels of the UK domestic sector and pathways to reducing emissions.

The Sir Angus Paton Bursary

The late Sir Angus Paton CMG FREng FRS made an endowment to the Academy in 1986 to fund an annual bursary to recognise excellence and inspire a suitably qualified engineer to undertake a full-time Masters course related to water engineering. The 2006 bursary was awarded to Louise Pennington to enable her to study the MPhil course in Engineering for Sustainable Development at the University of Cambridge.

Recognising excellence and inspiring the next generation

The Academy celebrates excellence by bestowing medals for outstanding achievement and by electing to its Fellowship the most eminent members of the engineering community. These outstanding role models, along with the Academy's Best Programme, are central to inspiring the next generation of excellent engineers.

EDUCATION

The Royal Academy of Engineering takes a lead in the engineering education of learners of all ages. It does this through a range of education programmes.

The Academy's Best Programme is a continuum of curriculum enrichment schemes in science, engineering and technology (SET). The Best Programme works in primary schools to promote engineering and related SET careers; in universities to support gifted engineering students and beyond university to develop the engineering leaders of tomorrow.

For half a generation, the Best Programme has worked in primary and secondary schools to promote attainment and progression in the science and mathematics that underpin engineering study. With children aged 7-11, the focus is on enthusing school pupils by getting them working on practical problems connected with the engineering and technology of the world around them. For older pupils (age 13+), the task is more one of enriching and enhancing the science and mathematics curricula. The desired impact is to see pupils attaining

better results in national tests and choosing to continue with science and mathematics beyond the age of 16.

The Academy's influence on school science is increasing. During 2006 two significant Government reports were published on school science: the 10 year science and innovation investment framework 'Next Steps' document in March and the Department for Education and Skills (DfES) / DTI STEM Programme Report in October. As a result, senior staff now represent the Academy on DfES boards responsible for school science strategy and delivery. In addition, the Academy has been drawn into the review of the secondary science curriculum at the Qualifications and Curriculum Authority (QCA).

This national visibility on school science was enhanced further in January 2007 with the publication of the Technology and Engineering in Schools Strategy (TESS) directory of engineering activities for schools and colleges. Branded with the *Shape the Future* campaign logo and distributed to heads of science and design & technology in schools, this directory has been welcomed with enthusiasm by teachers, government,

industry and the wider engineering community because it clearly sets out the options for bringing engineering activities into schools.

Progress has not been limited to work in schools; the Academy is helping shape the future of engineering further education through its role in supporting the development of a 14-19 Specialised Diploma in Engineering. Additionally, through the National Engineering Programme (its London Engineering Project pilot funded by HEFCE and industry) and through long established components of the Best Programme, engineering higher education is getting a boost. The focus here is on enhancing the student experience and on seeking out students from under-represented groups: women, students from certain minority ethnic groups, students from families with no experience of higher education and adult learners.

The National Engineering Programme

The National Engineering Programme is a partnership project to strengthen engineering higher education. Recognising engineering as a subject of strategic importance to the UK, it has already started work in London,

creating new engineering courses and enhancing the student experience in existing courses. It also works in schools in South London, seeking out students from the under-represented groups mentioned above with the capacity for higher education, an appetite for engineering and supporting them through their science and mathematics studies.

The partnership in London is large, strong and led by the Academy. Industry and the Higher Education Funding Council for England (HEFCE) have shared the funding to date and the stage is set for a national roll-out from 2008. This will create a high demand for ongoing funding, but this challenge is worth pursuing as the future of engineering higher education in the UK is at stake.

The London Engineering Project (LEP) has seen some 3,700 students engage with SETNET (Science, Engineering, Technology, and Mathematics Network); 19 new Young Engineers' clubs form and more than 2,300 other school-aged students take part in its Smallpeice Trust STEM days. The British Association for the Advancement of Science (BA) has engaged with an additional 11 primary schools as a result of the Project and both the UK Resource Centre for Women in SET and the African Caribbean Network for Science and Technology have trained 65 practitioners.

Of the participants, more than half are girls and most are from a minority ethnic background. Set against the LEP's target of increasing participation in STEM by girls and by ethnic minority students, these figures are a testament to its success.

Young Engineers

Young Engineers continues to expand its national network of engineering clubs, the services

provided to these clubs and the range of challenges, competitions and activities available to club members and individual students. In 2006, the Young Engineers website underwent a substantial update with the introduction of many new services to meet the demands of club leaders and members. Over 26,000 students took part in club activities and over 72,000 primary students took part in the K'Nex Challenge (a nationwide competition aimed at introducing pupils to engineering through designing and building structures with K'Nex).

Notable achievements in 2006 include individual success for young engineers in many prestigious engineering awards such as Brunel University's Isambard Kingdom Brunel (IKB) Awards, the Maritime Safety Award at the International Science and Engineering Fair in Indianapolis and Enterprising Young Brits (Teen category). In addition, Young Engineers has now received national accreditation for its activities from the Learning Grid.

Headstart

Headstart is a well-established range of summer schools held at 30 universities across the UK. They show hundreds of 16-17 year-old pupils how their academic abilities and interest in mathematics and science can lead to a stimulating and rewarding degree course and career.

During their residential week at university, 16-17 year-old students engage in practical design, build and test projects, attend lectures and seminars, visit leading-edge businesses, develop team-working skills and meet recent graduates as well as senior academics. The programme is monitored for quality by a team of Fellows from the Academy.

Headstart has also developed a new range of initiatives designed to attract younger students from black and ethnic minorities through its 'Spectrum' programme. There are also more girls taking part in the 'Dragon y' and 'Insight' courses. Recently, 'First Edition' (for 12-13 year-olds) has been introduced for those who will be the 'first in the family' so far as higher education is concerned.

Over 700 schools in England, Northern Ireland, Scotland, Wales, mainland Europe, South America and the United States will take part in 2007 and over 1,500 students will participate, of whom over 40% are young women. Additionally, a student exchange programme with schools of engineering at The University of Colorado and The University of Arizona is being developed – the first stage of an expanding international dimension.

During 2007, the first three science-based Headstart courses will be piloted. These are designed to stimulate interest in the impact that engineers can have on society and the environment.

Smallpeice Trust Schemes

The Smallpeice Trust offers young people aged 13-18 the opportunity to work with experienced professional engineers on four-day residential courses at universities focusing on practical and creative applications of engineering design and associated skills. The Trust also provides one day, in-school, curriculum enrichment courses for science, technology, engineering, and maths (STEM).

During 2006-07, 7,019 students attended Smallpeice courses, including 2,617 students from the new London Engineering Project where the Trust is a major delivery partner. This total is a substantial

increase over 2005-06 when 3,318 students attended Smallpeice events. An innovative marketing initiative has contributed to many of the Trust's courses becoming oversubscribed.

A strong interface with industry, education and professional bodies helps to ensure that the courses are properly supported, promoted and developed. The Trust continues to build on these relationships to widen the scope of opportunity available to young people and to strengthen its reputation for developing and delivering courses to a high standard.

New courses launched in 2006-07 included Aerospace Technology, Environmental Physics, Motorsports Engineering, and Nuclear Engineering. New courses planned for 2007-08 include Automotive Engineering, Mining and Minerals Engineering, and Nanotechnology.

Engineering Education Scheme

The Engineering Education Scheme (EES) encourages the most able young people to pursue a career in professional engineering by enabling them to work in teams on significant, ongoing industrial engineering projects. This is achieved through partnerships between schools or colleges and companies from October to April each year.

As a result of scheme participation, accreditation for teachers and engineers is available through the College of Teachers and the Science and Engineering Ambassadors scheme, respectively. The vast majority of students achieve the British Association Creativity in Science and Technology (Crest) Gold Award. EESE teams and students won a major award in the BA Science Fair held in February. The students experience teamworking, project management, report writing and

key skills development during their 6-month project. The scheme is also an access organisation for the Duke of Edinburgh Award Scheme.

Some 1,300 students aged 16-17 participated in 310 teams working on real engineering projects set by the sponsoring companies. Each team comprises four or five lower sixth-form students, a mentor engineer and a teacher. Following 18 Scheme Launch Days in October, the teams attended 14 residential university workshops across England in December and January. Project assessments were held at 16 Celebration and Assessment Days in April and May 2007.

Participation in the EES in Wales increased in 2006-07 to 440 students from 78 schools running 82 projects with 80 companies. In addition, the scheme retains its role as a catalyst for industrial placements, teacher training and curriculum development in Wales. It has agreed to do much of the initial contacting and groundwork for The Year in Industry in Wales.

The EES scheme in Northern Ireland enjoys an excellent reputation and works with 108 students from 25 schools, making up 27 teams. Both Queen's University Belfast and the University of Ulster play a significant role in supporting the Scheme and this has been a significant factor in its ongoing success and growth in 2006-07.

Go4SET

Go4SET is a new Engineering Development Trust (EDT) work related applied learning programme which was piloted in 2006-07. Teams of 13-14 year-old pupils, each six strong and supported by a company mentor, are set STEM projects. During the 10 week project phase pupils gain experience in industrial enterprises,

teamworking, project management and communication and presentation skills. The project is designed to promote and develop creativity and innovation. Subject to the success of the pilot, a national roll out is planned for 2007-08.

A total of 250 pupils participated in 40 teams for the pilot in London, Glasgow and Aberdeen working on the Go4SET water conservation project for eight weeks. The project phase began at three launch events in December 2006 where teams were introduced to the project and their company mentor. The project culminated in March at three Celebration and Assessment Days. Formal accreditation of projects is available through the British Association Creativity in Science and Technology (CREST) Awards. The London pilot is run in conjunction with the London Engineering Project.

The Year in Industry

The Year in Industry provides paid, degree relevant work placements for students before university or during their degree. Fifty-six percent of the 593 scheme participants went directly into industry on completion of their undergraduate studies and 22% went on to study an advanced course. Seventy-seven per cent obtained first or upper second class honours degrees and 76% of students came from state schools or colleges.

The students are supported throughout their placement with both the Year in Industry sta mentors and company mentors. A large number of students made considerable contributions to their company's profitability during the year; the winner of the National Contribution to the Business Award saved BAA Edinburgh Airport £23,000 per year with potential savings of over £180,000 during the work carried

out in his Year in Industry placement. Students have the opportunity to take the Chartered Management Institute's Certificate in Management at level three (equivalent to two A Levels).

The Undergraduate Programme

The objective of the programme is to encourage university students to retain their interest in engineering as a career through a series of developmental activities. This is only open to students who have participated in one or more of the school schemes of the Best Programme. These include a business awareness course and personal development training courses. Students are invited to register as they start their accredited BEng or MEng university course. This year, 1,532 students registered, of whom 24% are women.

Four Wyvern Initiative and Leadership Development (WILD) courses were held on Dartmoor. Similar to outward bound activities, these weekends provide practical examples of team building in a challenging environment and test the ability of participants to communicate effectively.

The Developing Business Skills course, which was oversubscribed, involved four teams competing in a simulated business game involving personnel management, sales and marketing, stock control and manufacturing.

For the first time a Renewable Energy Technologies short course was held at Loughborough University in September 2006. Seventy-eight undergraduates applied for the 30 places available and the participants (including nine women) attended seminars and were shown demonstrations of main-stream and emerging technologies.

Engineering Leadership Awards (ELA)

The ELA scheme is open to second year MEng undergraduates from all UK universities. Participants on the scheme, who are selected on the basis of an anticipated good degree result, have been assessed as having clear leadership potential. They are provided with the funding and opportunities to undertake an accelerated programme of personal development.

This year, 20 Engineering Leadership Awards, were made to students at 11 universities. Each will benefit from a Sainsbury Management Fellow mentor as well as training and networking events organised by the Academy. They will each receive £5,500 to be used over the next three years to enable them to improve foreign language skills, attend work placements (including overseas), conduct studies of engineering business in specific sectors and ultimately prepare them for fast track careers in UK industry.

Executive Engineers Programme

This programme is designed to assist highly motivated, entrepreneurial and innovative engineering graduates to enhance and accelerate their professional development to Chartered Engineer status. The 2006 programme was attended by 40 graduate engineers; in addition, four previous participants attended for the networking and social components.

Sainsbury Management Fellowships in the Life Sciences

Similar in objective to the Sainsbury Management Fellowships for engineers, this scheme is focused on life scientists working in the UK Biotechnology industrial sector. As the sector is one of the fastest growing in the UK economy, the scheme is

oversubscribed with highly qualified and motivated applicants.

In 2006 the total number of fellowships awarded through the scheme reached 51. The Academy continued to promote career planning and foster entrepreneurialism to young researchers in the sector by organising and hosting its 9th Annual Careers Seminar for the finalists of the Biotechnology Young Entrepreneurs Scheme on 10 November 2006.

Shape the Future

The first full year of the *Shape the Future* campaign saw the conclusion of both the ERA Young Engineers' photographic competition and the Bosch Independent Technology Horizons Award essay competition. Both asked young people for their views on the impact of engineering, but through different mediums. It was also the first time engineering featured in The Big Draw national programme (a nationwide annual event designed to encourage people of all ages to express their creativity through drawing). The illustrator/cartoonist Gerald Scarfe judged all the entries that required innovative design ideas for the bicycle of the future.

Teachers are a major influence on young people's aspirations and the *Shape the Future* STEPS at Work programme provides exciting business placement opportunities with a STEM (science, technology, engineering and maths) focus.

Asking leading engineers what will shape the future over the next 50 years resulted in a case study booklet aimed at young people and written by engineering undergraduate Tsz Fok. Published in March 2007, it sets out to encourage more young people to consider science and technology as a career.

The *Shape the Future* teacher directory of technology and engineering interventions is one of the first outcomes of the DfES/DTI STEM Programme Report and has also proved popular with companies. It was launched in January 2007 and the demand was so great that an updated and amended version will map each initiative to the national curriculum and be available to schools for the new academic year.

ACADEMY AWARDS

The Academy's Annual Awards Dinner was held on 5 June 2006 at Draper's Hall and was attended by the Royal Fellow HRH The Duke of Kent KG GCMG GCVO and Lord Browne of Madingley FREng FRS (the then Vice-President). The evening was made possible by the generous support of the following sponsors: BP, E.ON UK, IBM and Rolls-Royce and CSR.

Prince Philip Medal

Awarded to: Professor Oleg Zienkiewicz CBE FREng FRS, Professor Emeritus, University of Wales, Swansea.

Professor Zienkiewicz was one of the early pioneers of the Finite Element Method. As well as publishing nearly 600 papers and 25 books since 1947, he was also one of the first to realise the potential for the Finite Element Method to solve problems outside the area of Solid Mechanics. His studies in this were the first to be presented on the subject and they still remain standard reference texts today.

Professor Zienkiewicz has also had a distinguished research career during which he has supervised over 70 PhD students, many of whom have since taken up important positions in academia and industry. On top of this achievement, Professor Zienkiewicz

founded in 1968 what is still the major journal for the field of Numerical Computations.

Among his many honours, Professor Zienkiewicz has served as a member of Council of the Institution of Civil Engineers and was the Chairman of the Analysis and Design Committee of the International Congress for Large Dams. In 1979 he was elected to both The Royal Academy of Engineering and the Royal Society.

MacRobert Award

Awarded to: Optos plc for its Panoramic200 scanning laser ophthalmoscope.

The Academy's premier award and prize of £50,000 went to Optos plc. The company developed and commercialised a unique means of capturing a high resolution image of over 80 per cent of the retina in order to greatly increase the chances of detecting eye and general diseases. Healthcare practices in the UK, Germany, USA and Canada have installed the P200 machines and it is estimated that approximately 160 million examinations are performed annually in the company's existing markets.

The three other finalists were: AirbusUK for A380 Intergrated Wing Design; Brinker Technology Ltd for sealing Platelet Technology™ for pipe systems and flow lines; and Davy Process Technology Ltd for the development of an Environmentally Friendly Ethyl Acetate Production Process.

The President's Medal

Awarded to: Sir David Davies CBE FREng FRS.

Sir David Davies is one of the most influential engineers of his generation. The award recognises his continuing

contribution to UK engineering at the highest levels, from advice given to Government on sensitive political and defence issues, to his important technical developments in radar and communications.

Silver Medals

The four medals awarded this year were presented to the following, for their outstanding contribution to British engineering and commercial development:

Professor Andrew Blake FREng FRS, Principal Research Scientist for Microsoft Research.

Professor Blake has been at the cutting edge of image analysis research for many years. His research and subsequent expertise in visual segmentation and reconstruction and visual motion tracking has contributed enormously to the development of Microsoft products, and thus to millions of computer users.

Professor Blake's team at the Microsoft Research Laboratory have developed a number of key Microsoft technologies, including Digital Image and Expression – both highly advanced graphics tools. Currently under development is a new type of stereoscopic camera that can sense three dimensions and can follow a moving subject – something that could change teleconferencing for ever.

Dr Simon Gallimore, Chief of Turbine Thermofluids Systems Engineering at Rolls-Royce plc.

Since 1977, Dr Gallimore's career at Rolls-Royce has progressed with unusual rapidity to a position of technical leadership in his specialist field. For 30 years he has made significant contributions to engine designs, improving efficiency by large margins and thus helping reduce emissions and fuel consumption. Dr Gallimore's

continued expertise in his specialist field ensured that in 2001 he became a Rolls-Royce Engineering Fellow.

Dr Ian McEwan, Founder of Brinker Technology.

Dr Ian McEwan has used his expertise in particle-uid transport problems to engineer, develop and produce a new method of pipeline repair. Through using Platelet Technology™, Dr McEwan has ensured that pipe leaks can now be repaired temporarily in rapid time so that productivity and efficiency are not compromised. His company, Brinker Technology, is made up of a small team whose abilities in this area are unrivalled. Brinker Technology's strategic plans are now focused on market expansion, diversification and internationalisation.

Professor Lionel Tarassenko FREng, Professor of Electrical Engineering at University of Oxford.

Professor Tarassenko has combined academic research and commercial success to great effect during his specialist career in Biomedical Engineering. Using research in the detection of novelty signals, he managed to develop monitoring technologies for both healthcare and aero engine systems. He was elected to a Chair at Oxford University and will be Academic Director of the new Institute of Biomedical engineering. Alongside his many academic achievements, Professor Tarassenko has also founded companies such as Oxford BioSignals and e-San.

Sir Frank Whittle Medal

Awarded to: **Michael Ramsay** for his outstanding achievement in the field of engineering innovations in games, entertainment and the media.

As co-founder of TiVo Inc, Michael Ramsay is responsible for what

is regarded as one of the most important inventions in the history of television, digital video recording (DVR). From years of innovation in computer graphics, workstations and software, Michael was able to create, develop and commercialise the world's first digital video recorder, thereby enabling consumers to have television on demand.

TiVo technology has had enormous global success, with millions of units sold in the USA alone. Michael's achievements are varied, his developments in the world of 3D graphics during the 1990s brought, and continue to bring, incredible special effects to the movie screens.

The Public Promotion of Engineering Medal

Awarded to: **Professor John Burland CBE FREng FRS** for his work in the promotion of engineering.

Professor Burland is perhaps most famous for applying his expertise in the field of geotechnical engineering to saving the Pisa Tower in the 1990s. In correcting the tower's world-famous lean, he managed to bring engineering back into the public eye. Throughout his career, Professor Burland has shown a willingness and ability to stimulate public debate and interest in science and engineering.

Lifetime Achievement Award

Awarded to: **Professor Peter Kirstein CBE FREng.**

The Royal Academy of Engineering awarded its second Lifetime Achievement award to Professor Peter Kirstein CBE FREng for his exceptional contribution to the development of the Global Internet, from its very inception, to its current position of everyday, worldwide use.

Professor Kirstein has been at the forefront of internet development

for over 30 years. One of his key achievements has been to consistently bring together international collaboration in networking research and distributed applications.

At the very earliest stage of his career Professor Kirstein established one of two international nodes of the US ARPANET which was to be the precursor to the internet. Through this, he led a group that became a key player in the emerging international world of network connections, mail services, security, Internet video conferencing and the Next Generation Internet (IPv6).

Throughout his career, Professor Kirstein has led groundbreaking research and development projects that have helped shape the way the Internet is used today. In working with NATO, the European Commission and the USA, he has brought numerous advancements in online technology to the general public. At 70 he remains a giant in his field.

ERA Foundation Award

Awarded to:

Mario Iobbi

Established last year, this award was created to identify and recognise entrepreneurial researchers currently working in UK universities in the field of electrotechnology. This year's winner was Mario Iobbi, an Imperial College London PhD research student, whose novel respiratory therapeutic device, Saturation Driven Oxygen Therapy (SDOT), won him the prize of £40,000. As the leading device of Dynamic Therapeutics Ltd, the SDOT has the potential to dramatically improve the quality of life of those with breathing-related conditions through its ability to increase the supply of oxygen depending on a person's needs, thus lowering stress on the heart and allowing oxygen to be used more economically.

DECEASED FELLOWS

The Academy was advised of the deaths of the following Fellows during the past year:

- Mr R S Baxter FEng
- Mr J Dawson CBE FEng
- Professor P O Fanger FEng
- Sir Peter Gadsden GBE AC FEng
- Dr D J Henkel FEng
- Professor J R James FEng
- Dr H H W Losty FEng
- Professor Z S Makowski FEng
- Mr W A Mallinson CBE FEng
- Professor K J Miller FEng
- Mr M C Purbrick FEng
- Sir Gareth Roberts KBE FEng FRS
- Professor N E Simons FEng
- Dr D A Temple FEng
- Professor M W Thring FEng
- Mr P G Tregelles FEng
- Professor K H Walley FEng
- Professor J H Whitelaw FEng FRS
- Mr D Wray FEng
- Dr L Young FEng

FELLOWS

The Academy's Fellowship is chosen from the nation's most distinguished engineers. Up to 60 Fellows are elected annually from nominations made by existing Fellows. The Annual New Fellows' Dinner was held on 20 November 2006 at Draper's Hall in the presence of the Royal Fellow, HRH The Duke of Kent.

New Honorary Fellows elected in 2006 were:

Professor Sir Ara Darzi KBE
Head of Department, Bio surgery & Surgical Technology & Head of Division of Surgery, Oncology, Reproductive Biology & Anaesthetics, Imperial College London Paul Hamlyn Chair of Surgery, Royal Marsden Hospital

Jonathan Ive CBE
Senior Vice-President of Industrial Design at Apple in California

Professor Sir David King FRS
Chief Scientific Adviser and Head, Office of Science and Innovation, UK Government; Director of Research, University of Cambridge

New International Fellows elected in 2006 were:

Russell John Black (New Zealand)
Project Director, MTR Corporation Ltd, Hong Kong

Professor Edward Francis Crawley (USA)
Professor of Aeronautics & Astronautics; Professor of Engineering Systems, MIT

New Fellows elected in 2006 were:

William Stanley Bardo
Director, Systems Engineering for Autonomous Systems Defence Technology Centre

Professor Peter Cawley
Professor of Mechanical Engineering, Imperial College; Director, Guided Ultrasonics Ltd; Director, Intergration

Diagnostics Ltd; Director, Guided Ultrasonics (Rail) Ltd

(James) Nicholas Cooper
Managing Director, M G Bennett & Associates Ltd

John Joseph Dunkley
Chairman and Technical Director, Atomising Systems Ltd; Editor, Powder Metallurgy

Professor Anthony Glyn Evans
Professor, University of California, Santa Barbara

Professor Julian William Gardner
Dean, School of Engineering, Warwick University

Nigel Ian Gee

Naval Architect, Consultant to BMT Nigel Gee & Associates Ltd

Professor (John) Michael Russell Graham

Deputy Head of Aeronautics Department, Imperial College

Professor John W Hancock
Dean, Faculty of Engineering, University of Glasgow

Terence Malcom Hill

Chairman, Arup Group Ltd

Pieter Lindeque

IBM Distinguished Engineer

Professor Andrew Guy Livingston
Professor of Chemical Engineering, Imperial College; Managing Director Membrane Extraction Technology Ltd

Chris Mairs

Director, Data Connection Ltd; Senior Vice President and CTO, MetaSwitch; Chairman, A-Technic

Professor Geoffrey Colin Maitland
Professor of Energy Engineering, Imperial College London

Gordon Grier Thomson Masterton
Vice President, Jacobs Babbie Group; Past President, The Institution of Civil Engineers; Royal Commissioner on the Ancient and Historic Monuments of Scotland

Professor William Ireland Milne
Head of Electrical Division, Engineering Department, University of Cambridge; Director of the Centre for Advanced Photonics and Electronics, Cambridge

Professor Christopher John Peel OBE
*Director, Advise Air Ltd; formally
Technical Director, Air for QuinetiQ*

Professor Ian Postlethwaite
*Pro-Vice-Chancellor, University of
Leicester*

Professor Nigel Richard Shadbolt
*Professor of Artificial Intelligence,
University of Southampton; Chief
Technology Officer, Garlik Ltd;
Chairman, Epistemics Holdings Ltd;
Director, EPSRC Advanced Knowledge
Technologies IRC 2000-2007*

Professor Morris Samuel Sloman
Professor, Imperial College London

Paul Jonathan Stein
*Science and Technology Director,
Ministry of Defence*

Professor Philip Sutton
*Director, General (Research and
Technology) MoD*

**Professor (Kathleen) Liz (Elizabeth)
Tanner**
*Professor of Biomedical Materials, Queen
Mary University of London; Visiting
Professor, Lund University*

**Professor Christopher John
Taylor OBE**
*Head of the School of Computer Science,
University of Manchester; Head of
Research, Imaging Science & Biomedical
Engineering, University of Manchester*

Dr Jean Venables OBE
*Chairman, Crane Environmental;
Chairman, Venables Consultancy; Chief
Executive, Association of Drainage
Authorities; Chairman, Thames Estuary
Partnership; Chairman, Expert Panel
TE2100 Project*

Professor Michael Walker
*Research and Development Director,
Vodafone Group; Professor of
Telecommunications, Royal Holloway,
University of London*

Peter Thomas Warry
*Chairman, Victrex Plc; Chairman, Kier
Group Plc; Chairman, BSS Group Plc;
Chairman, Particle Physics & Astronomy
Research Council*

Professor Ian Hugh White
*Van Eck Professor of Engineering,
University of Cambridge; Chief*

*Technological Officer, Zin Wave Ltd,
Harston Cambridge*

Professor Robert Joseph Young
*Head of School of Materials, University
of Manchester; Professor of Polymer
Science and Technology, University of
Manchester*

Leading Debate

The Academy engages in the process of policy development on issues that have an engineering dimension. It does this at both national and international levels by formulating policy statements on its own initiative and submitting expert evidence to parliamentary and government bodies. The range of our work in public engagement is diverse, encompassing a variety of meetings, lectures, seminars and other events.

ENGINEERING POLICY INITIATIVES

Energy

A report of the series of seven seminars on Energy, led by Philip Ruddock CBE RDI FREng FRS throughout 2005, was published in July 2006.

On 8 May 2006, the Academy hosted a conference which looked ahead to the energy supply options which could exist for the UK in 2100. Initiated by the Prime Minister's Council for Science and Technology, the discussion was opened by Malcolm Wicks MP (Minister for Energy) and featured speakers from the known range of supply options who presented their analyses and scenarios of why their particular energy source would prove to be useful in the year 2100. Over 100 delegates attended the meeting and generated a wide range of opinions and views on the future of UK energy. The conference was also a useful source of information for the Government, providing input to the current Energy Review.

Philosophy of Engineering

The first two seminars in a series on philosophy of engineering were held on 27 November 2006 and 26 March 2007. The first was on the topic 'What is Engineering Knowledge?' and the speakers were Professor Peter Lipton of the University of Cambridge, Professor Sir Tony Hoare FREng FRS and Dr Kieron O'Hara of the University of Southampton. The speakers discussed how one can know if an

engineering design works and how philosophical problems concerning knowledge could be addressed by looking at the nature of engineering knowledge. The second seminar was on 'Systems Engineering and Engineering Design', and the speakers were John Turnbull FREng, Professor David Andrews FREng, Dr Chris Elliott FREng and Professor Maarten Franssen of the Technical University of Delft. The presentations covered the principles of systems engineering, the need for a philosophy of engineering design and how engineering design should take account of the people in a system – both the operators and users of complex systems and wider society.

Dilemmas of Privacy and Surveillance

On 26 March 2007 the Academy published its report *Dilemmas of Privacy and Surveillance: Challenges of Technological Change*. The report was the result of 18 months of discussion and research by a multidisciplinary group of engineers and social scientists, chaired by Professor Nigel Gilbert FREng. The report examined the current and future state of surveillance and data collection technologies.

Enlarged capacity for data storage means that more data is being collected and retained about individuals: from information about their shopping habits to images taken by increasingly ubiquitous surveillance cameras. The Government's move

toward e-government and the implementation of the national ID card means that more databases of personal information will be created. The report looked at how this increased surveillance impacts on privacy and trust.

The conclusion of the report was that, while we face dilemmas in the choice between protecting privacy and increasing security or convenience, good engineering can allow a balance to be achieved. The report called for more research into 'designing for privacy' and for engineers to be involved in assessing the risks inherent in large databases, so that the chance of a 'data disaster' can be minimised.

The report attracted a great deal of media attention, securing headlines in publications as diverse as the *Metro*, the *Financial Times* and the *Sun*. The report clearly addressed a crucial topic and showed how engineers have an essential role in addressing issues at the centre of society.

Systems Biology

Systems Biology: a vision for engineering and medicine, a joint report by The Royal Academy of Engineering and the Academy of Medical Sciences, was launched on 1 February 2007. It highlights systems biology as a groundbreaking new approach to scientific research in engineering and the biomedical sciences. Systems Biology introduces computer modelling and systems engineering

concepts into traditional, laboratory-based research. It allows researchers to gain an insight into the system's emergent behaviour by investigating how the components of a biological system interact with each other over time and space.

Systems biology will improve our understanding of severe medical conditions such as heart disease, cancer and dementia and enable the development of safer and better drugs. Through its sister discipline, Synthetic Biology, it will also produce stronger and lighter materials for use in transport and unlock the potential of biofuels.

The report recommends investment of £325 million over 10 years to establish three to five new systems biology centres of excellence; calls for reforms in higher education to make sure that there are enough qualified graduates and that the right working practices for systems biology research programmes are in place.

The report was produced by experts in the field of systems biology, engineering, physics, pharmacology and medicine. The working group was co-chaired by Professor Richard Kitney OBE FEng and Sir Colin Dollery FMedSci.

Engineering Ethics

The Statement of Ethical Principles for engineers was revised and presented to Council for approval in January 2007. It has now been officially adopted by The Royal Academy of Engineering and is to be circulated among other Engineering Institutions for their approval. An event is planned for summer 2007 to re-launch the Statement. Representatives of a number of engineering institutions and the Engineering Council UK (ECUK) will be involved in planning and supporting the event.

Road User Charging

On 24 May 2006, the Academy held a briefing on Road User Charging, thus bringing together the final outputs from three major Academy studies: The Challenges of Complex IT Projects; Transport 2050; and Dilemmas of Privacy and Surveillance. The Engineering Policy Committee then agreed that a statement on Road User Charging should be prepared for submission to the Department of Transport. This Statement was issued on 10 August 2006 and was responded to by Dr Stephen Ladyman MP, Minister of State for Transport, in early September 2006.

Industry/Academia Interactions

This year, further seminars in the series exploring the issues surrounding best-practice in Academic-Industrial relations took place. On 28 June 2006, Loughborough University was the venue for a seminar entitled 'Supporting SMEs to Innovate – how to use university and large company expertise'. Another seminar entitled 'Transport and Sustainability – Promoting Innovation' and was held on 27 November 2006 at Chilton Manor. And the final meeting of the year was held at the Leeds Business School on 18 December discussing the presentation 'Creating Innovative Engineering Businesses'.

The discussion at the seminars, output from related workshops, and responses from audience questionnaires will inform the working group responsible for the project. The outcome will be a critique of the current interactions between SMEs and universities with an indication of best practice, where it exists.

Obesity: Causes and Cures

Despite the stark evidence that obesity is prevalent in the UK and other developed nations, the cost to society of this rapid rise is proving

extremely difficult to reduce. On 4 May 2006, the Academy and the Academy of Medical Sciences held a joint briefing on the potential causes and cures of obesity. Peter Davidson FEng and Professor Phillip James FMedSci chaired the presentations. Professor Stephen Bloom FMedSci gave medical opinions on the causes of obesity, revealing some of the medical research aimed at treating obesity and how the financial burden on the medical services will also increase.

Professor Peter Fryer FEng asked what could be done to help those who were overweight and looked at the fact that there is technology available to the food industry to make healthy foods more palatable. Mark Whitby FEng presented a study of how the redesign of buildings and the urban environment could help reduce individual's weight problems, subtle redesigns of urban structures help to redress the balance, thus having a significant impact on obesity rates.

ENGINEERING POLICY RESPONSES

A central element of the Academy's work is to respond to Select Committee inquiries, Government consultations and requests from other bodies. Each response represents the collated views of Fellows invited to respond on issues within their field of expertise.

Personal Internet Security

The Academy submitted a response to The House of Lords Select Committee on Science and Technology's inquiry into personal internet security. It was pointed out that the two major threats came from attackers gaining access to private information, and through the use of unwanted, infected programs such as spyware. The response concluded that while the ultimate means of

protection was through raising on-line awareness, engineers still had a role to play in the design of computer systems with few of the bugs that are exploited.

The Future of the Strategic Nuclear Deterrent

The Academy responded to the House of Commons Defence Committee's second-stage inquiry into the future of the strategic nuclear deterrent which focused on the UK manufacturing and skills base. It was seen as a positive move to introduce a Defence Industrial Strategy if the UK was to maintain its strategic nuclear deterrent. An increased level of investment in education for nuclear engineering was seen as an essential move in order to prevent the further dilution of skills and knowledge in the military sector.

Energy Review

April 2006 saw the Academy submit its response to the Energy Review. It aimed to use the Academy's experience and knowledge to urge the government to develop a clear and consistent, long-term strategy that encompasses all aspects of energy policy. The response argued that a variety of energy sources should be used to ensure security of supply while also lowering carbon emissions.

The Policy Framework for New Nuclear Build

The Department of Trade and Industry launched an inquiry on the Policy Framework for New Nuclear Build in order to develop a more efficient and streamlined planning process for new nuclear power plants. In response to this, the Academy lent its support and in particular highlighted the importance of a clear planning system based on best scientific evidence and international practice. The Academy also emphasised the importance

of dealing with safety, security and decommissioning at a national level.

Science and Innovation Investment Framework 2004-2014: Next Steps

This document triggered passionate comments from Fellows, meaning that the Academy response was extensive. Four main points were raised:

- Barriers to innovation should be addressed by focusing on equipping scientists and technologists with highly specialised skills and knowledge, as well as the 'softer' competencies that can be transferred to and from academic environments and business.

- More financial resources need to be made available in order to encourage speculative research projects to be taken without risking the priority of 'safer' projects. Interdisciplinary research is an example of this and thus should be funded appropriately.

- Barriers limiting business innovation are mainly linked to a lack of financial incentives and support to SMEs which find difficulties in gaining access to academic knowledge and expertise. This is a massive contributor to the slowing down of their innovative developments. Business-University collaboration is also hindered by factors ranging from use of Intellectual Property Rights to the reluctance of Research Councils to invest in industry-led research.

- Large facilities operations should be integrated under a new Large Facilities Council. This Council should act as a Research Council, not just a management facilitator.

The Fellows disagreed on what should be the focus of Universities and Research Councils. Opinion was divided between using them for the nurturing and enrichment of the knowledge base and for providing only what the market economy demands.

Reform of Higher Education Research Assessment and Funding

The Academy responded to the Department for Education and Skills' consultation on whether to reform the Research Assessment Exercise (RAE) to a system based on metrics rather than peer review. The Academy's response was developed from the output of a Fellows meeting which argued against a wholly metrics-based assessment as this method could not capture the mixture of complex data needed to assess research departments. The Academy also dismissed the idea that a parallel metrics panel should run alongside an unaltered RAE2008, as well as suggesting that contrary to the main argument of HM Treasury, the Academy was good value when compared to other funding models in terms of administration costs.

Data Sharing and Data Theft

In response to a Home Office consultation on *New powers against organised and financial crime* in which the Home Office called for greater powers for sharing data, the Academy accepted this need but stressed the need for data subjects to be protected against potential intrusions into their privacy. It also put forward that if data was to be shared, it should be kept up-to-date in order to ensure that expired information would not raise unwarranted suspicion about a person.

The Department for Constitutional Affairs issued a consultation on *Increasing penalties for deliberate and wilful misuse of personal data* to which the Academy offered a response. The Academy supported the suggestions made in the consultation, agreeing that greater penalties were needed as punishment for the misuse of personal information which can

cause serious personal distress as well as financial loss in cases of identity fraud.

Forensic Use of Bioinformation: Ethical Issues

Drawing on considerations from both the Academy's *Dilemmas of Privacy and Surveillance* report and the Ethic's working group, the Academy responded to a consultation paper by the Nuffield Council on Bioethics. The main message of the response was that the drive to prevent or detect crime should not result in an infringement of the privacy of innocent citizens.

Efficiency and Effectiveness of Peer Review Process

The Academy responded to the Research Councils' consultation which was part of its *Efficiency and Effectiveness of Peer Review Process*. The consultation proposed a number of ways in which the peer review process of awarding grants could be improved. The Academy supported a consolidation of research grant funding and a greater use of proposal outlines but rejected the proposal for institutional grant level quotas. The response also gave some guidance on how to improve the assessment of potential economic impact of proposed research and emphasised the importance of finding reviewers who have sufficient expertise in the relevant field.

Cooksey Review of UK Health Research

In March 2006, the Chancellor announced a single, ring-fenced budget to support the health research funded by the Medical Research Council and the NHS R&D Programme. Sir David Cooksey announced his review of the institutional arrangements for the fund in the autumn of 2006.

Inputs from Fellows and members of the UK Focus for Biomedical Engineering Executive Committee were used to form the Academy response. The Academy voiced concerns that due to it being a highly interdisciplinary research subject and thus being under the remit of several funding bodies, Biomedical Engineering was in danger of falling by the wayside. Also of concern was the lack of public funding for research related to engineering-based health technology. However, the Academy was positive about the creation of a Single Health Research Fund in the hope that it would provide more resources and put in place more effective funding mechanisms for Biomedical Engineering.

Nanotechnology

In February 2005, the Government published a response to the joint report by The Royal Academy of Engineering and the Royal Society on *Nanoscience and Nanotechnologies: opportunities and uncertainties*. Within the response, the Government charged the Council for Science and Technology (CST) with the task of making two reviews of the progress made by Government since the publication was released. The CST asked for evidence from both academies in order to create the first review in May 2006.

The joint response stated that the international lead gained by the UK in encouraging the responsible development of nanotechnologies as a result of the report and the Government's response was being lost. It was argued that progress on the Government's research objectives had been slower than expected due to the lack of a wide enough research base in nanoscience, despite the funds available. However, the response did welcome the Government's commitment to public

engagement on the issue. Despite this, it was stressed that suitable mechanisms should be put in place to ensure that the outputs from these engagements are taken into account in policy making.

European Institute of Technology

Fellows were consulted over an Academy response to the European Commission's proposal to establish a European Institute of Technology. There was no consensus of opinion from the more than 130 Fellows that replied, with an even spread of opinions across the board. The responses were collated into a statement and delivered to the European Council of Engineering Academies (Euro-CASE) at a stakeholders' meeting in Brussels.

EDUCATION INITIATIVES

Educating Engineers for the 21st Century: The Industry View

The Academy launched a report into current best practice in the UK and overseas engineering at the Innovation in Engineering Education Symposium in March 2006. Following this, a Questionnaire Survey was issued to all university engineering departments to ascertain their views on the study and establish the initiatives which they wished to take forward. Professor Julia King CBE FREng presented the findings to the International Academies of Engineering Conference on Engineering Education in Chennai on 1 March 2007.

Diversity Programme

The Academy is a partner in Equalitec: Advancing Women in ITEC (IT, Electronics, Communications) and holds regular meetings of the Equalitec Diversity Forum to discuss the problems involved with attracting and retaining women in the ITEC Sector. On 11 May 2006,

the Forum focussed on effective ways for enhancing productivity through diversity and concluded that companies that pursue an active diversity policy gain a noticeable competitive advantage through developing a wider skill set. The second Forum of the year took place on 30 November 2006 and looked at how to create the necessary cultural change required to harness diversity effectively. Reports from these Forums have been published and are available on the Academy website.

EDUCATION RESPONSES

Throughout the year the Academy made a number of submissions related to education matters. The SEMTA 14-19 Engineering Diploma Second Phase Consultation provided an opportunity to ensure that the mathematics and science content of the Specialised Diploma in Engineering at Level 3 was sufficient for university entrance. The Academy is taking the lead in promoting the Diploma in Southwark and Lambeth as part of the London Engineering Project. This advice was also reiterated in response to the House of Commons Education and Skills Select Committee 14-19 Specialised Diplomas consultation.

The House of Lords Select Committee on Science and Technology 'Science Teaching in Schools' consultation gave the Academy the opportunity to highlight the need to train more physics and mathematics teachers; to provide more professional support for science teachers and to create better links between schools, universities and industry in order to facilitate science teaching. The Academy drew attention to the high impact of existing schemes to help generate enthusiasm in young people for science subjects such as those in the Best Programme and the Shape

the Future campaign, as well as the success of the Shape the Future STEPs (Science, Technology and Engineering Placement) at Work programme in providing industry based continuing professional development for science and technology teachers.

A series of consultations on Further Education (FE) enabled the Academy to inform Government of the experience gained in the London Engineering Project. The DfES White Paper Consultation: Further Education: Raising Skills, Improving Life Chances provides a sound framework for taking advantage of delivering the widest possible spectrum of applied learning courses and, in particular, providing a smooth transition to Higher Education through the new Foundation Degrees which the Academy endorsed.

The need to ensure a robust FE quality framework was dealt with in response to the Quality Improvement Agency: Pursuing Excellence: An outline improvement plan for the further education system and to the Learning and Skills Council: Framework for Excellence: A comprehensive Performance Assessment Framework for the Future Education System.

The HEFCE Consultation 2006/48: Higher Education in Further Education Colleges also allowed the Academy to draw attention to the need for adequate financial resources to support these initiatives. The potential for extending the outreach of applied learning courses even further was embraced by the DfES Consultation: Personalised Further Education- Developing a Vision which the Academy also endorsed.

The information and data being assembled as part of the Academy's ongoing Educating Engineers for the 21st Century study proved invaluable in making responses to the House

of Commons Education and Skills Select Committee consultations on 'The future sustainability of the higher education sector: purpose, funding and structures' and 'The Bologna Process'. In the first the Academy drew attention to the need to ensure that the teaching of engineering in the universities is adequately resourced. Currently the unit of resource allocated by HEFCE to deliver engineering courses is far below the cost of delivery so that there is no incentive for universities to increase numbers or, more seriously, fund the facilities required for curriculum development. In the second the Academy pointed out the inadequacy of the European Credit Transfer System (ECTS) as a metric for Bologna compliance and the particular difficulties it could create for accrediting UK Masters of Engineering (MEng) degree courses. The Government was urged to continue to press for the adoption of competence based output standards as the Bologna benchmark.

INTERNATIONAL MATTERS

European Council of Applied Sciences and Engineering (Euro-CASE)

In 2006 Euro-CASE succeeded in winning the contract to continue administering the European ICT Prize on behalf of the EC. The competition awards substantial monetary prizes to small businesses for advances in new technologies. The awards ceremony for the 2007 prize was held at CeBIT, the world's largest ICT trade fair, in Hanover in March and was attended by Viviane Reding, the Commissioner for Information Society and Media. It was a successful event and one of the three Grand Prizes of €200,000 was awarded to a British company, Transitive Corporation, for its 'QuickTransit' hardware virtualization 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 on the Executive Jury.

A Euro-CASE Board Meeting was held on 27 September 2006 in Bern at which the Academy's Director of Engineering Affairs, Keith Davis, led the Academy's representation. The Academy also continued to participate in Euro-CASE thematic activities, with Professor Mike Laughton FREng representing the Academy on the Energy and Environment Platform and Professor David Nethercot OBE FREng providing Academy representation on the Education Platform. In addition, the Academy led the Euro-CASE input to the Commission on the subject of the European Institute of Technology.

Council of Academies of Engineering and Technological Sciences (CAETS)

A meeting was held in Brussels in June 2006, which consisted of a seminar on the Hydrogen Economy and a CAETS board meeting. The seminar was of a high quality, involving experts in various aspects of the hydrogen economy from around the world, and resulted in a CAETS statement on The Role of Hydrogen in our Energy Future. Topics discussed at the board meeting included the strengthening of links between CAETS and other international bodies such as UNESCO.

China

At the invitation of the Chinese Academy of Engineering (CAE), an Academy delegation visited Beijing in December 2006 to participate in an International Forum on the Globalisation of R&D, jointly organised by the CAE, the Chinese Ministry of Commerce and UNCTAD. Peter Saraga

OBE FREng, Honorary International Secretary, delivered a presentation on how the UK government takes account of the international dimension in its science and technology policy and Dr Stephen Bold FREng, Managing Director of Sharp's European Laboratories, spoke about experiences of operating a foreign owned research centre in Europe.

India

In March 2007, the Academy participated in a conference in Chennai on International Engineering Education organised by the Indian National Academy of Engineering with support from CAETS and the Indian Institute of Technology Madras. Professor Julia King CBE FREng led the Academy delegation and presented the Academy's work on Educating Engineers for the 21st Century to the conference.

Capacity building

The Academy has continued to develop its proposals for an engineering capacity building activity in Sub-Saharan Africa over the past year. Dr Helen Bartlett presented the results of her Pilot Study Investigating Engineering Capacity Building in Sub-Saharan Africa to International Committee in April 2006. By means of a literature review, interviews and correspondence, the study investigated the concepts of engineering capacity building, identified initiatives being undertaken by other organisations and compiled suggestions for possible action by the Academy. Funding is now being sought for the Academy's proposals.

Other activities

The Academy undertook missions to the Swedish and US Academies to strengthen relations with these Academies and to learn from their experiences.

Hinton Lecture

The Hinton Lecture 'Redesigning African Economies: the role of engineering in international development' is reported in the section on Meetings and Events.

ASSOCIATE PARLIAMENTARY ENGINEERING GROUP

The Academy organises the secretariat for the Associate Parliamentary Engineering Group (APEG). This is the sole Parliamentary Group providing a focus in Parliament for issues of concern to the wider engineering community. APEG, chaired by Bill Olnier MP, has a membership which includes MPs, Peers and representatives from business, academia and other individuals. Its programme consists of a number of seminars held in the House of Commons by distinguished engineers and business leaders on topics of public and parliamentary interest with an engineering and public policy theme.

Last year's programme included a speech by the Secretary of State for Trade and Industry, Alan Johnson MP at the Annual Dinner; a talk from the Chairman of the Brunel 200 project on the anniversary of the birth of Isambard Kingdom Brunel; a review of the planned Crossrail link in London; an Energy Roundtable to discuss the challenges facing the energy industry over the coming years and a speech from an Energy Consultant at Arup about Sustainable Energy; a talk on delivering infrastructure on time from the Head of Rail at Betchel and a speech from the Director of Arup on China's Dongtan eco-city project. Information on the APEG programme, to which all Fellows are invited to attend as Academy guests, can be found on the group's website at www.apeg.org.uk

UK FOCUS FOR BIOMEDICAL ENGINEERING

The Executive Committee of the UK Focus for Biomedical Engineering, chaired by Professor Richard Kitney OBE FREng, met four times during the year. In September 2006 a UK 'Futures' meeting for young researchers took place over three days at the University of Durham. This year's biennial meeting focused on musculo-skeletal mechanics and was attended by 50 researchers while Professor Angus Wallace of the University of Nottingham gave the keynote speech.

Neil Jordan, World Wide Executive Director for Microsoft Healthcare Industry, spoke on 'The New World of Health Work' at the second UK Focus for Biomedical Engineering Annual Lecture in November 2006. Mr Jordan focused on the poor use that is made of health technology, despite the multitude of applications available and the efforts that are made to ensure they are user-friendly. Also discussed was the vital role that technology can bring to society in developing economies and rural areas where something as basic as a mobile phone allows for an exchange of basic health information over large distances.

There were three UK Focus briefings in the year on 'Mobile eHealth', 'Personalised Medicine' and 'Functional Imaging'. The aims of these briefings were to make each topic more accessible to a wider range of non-specialists.

POLICYNET

Since its inception in 2003, PolicyNet has sought to forge links between members of the wider community of policy professionals. A number of lunchtime meetings have been held in which key policy makers from this

community have spoken to members of a range of organisations involved in Science, Engineering and Technology policy advice. During 2006-07, there were six PolicyNet meetings in which the following people spoke on key policy topics: Richard Thomas, the Information Commissioner; a speaker from the National Security Advisory Centre; Phil Willis MP, Chairman of the House of Commons Science and Technology Committee; Sir Keith Peters FRS FMedSci, former Co-Chair of the Council for Science and Technology; Professor Paul Wiles, Chief Scientific Adviser (CSA) for the Home Office and Sir Howard Dalton, CSA for Defra.

MEETINGS AND EVENTS

Lectures

An important aspect of the Academy's role is to act as a forum for debate. Transcripts and presentations for the many public lectures, discussion meetings, briefings and debates it holds are available in the 'Past Events' section of the Academy website at www.raeng.org.uk.

Professor Calestous Juma FRS gave the 2006 Hinton Lecture which is the Academy's flagship lecture. The internationally-recognised Harvard Professor gave a talk entitled 'Redesigning African Economies'. Professor Juma asserted that a shift in focus was occurring in African development away from emergency relief towards long-term solutions. He emphasised the importance of innovation, education and an understanding of national and regional circumstances when aiming towards business development in Africa.

In June 2006, Professor Sir Robert Worcester KBE DL, founder of Market and Opinion Research International, gave the Academy's annual Lloyd's

Register Educational Trust Lecture. The lecture was entitled 'The Public Perception of Risk' and looked at the three elements that affect the public's perception of risk – namely opinions, attitudes and values, before identifying the media as one of the key reasons why public perception of core authoritative groups in society is now falling. The lecture concluded that consistency, reassurance and transparency are critical to gain public trust.

The Academy's regional Annual Lecture and 'Spring' Dinner was held at the University of Manchester in March 2007. Professor Geo Tomlinson FREng, Pro-Vice Chancellor (Research) at the University of Sheffield gave a lecture entitled 'Next Generation Materials for Reducing Vibration in Aircraft Engines'. The lecture was followed by a Fellow's dinner hosted by the University of Manchester President and Vice-Chancellor, Professor Alan Gilbert.

The President's New Year Reception and Lecture took place on 11 January 2007. After the welcome from the President, Michael Ramsay, Co-founder, TiVo Inc, gave a lecture entitled 'TiVo – Creating a Revolution in Television' in which he shared his inside knowledge and considerable experience of TiVo's rise to a position of a high-growth public company. The key elements of his speech outlined the difficulties of building a company in the face of the massive media industry in Hollywood, the challenges inherent in creating new technology and the importance of encouraging the formation of a company culture in which employees are inspired to work harder in order to stay ahead in the market place. During the evening he was also presented with the Sir Frank Whittle Medal that he won in 2006.

The Academy held a further two of the Vodafone-sponsored Lecture Series in Mobile Telecommunications and Networks. In June 2006, Professor Robert Calderbank, Professor of Electrical Engineering and Mathematics, Princeton University and a leader in the field of mobile telecommunications spoke on 'Quantum Computing and Cellular Phones' and described how the wireless industry is using mathematics developed by number theorists over 100 years ago. In November 2006, the Academy hosted a fourth lecture in the series and invited Professor Joachim Hagenaur, Professor of Telecommunications at the Munich University of Technology (TUM), to speak. Professor Hagenaur spoke on 'Information Theory and Mobile Communications' and outlined the challenges faced by engineers as antennas and relay systems reach their capacity.

Briefings

John Coles CB FREng of the Ministry of Defence was the speaker at the 'The Future Aircraft Carrier – the engineering and technical challenges of designing and building the largest ever warships for the Royal Navy' briefing held by the Academy on 20 March 2007. This briefing was very popular with Fellows and all who attended heard the project leader of the Future Aircraft Carrier, John Coles, explain how the challenges of creating the UK's largest ever warship had been met and overcome.

Three speakers lectured at the Academy Briefing 'The State of the Art in High Power Lasers and Large Optical Systems' in February 2007. Dr Edward Moses, Director of the National Ignition Facility at Lawrence Livermore National Laboratory (LLNL) in California, spoke on 'The National Ignition Facility (NIF) – A New Age in Science'. Professor Mike Dunne,

Director of the UK's Central Laser Facility at the Rutherford Appleton Laboratory (CCLRC), gave a speech entitled 'Towards the next generation of ultra high power lasers'. Professor Paul Shore, Head of the Cranfield University Precision Engineering Centre, ended the briefing with a presentation on the 'UK National Facility for Ultra Precision and Structured Surfaces (UPS2)'.

A Briefing entitled 'Future developments in the management of nuclear waste: building on CoRWM' took place at the Academy in December 2006. The speakers at this event were Professor Gordon MacKerron, Phil Davies, Toby Free and Dr Doug Parr.

Fellows' Visits

In January 2007, a small group of Fellows visited The Grain LNG Importation Terminal in the South East of England. During their visit, the Fellows heard from the Director, the Importation Terminal Manager and the Project Manager of Grain LNG and gained an understanding of the increasing importance of this facility to the burgeoning UK gas supply market.

The Fellow's Annual Regional summer visit took place in September 2006 and was held at two of the University of Sheffield's new research facilities. The day was arranged by Professor Geoffrey Tomlinson FREng and entailed a morning tour of the Kroto Research Institute at the University's North Campus, before heading to the Advanced Manufacturing Research Centre (AMRC) at Catcliffe.

Professor Bill O'Riordan FREng hosted a follow-up Fellows visit to his Flight Simulator, as first experienced by a small group in 2005. He welcomed Fellows to his home to see a demonstration of the new innovations installed on

his Twin Engine fixed wing aircraft simulator, as well as showing them the newly constructed Robinson R22 helicopter simulator. The Fellows were given the opportunity to experience the simulator – from take-off at City Airport, to exploring London overhead and returning safely to base.

COMMUNICATIONS

The Communications team has continued to develop key relationships with national journalists and to engage on a wider level with the online and broadcast media community. The Academy's education schemes have received wide coverage with articles, interviews and many case studies, notably in *The Independent*.

An ongoing priority is the positioning of Academy Fellows as experts on engineering issues in the media. This has been achieved on energy issues, science policy and the Cumbria Rail Crash across national print and broadcast media. Our relationship with the Science Media Centre and a co-ordinated approach to media stories with the engineering and science community has led to increasing requests for Academy Fellows as commentators.

A key success for the Communications Team was the level of media coverage surrounding the launch of the report *The Dilemmas of Privacy and Surveillance* in March 2007. The response was welcomed by a number of third parties, including the Home Office and opposition politicians. The messages to appear in the press were overwhelmingly favourable for the report and for the Academy. The report was covered by *The Guardian*, *Daily Telegraph*, *Metro*, *The Times*, *Daily Mail*, *Financial Times*, *Scotsman*, Radio 5, LBC Radio and a number of national online news and trade publications.

INGENIOUS

The Academy launched the *Ingenious* grants scheme in November 2006 to promote open debate and dialogue between citizens and engineers on engineering issues of public interest and concern. The scheme is funded by the Office of Science and Innovation.

There has been much discussion on the importance of engaging society with key technological issues. The *Ingenious* awards will provide engineers with formal training or experiential learning in public engagement, to become better equipped to interact with those outside the engineering community. In addition, the awards will provide engineers with opportunities to consider the societal implications of their work.

Ingenious aims to build an infrastructure upon which public engagement with engineering can take place. It has two principal objectives. Firstly, to foster a community of engineers that is skilled in communicating and open to dialogue and debate with the public. Secondly, to develop networks and partnerships between engineers and those organisations that are able to reach the public such as science centres, the media, theatres, schools and science/engineering communication institutions.

The deadline for the first round of applications was in January 2007; over 100 applications were received. A total of £344,760 was eventually awarded to 15 different projects. The range of projects was diverse and included a drama production to engage engineers and young people in debate about privacy and surveillance technology and a public adult event programme event exploring issues such as nanotechnology and robotics.

Communications and Public Engagement Committee

A new committee was formed during the year and held its first meeting on 9 November 2006. The role of the Committee is to provide strategic advice to the Academy's communications activities on behalf of Council, with particular emphasis on ensuring the soundness of the Academy's reputation and on developing the Academy's profile. It comments on all aspects of the Academy's communications and public engagement activities, ensuring they are delivered in line with Royal Charter and Business Plan commitments.

Ingenia Magazine

The *Ingenia* Editorial Board led by Editor-in-Chief Dr Scott Steedman FREng, directs the course of the Academy's quarterly flagship magazine. *Ingenia* is mailed out directly to 3,800 people and circulated to 1,200 more. The Academy was pleased to welcome Lloyd's Register as a new sponsor of the magazine during the year, who join Arup, BAE Systems, Mott MacDonald and Rolls-Royce plc.

In a readership survey carried out in June 2006, 95% thought that *Ingenia*'s content was 'Good' or 'Very Good'. There was also support for reaching out to a younger audience and, as a result, a poster aimed at 15-18 year olds was produced and trialled among 25 schools and sixth form colleges. Depending on the responses, a poster might become an established offshoot of *Ingenia*.

Website

The Academy's website had an increase of over 40% in the number of people that logged on to the site during the year. The number of people visiting www.raeng.org.uk averaged 78,000 'unique visitors' a month. An internal review during

the year recommended changes in structure, content and function. These amendments, together with greatly increased daily additions to the site augmented the traffic passing through the site.

During the year a new website for the London Engineering Project was created. In addition a new website for *Ingenia* is also currently being built and will launch in summer 2007. The internal web review also proposed introducing a Really Simple Syndication (RSS) facility for news releases for implementation in spring 2007.

Fellows' Newsletter

There were four newsletters for Fellows produced during the financial year. The design of which was brought inhouse which will save on production costs. Each issue was mailed out to Fellows and a pdf of each one will now be placed on the Academy website.

Academy Business

ANNUAL GENERAL MEETING

The Academy held its 30th Annual General Meeting at the Royal College of Surgeons on 4 July 2006, with the Royal Fellow, HRH The Duke of Kent KG GCMG GCVO, in the Chair. The Royal Fellow proposed that Lord Browne of Madingley FEng FRS be elected as successor to Lord Broers FEng FRS as President. This was unanimously approved and Lord Browne pledged to continue the good work of his predecessor. Three Honorary Fellows, two International Fellows and 29 Fellows were elected, the Annual Review and Accounts for 2005-06 were adopted and new Council members were elected. The AGM also approved increases in the Fellows' subscription rates to take effect from 1 January 2007.

After the formal business of the AGM concluded, presentations were given by: Joseph Corrigan, PA Consulting, a former Engineering Leadership Award holder; Dr Brian Henson, University of Leeds, a participant in the Industrial Secondment Scheme; and Dr Eleanor Stride, University College London, a RAEng/EPSRC Research Fellow. Later in the evening the Royal Fellow hosted a valedictory dinner in honour of Lord Broers and in celebration of his term as President of The Royal Academy of Engineering 2001-06.

MEMBERSHIP STUDY

Council set up a Study Group in June 2006 under the chairmanship of Sir Peter Gershon to review membership procedures. Council is concerned to ensure that nominations for Fellowship are obtained for candidates who are presently underrepresented in the Fellowship. Two such underrepresented groups are women and engineers employed

in SMEs. The Study Group reported its findings in April 2007 and work is in hand to implement the recommendations.

DEVELOPMENT REPORT

The Reception at Buckingham Palace in May provided the Academy with a privileged opportunity to mark its 30th Anniversary with a large number of mostly corporate guests, many of whom were unfamiliar with the Academy's work and ambitions. Emphasis throughout the year has been on 'raising friends' and a level of success can be reported.

A Development Steering Group has been set up, chaired by Sir John Parker and tasked with preparing the way for further fund-raising approaches within the Fellowship and beyond, to those who share our passion for engineering excellence and the need to attract and retain talent in all areas of engineering. This effort requires considerable investment and will take time. Success is aided by a strongly performing Academy being actively supported by its Fellows.

Pledges and donations by Fellows and others now total £658,000 and these, together with the very generous £250,000 grant from The Kirby Laing Foundation, contributed to a Building Fund of more than £3,000,000. A growing number of Fellows notified the Academy of intended legacies which was also most welcome.

New commitments from companies and trusts totalled £250,000, giving many more young people access to our educational activities. As examples, the Airbus partnership increased Best Programme activity, including the launch of Young

Engineers' Project Eggs Factor. Fellows connected with Rolls-Royce initiated a matched funding scheme whereby their own gifts to the Building Fund are matched by contributions from the company for targeted educational activities. This has raised £130,000 to date. Smiths Group selected the Best Programme's Headstart scheme to fund a number of talented young people to study engineering at university as well as offering company placements; such engagement was well received by their employees. It is increasingly evident that the Academy's comprehensive and effective provision of educational outreach with its emphasis on collaboration and coherence is valued – more commitments are expected.

The year ends with news of the move to Carlton House Terrace. The valuable benefit of lower rental costs for a much larger facility is in part reflected in the upfront lease premium. The building's potential for longer term redevelopment is also significant. Both factors mean more capital will need to be raised and the development resource increased. The further strengthening of Academy friendships in all quarters will be the route to success.

The implementation of an Academy-wide contact relationship management system has been more difficult than anticipated. The core system is up and running and the web version due for launch shortly. Costs are within budget but the scope of work embedded in the Academy's many activities has been significant and access to benefits delayed. When fully deployed, the Academy expects to see both efficiency and service benefits and thus achieve an appropriate return on its investment.

ACADEMY RELOCATION

The Academy had been contemplating a move to a new building for several years. This was due to the need to provide both room for expansion, and better facilities for conferences and lectures. In June 2006 the Academy became aware that the Work Foundation were contemplating relocation and, following negotiations, an agreement to purchase their lease on 3 Carlton House Terrace, London SW1 was signed on 22 December 2006. The lease purchase price was £5.31 million. The Work Foundation will vacate the building on 8 June 2007, and the Academy expects to occupy the building in the Autumn of 2007.

The move is being supervised by a Project Committee under the chairmanship of Sir David Davies supported by Fellows Sir Duncan Michael, Peter Rogers, Peter Saraga, and Professor Ernest Shannon. The Project Committee has appointed an architect, project manager, construction manager, quantity surveyor and other professional service providers required in a project of this kind.

The property consists of 3 and 4 Carlton House Terrace which have been conjoined. The total area is 25,000 square feet, nearly twice the size of the existing Academy headquarters. There are several rooms which will provide excellent facilities for meetings, conferences and dining. The office accommodation lends itself to an open plan layout and is large enough to accommodate expansion for several years. The large basement provides very useful small to medium-sized meeting rooms as well as facilities such as plant rooms, kitchen and store rooms. The eventual aim for the basement area, when funds permit, is to create a conference

facility with a lecture theatre for up to 150 people. The building has Grade 1 listed status and therefore, the full agreement of English Heritage has to be obtained on any structural alterations that may be contemplated.

Work is in hand to assign the tenancy at 29 Great Peter Street. A marketing campaign began in mid January 2007 and has generated considerable interest.

Council

The Council – which held four ordinary meetings during the year – directs and manages the Academy and governs and controls its affairs, delegating as appropriate some of its functions to Standing Committees, each of which reports regularly to Council. As the Academy is a registered charity, the Officers and Members of Council fulfil the role of Trustees. As at 31 March 2007 the Council consisted of those listed below.

OFFICERS AND MEMBERS OF COUNCIL

President

Lord Browne of Madingley
FREng FRS

Past President (ex officio)

Lord Broers FREng FRS

Senior Vice President

Prof W Hall CBE FREng

Vice Presidents

Prof W R Eatock Taylor FREng

Dr S E Ion OBE FREng

Mr P Saraga OBE FREng

Dr R S Steedman FREng

Professor R A Williams FREng

Honorary Treasurer

Mr F C Price FREng

Hon Sec for International Activities

Mr P Saraga OBE FREng

Hon Sec for Education and Training

Dr D Grant CBE FREng

Ordinary Members

Mr R Benaim FREng

Mr M A Brinded CBE FREng

Sir David Brown FREng

Prof P J Gregson FREng

Mr C G Hodge FREng

Prof R Holdaway FREng

Mr M G Howse OBE FREng

Dr I D Nussey OBE FREng

Mr R L Olver FREng

Prof J D Perkins FREng

Prof D I A Poll OBE FREng

Dr M Shears CBE FREng

Sir Martin Sweeting OBE FREng FRS

Sir John Taylor OBE FREng FRS

Prof S J Young FREng

Chairman Membership Committee (ex officio)

Prof M J H Sterling FREng

Chief Executive

Mr P Greenish CBE

Director, Finance & Administration (Secretary to Council)

Mr A Thomas

Academy Standing Committees

Awards Committee

The Awards Committee is responsible for identifying and recommending to Council appropriate candidates for all relevant prizes and Awards, whether in the Academy's gift or not, with the exception of National Honours and the MacRobert Award.

Chair

Prof R A Williams FREng

Members

Mr K E Batchelor FREng
Prof R E Challis ACGI FREng
Prof D Fisk CB FREng
Prof M J Hamlin CBE FREng FRSE
Mr R B Haryott FREng
Mr C G Hodge FREng
Prof A Hopper FREng
Prof R I Kitney OBE FREng
Prof J N Randle RDI FREng
Dr P Watson OBE FREng
Prof C R Whitehouse FREng

Committee Secretariat:

Mr P Greenish CBE
Dr R. Wilson
Miss A Pennington

Communications and Public Engagement Committee

The role of the Committee is to provide strategic direction to the Academy's communications activities on behalf of Council, with particular emphasis on ensuring the soundness of the Academy's reputation and on developing the Academy's profile. It oversees all aspects of the Academy's communications and public engagement activities, ensuring they are delivered in line with Royal Charter and Business Plan commitments.

Chair:

Dr R S Steedman FREng

Members:

Mr J M Cooper
Dr M Earwicker FREng
Prof I Fells CBE FREng FRSE
Prof D I A Poll OBE FREng
Ms F Wainwright FREng
Dr W Webb FREng
Prof C M Wise RDI FREng

Ex Officio:

Mr K Campbell
Dr R Highfield
Mr C Hird

Committee Secretariat:

Dr R Wilson
Miss A Abbott

Education and Training Committee

The Education and Training Committee's role is to oversee and be responsible for the Academy's activities in engineering education and training and to maintain links with other bodies working in these fields.

Chair

Dr D Grant CBE FREng

Members

Dr S Bold FREng
Dr S W Huntington FREng
Prof W I Milne FREng
Prof J P K Seville FREng
Prof A Unsworth FREng
Prof J V Wood CBE FREng

Ex Officio

Prof G J Davies FREng
Prof P J Deasley FREng
Prof R G Dodds FREng
Prof J E King CBE FREng
Mr E H Norie OBE FREng
Professor M J Withers FREng

Committee Secretariat

Dr R W Ditchfield
Mr I J Bowbrick

Engineering Policy Committee

The Engineering Policy Committee's role is to advise and be responsible to Council for the engineering policy of the Academy and for all matters concerned with the application of engineering knowledge and principles (other than education and training). It should identify, monitor and promote attention to emerging and generic issues of importance to engineering in pursuit of this role.

Chair:

Dr S Ion CBE FREng

Members:

Mr J Baxter FREng
Prof T W Broyd FREng
Prof S F Davies FREng
Dr K W A Guy FREng
Eur Ing Dr R P Harris FREng
Dr M G Howse OBE FREng
Prof M J Kelly FREng FRS
Prof A D May OBE FREng
Mr J E Roberts CBE FREng
Prof C M Snowden FREng FRS

Ex Officio:

Dr P J Hargrave FREng
Prof R Holdaway FREng
Prof R I Kitney OBE FREng

Committee Secretariat:

Mr B G Doble

Finance and Audit Committee

The Finance and Audit Committee is responsible for all financial and auditorial affairs of The Royal Academy of Engineering. This includes management of Academy budgets, external investment fund managers, insurance policy, risk register, audit arrangements and compliance with external financial reporting standards.

Chair:

Mr F C Price FREng

Members:

Mr R Benaim FREng
Mr C V Betts CB FREng
Dr I D Nussey OBE FREng
Prof P N T Wells FREng FRS
Prof S J Young OBE FREng FRS

Committee Secretariat:

Mr A Thomas

International Committee

The International Committee's role is to advise and be responsible to Council for promoting the international interests of the Academy. In pursuit of this role the Committee's interests include oversight of the Academy's relations with the Council of Academies of Engineering and technological Sciences (CAETS) and the European Council of Applied Sciences and engineering (Euro-CASE)

Chair:

Mr P Saraga OBE FREng

Members:

Prof G J Davies FREng
Prof P M Guthrie OBE FREng
Prof R Holdaway FREng
Prof W O'Riordan FREng
Prof G R Tomlinson FREng

Committee Secretariat:

Dr H Sillem

Membership Committee

The Membership Committee is responsible for considering candidates for election to The Royal Academy of Engineering and for submitting a list of not more than 60 names to Council for approval before each Annual General Meeting. Each of the five Members of the Committee chairs a Panel covering a specific area of expertise.

Chair:

Prof M J H Sterling FREng FRS

Ex Officio:

**Lord Browne of Madingley
FREng FRS**

Chairs:

**Panel 1 Mr A D Roche FREng
Panel 2 Prof P M Guthrie OBE FREng
Panel 3 Dr D Grant CBE FREng
Panel 4 Prof P J Gregson FREng
Panel 5 Prof J J O'Reilly FREng**

Committee Secretariat:

Mrs J Wagsta

(see next column for details of other panel members)

Additional Panel Members:

Panel 1 (Mechanical, aeronautical, marine and manufacturing engineering)

Dr R A Ainsworth, Mr J Baxter,
Mr K G Jackson, Mr R J Parker,
Prof K Ridgway OBE, Mr A Shooter,
Prof D J Williams, Mr L G Williams

Panel 2 (Civil, structural, public works and building services engineering)

Prof R J Chandler OBE,
Mr P R Head OBE, Mr R F Emmerson,
Prof D N Lerner, Mr D E Sherwood

Panel 3 (Electrical, electronic, control engineering and computing)

Prof H D Griffiths, Prof C J Harris,
Mr D J Hughes, Prof D J N Limbebeer,
Prof J G McWhirter, Dr J E Roberts CBE,
Mr E A Wallis

Panel 4 (Chemical, fuel, process, mining and materials engineering)

Mr K E Batchelor, Dr S E Bold,
Prof B D Crittendon, Prof R C Darton,
Dr R E Dolby OBE, Dr P E J Flewitt Prof
P J Goodhew, Mr S P Vbranch

Panel 5 (Informatics)

Prof A E Chessell, Mr M F Cowlshaw,
Prof S B Furber, Prof P M Grant,
Mr D A Hendon, Prof A Hopper,
Prof M Petrou, Mr M H Reeve

Research and Secondment Schemes Committee

The role of the Research and Secondment Schemes Committee is to advise and be responsible to Council for the supervision of research and secondment schemes other than those concerned with education and training.

Chair:

Prof W R Eatock Taylor FREng

Members:

**Prof M J Adams FREng
Prof P S Cannon FREng
Prof H A Chase FREng
Mrs A E Chessell FREng
Dr S J Garwood FREng
Prof H D Griffiths FREng
Dr P J Hargrave FREng
Prof J V Kittler FREng
Prof M S Snaith FREng
Prof R R Syms FREng
Prof H R Thomas FREng
Prof D E Winterbone FREng**

Ex Officio:

**Professor J D Perkins FREng
Prof G R Tomlinson FREng**

Committee Secretariat:

Mr R Barrett

Academy Sta

As at 31 March 2007

Chief Executive
Philip Greenish CBE

Personal Assistant
Éva Culleton-Oltay

COMMUNICATIONS

Director, Communications
Dr Richard Wilson

Head, Events & Awards
Amy Abbott

Assistant Managers, Events
Jacqueline Cox, Faye Whitnall

Assistant Manager, Events & Awards
Alexandra Pennington

Head of Public Engagement
Dr Lesley Paterson

Manager, Communications
Jane Sutton

PR Consultant
Tonia Page

Publications and Web Editor
Dominic Joyeux

Assistant Publications Editor
Angus Dawson

ENGINEERING AFFAIRS

Director, Engineering Affairs
Keith Davis

Secretary
Sylvia Hearn

Head of Engineering Policy
Brian Doble

Policy Advisors
**Richard Ploszek, Dr Alan Walker,
Dr Natasha McCarthy,
Dr Loredana Santoro**

Manager, International Affairs
Dr Hayaatun Sillem

Manager, Research Support
Rob Barrett

Assistant Manager, Research Support
Dr Chris Coulter

Research Administrator
Angus Baker

Manager, Industrial Secondments
and Visiting Fellowships
Dr Imren Marks

DEVELOPMENT

Director, Development
Sarah Philbrick

Development Executive
Kim Bond

FINANCE AND ADMINISTRATION

Director, Finance & Administration
Ashley Thomas

Secretary
Janet Weekes

Manager, Finance
Margaret Stewart

Finance Assistant
Karen Russell

Manager, Membership
Joanne Wagsta

Membership Administrator/
Librarian/Archivist
Hema Lingham

Head of IT
Hakan Altinisik

IT Assistant/Web Administrator
Barry Weekes

IT and Web Officer
Kate Philips

House Services Manager
Nigel Palmer

Reception/Security
Paul Morant

Manager, Facilities & Catering
James Lucey

Facilities Assistants
Terry Woolgar, Craig Clarke

EDUCATION AFFAIRS

Director, Education Affairs
Dr Robert Ditchfield

Secretary
Patricia Frome

Manager, Engineering Design
Education
David Foxley

Manager, Postgraduate and
Professional Development
- *Sainsbury Management
Fellowship Scheme*:
Ian Bowbrick

Assistants, Postgraduate and
Professional Development
Anne Mahabal, Pauline Stillman

EDUCATION PROGRAMME

Director, Education Programme
Professor Matthew Harrison

Manager, Pre-University and
Undergraduate Programmes
- *Engineering Leadership Awards*
- *Executive Engineers Programme*
Dr Peter Revell

Administrator, Education Programmes
Sandra Palmer

Administrative Assistant
Joanne Page

Manager, Education Communications
Dr Claire McLoughlin

Education Officer
Lynda Mann

Head of Campaigns
Dave Rowley

London Engineering
Project Co-ordinator
Heather Hawthorne

**Autonomous and separately funded
organisations forming the Best
Programme:**

Engineering Development Trust:
Dr Gordon Mizner

*Engineering Education Scheme
England:* **Roy Bromley**

*Engineering Education Scheme
Northern Ireland:* **Brian Campbell**

*Engineering Education Scheme
Wales:* **Austin Matthews MBE**

Go4SET:
Duncan McSporon

Headstart:
David Ozholl

Smallpeice Trust Courses:
Dr Andrew Cave

The Year in Industry:
Chris Ward

Young Engineers:
Captain Stuart Ellins RN

Annex

RESEARCH CHAIRS AND SENIOR RESEARCH FELLOWSHIPS

Seven new Research Chairs were appointed during the year, bringing the total number of awards to 36. The holders are:

Research Chairs in Innovative Manufacturing
(co-sponsored with the Engineering and Physical Sciences Research Council)

Name	Co-sponsor	Subject	University
Prof D Kehoe	IMI	E Business modelling for Manufacturing Supply Networks	Liverpool
Prof P Sharratt	IMI	Innovative Manufacturing for the Process Industries	Manchester

Research Chairs

Name	Co-sponsor	Subject	University
Prof C Baker	Thales UK	Intelligent Radar Systems	UCL
Prof S Biggs	BNFL	Particle Science and Technology	Leeds
Prof N Cowern	Philips/Applied Materials	Nanoscale Materials Processing	Surrey
Prof D Fisk CB FREng	BP	Engineering for Sustainable Development	Imperial College
Prof A Forsyth	Rolls-Royce	Electrical Systems for Extreme Environments	Manchester
Prof C Garner	Perkins Engines	Applied Thermodynamics	Loughborough
Prof S Grimes	SITA	Environmental Waste Management	Imperial College
Prof G Hankinson	Advantica	Pipeline Technology	Loughborough
Prof M Johnson	Rolls-Royce	Power Electronics	Sheffield
Prof R Kalin	Keller Ground Engineering	Environmental Engineering	Queens, Belfast
Prof C Lawrence	Schlumberger	Oilfield Process Engineering	Imperial College
Prof D Loveday	E.ON	Low Carbon Energy Technology	Loughborough
Prof D McFarlane	BAE Systems	Service Support Engineering	Cambridge
Prof S Muggleton	Microsoft Research	Machine Learning	Imperial College
Prof B Mulgrew	SELEX	Multi-Sensor Signal Processing	Edinburgh
Prof M Newborough	Scottish Power	Energy and Environmental Engineering	Heriot-Watt
Prof K Nikbin	British Energy	Structural Integrity Assessment	Imperial College
Prof S Raghunathan	Bombardier Aerospace	Aerospace Engineering	Queens, Belfast
Prof A Sheno	Lloyd's Register	Lightweight Structures	Southampton
Prof R Smith FREng	AEA Technology/Hitachi	Future Rail Research	Imperial College
Prof Nina Thornhill	ABB	Process Automation	Imperial College
Prof José Torero	BRE	Fire Safety Engineering	Edinburgh
Prof A Zisserman	Microsoft Research	Computer Vision Engineering	Oxford
<i>appointment pending</i>	Welsh Development Agency	Power Electronics	Swansea
<i>appointment pending</i>	Rolls-Royce	Computational Aerothermal Engineering	Oxford
<i>appointment pending</i>	BAE Systems	Systems Engineering	Loughborough

Senior Research Fellowships

Name	Co-sponsor	Subject	University
Dr P Gardner	Microsoft Research	Active Web Data	Imperial College
Dr H Ford	Daphne Jackson Trust	Fibre-Optic based Optical Coherence Tomography	Cranfield
Dr R Moore	ICI/Cytec	Engineered Materials Performance of Polymeric Adhesives	Imperial College
Ms J Punekar	Daphne Jackson Trust	Aeroacoustic Modelling of High-Speed Jet Noise	Queen Mary, UCL
Dr S Vijayakumar	Microsoft Research	Learning Robotics	Edinburgh
Dr L Zhang	Daphne Jackson Trust/Equalitec	Advanced Electronic Materials	Liverpool
Dr B Grieve	Syngenta	Biosensors and Remote Detection	Manchester
<i>appointment pending</i>	Microsoft Research	Information Retrieval	Glasgow

Leverhulme Senior Research Fellowships

Name	Subject	University
Dr D Allsopp	Novel Nano-Template Technology and its Applications to the Fabrication of Novel Photonic Devices	Bath
Dr H Burd	Engineering methods for design and assessment of potential surgical treatment for presbyopia	Oxford
Dr A Heyes	Non-intrusive Condition Monitoring of Components and Coatings in the Hot Section of Gas Turbines	Imperial College
Dr D McNally	Full field strain measurement in clinically important soft tissues	Nottingham
Prof R Ocone	Biochemical reaction engineering - a lumping methodology	Heriot-Watt
Prof M Rainforth	An investigation of the atomic structures of nanoscale coatings and thin films using newly developed aberration free microscopy techniques	Sheffield
Dr F Toni	Argumentation as a Foundation for Agent Based Grids	Imperial College

EPSRC/ACADEMY RESEARCH FELLOWSHIPS

Name	Subject	University
Dr M Booth	Adaptive Nano-Optics	Oxford
Dr D Barratt	Ultrasound Image Registration for Guiding Medical Interventions	UCL
Dr M Bustard	Bio-Electric Systems – A Novel Bioprocess Intensification Strategy	Heriot-Watt
Dr S Calverley	Embedded Electrical Machines	Sheffield
Dr J Chew	Developing Dynamic Gauging as a Surface Layer Probe	Cambridge
Dr A Clare	Engineering the Intelligent Scientific Laboratory	Aberystwyth
Dr R Dorey	Fabrication of Functional Ceramic Devices	Cranfield
Dr H El Mubarek	Point Defects Engineering: A New Method of Dopant Diffusion Suppression in Semiconductors	Southampton
Dr G Goussetis	Synthetic Metamaterials for RF, micro- and mm-wave Applications	Heriot-Watt
Dr E Grace	Next Generation DVD: Chiral Beams for Ultra High Capacity Multiplexed Optical Data Storage	Imperial College
Dr K Groom	Advanced Semiconductor Laser Engineering	Sheffield

EPSRC/ACADEMY RESEARCH FELLOWSHIPS *continued*

Name	Subject	University
Dr J Hastie	Visible and Ultraviolet Surface Emitting Semiconductor Lasers for Life Science Applications	Strathclyde
Dr M Jackson	Consolidation and Behaviour of Continuous Solid State Processing of Titanium from Emerging Reduction Methods	Imperial College
Dr J Jones	Development and Optimisation of Porous Bioactive Scaffolds for Bone and Cartilage Regeneration	Imperial College
Dr E Kerrigan	Robust Control of Constrained Dynamic Systems	Imperial College
Dr V Khomenko	Design and Verification of Asynchronous Circuits	Newcastle
Dr I Kinloch	Nanotubes in Advanced Engineering Materials	Manchester
Dr A Kohn	Correlating Microstructure and Anti-Ferromagnetic Domains in Thin Films for Spin Electronic Applications	Oxford
Dr V Kolmogorov	Discrete Optimisation Methods for Intelligent Systems	UCL
Dr P Lee	The Tribological Investigation of Modern Automotive Engines for Improved Fuel	Leeds
Dr K Miller	Improved Imaging of Brain Function and Connectivity	Oxford
Dr J Mackenzie	Efficient High Power Planar Waveguide Lasers	Southampton
Dr M McLoone	Cryptographic Algorithms for System-on-Chip	Queen's, Belfast
Dr P McSharry	Non-Linear Analysis of Biomedical Signals	Oxford
Dr M Migliorato	Atomistic Simulations of the Structural and Electronic Properties of Semiconductor Materials for Nanotechnology	Manchester
Dr I Miguel	An Automated Constraint Modelling Assistant	St Andrews
Dr A Morgans	Active Control of Combustion Instabilities	Cambridge
Dr M Parkinson	Local Reasoning for Generics and Concurrency	Cambridge
Dr J Price	Pulsed Fibre Laser Systems and Applications	Southampton
Dr F Simonetti	Super Resolution Sub-Surface Sensing	Imperial College
Dr S Speller	Superconducting Metamaterials for near field NMR Microscopy Applications	Oxford
Dr E Stride	Characterisation and Design of Coated Microbubbles for Ultrasound Imaging and Cancer Therapy	UCL
Dr K Teo	Next Generation Electronics using Carbon Nanotubes	Cambridge
Dr G Treece	Mitigation of Imaging Artefacts in 3D Ultrasound	Cambridge
Dr R Wilcox	Vertebroplasty: Innovations in Cement Application	Leeds
Dr R Willden	CFD Modelling of the High Mode Vortex Induced Vibrations of Long Flexible Pipes	UCL
Dr S Williams	A Biotribology Simulation System for Pre-Clinical Evaluation of Novel Cartilage Repair Systems	Leeds

GLOBAL RESEARCH AWARDS

Award holders current during the year are:

Secondee	Employer	Project Title	Host
Dr A Adams	University of Reading	Privacy and Data Protection in the Global Village: Anglo-Japanese and Euro-Asian Comparisons	Meiji University, Tokyo, Japan

GLOBAL RESEARCH AWARDS *continued*

Secondee	Employer	Project Title	Host
Dr G Airey	University of Nottingham	Moisture Damage Evaluation & Micro-Structural Characterisation of Asphalt Mixtures	Texas A&M University, USA
Dr J Allwood	Cambridge University	Charting the Future of Flexible Metal Forming	University of Palermo, Italy
Prof S Chen	University of Southampton	Optimising Control System Integrity for Finite Precision Implementation	Zhejiang University, People's Republic of China
Prof T Curtis	University of Newcastle	Unifying Concepts in the Design of Biological Water Treatment Systems	Stanford University, USA
Dr N Dodd	University of Nottingham	Beach Engineering: Field Validation of a Morphodynamical Stability Model	Naval Postgraduate School, Monterey, California, USA
Dr V Dubey	University of Bournemouth	Design of a Gravity Balancing Upper-Arm Orthosis for Older People	University of Delaware, USA
Dr I Eames	UCL	The Effect of Phase Change on Dispersed Turbulent Multiphase Flows	National Technical University of Athens, Greece
Dr A Elsheikh	University of Dundee	Corneal Biomechanics and their effect on Intra-Ocular Pressure Measurement	University of New South Wales, Australia
Dr M Folley	Queen's, Belfast	An Investigation of Wave Powered Desalination	Instituto Tecnológico de Canarias, Spain
Dr Wolf-Gerrit Früh	Heriot-Watt	Turbulence Modelling for Wind Turbines	Institute of Turbomachinery, University of Hanover, Germany
Dr C Gervet	Imperial College	A Geometrical Approach Embedded Into Finite St Constraint Programming Languages: Application to Combinatorial and Network Designs	Brown University, USA
Dr M Halsall	University of Manchester	Nitride Semiconductor Devices for THz electronics	iQCD, University of California, Santa Barbara, USA
Dr D Jones	University of Wales, Bangor	Control and Guidance of Autonomous Rotorcraft for Power Line Inspection	CSIRO, Australia
Dr P Lee	Imperial College	Through-Process Simulation of Cast Aluminium Components for Automotive Applications	University of British Columbia, Canada
Prof Chun-Qing Li	University of Greenwich	Development of Risk Assessment Models for Corrosion Affected Reinforced Concrete infrastructure	University of Newcastle, Australia
Dr X Luo	University of Glasgow	Developing a New Dynamical Computational Model for Mitral Valves	The Courant Institute, New York University, USA
Prof J Ooi	University of Edinburgh	Applications of Discrete Element Modelling to Industrial Handling of Particulate Solids	The University of New South Wales, Australia

GLOBAL RESEARCH AWARDS *continued*

Secondee	Employer	Project Title	Host
Dr L Ran	Durham University	Investigating Flywheel Energy Storage of a Doubly Fed Induction Machine Configuration	MIT, USA
Dr P Remagnino	Kingston University	Ambient Intelligence Methods and Human-Robot Interaction	Saitama University and Toshiba Corp. R&D, Japan
Dr MC Schraefel	University of Southampton	Supporting Exploratory Search via the Semantic Web	MIT, University of Maryland, University of Texas, USA
Dr H Wang	University of Bath	Laboratory Experiment of Renewable Generation and Supply Network by FACTS Control	NKLPS, Tsinghua University, Beijing, China
Prof W Yang	Manchester University	Dielectric and Magnetic Measurement and Imaging	MIT, USA
Dr Z You	Oxford University	Mathematical Origami and Deployable Structures	MIT Computer Science and Artificial Intelligence Laboratory, USA

INDUSTRIAL SECONDMENT SCHEME

Thirteen awards were made during the year 2006-07:

Industrial Secondment Awards

Awardee	Subject	Univeristy	Host Organisation
Prof H Shah	Computing and Information Systems	Staffordshire	Britvic Soft Drinks Ltd
Dr S Black	Software Engineering	London South Bank	IBM UK Ltd
Dr J Wang	Marine and Offshore Engineering	Liverpool John Moores	ABS Consulting Ltd
Dr M Kraft	Chemical Engineering	Cambridge	Computational Dynamics Ltd
Dr D Yang	Computing: Fault Modelling with the Synthetic Environment	Loughborough	BAe Systems, SEIC
Dr J Collomosse	Software Engineering	Bath	HP Labs
Professor A Cole	Mechanical Engineering	University of Central England	WDP Consulting Ltd
Dr M Goh	Mechanical Engineering	Sheffield	Airbus UK Ltd
Dr K Simmons	Mechanical Engineering	Nottingham	e-on UK Plc
Dr L Basheer	Civil Engineering	Queen's, Belfast	Taylor&Boyd LLP
Dr J Bown	Software Engineering	Abertay Dundee	NHS Tayside King's Cross Hospital
Dr R Hibberd	Software Engineering	Nottingham Trent	Siemens Enterprise Communications Ltd
Prof J R Banerjee	Mechanical Engineering (Aeronautics)	City University	Marshall of Cambridge Aerospace Ltd

VISITING PROFESSORS IN PRINCIPLES OF ENGINEERING DESIGN SCHEME

The scheme now has 120 Visiting Professors at the following universities:

University of Aberdeen; Aston University; University of Bath; University of Birmingham; University of Bradford; University of Brighton; University of Bristol; Brunel University; University of Cambridge; University of Cardiff; University of Central Lancashire; City University; University of Coventry; Cranfield University; De Montfort University; University of Dundee; University of Durham; University of Glasgow; Heriot-Watt University; University of Hertfordshire; University of Hull; Imperial College; University of Kingston; University of Leeds; University of Leicester; University of Liverpool; University of Loughborough; University of Manchester; University of Newcastle upon Tyne; University of Nottingham; Open University; University of Oxford; Oxford Brookes University; University of Plymouth; Queen Mary, University of London; Queen's University Belfast; Royal College of Art; Salford University; University of Sheffield; University of Southampton; Strathclyde University; University of Surrey; University of Sussex; University of Ulster; The University of Manchester; University of Warwick

VISITING PROFESSORS IN ENGINEERING DESIGN FOR SUSTAINABLE DEVELOPMENT

Name	Subject area	Univeristy
Prof B Mould	The built environment	Brighton
Prof J Hulse	Chemical and process engineering	Newcastle upon Tyne
Prof R Booth	Renewable and sustainable energy	Oxford
Prof C Ainger	Sustainable construction	Cambridge
Prof D Bartholomew	Energy conservation in the built environment	De Montfort
Prof C Du	Processing, recycling and dematerialisation	Surrey
Prof B Hanna CBE	Energy and the built environment	Ulster
Prof J Lopez-Merono	Manufacturing and materials	Aston
Prof G Acres OBE	The hydrogen economy	Birmingham
Prof G Howarth	Product design and waste prevention	Bournemouth
Prof H Eccles	Contaminated land remediation	Edinburgh
Prof D Welsh	Power generation in developed and developing countries	Bristol
Prof J Poole	Environmental protection	Cardi
Prof B Carroll	Sustainability assessment of infrastructure projects	Glasgow
Prof R Dodds FREng	Consumer goods	Liverpool
Prof R Venables	Sustainability of large infrastructure projects	Queen's, Belfast
Prof C Engel	Chemical processing	Manchester
Prof M Fletcher	Water as a resource	Bradford
Prof A Emery	Natural resource extraction	Bath
Prof S Halliday	The link between engineering and architecture	Strathclyde
Prof L Walker	Methods for assessing sustainability	Sheffield
Prof D Rao	Product development	Leeds

VISITING PROFESSORS IN INTEGRATED SYSTEM DESIGN

Visiting Professors	University
Prof P Wiese	Bath
Prof Jan Baeyens	Birmingham
Prof E Henshall	Bradford
Prof C Pearson and Dr I Shams	Brunel
Prof D Stupples	City
Prof M Henshaw	Cranfield
Prof D Oxenham	Imperial College
Prof K Brunson, Prof R Hyde and Prof D Williams	Edinburgh
Prof P Davies	Loughborough
Prof M Wood	Nottingham
Prof J Gittus FEng, Prof G Skates and Prof R Stone	Plymouth
Prof J Hsu	Queen's University Belfast
Prof C Lyde	Surrey
Prof K Robinson	University College London
Prof E Adams	University of Ulster

ENGINEERING PROFESSIONAL DEVELOPMENT AWARDS

The companies who received awards were:

Abraham Consulting Engineers	Donaldson Filtration GB Ltd	Power Technology Solutions Ltd
Airbus UK Ltd	EEF South	Q Tech Services Ltd
Aker Kvaerner Ltd	Eurostep Ltd	Quality Castings Ltd
Allen & Heath Ltd	Fleet Support Ltd	Quantum Specials Ltd
Allen Brothers (Fittings) Ltd	Geo W King Ltd	REACT Engineering
Aperio Ltd	Huf UK Ltd	Rolls-Royce plc
Aylesbury Automation Ltd	Hydro Aluminium Ltd	RPS Consulting Engineers
Balfour Beatty Ltd	Icore International Ltd	Siemens Automotive Ltd
Barrus Ltd	Island Tyre Co Ltd	Slack & Parr Ltd
Bartram Mowers Ltd	Jayberg Engineering Ltd	Smiths Aerospace
BCMZ Ltd	Kemlows Diecasting Products Ltd	Star Refrigeration Ltd
Bendalls Engineering	Kimberly-Clark Ltd	TRW Automotive
Bentley Motors Ltd	LBBC Technologies	Technical Support Associates
Bombardier Aerospace	Leicester City Council	Thyssenkrupp Automotive Ltd
Brimar Engineering Services	Lightweight Medical Ltd	Tyco Ltd
British Airways Maintenance	LSW UK Ltd	Tyco Electronics UK Ltd
British Turntable Co Ltd	M W Kellogg Ltd	Tyco Healthcare
Cadogan Consultants	Mason & King Ltd	Wakefield Acoustics
Caterpillar Peterlee	Meridian Technologies Ltd	Waterman Environmental
CCL Stressing Systems Ltd	MITIE	Waterman Structures Ltd
Cold Drawn Products Ltd	Monsal Ltd	Westlakes Engineering
Cole Agricultural Engineering	Novelis UK Ltd	Young Calibration Ltd
Crawford NBS Division	Nyquist Ltd	
Croft Engineering Services	Obsidian Research Ltd	
Cultech Ltd	Plastic Omnium Automotive Ltd	

SAINSBURY MANAGEMENT FELLOWSHIPS IN ENGINEERING

In the last year 11 Fellowships were awarded, bringing the total number to 237 since the schemes inception. The Fellowships were made to:

Recipient	University
Sabih Behzad	LBS
Brendan Moss	LBS
Ian Daly	LBS
Paolo Ronchi	IESE
Mark Futyan	Columbia
Daniel Rynehart	LBS

Recipient	University
Kyle Henderson	INSEAD
Mojgan Saebi	INSEAD
Shaun Kenny	IESE
Gavin Sathianathan	Harvard
Mohit Midha	LBS

ERA FOUNDATION ENGINEERING TEACHING PRIZES

In 2006, prizes were awarded to:

Recipient	University
Dr Andrea Cavarello	Queen Mary, University of London
Dr Kerstin Eder	University of Bristol
Dr Andrew Hunt	University of York
Dr Sherri Johnstone	University of Durham
Dr William Knottenbelt	Imperial College London
Mrs Elena Rodriguez-Falcon	University of Sheffield

ERA FOUNDATION RESEARCH STUDENT DEVELOPMENT FELLOWSHIPS

The 2006 awardees were:

Recipient	University
Michael Aspinall	Lancaster University
Frances Baxter	University of Bath
Bryony Davidson	University of Edinburgh
Bryan Horton	University of Aberdeen
Iain Roberts	University of Edinburgh

SAINSBURY MANAGEMENT FELLOWSHIPS IN LIFE SCIENCES

In 2006 the total number of fellowships awarded through the scheme reached 51, with awards being conferred upon:

Dr Michael Chipchase	Dr Jonathan Halstead
Dr Henry Lambie	Dr Rowan Minnion
Dr Matthew Moorcroft	Mr Sameer Sabir

THE PANASONIC TRUST

Seven new Fellowships were awarded during 2006:

Recipient	University
Peter Dale	Imperial College London
Stephen Dockrill	Cranfield University
Gemma Gotch	University of Strathclyde
Victoria Hickman	University of Cambridge
Louise Medland	University of Cambridge
Amanda Wycherley	University of Cambridge
Denis Yatta	Cranfield University

THE PANASONIC TRUST

Nine new Gold Medals were awarded in 2006 to:

Recipient	University
Stephen Hunt	University of Cambridge
Aaron Stevens	Loughborough University
Ian Richardson	University of Reading
David Holland	University of Sheffield
Jane Wickham	University of Reading
Javed Hason	Heriot-Watt University
Mark Harding	Loughborough University
James Robinson	Loughborough University
Ben Sang	Loughborough University

BUILDING FUND

Since the launch of the Development Appeal to the Fellowship in summer 2004, donations and pledges have been received from 230 Fellows and other individuals. As at 31 March 2007 these amounts totalled £658,000. In addition we have been notified of a number of legacies. Donations have been allocated to the Building Fund except where otherwise instructed. This Fund now totals £3 million and benefits from the donations of additional Fellows in earlier years.

- Mr H E K Allen FREng
- Dr J Alvey CB FREng §
- Brigadier J R Appleton OBE HonFREng
- Mr J A Armitage CBE FREng
- Professor V Ashkenazi FREng
- Sir Robert Atkinson DSC** RD FREng
- Sir Sidney Bacon CB FREng
- Mr D A Ball FREng
- Mr J Banks FREng
- Mr J K Banyard OBE FREng
- Sir William Barlow FREng
- Mr J V Bartlett CBE FREng
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- Sir Peter Baxendell CBE FREng
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- Mr A J Bennett FREng
- Professor R S Benson FREng
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- Mr P K Blair OBE FREng
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* Donations for specific activities.
§ New donors in the financial year 2006-07.

Additional thanks are made to all those who donated by taking part in the raffle drawn at the New Year Reception.