

# Unis



A Vision for 2020

Annual Report 2001/2002



Unis  
University of Surrey

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**Professor Patrick J Dowling,  
Vice-Chancellor and Chief Executive.**



## A Vision for 2020:

# The creation of a truly world class university

The University of Surrey (UniS) stands at a threshold. After 35 years, past achievements allow UniS to be recognised today as one of the UK's most successful, upwardly mobile, research-led universities. The present provides the launch pad for the future – a future which with careful stewardship will witness the University of Surrey becoming one of the world's great seats of learning.

I know this ambition is shared by my staff and I know that it is within their grasp. It has been an enormous team effort to arrive at our current stage of development, and that it has been achieved in the toughest of financial environments for the Higher Education (HE) sector, is a tribute to a wise Council, sound management, excellent staff, focus, hard work and determination. I am personally indebted to our talented and loyal staff, both academic and support, for the load they have borne, in some cases somewhat unevenly and way beyond the call of duty.

The University achieved a very satisfactory financial outcome for the year of £3.25m – significantly ahead of budget (by more than £4m). This produced a surplus of 2.3% of turnover. I fully believe that we are now beginning to reap the full fruits of our

labours to achieve academic excellence with financial robustness.

However, ambitions will not be attained by resting on our laurels, and over the past year we have laid the foundations for our continuing success by putting in place a new senior management team and a re-organised School structure to position ourselves optimally for future challenges and opportunities.

UniS marked the 35th anniversary of its university status with high profile celebrations – on its campus, in Guildford cathedral and through a 'Town and Gown' parade in its ancient High Street which culminated in the unveiling of the sculpture of 'The Surrey Scholar' as a permanent reminder of the University in the heart of its home town. The 25 years of service given by HRH The Duke of Kent as the University's Chancellor was also marked appropriately by a Celebration Dinner held at the University. A coffee table book: 'Understanding the Real World – A visual history of the University of Surrey' was produced and 'Hidden Depths – An Archaeological Exploration of Surrey's Past' published by the Surrey Archaeological Society was part-sponsored by the University.

In terms of achieving specific strategic objectives much progress has been made during the past 12 months.

## Research excellence and enterprise

The excellent performance by UniS in the 2001 Research Assessment Exercise (RAE), has resulted in an increase in our funding base of 22%, from which we will benefit over the next five years. This was the sixth highest percentage increase in funding of all UK universities. The additional revenue will enable us to boost research activities by targeting our areas of research strength and by recruiting new staff at both junior and senior levels, by pump-priming new interdisciplinary research teams, and by upgrading research facilities.

UniS-led initiatives in collaboration with neighbouring universities have secured 'third-leg' funding from the Government to a total value of £10.85m and have also resulted in the establishment of a Surrey Enterprise Hub based on the Surrey Research Park.

## Developing market-led approaches

The launch of two major new programmes, at undergraduate level, one in Business Management and the other in Law, has proved hugely successful and placed UniS amongst those UK universities showing the

Running through the pages of this year's Annual Report are images from a photographic project involving staff and professional photographers to record a "Day in the Life" of the University of Surrey.





“The launch of two major new programmes, at undergraduate level, one in Business Management and the other in Law, has proved hugely successful ”

An artist's impression of the new student residences currently under construction on Stag Hill.



highest percentage increase in the number of applicants. Creating well thought-out courses to meet market demand is now widely accepted and acted upon throughout the University. Several more new courses are currently in the pipeline.

### Distinctive skills for UniS graduates

Intensive efforts have gone into identifying distinctive skills sets for UniS graduates. Many such skills are already part of our undergraduate curriculum, and during the year UniS yet again maintained its outstanding record for producing the most employable graduates of any UK university – a magnificent achievement! However, further recommendations are currently under discussion as we are determined to continue setting the pace nationally in this important area.

### Developing a campus fit for the 21st Century

#### Manor Park

The Government expects higher education institutions such as the University of Surrey to provide better and relevant education for more people. To achieve this effectively, UniS needs to plan for its future growth. The importance of the Manor Park site to the medium- and long-term future of UniS cannot be over-emphasised.

Against this background, Guildford Borough Council has considered the University's future in preparing its Review of the Guildford Local Plan. The Council has resolved to adopt a new local plan which

allocates the land at Manor Park for the future development of UniS.

The provision of staff and student residences is absolutely key to our future expansion and detailed funding arrangements are currently being explored simultaneously with ongoing plans for the infrastructure, sports grounds and buildings.

A major plank to our future expansion plans will be an enlargement of our involvement in the health area where we have already earned an international reputation for Biomedical and Life Sciences. Plans for the Postgraduate Medical School, to be shared with the Royal Surrey County Hospital, are being jointly drawn up and a professional team selected for its design. This will be the first major academic building on Manor Park and will be located on our land immediately adjacent to the Hospital.

The possible location of several other facilities on Manor Park, which will strengthen the medium and long-term position of UniS as a leading university, is being actively considered.

#### Stag Hill

The building of the Advanced Technology Institute, named in honour of Professor Daphne Jackson, was completed on time, within budget and is now occupied, having recently been opened by Lord Sainsbury. It is anticipated that the new Management Building will be completed early in 2003.

Other priority projects on the Estates Plan which been completed during 2001/02 have seen the refurbishment of laboratory space for The Centre for Vision, Speech and Signal

Processing (CVSSP) and the Centre for Nutrition and Food Safety.

### Creating a more efficient organisation

The implementation of restructuring in some of the Academic Schools of the University, together with reviews of activities in administrative and service delivery areas, will reduce the cost base of UniS to ensure sustainability of the academic activities of the University.

The outcomes of the three sets of reviews I announced in last year's introduction to the Annual Report are now known and being vigorously implemented. Most of the key recommendations of the Academic Strategy Task Group (ASTG) Report have been achieved. These have included:

- the creation of fewer, larger Schools via a new seven-School structure
- restructuring and repositioning our activities in Engineering and Chemistry
- a review of teaching courses in each of the Schools
- the growth of inter-disciplinary research across the University
- the recruitment of new academic leaders
- a rationalisation and strengthening of health-related subjects
- the introduction of a Distinguished Professor Scheme

The results of the Senior Management Review recommended that a new senior management structure and team be put in place. A new Executive Board has been created and work on the new committee





“The inaugural Federal Games, resulting in a much to be commended and diplomatic draw, were also held in the year ”

Far right: Senior Pro Vice-Chancellor, Professor Peter Butterworth, and right: University Secretary and Registrar, Wyn Davies.



structure is proceeding. I confidently expect the outcomes of the Process Reviews to increase administrative efficiencies across the University to proceed apace with the full support of the Executive Board.

### The Federal University of Surrey

Twelve strategic targets have been set for the medium-term development of the Federal University. The first two federal degree programmes, a BA in English Local History and the expansion of a UniS ESRC-recognised MSc in Social Research Methods to encompass students at Roehampton, have been developed and validated.

Significant preparation was also undertaken during the year for the Quality Assurance Agency's (QAA) Review of Federal Arrangements. Two further projects which have developed significantly during 2001-02 are the Science Teaching Initiative, which will lead to the establishment of an Academy for the Teaching of Science Teachers, and a Federal Centre of Applied and Professional Ethics which has developed out of the Surrey Ethics Forum.

The inaugural Federal Games, resulting in a much to be commended and diplomatic draw, were also held in the year between student teams from UniS and Roehampton.

### Providing for our students' needs

The level of financial support for the Students' Union was increased substantially during the year. This was partly in recognition of the increasing number of services and support

mechanisms which the Union now offers its students, both in traditional activities such as entertainment, and through a number of new initiatives like the Individual Development Scheme.

Plans for additional student accommodation were realised and impressive progress is already being made on the construction of new residences opposite the ATI – much needed for the rapidly growing numbers of postgraduate students UniS is attracting from all over the world, especially China.

I have to report that progress on the provision of child care facilities has been particularly frustrating, and solving this problem will be a major priority for next year.

### Thanks to Peter and Wyn

My introduction to this year's report would not be complete without proper recognition of the work of the University's Senior Pro Vice-Chancellor, Professor Peter Butterworth and University Secretary and Registrar, Wyn Davies, both of whom decided to step down from their positions at the year's end. During the eight years of my period of office as Vice-Chancellor, Wyn and Peter have been my most senior colleagues, taking responsibility for administrative and academic issues respectively. I would like to thank them both and wish them long and happy retirements. Peter has decided that he cannot bear to leave us yet and, from February 2003, he will take responsibility for the development of fundraising. I hope to report on the first fruits of his success this time next year!

Departures usually mean arrivals and I am pleased to welcome Professor John Turner to UniS as Deputy Vice-Chancellor. John is currently Senior Vice-Principal (Planning & Resources) and Professor of Modern History and Politics, at Royal Holloway (University of London). John will succeed Peter Butterworth, no easy act to follow, but I am confident that John will continue the good work Peter pioneered in academic planning and budget management.

I am also very pleased to welcome Greg Melly who has recently joined UniS as Director of Corporate Services. He joins the new Executive Board which, together with Greg, comprises myself as Chairman, the Deputy Vice-Chancellor, the Pro Vice-Chancellors, the Director of Finance, the Registrar, the Director of External Academic Relationships, the University Secretary and the Heads of Schools.

### Achieving our goals

In the opening words to this introduction, I suggested that the University of Surrey had ambitions to become a truly world class university. In closing, I trust that the remaining pages of this Report will provide you with many excellent examples to suggest why we believe our vision is both realistic and attainable!

Professor Patrick J Dowling CBE DL FEng FRS  
Vice-Chancellor and Chief Executive



**Professor Barry Evans,  
Pro Vice-Chancellor  
(Research & Enterprise).**



## Focusing on:

# Research and Enterprise

The 2001 Research Assessment Exercise (RAE) greatly enhanced the international reputation the University has gained for its work. In tandem with its research activities, UniS is also in the vanguard of UK universities who are seeking to exploit intellectual property and forge partnerships with industry and commerce. Professor Barry Evans, Pro Vice-Chancellor (Research & Enterprise) explains:

“I see our activities as a sort of continuum comprising three elements that are constantly interacting with each other; these are research, income generation and technology transfer. UniS exists to support these three and is in turn supported by them. Our high standards and achievements help us to get the grants we need to carry out our research work. These awards and other income sustain our academics and improve our research work. This of course leads to commercial enterprises, licensing patents and other income generating activities. Some of the profits from these activities then add to other UniS income, thereby completing the circle. In fact 30% of total university funding comes from our research activities.”

### 2001 Research Assessment Exercise (RAE)

The results of the RAE, published in December 2001, show UniS researchers have improved their ratings significantly since 1996 in 14 out of 19 of the Units of Assessment. Three research groupings received maximum 5\*A ratings;

- Electronic Engineering (including Computing)
- Sociology
- Subjects Allied to Medicine

Sociology's rating is a reflection of its strengths in research in the fields of ageing, criminal justice, health, and the social aspects of new media and communication technologies. Of the 75 entries made by Higher Education Institutions (HEIs) to the RAE in the area of Subjects Allied to Medicine, UniS was only one of three to receive a 5\*A rating, with a submission of much greater breadth than any of its counterparts. Electronic Engineering has great strength in depth across communications, satellite technology, solid state electronics, ion beam applications and microwave systems.

An impressive 34% of the University's research-active staff are now members of 5\*A rated research groups. This places UniS firmly in the top few research universities in the UK as illustrated by the table below:


#### % Staff in 5\* Units of Assessment

1	Imperial
2	Cambridge
3	Oxford
4	London School of Economics
<b>5</b>	<b>Surrey</b>
6	Southampton
7	University College, London
8	Bristol
9	Essex
10	Lancaster
11	Kings College
12	Durham

Seven other areas: Psychology, Physics, Applied Mathematics, Statistics and Operational Research, Chemical Engineering – Environmental Strategy, European Studies and Russian, Slavonic and East European Languages achieved 5 ratings in the outcome, meaning that 60% of the University's research-active staff are now rated World Class in their field compared to 22% in 1996 – this dramatic increase is all







“The 2001 Research Assessment Exercise (RAE) greatly enhanced the international reputation the University has gained for its work ”

The UniSdirect Business Hatchery provides office space, networked computer facilities and meeting rooms together with office support and management expertise to assist emerging businesses.



the more remarkable given that the number of staff submitted for the exercise has risen by nearly 25% since 1992.

Commenting at the time of the outcome, Professor Barry Evans said:

'UniS aimed to achieve quality in the 2001 RAE, but at the same time submitted a majority of research groups of critical mass. The results show that we have succeeded, and illustrate that in each of the areas awarded 5 and 5\*A ratings, there is a strength in depth which should bode well for the University's future funding prospects.'

Professor Evans' predictions proved accurate as UniS received an extra £3m per annum of government funding as a result of its 2001 RAE performance. Research income from industrial and other funders is also set to rise in view of the University's much enhanced research status.

Improved RAE ratings have been matched by the University's steadily increasing grants and contracts income. A figure of £20.3m was achieved in 2001/02, a year on year increase of £1.6m. Awards and extensions also increased to £19.3m, compared with £17.6m last year.

UniS currently lies twelfth in the table of total funds awarded by the Engineering and Physical Science Research Council (EPSRC), with only much larger institutions placed above it. If this figure were normalised to the number of active research staff, the University would be amongst the country's three top universities in terms of research income per active researcher.

The total research income received over the 1996-2001 period was £93.7m,

compared with £55m for the previous RAE reporting period, a 70% increase in funding.

UniS has recently appointed an EU/Research Council Officer to spearhead the University's involvement in Framework VI bids and to optimise bidding for Research Council Initiatives. She will help academics liaise with the EU, an important role, as 20% of the University's grants come from this source. Parallel to this appointment, the Research Contracts Office staff has been expanded.

#### UniSdirect

UniSdirect was established in response to the Government's agenda to develop the regional economy through technology transfer and builds on the University's commitment to the region. Grants of £9.65m were obtained with partner institutions in the south of England, through two different schemes for Knowledge Transfer Awards.

#### The Business Hatchery

A sum of £5m from the Higher Education Infrastructure Fund (HEIF) will enable a consortium of universities of Bath, Bristol, Surrey and Southampton together with the Rutherford and Appleton Laboratory and the Defence Research Laboratory at Farnborough, to establish a Centre of Excellence for Technology and Innovation in Southern England, endorsed by the South-East and South-West Regional Development Agencies. The money will be used to set up a network of centres for the development of

high-technology, high-growth businesses, supporting 1,000 budding entrepreneurs over the first five years.

The UniSdirect Hatchery provides office space, networked computer facilities and meeting rooms for the emerging business together with office support and the necessary technological and management expertise to determine the feasibility of a business idea. It allows the business to develop to the stage where it is ripe for investment and ready to take to the marketplace. Through the University's own resources and its networks within the region, nationally and internationally, the emerging businesses are able to access a vast range of expertise, as well as business-angel funding and venture capital.

#### UniSventures

UniSventures has been set up to cover spin-off activities, which include the existing Seed Corn Fund (USSF) as well as the University's involvement in the HEIF collaborative Seed Corn Fund, CASCADE. CASCADE has been established as a result of a £4 million award from HEIF to a consortium of universities comprising: Royal Holloway University of London, Brunel, Reading, Sussex and UniS.

UniSdirect has established a new Intellectual Property Rights (IPR) section, which has dealt with the filing of 40 to 50 new patents. The section assists academic staff to exploit IPR, and licensing income has increased to £105K, compared with £34K last year. Three patents have led to commercial ventures, and the University now holds 31 revenue-generating patents.





“ Guildford entrepreneur Jonathan Nwabueze, grew so tired of ironing and being delayed in the morning because of last minute creases that he invented an iron that works without the need for a board ”



**Local entrepreneur Emma Newton has built a growing business from her idea of spray painting electric violins to appeal to the youth market.**

## Working with SMEs

UniS received a further £640,000 to fund the appointment of three Innovation Network Managers. These managers will be responsible for liaising with local and national businesses and organisations and assisting them with access to the knowledge base of the University as well as brokering research contracts.

Small and Medium-sized Enterprises (SMEs) will benefit from the revised mandate of UniSconnect, a business club offering access to the resources of UniS. This was previously only available to large businesses, but new membership packages have now been created to meet the needs of SMEs.

A new TCS (previously Teaching Company Scheme) office has been set up with HEIF support to help SMEs to exploit research results from the University's work. The programmes enable high quality graduates to work in companies, normally for two years, on technology transfer projects central to the needs of the company. They are supervised by academic experts from the University.

A fruitful partnership is with Kent-based DNA Research Innovations (DRI) in DNA extraction. The partnership has been awarded a TCS research grant of £104,000 for the development of new solid phase materials for nucleic acid purification and manipulation. Driven by genomics and clinical diagnostics, the Global DNA purification market is growing all the time. All genetic analyses require DNA to be extracted from a sample and hundreds of

millions of DNA extractions are carried out annually. As a consequence the market is valued at more than £300 million and is growing at over 20% per year. DRI aims to exploit its proprietary Charge Switch™ Technology for DNA purification.

## Early successes

Guildford entrepreneur Jonathan Nwabueze grew so tired of ironing and being delayed in the morning because of last minute creases that he invented an iron that works without the need for a board.

His invention, featured on Tomorrow's World in July of this year, takes the drudgery out of ironing by using a heated vacuum to remove the creases from clothes. Garments and other fabrics can be ironed whilst they are hanging or free-standing, or when travelling. The Jen Turbo Boardless Iron can also be used for large area fabrics where an ironing board is of no use.

The Boardless Iron uses a small fan powered by an electric motor which draws the cloth towards its heated base, through a combination of direct suction and the lowering of air pressure between the fabric and plate. Steam is generated in a chamber above the plate, which is blown onto and through the fabric by the internal fan to remove the creases. The steam is then re-cycled back into the body of the iron by the fan.

The project was not without hitches, but Professor David Kirby, Director of the UniSdirect Business Hatchery, was able to provide Jonathan with technical expertise

and help with the production of promotional material in advance of the Tomorrow's World exhibition. Jonathan is now looking for a manufacturer and investor to support further development to the point where the exciting new product is ready to be launched to consumers.

Emma Newton is another local entrepreneur, who has benefited from a project run by the UniSdirect Business Development Office to increase the sustainability of Small and Medium-sized Enterprises (SMEs). It has given mentoring and support to 40 new businesses providing each with a new PC and printer.

Emma owns a successful business making electric violins. Starting in this industry as a 'Saturday girl', she then trained as a Theatre Stage Manager and went on to work on West End shows, whilst continuing to restore antique violins in her father's shop. She had the idea of making electric violins and spraying them in bright colours to appeal to young people. Her first display, held at an exhibition for music teachers, had such a good reaction that she went into production. Emma founded The Rainbow Violin Company Limited in July 1999, after negotiating a UK-wide deal and took on an employee – a paint sprayer. She now employs three sprayers and has sold 2500 violins in the UK. World exports are also increasing and plans are underway to double annual production. In January 2003, Emma will be exhibiting in Los Angeles at the North American Music Messe, the biggest music trade show in the US, which attracts 65,000 visitors. Emma says that the PC supplied by UniSdirect has proved invaluable.



The Surrey Technology Centre.



## Focusing on:

# The Surrey Research Park

Since development of The Surrey Research Park began nearly 20 years ago, it has provided a bridge between the University and business. Many tenants have chosen to locate on the Park not just because of the high-quality business environment and convenient international location, close to London and two international airports, but also so they enjoy the opportunity to tap into the expertise UniS has to offer. The potential for links with the University sets The Surrey Research Park aside from being in the tradition of a commercial landlord; to use a marketing term, UniS is the Park's Unique Selling Proposition.

The notion of knowledge creators spinning out companies to exploit their discoveries is nothing new to materials scientists Professor Peter Miodownik and Dr Nigel Saunders. They left the University to set up their company, ThermoTech, in the business incubator, The Surrey Technology Centre, 12 years ago. Their "virtual prototyping software" accurately predicts the strengths and weaknesses of possible new alloys. It could save the world's metal producers millions of pounds by reducing the need for conventional trial and error experiments with valuable materials.

Backed by an international consortium that includes Rolls Royce Aerospace, DERA – the defence research agency and steel manufacturer Corus, they have turned their expert knowledge into a practical computer program that plant engineers and research scientists can use.

In 1986, the University opened the County's first business incubator offering high tech start-ups, a package of flexible workspace and business support. However, in the last year the services offered in this building have been supplemented with mentoring, investment and mutual support by the Surrey Enterprise Hub. Similar units are coming on stream at Royal Holloway (University of London) and Leatherhead Food Research Association, which are the University of Surrey's partners in this new business to business network that aims to boost the local economy.

The South East England Development Agency (SEEDA) required the Enterprise Hub to have a "champion" from the local business community. We were delighted that one of the Park's most successful entrepreneurs, Nigel Biggs, founder of digital imaging software company Pixology, became Hub chairman. His energetic



Dr Malcolm Parry, Director of the Surrey Research Park.

“The potential for links with the University sets The Surrey Research Park aside from being in the tradition of a commercial landlord; to use a marketing term UniS is the Park's Unique Selling Proposition ”





The entrance hall of the Surrey Technology Centre.



advocacy is raising public awareness of a concept that has been shown to double a new company's chances of survival.

The Hub progresses the serviced office support already available to companies based at the Technology Centre. Several have received official recognition for their valuable technologies, in the form of DTI SMART Awards. These include:

- Biotechnologists Dr Ian McKay and Dr Ralph Harris of Cleansorb, who have developed an environmentally friendly way of cleaning oil and gas wells
- Dr Bilgay Akhan of VisiOprime, who is developing advanced video compression techniques so video clips can be sent to a mobile phone or over a land line for remote monitoring and surveillance
- Dr Alan Cook of VisionTec CL who has developed the world's first daily disposable contact lens for people with astigmatism, using a novel spin-moulding manufacturing process to greatly cut unit costs

Larger companies on The Research Park have had their successes, too. Another multiple SMART Award winner, Disperse Technologies, won a contract from the Engineering and Physical Sciences Research Council (EPSRC) to apply its novel Thin Film Encapsulation technology to packaging and printing. Applications could include replacing solvent-based inks with environmentally friendly water-based alternatives and "smart packaging" that warns of tampering or damaging temperature changes by a controlled release of ink.

Defying the all-pervading gloom surrounding the international high-tech sector, Detica became the first such company to float on the London Stock Exchange in more than a year. As a leading Customer Relationship Management consultancy, it launched the UK's first CRM course accredited by the Institute of Marketing and helped the Ministry of Defence with a web-based pilot version of the publication scheme required by the Freedom of Information Act 2000.

Since setting up on the Research Park in 1989, IDBS has supplied chemical and biological data management software to more than 150 of the world's leading pharmaceutical, biotechnology and other discovery-driven companies. In its Occam Court headquarters and in three US offices it now employs more than 130 people. This summer it expanded on the Park when it opened a new customer training unit in the Surrey Technology Centre.

Demonstrating the Research Park's continuing appeal to businesses of all sizes, Syngenta, the global company formed by the merger of Novartis Agribusiness and Zeneca Agrochemicals, completed the relocation of its 200-strong European Regional Centre to the former BOC Engineering Centre in Priestley Road.

**Above, left to right: Dr Bilgay Akhan of VisiOprime, Dr Ian McKay of Cleansorb and Derek Wheeler of Disperse Technologies.**

“Larger companies on The Research Park have had their successes, too”



“ Teaching is informed by research, academic scholarship and leading edge professional, commercial and industrial practice ”

## Focusing on: Teaching and Learning



**Professor David Airey (Pro Vice-Chancellor Teaching & Learning).**

Alongside world class research, UniS seeks to offer its students high quality programmes of study which have a professional ethos and a relevance to the real world. Teaching and learning methodologies are continually updated in the light of best practice and congruent with advances in pedagogical approaches and technology.

The University seeks to ensure that teaching is of the highest calibre. In the past year, economics scored an excellent 23/24 in its Subject Review by the Quality Assurance Agency (QAA), and teaching staff are provided with support in development opportunities and rewards for teaching excellence. Teaching is informed by research, academic scholarship and leading edge professional, commercial and industrial practice.

Professor David Airey (Pro Vice-Chancellor Teaching & Learning) chairs the Teaching and Learning Strategy Group (TLSG) which monitors and reviews the University of Surrey's Teaching and Learning Strategy.

In autumn 2001, and in the context of the Academic Strategy Task Group Review, increased revenue from outreach activities and plans to develop the Manor Park

campus, the TLSG identified six priorities for development across the University:

- Widening Participation (WP)
- Developing Skills across the Curriculum
- Extending Learning Technologies
- Refreshing Course Provision
- Flexible Delivery
- Providing Management Teaching across the University

### Widening Participation

UniS' Widening Participation strategy was drafted and is monitored by the Widening Participation Advisory Group (WPAG), Chaired by Professor Stephen McNair. The group is composed of representatives from all Schools and Services. A Competitive Fund aims to support initiatives in Schools and Services that are congruent with the WP Strategy and that develop models of good practice. Among the initiatives supported during the reporting period covered by this publication were: Schools without Walls; Breaking down Barriers; and a Feasibility Study for a Pre-Entry Study Skills Package.







The UniS Widening Participation team at work.

### Skills across the Curriculum

The Skills Unit, along with the other branches of the Centre for Learning Developments (CLD), has been brought under mainstream funding, providing stability and enabling longer-term planning. The Unit has been renamed the Skills and Personal Development Unit (SPDU), to reflect its focus, and its staffing has been increased. With guidance provided by a Skills Management Group chaired by Professor Airey, the SPDU is now working with individual Schools following a comprehensive skills audit. A summary skills statement is being produced and two other priorities being pursued currently are: the introduction of Progress Files and the Personal Development Plan, and Postgraduate Skills Development.

### Learning Technologies

The Learning Technology Management Group, chaired by Professor Andrew Lockwood, is working to the creation of a common platform for all Schools and Services. The aim is to move towards a Virtual Learning Environment (VLE) and eventually to a Managed Learning Environment (MLE) which will integrate all aspects of the University's work.

The use of electronic provision, already central to the Virtual Business School created by the Surrey European Management School, allows UniS to educate increasing numbers of students through the utilisation of web technologies.

### Refreshing Course Provision and Flexible Delivery

The creation of a market research capacity within the University's Department of Marketing and Public Affairs and its representation on various teaching and learning committees, provides opportunities to discuss how the University might become more market-led through a combination of curriculum development relevant to identified needs and better targeting of potential markets.

Flexible delivery is another priority. Most Schools operate on a modular basis and are responding to market demands by offering part-time courses and distance learning opportunities. The Fund for the Strategic Development of Learning and Teaching has continued to provide support for projects in line with the overall strategy. Projects funded during the year have included the development of e-books, the creation of new dietetics programmes, and the use of IT in chemistry practicals.

In recent years, UniS has witnessed and responded effectively to major changes in student demand. Business management, nursing and midwifery have been hugely expanded at undergraduate level, while the introduction of a generic law degree is also proving popular. Taught postgraduate courses are currently in great demand, particularly from overseas students, and such demand is effectively supported by areas such as the English Language Institute, which is able to provide students with the necessary language skills.

However, a major challenge for the University has been the decline in potential students studying mathematics and the physical sciences through to full 'A' level. A Federal University of Surrey initiative which is being pursued vigorously will see the creation of an Academy of Science for the training of science teachers at the University of Surrey Roehampton. This will help to fill the deficiency of well-qualified maths and science teachers in schools and will hopefully encourage more students to carry on their studies in these areas.

During the year, preparation for the Quality Assurance Agency's Review of the Federation was undertaken, and work has continued to harmonise the pedagogical practices of UniS and Roehampton.

In order to bring together all members of the academic staff to share good practice, a one day event entitled *Teaching and Learning in the 21st Century* was held in June 2002. This was addressed by the Vice-Chancellor, Professor Airey and a range of speakers representing, UniS, Roehampton, the Learning and Teaching Support Network (LTSN) and local partners.



Lord Sainsbury pictured with the Vice-Chancellor at the recent opening of the refurbished laboratories of the Centre for Vision, Speech and Signal Processing.



Professor Maria Petrou (right) who conducts research in the areas of medical imaging and remote sensing.

## Focusing on: Virtual Worlds

With the help of a £2.7m grant from the HEFCE Joint Infrastructure Fund (JIF) the laboratories at the Centre for Vision, Speech and Signal Processing (CVSSP) have been refurbished. Now, according to the Director of the Centre, Professor Josef Kittler, they are comparable with those at the Massachusetts Institute of Technology (MIT), allowing for research and development to be carried out to the highest international standards.

### The Visual Multimedia Laboratory

The refurbishment of CVSSP's laboratories has resulted in the creation of a visual multimedia laboratory to support research in real time video processing and visualisation. In addition, improvements have been made to the Centre's capability for processing, capture and storage of video and audio data. Other additions include a picture quality assessment laboratory, a medical imaging laboratory and a robot vision laboratory with a six-axis robot arm.

The Centre, which is one of the largest of its kind in the UK, comprises 35 PhD students, 12 academics, 20 research assistants and three support staff. Its annual research income is more than £2m, about half of which comes

from the EPSRC, EU and from industry in the form of grants. Over the year, 74 papers were published, 22 in refereed journals, and one, on Cursive Script Recognition, won the Institute of Electrical and Electronics Engineers (IEEE) AH Reeves Award.

New equipment includes a video server that can hold up to 30 hours of uncompressed video and audio, and can handle simultaneous recording or playback of eight video channels. Also new is a video-processing engine comprising five 8x9MHz processor machines that can be configured to appear as a 40-processor cluster. Each of these machines has two video pipelines to allow capture, processing and playback of up to ten streams of real time video simultaneously.

The video engine and video server are both connected to an extensive network to allow routing of video streams to and from any hardware in the Centre. This equipment is supplemented by a professional editing suite and ten high-end graphic stations.

In addition, CVSSP has two network-attached RAID-based file servers with an online storage of up to 3.5 terrabytes. The servers allow high speed/high availability access to all the groups within the Centre,

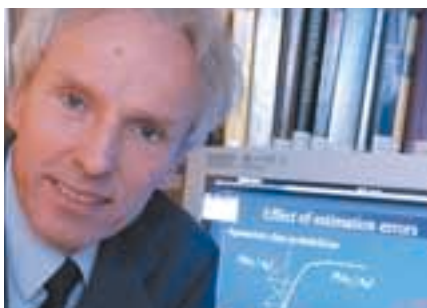
and incorporate a backup system with online 'snapshots' for instantaneous file retrieval as well as a 42-slot, two-drive tape library for long-term backup storage. Professor Kittler is seeking to make further improvements to the laboratories in the field of high definition TV.

### Medical Imaging and Remote Sensing

Research in the areas of medical imaging and remote sensing is led by Professor Maria Petrou, with a grant of £450,000 from the EPSRC. Despite the differences of the subject matter, there is considerable cross fertilisation between the geoscience and biomedicine topics which are researched.

In the field of biomedical imaging, Professor Petrou's research group is working on improving the quality and amount of information from patients using Multi-Resonance Imaging (MRI) and Positron Emission Tomography (PET) data processing. A recent breakthrough has been in the field of X-ray video processing which it is expected will reduce the X-ray dosage needed for endoscopy by almost one order of magnitude.





Left: Professor Josef Kittler, Director of the CVSSP and right: Professor John Illingworth.



Another project is underway to model human organs as an aid to pre-surgery planning. It will be possible to model the shape and the internal structure of say, the liver or heart of a particular patient using a variety of data input, to give surgeons a three dimensional image of an affected organ before an operation. This will improve the efficacy of any later intervention.

A recently completed project allows the application of image processing techniques to auto-radiography, allowing digital radiography to be performed at room temperatures, with beneficial implications for tissue imaging.

The application of this technology in the field of geosciences employs a remote sensing technique to detect the position of buried pipelines from space. This facilitates the safe siting of roads and buildings, and can assist such activities as mining or tunnelling.

Professor Petrou has also been involved in several European environmental projects, one of which is the analysis of fire damage to forests and similar areas, especially in Mediterranean areas, using satellite data. Information obtained this way can help governments or authorities decide whether to replant or allow natural vegetation to take over.

### Pattern Recognition Techniques

Professor Kittler's specific interests lie in pattern recognition techniques, with applications to object recognition, aerial image matching and land cover classification – an important tool in environmental studies.

Pattern recognition techniques also cover the detection of faults in textured surfaces such as ceramic tiles, granite and marble; the detection of microcalcifications in digital mammograms (with important implications for the treatment of breast cancer); the detection of forged banknotes; recognition of printed and hand-written script; speech recognition; and the classification of sound and speech synthesis.

A major project being led by Professor Kittler in collaboration with the BBC and Sony, is based on a process known as 'retrieval by content'. Known as 'Ovid', the programme is able to identify specific sporting activities from videotapes containing material covering many different kinds of sport. This means that hundreds of hours of tapes from a major sporting event such as the Olympics can be scanned automatically to identify and ultimately extract just the required material. Both visual (images, image sequences and text) and audio clues (speech, sounds and music) are exploited to find the required information. All of these modalities are combined in the programme; previous assumptions that only one channel of information was necessary have been disproved. The system was recently presented at the International Broadcasting Convention in September (2002) and is now being assessed by the BBC for possible commercial application.

Another project, being undertaken with Canon, is intended to improve the quality and reduce the cost of video conferencing, by using only a small number of bits to transmit highly compressed information. Associated

developments in face recognition techniques, known as Personal Identity Authentication incorporate a combination of data such as face image, voice characteristics and lip dynamics. This is of particular value for access control, smart home applications, web banking, and a variety of security systems.

In general, the focus of research has been on video segmentation, and the extraction of information about colour, texture, shape and motion behaviour, and the detection of higher-level cues. Shape One technique, known as the Curvature Scale Space descriptor has been selected for inclusion in the MPEG7 standardisation programme. This particular research is being carried out in collaboration with Mitsubishi Electric.

### Robot Vision

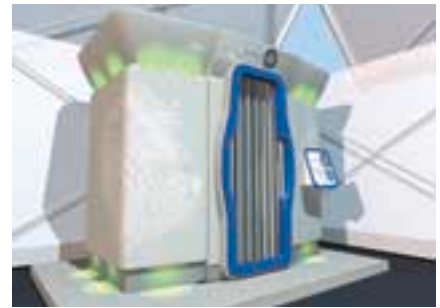
Multimedia data processing is being used to develop robot vision, under the leadership of Professor John Illingworth in the Visual Media Research Group. This technology, together with other programmes, will enable robots to recognise objects, and act on or avoid them. Tasks such as manoeuvring around simple obstacles, or moving in confined areas, are already proving feasible. However, better recognition techniques are needed, and research is in progress into acquiring three dimensional surface information through statistical estimation. This means extracting only meaningful information from a mass of statistics.

Research in conjunction with statistical estimation is improving the ability to deduce three dimensional information from two





Left: Dr Adrian Hilton, and right: the automated 3D-photo booth to capture animated models of people.



dimensional images taken from different viewpoints. This can also be used to infer the position from which the 2D images are obtained. It will enable robots to move successfully in realistic settings where the environment is complex. New theories and algorithms are validated in the laboratory using mobile robot platforms and the six-axis robot arm. The challenge is to develop and autonomise a robot which can decide its own goals, and optimise all its relevant sub-systems to achieve its objectives.

A typical use of a robot with accurate sensing of the immediate environment could be a driverless vehicle, or, closer to realisation, a vehicle with artificial vision that could warn the driver of obstructions, or potentially dangerous situations and possibly take or advise on remedial action. The broad principle of combining a human operator and vision system can be exploited for a variety of applications, industrial, commercial and security.

Issues of accurate robot positioning can be addressed by incorporating data from a variety of different sources. Using motion and positioning sensors alone is not entirely satisfactory; mechanical wear and lack of clear feedback hamper the acquisition of accurate data about position. So research is being undertaken to explore how robot vision can be combined with inputs from gyroscopes and distance-measuring wheels to provide more precise position information.

### 3D Broadcasting and Shape Capture

Dr Adrian Hilton leads the Visual Media Research Group (VMRG) where work is undertaken in 3D broadcasting and shape capture. A recent success was the development of an automated 3D-photo booth to capture animated models of people. This won an EU Information Society Technology prize in 2001. A Joint Infrastructure Fund (JIF) award has allowed the remodelling of the VMRG laboratory: the specifications were stringent, with high ceilings, a multi-camera system, an extensive lighting rig, and high spec audio-video cabinets and networks.

The area in which the Group works is allowing exciting new 'virtual' environments to be created for use in television. Models are being developed that create the illusion of an actor working in, for example, an extremely dangerous setting like a burning building or against a backdrop of an environment to which it would be costly to send a production unit. This involves refining methods of 3D information capture, and techniques for broadcasting the information in 3D form or as film. Apart from enhancing the visual quality of film or TV, the application also provides the potential for cost reduction. Human actors could be replaced in part by realistic models, or would not be required to travel to particular locations.

### Jeremiah

Human/computer interaction is also a subject being researched in this laboratory for automated tracking and behavioural analysis of objects for visual surveillance. One result of

this type of work by Dr Richard Bowden has been the development of Jeremiah, a virtual head that responds to nearby human activity by displaying sadness or pleasure according to the level of interest shown in 'him.' Jeremiah was on show for several months at the Science Museum in London.

Currently, the recognition of the human participation is fairly simplistic but it has implications for visual interaction such as in sign language recognition. Methods are being investigated which would allow automatic recognition of British sign language. Novel techniques of modelling and tracking sign language have been developed that will be of obvious benefit to the deaf community. The ultimate aim is to produce a system capable of converting British Sign Language to other interpretation sign languages and to spoken text.

Visual Content Analysis, which combines the use of multiple cues such as motion, colour, texture and depth of field, is being developed for use in editing, manipulating and coding of digital video. It allows the digital restoration of film and television archives, where unwanted signals resulting from vibration and intensity fluctuations can be automatically reduced or eliminated.

New ways are being explored in digital compression of high definition television which will provide substantial improvements for viewers. Other research also aimed at improving TV quality is an attempt to provide objective assessment of undesirable material on images generated by digital compression. This involves taking into account the subjective response of human viewers, a difficult area that is, for the moment, proving elusive.



Jeremiah, a virtual head that responds to nearby human activity by displaying sadness or pleasure according to the level of interest shown in 'him.'



**There are active links between the University and the pharmaceutical industry.**



## Focusing on: Health

UniS seeks to serve the health needs of the community, and in particular to work alongside the local health services. Strengths in both research and teaching across a range of disciplines have brought real benefits to the health of the region and the wider population.

### Working Alongside the NHS

The Postgraduate Medical School has developed a strong interface with the NHS, providing undergraduate and postgraduate education and training as well as international calibre research relevant to the health sector. A primary aim is to ensure that the key strategic activities and priorities of the NHS are linked to those of the University. Visiting appointments of senior NHS staff have been made in important clinical areas, including cancer surgery, minimal access surgery, pathology, medical physics, diabetology/ endocrinology, vascular medicine and cardiology.

Medical research that makes a difference to patients is best encouraged by providing an environment where NHS staff involved in research and teaching have the opportunity to meet with and work alongside university academics. It is recognised that a multi-

disciplinary approach to strategic developments in relevant research will significantly strengthen the local health services. Future growth will promote the development of the research agenda relevant to the NHS and enable the Postgraduate Medical School to become a prime leader in postgraduate teaching and education at both local and national level.

Research within the Postgraduate Medical School is focussed on areas that complement the NHS and operates with many outside and visiting staff. An area that the Postgraduate Medical School is active in is that of Primary Care Research. The School has been encouraging research in Primary Care Trusts (PCTs) and in the Surrey area, for instance, Guildford and Waverley have one of the largest screening programs for osteoporosis in the country, with over 7,000 women having been screened.

### Working Alongside the Pharmaceutical Industry

There are active links between the University and both the Health Service and the pharmaceutical industry. UniS is well placed geographically, to take advantage of the positioning within the M25 area of the top ten

pharmaceutical companies in the UK. The University is a leading centre for training in Pharmaceutical Medicine and currently runs two postgraduate programmes. It is planning to develop a European Centre in Pharmaceutical Medicine to enhance the educational potential and develop an independent research facility.

### Delayed Hospital Discharges

A project based in the European Institute of Health and Medical Sciences (EIHMS) has focused on elderly patients' discharge needs and reasons for delayed discharges in older people in the East Elmbridge and Mid Surrey Primary Care Trust area. The project was funded by the Kent, Surrey, Sussex Workforce Development Confederation and was a partnership project between EIHMS, the PCT and Surrey Social Services. The project was led by Karen Bryan.

Available information was collected on transactions involving people over the age of 65 from health and social services, and the profile of the staff involved in those transactions. Information on delayed discharges was analysed for a one year period with a detailed analysis of a typical





“Preparation and assessment for midwifery practice within a range of hospital and community settings is undertaken at UniS”



The inter-disciplinary Centre for Research in Nursing and Midwifery Education provides a focus for new areas of research in nursing and midwifery education.

week and a two week period where delayed discharge increased. A number of key health and social service managers were also interviewed.

The project showed that delayed discharges are continuing to occur despite measures already taken to prevent them, and gave a detailed analysis of the factors contributing to them. The cost is significant and they have a negative impact on the health of older people. The project set out a series of recommendations for tackling the problem of delayed discharges in older people.

### The Centre for Research in Nursing and Midwifery Education

The inter-disciplinary Centre for Research in Nursing and Midwifery Education is funded by endowments from the General Nursing Council for England and Wales and the Midwife Teacher Training College Trust. The Royal College of Midwives has also been closely involved in establishing the Centre. The aims of the Centre are to provide a focus for research in nursing and midwifery education and will include the investigation of the development of nursing and midwifery knowledge and skills and the effectiveness of educational strategies. Activities will involve networking with local, national and international organisations in order to develop a research programme which encompasses multicultural and global contexts.

### Researching Midwifery Practice

A key research project is the investigation of the preparation and assessment for midwifery practice within a range of hospital and community settings, funded by the Hospital Saving Association (HSA) and the Midwife Teacher Training Council Trust. The aims of the study are to investigate:

- the nature of practice experience in relation to assessing the process and outcomes of midwifery education programmes
- the preparation and role of practice assessors in midwifery education and practice, and the implications for continuing professional development

A multi-method approach is being used in order to obtain robust information on the range of issues which will influence effective education and practice in midwifery. The methods include survey, documentary analysis and case study. Five case study sites within England were selected, based on geographical location, systems of maternity care and type and level of midwifery education provision. Four case study sites have agreed to participate in the project to date and data collection has been completed within these sites. Research midwives were recruited within each geographical area to undertake local data collection. The research team is currently undertaking preliminary analysis of documents, transcripts, diaries and observation notes and developing the case records for each site. The fifth (and final)

case study was undertaken in early 2002. The project is due for completion in December 2002.

### Focus on Infectious Diseases – Meningitis and Tuberculosis

Professor John Joe McFadden is Head of the Microbial Sciences Group within the School of Biomedical and Life Sciences. His research interests are in the development of new vaccines for the infectious diseases meningitis and tuberculosis.

The meningococcus is a major pathogen and although vaccines have been developed that protect against group A and group C meningococcal infections, no vaccine is currently available for the group B meningococcus, the strain that causes most cases in the UK. The current research, headed by Professor McFadden, and funded by the Meningitis Trust, is trying to identify possible vaccine antigens, in the form of proteins, that can then be incorporated into a vaccine. The search for these proteins has been accelerated with the release of the genome sequence, which allows the targeting of a particular gene that acts as a switch for all the genes involved in virulence.

If the genes are regulated by one genetic switch, then gaining effective “genetic control” of that switch would allow the deregulation of the genes that cause the disease. The research group is actively searching to identify such genes and then to see if they would make good vaccine candidates but it is too early to say yet whether a good candidate has been found. The timescale for this type of







research is two to three years to find a good candidate and then five to ten to develop a vaccine that can be introduced to the health service.

Tuberculosis is one of the biggest killers in the world, with two to three million people dying each year, mostly in the African and Asian continents of the developing world. The long duration of drug treatment is one of the contributory factors to such a high mortality rate. Often patients feel better within a few weeks and so stop their medication, which should be continued for six months due to the slow growing states of tuberculosis that are resistant to antibiotics. Consequently a few months later, there is a re-emergence of the disease which often leads to death. Control of these lengthy treatment regimes is one of the biggest problems faced by health care workers in this field.

At UniS, a laboratory system has been developed to slow the growth rate in the laboratory. Functional genomic approaches are then used to identify genes, proteins and metabolic pathways that are active in the slow growing state. Some of these may provide new targets for drugs that attack the slow growing organisms. Eventually, it is hoped to develop drugs that will work on the slow growing states within a few weeks, so drastically reducing the treatment times.

Professor McFadden and a colleague, Dr Sub Reddy, whose research interests are in biosensors, are working as joint supervisors on a PhD project that combines both of their research interests to investigate a biosensor to detect the slow growing stage of tuberculosis.

## Biosensors

Dr Sub Reddy is also currently working on smart materials used for electrochemical biosensors and quartz crystal microbalance biosensors, which have recently received much interest due to their potential applications in the NHS. When an overdose patient is brought into a hospital's accident and emergency department, the pressure is on to determine which drug has been taken as quickly as possible. The biosensor developed by Dr Reddy and his team can test a sample of the patient's blood for certain substances such as paracetamol in less than ten minutes. The sensor is portable enough to be used in ambulances to enable the medical staff to know what the patient has overdosed on prior to arrival at hospital.

The sensor works by using a quartz crystal microbalance. When an alternating current is applied the crystal vibrates and will continue to oscillate even when immersed in a liquid. Anything which then sticks to the crystal surface or affects the viscosity of the surface film around the crystal affects the vibrational frequency. The concept of the sensor is to have a small chamber above the surface of the crystal and, when a sample is placed in the chamber, a series of carefully designed chemical reactions can be made to occur that are specific to the molecule of interest. These reactions contribute to the formation of a solid product, which then attaches to the surface of the crystal and the corresponding change in vibrational frequency can be measured. As the chemical reactions can be made to be highly specific to

**The development of biosensors portable enough to be used in ambulances enables medical staff to know what a patient has overdosed on prior to arrival at hospital.**

“ The biosensor developed by Dr Reddy and his team can test a sample of the patient's blood for certain substances such as paracetamol in less than ten minutes ”





Far left: a patient being fitted with a stereotactic frame prior to the delivery of high precision radiotherapy on a brain tumour. Left: Developing radiotherapy using IMRT.

the molecule of interest, only one solid product is formed and other substances in the sample will not interfere with the process or provide spurious readings. Research so far has shown good results with excellent sensitivity.

### Mathematical Modelling

Dr Norman Kirkby from Chemical Engineering is involved with innovative research to mathematically model the response of tumour cells to radiotherapy. There is a class of brain tumour called a glioma, which is amongst the most dangerous, as it is inoperable and within seven to ten months of diagnosis 50% of patients are dead. It does not form a lump like more traditional tumours but invades healthy tissue in a diffuse manner. Some gliomas have been found to exhibit a hypersensitivity to low doses of radiotherapy, which is good news as they are inoperable and resistant to chemotherapy because suitable drugs cannot easily penetrate the blood brain barrier.

The mathematical modelling work followed on from final year undergraduate projects exploring mathematical modelling of tumours. Dr Kirkby works with Dr Neil Burnet, a clinician at Addenbrooke's Hospital in Cambridge and Dr Susan Short at the Gray Cancer Institute at Mount Vernon Hospital in Middlesex. The work is close to entering clinical trials.

All cells take part in a cycle of activity in which they grow and divide to form a tumour. In a typical cell cycle, the cells first take in nutrients until they have enough energy, then make a copy of their DNA, then check that

the copies have no errors and subsequently divide. Cells are much more sensitive to lethal damage by radiation in some parts of this cycle than others. For instance, when the DNA repairs and checking is already active, extra damage from radiation is also repaired very efficiently.

When radiotherapy is applied to a tumour, cells in some parts of the cell cycle are heavily damaged while others escape with their damage repaired. The model looks at individual cells and can describe the holes produced in the age distribution when radiation is applied. This information has provided a breakthrough in treatment as, in addition to describing the cell cycle effects, it is also possible to describe the recently discovered phenomenon of hypersensitivity. Dr Susan Short has discovered that some brain tumours are abnormally sensitive to low doses of radiation. Putting the data about this hypersensitivity into the UniS model has allowed the rapid development of new ways to apply radiotherapy.

This approach now suggests ways to time the doses of radiation to ensure that the maximum number of abnormal tumour cells are killed. This method typically requires smaller doses to be given three times a day for a period of up to six weeks. This research could be a breakthrough for glioma sufferers because the smaller doses of radiation do less damage to healthy tissue and the overall success rates in treating these aggressive tumours will hopefully increase.

“There is a class of brain tumour called a glioma, which is amongst the most dangerous, as it is inoperable and within 7-10 months of diagnosis 50% of patients are dead.”





Left: A solar panel-powered electricity project in Africa, part of Dr Katie Begg's evaluation work on emission reduction. Right: Professor Roland Clift, Director of the CES.



## Focusing on: Sustainability

Understanding the environment has been a key focus of multidisciplinary work at UniS, with scientific, engineering and sociological interests forming fields of study undertaken by research groups. Addressing environmental issues which affect both developed and developing world nations has been a key element of much of the work conducted thus far.

### The Centre for Environmental Strategy

Central to the University's research in this area is the Centre for Environmental Strategy (CES), which opened in 1992. It has grown into an established research and postgraduate centre. In the 2001 Research Assessment Exercise it was awarded a '5A' grade, defined as "research of national and international standard". For a multi-disciplinary centre, this is a real achievement – recognition of the ability and dedication of everyone who has contributed to the development of CES.

Although CES, under the leadership of Professor Roland Clift OBE, is characterised by the multidisciplinary which is essential to address environmental problems "in the round", it is nevertheless important that the

Centre is part of the School of Engineering to ensure that it retains a "problem-solving" approach. The Centre's aims, outlined below, emphasise that its work is not complete if it is limited to analysis and criticism.

### Developing Methods to Assess Environmental Impact

CES seeks to develop and apply methods to assess the environmental and social effects of human activities. Chief amongst these is Life Cycle Assessment (LCA) – a systematic approach to analysing the environmental impacts of the complete supply chain of a product or service. CES has been one of the leaders in LCA development and it now provides one of the corner stones of European environmental policy. LCA has been adapted as a way of assessing waste management strategies and the Centre, together with the Environment Agency, has been one of the lead players in developing a tool to be used by local authorities to evaluate waste management plans. The agenda is now moving on to industrial ecology, an approach which tries to maximise the value obtained from materials and products by repeated use and re-use.

An example of this approach is evidenced in a new research project funded by the Norlands Foundation to study the efficacy of a plastics recycles pool in Surrey, being carried out by Dr Gary Stevens, Head of the Polymer Research Centre at the University and a director of the UniS spin-out company, Industrial Ecology Solutions. The University of Surrey Environmental Body (USEB) project 'Plastics Recyclate Pools' will seek to establish whether stores of the products from used plastic materials could be developed to enable the manufacture or derivation of new products. The project, to be run over 18 months, will draw up a framework for the location of such stores across the county and how they would operate, to give optimum technical, financial and environmental performance.

### Environmental Issues in the Broad Context

Most informed observers now recognise that global climate change represents one of the biggest threats to the stability of life on earth. To combat this threat requires us to rethink the way in which we convert and use energy. Renewable energy sources and systems is a





Industrial ecology tries to maximise the value obtained from materials and products by repeated use and re-use. Guildford MP Sue Doughty (right) pictured with Dr Gary Stevens at a recycling centre.

continuing research theme in CES, feeding into national and international policy through analyses of the Carbon Trading systems and the Clean Development Mechanism (CDM) set up to implement the international negotiations started in Kyoto following the UN Conference on Environment and Development at Rio in 1992. The Kyoto Protocol of 1997 set legally binding emission targets for greenhouse gases for industrialised countries. The overall target is to reduce the emissions during the period 2008-2012. Part of this emission reduction can be achieved through investment in greenhouse gas emission reduction projects in the developing world. This can be achieved through investment by industrialised countries in countries where the cost of emissions reduction is lower – project co-operation takes place under the Clean Development Mechanism. The industrialised partner country can in this way receive credits for the emission reductions achieved and the project itself should contribute to the sustainable development path of the developing country host.

A current Department for International Development funded-project, CDM Analysis for Poverty Alleviation (CAPA), is studying the design of small scale poverty-focused energy projects. These projects, such as local hydro power stations, often set up in remote communities, have an important role in emission reduction and additionally bring poverty alleviating benefits to the local community. Under the co-ordination of Dr Katie Begg, studies in Africa are examining their costs and benefits, and how emission reductions are achieved.

Professor Roland Clift's membership of the Royal Commission on Environmental Pollution allowed CES thinking to inform the Commission's report on "Energy – the changing climate", which was published in 2000 and has led to a complete review of UK energy policy.

High-level policy debates can sometimes ignore the concerns of "marginalised" people, not just in developing countries but also in the industrial world. "Rainforests are a long way from here" was the title of a report by Kate Burningham and Diana Thrush, a joint activity of CES and the Department of Sociology. Published in 2001, it investigated the day-to-day environmental concerns of some of the less visible members of UK society.

One of the most important high level themes and one which is being developed in several projects of CES, is what level of consumption the planet can sustain and what changes in thinking and behaviour are needed for human society to become sustainable.

### **Informing technological, economic, social and political choices**

Sustainable Development has become an overworked phrase (even though it was the title of the World Summit held in Johannesburg in 2002), but it is linked inescapably with the principle of equity – equal access to resources, benefits and opportunities. Much of the research in CES is directed at exploring the practical meaning of sustainable development: how and where inequities arise, particularly along the kind of



**The Kyoto Protocol of 1997 set legally binding emission targets for greenhouse gases for industrialised countries.**

“ Much of the research in CES is directed at exploring the practical meaning of sustainable development ”





The MSc programme in Life Cycle Management studies the cradle-to-grave responsibilities of producers of materials in industrial societies.

supply chain which can be explored by Life Cycle Assessment; and what kind of metrics can be used to help companies measure and set targets for their environmental and social performance. An approach known as Environmental Burden was developed by ICI with help from CES; it has been adopted widely in the chemicals sector and is set to become the basis for compiling and comparing national environmental statistics, in the UK and elsewhere. It has been developed further, by several members of CES, into sets of indicators which can be used generally for environmental management.

A collaborative study by researchers from CES and the Department of Sociology was conducted to investigate the attitudes of policy-makers, business and the general public to environmental tax reform (ETR) in Denmark, France, Germany, Ireland and the UK. Germany and Denmark have ETR applying to both consumers and business. The Climate Change Levy in the UK is an ETR applying only to business. France and Ireland do not currently have ETR. The UK findings from this research have provided interesting evidence for policy makers as they seek to improve the design of environmental taxation.

ETR is a policy that raises taxes on the use of energy (or other environmentally-damaging activities) and lowers other taxes, usually those on employment. The rationale is that tax should be imposed on negative effects instead of positive ones. A refinement is the 'double dividend' argument: that higher taxes on energy will lower pollution, while lower taxes on labour will decrease unemployment.

The research shows that the problem that ETR faces in terms of public acceptance is not so much outright hostility to environmental taxation as conceptual problems with the design. Similar conceptual problems were also found in the interviews with business people who:

- did not trust assurances that the revenues will be used as promised by the government
- had difficulty in understanding the purpose of increasing taxes on energy while lowering taxes on employment
- desired measures seen as incentives as well as penalties

Recommendations made to increase the acceptance of future environmental tax reform included: a levy administered by an independent body; revenues for energy efficiency programmes to be earmarked targeting areas which can be addressed at zero or negative net cost; the provision of grants for local environmental projects, renewable energy and public transport improvements; sending utility customers vouchers for energy efficiency investments with their bills in order to make the connection between the levy and its benefits tangible; extra help for those on low incomes; and the consideration of levy-free allowances and rebates for meeting energy conservation targets.

## Provision of Environmental Education and Training

CES manages a Doctor of Engineering programme in Environmental Technology, offered jointly by Brunel University and UniS. All the Research Engineers following the programme are sponsored by industrial organisations and carry out their research with the sponsor, but follow a course of taught modules at the two Universities. Fifty Engineers have graduated from the programme. They have proved to be in demand, and many are rising to senior managerial levels and are acting as agents to disseminate and apply the CES philosophy.

The Centre also offers an MSc programme in Environmental Strategy, which took in its first full-time students in 1999. With support from the EPSRC, CES is now developing a unique Diploma and MSc programme in Life Cycle Management. Completion of any of these programmes offers a direct route to Associate Membership of the Institute of Environmental Management and Assessment. CES is the sole provider of Environmental Training for the 5,000 staff of the Foreign and Commonwealth Office. In the 2002/3 Academic Year, The Centre starts a series of undergraduate modules in Sustainable Development for all students in the School of Engineering.





**Professor Nigel Gilbert, Professor of Sociology and Pro Vice-Chancellor (Staff Development).**

### **Improving water resource planning**

Professor Nigel Gilbert's research interests include computer simulation, the sociology of science and science policy, innovation and the sociology of the environment.

The Freshwater Integrated Resource Management with Agents (FIRMA), which he co-ordinates, is funded through the Energy, Environment and Sustainable Development theme of an EU Framework V programme. This project brings together environmental and social scientists from nine partners in seven European Member States in the development of simulations to help manage drinking water at the local level. The project aims to improve water resource planning by developing and applying agent-based modelling to integrate physical, hydrological, social and economics aspects of water resource management. The work will yield insights into the social processes of water management, leading to the consideration of a wider range of aspects of the environment in decision making. Better management of water catchments, amongst other improved water management techniques, are likely to result from this study.

'Stakeholder participation is an essential feature of the project', explained Professor Gilbert, 'starting with the formulation of questions and the design of the models. Each of the five European regions has its own problems, risks and options, each of which needs to be assessed and evaluated using the models in participatory settings.'

A generic model will be developed and applied across the regions, seeking to ensure the outputs are of use to stakeholders.'

The models will improve on existing integrated assessments by explicitly representing customers, suppliers and government at all levels of aggregation. This new approach will provide innovative tools for policy makers concerned with issues such as waste water, water scarcity and integrated catchment planning. Outcomes will include the prototype models in the form of tools usable by managers, a methodology for developing and applying agent-based models and educational materials for water resource managers and modellers.

### **Better utilisation of fish stocks**

Dr Nazlin Howell in the School of Biomedical and Life Sciences is co-ordinating a €1m EU Framework V research project to improve the quality and utilisation of low value fish in developing countries. The project brings together a multidisciplinary group of scientists and engineers from the UK, The Netherlands and Portugal, and two developing regions in Africa and Asia. Although the oceans surrounding these continents are exceptionally productive, the per capita availability of marine fish is declining due to over fishing and increases in the regions' populations. Fish can provide much needed protein, frequently missing from the average diet of low income groups – particularly infants, in developing societies. These needs can be met by efficient preservation and

utilisation of existing catches, since it is estimated that some 27 million tonnes of low value and undersized fish are discarded each year out of the 110 million tonnes landed.

Pollutants such as DDT, PCBs and dioxins are being monitored as part of the project. Biochemical and physical changes in fish proteins and lipids during processing which affect nutritional quality and safety are being investigated using advanced spectroscopic, cell culture and rheological techniques. Innovative techniques are being studied to process under-utilised fish species, polyunsaturated fish oils and fish gelatin into extruded and dried products including infant foods. Also improved preservation using indigenous natural antioxidants is being explored.

The project will aid sustainable development of fisheries in line with policies of developing countries as well as the EU Common Fisheries Policy. Research and training at an international level will be strengthened and food security in developing regions will be improved, through the dissemination of the results of the work in collaboration with industry, the Food and Agriculture Organisation and the United Nations Children's Fund.





**The Sleep Disorders Unit presents an exciting vision for the provision of research and clinical services in the area of sleep medicine.**

## Focusing on: Sleep

Sleep is an area of research that can be encompassed in many disciplines but which has only recently gained recognition in its own right. The Royal Society of Medicine now has a Sleep Section and interest in the subject is increasing all the time. Much research is driven by questions such as how much sleep we need and the effects of sleep deprivation.

It is only through the interweaving of the research of sociologists, biochemists, psychologists and pharmacologists that a proper understanding to accommodate and treat sleep disruption may emerge in the future. Dr Derk-Jan Dijk from the School of Biomedical and Life Sciences is currently Chair of the Scientific Committee of the Sleep Research Society. He recognises the need to formalise the research linked to sleep at UniS through the establishment of a Multi-disciplinary Sleep Research Centre to be realised in 2003.

### **The Sleep Disorders Unit**

As a leader in the field of sleep research, the present sleep research unit of the Human Psychopharmacology Research Unit (HPRU) has a well-established reputation in scientific investigations and novel research across

Europe and internationally. The Sleep Disorders Unit presents an exciting vision for the provision of research and clinical services in the area of sleep medicine, physiology and applied clinical research and has conducted some of the largest single centre sleep studies ever performed. The Unit consists of six sleep and chronobiology bedrooms and a 12 bed ward.

Individual bedrooms have advanced sound attenuation (75-80dB between rooms), and are temperature-controlled and isolated from all external time cues, such as darkness and daylight. This allows the performance of accurate chronobiological experimentation.

Facilities have recently been improved through the introduction of two new methods to allow the promotion of a state of insomnia in people who would otherwise sleep normally. This is done by subjecting volunteers to either environmental or traffic noise. These 'noise models of insomnia' are allowing the sleep centre to study insomnia and test hypotheses with more accuracy than before. Environmental noise can cause significant arousal and awakening, and even be used to stop sleep altogether, promoting transient responses in healthy subjects similar to acute insomnia. Research by the World

Health Organisation (WHO) revealed that a background noise level of 30dB(A) promotes "measurable effects upon sleep", with noise in excess of 60dB(A) causing complete awakening. Because of the stimulating properties of noise, it can be used to promote acute insomnia states in healthy volunteers in a controlled and reproducible fashion.

The 'Traffic Noise Model of Insomnia' uses real traffic noise to provide a psychobiological stimulus in the 12-bed ward. The model was designed to disrupt sleep in a uniformed fashion across the whole night (similar to sleep maintenance insomnia). Awakenings and arousals during the night are measured. The 'Continuous Noise Model of Insomnia' uses a noise level of 80dB(A) and is presented after waking the subject in the middle of the night. The time taken for the individual to return to sleep is then measured.

Both models have allowed large scale trials in the time course of action of hypnotic medications to be conducted at HPRU.

### **Circadian Rhythm Cycles**

Professor Debra Skene heads the Neuroendocrinology Group that is part of the School of Biomedical and Life Sciences at







“ The Royal Society of Medicine now has a Sleep Section and interest in the subject is increasing all the time. Much research is driven by questions such as how much sleep we need and the effects of sleep deprivation ”



**Left: Professor Debra Skene, and right: Research has been conducted on North Sea oil rigs to examine the effect of shift patterns on the body clock.**



“ Within each of us is a biological clock, the precise working of which is thought to be genetically determined, giving rise to individuality between human beings ”

UniS. Much of her work is looking at circadian rhythm disorders in humans, both natural disorders such as the desynchronisation of rhythms suffered by totally blind people and forced disorders, which can be short lived, such as those experienced by night shift workers and travellers across time zones.

Within each of us is a biological clock, the precise working of which is thought to be genetically determined, giving rise to individuality between human beings. It is this master biological clock which generates and maintains 24 hour circadian rhythms in physiological, biochemical and behavioural variables in the body, like core body temperature, mental performance and the synthesis and secretion of many hormones. As we have evolved, our behaviour and physiology has developed so that our internal rhythms complement our surroundings. So, for example, we expect to sleep during the night when it is dark and work or play during the day when it is light.

In fact, circadian rhythms are slightly longer than 24 hours and everyday we need our clocks to be slightly reset. This is achieved through the natural cycle of night and day. We need the light that enters our eyes when it is daylight to tell the brain what time it is and this is why totally blind people end up with completely desynchronised rhythms, which lead to cyclic sleep problems. There will be times when a blind person's rhythms are in phase with night and day and their sleep is normal but others when they gradually 'de-phase' and suffer sleep disturbances.

Debra and her team have been successfully treating blind people with

melatonin. This acts in the same way as exposure to light by resynchronising rhythms to a night and day cycle which eliminates the sleep disturbances. Science has suggested that light is more effective than melatonin as a synchronising agent for circadian rhythms. It can be used to both induce advances or delays in certain circumstances. Thus exposure to light has been studied in people, such as shift workers, who have a mismatch between their body clock and the environment. This research has shown that the human circadian system is sensitive to short wavelength visible light that is dark blue in colour. A new non-rod, non-cone photoreceptor system has been shown to be responsible for processing and transmitting information to the body clock.

**Night Shift Work**

There is increasing concern with the possible health and associated problems of working out of hours. The University's Neuroendocrinology Group and the Centre for Chronobiology have been collaborating with Dr Linda Morgan from Nutrition, and conducting studies in unusual environments.

The major problems of night shift work are an increased accident rate, poor sleep and an increased risk of a number of diseases including chronic sleep disorder and cardiovascular disease. Chernobyl, Three Mile Island and Bhopal were all night shift accidents. Sleeping out of 'phase' for example in the morning after night work, generally leads to shorter sleep of poorer quality than that taken at the appropriate





Left: Professor Josephine Arendt, and right: Halley Base, Coats Land, the most southerly of British Bases.



time. Adjusting the body clock to night work will alleviate this problem. In an offshore environment, such as an oil rig, this can be done relatively easily as workers are a 'captive audience' and they can be given melatonin or subjected to light in a controlled way. However, in most onshore shift work environments this does not happen.

The amount of light experienced at different times of the day has a major influence on adaptation to night work and back to day work. Research on North Sea oil rigs has shown that some 12 hour work – 12 hour leisure/sleep schedules are better than others for adapting the body clock to night shift (HSE study). Work from six o'clock in the evening to six in the morning is good, whilst working from midnight to midday is not, and light exposure times are probably the main reason for these differences.

There are large individual time differences in some shift work schedules and this can lead to problems. For example during a week of nights, 18.00 to 06.00 hours, most oil rig workers will adapt their body clocks, but if this is followed by a week of days, 06.00 hours-18.00 hours, few will readily adapt back to the dayshift. This situation means that each schedule needs to be evaluated before any advice or countermeasures can be implemented. One major problem with workers who adapt to offshore night shift is that, when they return home, they are out of synchrony with their home environment.

Projects funded by the Health and Safety Executive (HSE) and the Institute of Petroleum, to be conducted by Professor Skene, intend to investigate possible means

of hastening adaptation back to home life. The initial project is to give subjects extra light at specific times using special light boxes. Their mood, activity and rest, and the timing of their body clocks are then assessed. The use of melatonin to help shift workers sleep 'out of phase' and to speed up adaptation has been pioneered at UniS by Professor Josephine Arendt and her team at the Centre for Chronobiology. They are now acknowledged world leaders in this area of research.

In parallel with these studies in an industrial environment, the researchers are using the extraordinary natural 'light laboratory' of Antarctica in an attempt to understand further the light dependent aspects of human physiology and behaviour. At Halley Base, Coats Land, the most southerly of British Bases (75°S) the sun does not rise for three months in the winter and does not set for three months in the summer. During the winter, the average maximum amount of light experienced is about one third of that in the UK. The only light experienced at all being that of domestic lighting. Some Base personnel may experience low morale and poor sleep, with their body clocks desynchronising from the 24 hour day in the way that is seen in some registered blind people with no perception of light.

The Halley Base environment has been used to show that meals taken during the night shift lead to an increase in the presence of risk factors for heart disease compared to meals taken on the dayshift. In general, shift workers have a higher incidence of heart disease, and this is the first time that a

possible mechanism has been shown in real shift workers as opposed to laboratory simulations.

Previous studies at Halley have shown that a little extra broad spectrum light at the right time enables people to maintain optimum body clock time and may help them tolerate the darkness of the Antarctic winter. It could even help to normalise risk factors for heart disease during the night shift. Special light equipment is currently being shipped to Antarctica to provide extra lighting for the Base and assess any change (improvement or otherwise) in sleep, morale and body clock status in future studies.

Shift work, such as watch keeping on the British Antarctic Survey ships provides yet another opportunity to assess the health implications of working out of hours and the effect of light environments. There have, in the past, been numerous studies of watch keeping on merchant vessels. They concluded that all watch keepers had sleep problems and that different schedules should be tried. No record of personal light exposure or objective assessments of sleep were made and no one has compared night watch in 24 hour daylight (which occurs in Polar Regions) with darkness at night. Professor Jo Arendt is at present evaluating sleep, light exposure and body clock status in watch keepers and dayworkers.

The results of this research may have a significant impact on the design and use of lighting for the treatment of disorders where an adjustment of the circadian rhythms is required. In addition to helping with the adaptation to shift work, light can also be





Professor Sara Arber.

used to aid travellers on long haul flights to avoid jetlag, sleep disorders and seasonal affective disorder.

### Sleep in Ageing Women

The Centre for Research on Ageing and Gender (CRAG) is based in the Sociology Department and brings together social scientific expertise to conduct policy relevant research on ageing and gender. Research into the sociology of sleep is one of the current research projects being undertaken by Dr Jenny Hislop and Professor Sara Arber. Working as part of a multi-disciplinary scientific team on a three-year EU-funded project 'Sleep in Ageing Women', they are conducting empirical research which examines the social dimensions of sleep. The research aims not only to provide insights into the social world and the gendered nature of our lives, but to complement and challenge existing and future research into the biological and psychological aspects of sleep.

The project examines how patterns of sleep change in women aged 40 and over, the kind of sleep problems they experience, how these problems affect their lives, and the strategies and treatments they use to try to overcome them. Using a qualitative approach to record women's actual experiences of sleep as well as how their patterns of sleep are related to their gender roles and everyday lives, the research has to date included the participation of 82 women in ten focus groups, in-depth interviews with a further 35 women, and the use of audio sleep diaries in which they tape-recorded an

assessment of their sleep each morning for seven consecutive days.

Analysis so far has focused on the experiences of sleep among mid-life women aged between 40 and 59. The mid-life period for women is characterised by a multiplicity of roles, responsibilities and gender expectations that potentially have a greater impact on sleep than at other times of the life course. It is not surprising in this context that sleep disruption, rather than disorders, is a feature of mid-life women's sleep. The interaction of the physical and emotional labour involved in caring for babies, young children and teenagers, as well as the worries and concerns associated with family responsibilities, work, and caring for ageing parents, may compromise a woman's access to quality sleep. While the majority of women in the study accept some disruption to their sleep as 'part of being a woman', they do not consider these disruptions desirable. They develop a range of preventive and responsive strategies to try to improve the quality of their sleep and to maximise their sleep potential. The strategies they choose, however, may be constrained by their social circumstances and the nature of their sleeping environment.

The study of sleep from a sociological perspective is still in its infancy and further research needs to be undertaken to build on the foundations provided by the 'Sleep in Ageing Women' project. This research illustrates that sociology can contribute significantly to the study of sleep by providing insights into the social context of sleep; an area which to date has been overlooked in the sleep research agenda.

“ The project examines how patterns of sleep change in women aged 40 and over, the kind of sleep problems they experience, how these problems affect their lives, and the strategies and treatments they use to try to overcome them ”



Professor Greville Corbett.



## Focusing on: Society's Needs

It is a popular misconception that the University of Surrey's world class activities are limited to the fields of science and technology. In the 2001 Research Assessment Exercise (RAE), the Department of Sociology obtained the highest possible accolade – a 5\*A rating. The quality of much of the research in the School of Arts is of a similarly high level.

### Understanding Language

Language is a key element which helps to bind societies together. The study of which languages are spoken by which societal groups, in what parts of the world and how they relate to each other is crucial to preserving rare languages and to better understanding language development. The Surrey Morphology Group, based within the Department of Linguistic, Cultural and International Studies, was formed twelve years ago as a result of collaborative work between Professor Greville Corbett, a typologist, and Norman Fraser, a computational Linguist. The Group has been consistently highly rated for its research; in the 1996 RAE it was 'flagged' and in the 2001 RAE it was included in the Russian submission which gained a 5 rating.

Professor Greville Corbett, who heads the Surrey Morphology Group, has recently been awarded a prestigious ESRC Fellowship for research into the notion of possible words. There are 6,000 languages in the world and many of these will be lost before research into them can be completed. There are many languages whose chances of survival are poor and, if the development and decline of these is to be fully understood, this research is necessary and urgent.

Professor Corbett has worked for many years studying the different types of languages that exist. There are profound differences in the way in which languages work and his research on gender systems, on which he has become an expert, has provoked much interest. He has contrasted the familiar languages like French, which has two genders, and German and Russian, which have three, with languages from Daghestan (typically four) and from West Africa that can have up to twenty. As a result, he and other members of the Surrey Morphology Group have been asked to contribute typological data to the World Atlas of Linguistic Structures, being co-ordinated by the Max Planck Institute in Leipzig. This novel research plots different linguistic

structures on a map of the world to establish which geographical or genetic patterns can be associated with a particular language feature. The complete Atlas is due for publication in early 2004 and will have five chapters from the Surrey Morphology Group.

Members of the Group have an impressive range of language expertise and of research techniques. A great strength of the Group is in its multidisciplinary approach to research, working with colleagues in psychology, statistics and computing, and using a variety of computational methods. In particular, the Group uses DATR, a language that allows the representation of the lexicon of a language and the ability to check that the forms predicted by a particular theory are the correct ones. This is, in effect, a way of using computational techniques to ensure the validity of the theory being developed in the Group, namely Network Morphology. Members are testing morphological phenomena in a range of genetically diverse languages and this work involves the construction of databases for a genetically diverse sample of languages. These databases are now available on the World Wide Web and have led to the Surrey Morphology Group becoming part of a European network, based in Utrecht.





Professor Martin Bulmer.



The social survey is a key tool for sociologists seeking a better understanding of how the population lives and thinks.

### Answering Societal Questions

One of the most important investigative tools of the sociologist and social researcher is the social survey. Sociologists at UniS have developed a 'one stop shop' to enable surveys which provide national benchmark data on topics such as unemployment, price levels and changing social attitudes to be conducted. The National Labour Force Survey, General Household Survey, Expenditure and Food Survey, British Social Attitudes Survey and British Household Panel Study are all examples of social surveys.

Professor Martin Bulmer is the Director of the Social Survey Question Bank, an electronic resource based at the University of Surrey funded by the Economic and Social Research Council. Professor Bulmer is aided by colleagues Harshad Keval and Julie Lamb. It is a virtual presence on the World Wide Web where social scientists, social researchers and interested members of the public can discover how particular topics are investigated and study the actual questionnaires used by the survey agencies. The site currently holds some 26,000 pages of information. Part of the Question Bank's task is to promote the greater use of social surveys and social survey data by social scientists.

Professor Bulmer was attracted to Surrey by the Sociology Department's strength in social research methodology. The Department has a particularly strong professional orientation to this area, running two flagship Masters' degrees in the subject and a 5\* RAE rating to back it up. Maintaining an

electronic resource such as the Question Bank involves a combination of technical expertise in web design, the finer points of social research methodology together with entrepreneurial outreach to the Question Bank's user community. Professor Bulmer also runs the Survey Link Scheme, which provides short placements in major surveys for the UK social science community.

The Question Bank is part of the Centre for Applied Social Surveys (CASS) which is a joint enterprise between the University of Surrey, the University of Southampton and the National Centre for Social Research in London, the leading independent survey agency. Its task is to raise the level of expertise in survey research among British academics and postgraduate students.

Martin is a sociologist of huge experience, whose research for many years has concentrated upon the history of the social sciences, and on the study of race and ethnic relations. He is the editor of the world's leading social science journal on the subject, 'Ethnic and Racial Studies'. During his time at UniS, Martin's work has been strongly focused on the area of social research. He is the Co-Director of the Department's Institute of Social Research and has strong connections with independent research institutes.





**Adding value to digital products and services will be crucial to the success of on-line music buying.**

## The Social Impact of New Technology

A combination of Surrey's expertise in sociological research and technology led to the establishment of INCITE – The Incubator for Critical Inquiry into Technology and Ethnography. The Research Centre based in the Department of Sociology is developing interdisciplinary methods of investigating the social impact of new technology. INCITE collaborates closely with people working in a range of commercial roles, including designers and engineers, together with marketing and business people. The impact of this collaboration is to broaden the purview of the research by adding a commercial perspective – the results of the research materialise as well-designed products and product concepts.

By then studying the methods and outcomes of this collaboration, INCITE expands the basis for effective academic-industry partnerships. During the year, amongst the wide range of research projects being carried out by the INCITE team, led by Director Dr Nina Wakeford, were several specific collaborative areas of work.

One such project was the Digital Music Mission funded by the Department of Trade and Industry International Technology Service. The mission comprised a group of leading UK companies with vast experience of producing and distributing music, and their fact finding visit to the West Coast of the USA brought them into contact with a huge range of individuals from academic institutions and large music publishers to small start up

companies. The mission visited the United States to gain an insight into how the advent of some of the latest digital developments has impacted upon the US music industry, with the view that what is already taking place across the Atlantic is likely to appear in the UK in the near future. The development of digital music products and services depend on reducing pirate distribution and delivering viable alternatives to free file sharing. Future music buying options could include a subscription where consumers pay a monthly fee to download music or pay per download. Another option is that advertising revenue could support the free music downloads.

The report of the mission 'Monetising Anarchy' was published in March 2002. In their report, the DMM stressed that adding value to the digital products and services will be crucial to the success of online music buying.

"In the context of new technological developments, companies right along the music value chain are realising that they need to know more about everyday consumers," Nina Wakeford said. Managing digital rights should be straightforward and consistently applied. So far it has been confusing to consumers, making pirate file share easier. A 'promise' to manage change on behalf of the consumer might stimulate development of the digital music market. If the consumer has rights to play a digital version of his favourite track, he should be assured that the format he bought would not be useless within a few months. This will mean that the service provider should make the latest available versions of the track available to the

consumer if he acquired the rights with their service. All available repertoire must be available to all digital music services. If this is not the case, piracy will seem a more compelling option. Digital offerings should also be more compatible between file formats and portable players. The mission also concluded that there is a lot to learn from the success of ring-tones. Despite being of often dubious quality, they serve a social function and make a public statement similar to the branding of clothes. Some artists have already used this form of music distribution – the Dutch group Vengaboys released a single as a ring-tone before the track was available elsewhere.





## Focusing on: Space

**Left: An SSSL engineer conducts pre-launch tests on AISAT-1 at the Surrey Space Centre; centre: Disaster Monitoring constellation from space providing fast delivery of visually intelligible images to the disaster relief community world-wide; right: Jeff Ward, Managing Director of SSSL.**

The first network of satellites dedicated to monitoring and mitigating man-made and natural disasters is underway at the Surrey Space Centre, with the first of five satellites already in-orbit above the Earth.

Every year, natural and man-made disasters result in devastation around the world, causing loss of life, widespread human suffering and huge economic losses. The Disaster Monitoring Constellation (DMC) is an international proposal, led by SSSL, to construct a network of between five and seven microsatellites for rapid-response disaster monitoring and mitigation.

Although satellites currently observing the Earth may provide images of disaster areas, they are not best suited for the task of monitoring such events. The images from these satellites can be infrequent, and sometimes delivery of critical images can take months due to periodic cloud cover and conflicting tasks that are being undertaken by the satellite. At best, an image of a particular spot on the Earth's surface may only be re-imaged every 17 days. These images are also expensive to generate as their instruments are designed to meet many different user requirements.

SSSL has developed a highly sophisticated 90kg microsatellite to provide high

quality Earth imaging at 1/50th the conventional cost.

Jeff Ward, Managing Director of SSSL, said of the project: "Surrey technologically and politically enabled the Disaster Monitoring Constellation. This international collaboration will show that satellite technology can deliver global humanitarian and ecological benefits at a modest price. And you seldom see "modest price" and "satellite" in the same sentence".

The imaging system on each spacecraft will be capable of monitoring any rapidly changing phenomena on the Earth's surface every 24 hours. In fact, with just one satellite in-orbit, it is possible to re-image a scene every four days. This is due to the exceptionally wide imaging capability of the SSSL-built cameras – each image will view an area of the Earth's surface 600km wide.

Currently, seven nations are working in partnership: Algeria, China, Nigeria, Thailand, Turkey, the UK and Vietnam. Each satellite will be owned independently and operated on a day-to-day basis for each customer's Earth observation and space science requirements. When disaster strikes, the consortium of owners will work together to provide fast delivery of images to the disaster

and relief community via The Reuters Foundation Alertnet.

"The disaster monitoring constellation is a beautiful example of how Surrey's microsatellites are bringing the advantages of space to a wider global community", Jeff Ward explained. "We start by designing a microsatellite that is affordable to the world's smaller countries and organisations. Then we show those countries that by forming a consortium and sharing their microsatellites as a "constellation," they can achieve a result that even the major space-faring nations have never achieved: satellite images of any location on Earth, every day. This is a true synergy. The whole is greater than the sum of the parts, and it is enabled by adapting leading-edge consumer technologies (such as digital imaging) to the rigours of space flight."

The first satellite for the constellation, AISAT-1, was launched for Algerian customer, Centre National des Techniques Spatiales, on 28 November 2002 and is fully operational. A further three satellites are currently under construction at the Surrey Space Centre for Nigeria, Turkey and the UK, all due for launch mid-2003. A third and final launch will see the entire constellation operation in-orbit by early 2004.







Sir Martin Sweeting (right), founder of the Surrey Space Centre, was knighted in 2002 for services to microsatellite engineering.



# Focusing on International Issues

## Providing a Lead for Others

A world class University thrives on its links and interaction with institutions across the globe. As well as developing and maintaining collaborative links in research and teaching, UniS has acted as a role model for others to follow. In a publication to mark Singapore's Nanyang Technological University (NTU) '21 Years of Success', UniS is cited as a major influence on the development and success of the institution. The story started with a visit to UniS by an NTU team of lecturers and its President Dr Cham Tao Soon in 1995. Associate Professor, Steve Seumahu, the first satellite project principal investigator recalls that: "He was very impressed with Surrey's capacity for building satellites. He asked: 'Can we do it?' Nobody said anything, so I said: 'Yes, we can!'" Expertise and training were given at the Surrey Space Centre and as the book recounts: 'At the time, NTU had no facilities, no infrastructure, and, worst of all, no funding for any project of this scale.' Yet, within two years the NTU team launched its first satellite.

## Developing Effective International Partnership Approaches

There is much to be said for developing partnership approaches when working on the international stage. Established in January of this year, the International Special Interest Group, comprising UniS, the South East England Development Agency (SEEDA) and Surrey County Council (SCC) meets every three months or so to discuss areas of mutual benefit in the development of international strategy. Professor Ken Taylor at UniS has already opened doors for SEEDA in Finland due to the excellent partnerships UniS enjoys with the Baltic States, and the SEEDA Incubation Manager is now on secondment to the Science Park in Kuopio. It is all about sharing networks and moving up the learning curve more quickly, something that UniS has taken advantage of by making contact with SEEDA's representatives in Washington and Japan.

## Scientific and Technological Co-operation

The development and promotion of scientific and technological co-operation between institutions and researchers from the UK and the rest of the world is a key theme at the University. There is no doubt that international collaborations will result in higher impact research than that from individuals working alone, particularly in areas of global interest. Researchers need to be aware of the international scenery to develop technologies that can be used to overcome the problems of developing countries. In these countries there is an enormous human resource potential that is underused because of lack of opportunities. Research programmes need to incorporate social aspects by integrating such human resources in these activities, which can easily be done without excluding academic excellence.

Professor Angela Danil de Namor, a Professor of Thermochemistry, is a key advocate of such themes. She is involved with five EU Framework V projects that have been awarded contracts. In the contract which addresses the problems of monitoring and treating mercury contamination in South





UniS Professors Ferns and Goldfarb meet with a Finnish delegation.

America, Professor Danil de Namor is working with partners in Spain, Peru, Argentina, Brazil and Sweden. She has managed to obtain an allocation of funding to train young people from shanty villages in Argentina in water sampling. "It is essential to integrate these people into society and to encourage them to earn their living by contributing to local needs. We have a lot to offer and a lot to learn from them" she says.

Mercury has been recognised as a highly dangerous element by the Environmental Protection Agency (EPA) due to its accumulative and persistent character in some environments. In the Latin American Region several countries are affected by the high content of mercury in the environment and consequently in water. Water treatments are currently scarce in Latin America and the current analytical techniques for monitoring mercury require costly equipment which is expensive to run. Therapeutic treatments for curing mercury intoxication are based on chelating agents (chemicals which combine with unwanted heavy ions) which are in critical need of improvement.

The general objectives of this project are to develop 'on site' methodology for monitoring mercury, both inorganic and organic, in water, viable technologies for mercury removal from water and chelators with therapeutic properties.

It is hoped that the project will bring forth a series of novel mercury (II) and methyl mercury ion-selective electrodes and 'on site' equipment for monitoring these speciations in water. It is hoped to develop low cost, selective and recyclable decontaminating

agents for the removal of mercury from water and a new group of water-soluble receptors for the treatment of mercury poisoning. A further spin off from the work might be a new instrumental development for screening plants which is expected to be faster than present methodology.

In another continent, Professor Danil de Namor is working with researchers from Russia, Latvia, Germany and Armenia to address the problems associated with pesticide pollution in the former countries of the Soviet Union. It is hoped that methodologies for the decontamination of polluted soil, water and food, and in particular milk, will be the outcome of this project.



Professor Danil de Namor.

“A world class University thrives on its links and interaction with institutions across the globe”





Averil Macdonald demonstrates the 'Fantastic Plastic' lecture which is very popular with Years 8-10.

## Focusing on: The Community

### Working with Local Schools

Amongst the more active areas in the University working with local schools is the Department of Physics. Co-ordinated by Dr Paul Sellin, but involving many members of staff the activities include schools talks and visits, Institute of Physics' talks in the Department, sixth form open days and taster days, and probably most uniquely for this department, school resources for teachers and students. The Department has developed a range of informative posters covering aspects of its courses and resources for teachers, that can be found at:

[www.ph.surrey.ac.uk/schools](http://www.ph.surrey.ac.uk/schools).

Messages from Space ([www.ph.surrey.ac.uk/satellites](http://www.ph.surrey.ac.uk/satellites)) is a website and CD which provides schools with information and data about Surrey satellites. The project was funded by a £50k grant from PPARC under their National Award for Public Understanding of Science. The project was led by Paul Sellin, in collaboration with Craig Underwood from the Surrey Space Centre. Messages from Space supports the space and satellite related components of AS and A2 physics syllabuses, particularly the new Salters Horners and Advancing Physics courses.

Teachers can use the free CD to load the material onto their school computers, or access it through the web site. The project features direct access to datasets and images from Surrey satellites, a live satellite tracking map to monitor space craft locations, detailed teaching resources covering orbital motion and telecommunications, and more advanced extension activities for school use.

StarBase is a CD and website supporting astrophysics teaching in sixth forms. During 2002 the content of StarBase was extended to also cover topics of Particle Physics. Fantastic Plastic is a demonstration lecture funded by an EPSRC Public Understanding of Science Award. It looks at the properties of different types of polymers and plastics, including slime, potty-putty and artificial legs! The content is aimed mainly at pre-16s, and has been used for example in the department as part of a Physics Taster Day for local schools.

Liftoff! is a model rocket programme for Y8-Y10 pupils. During 2000, this was run as a rocket building competition with local schools, culminating in a launch day on campus. Since then the material has been packaged as a Teachers Guide to using model rockets in schools, and this is available

to teachers from the website. The guide covers all aspects of model rockets such as classroom resource sheets on aerodynamics, water and air rockets, and powered models.

Across the department a lot of effort is put into both visiting schools and in encouraging them to come to the University for sixth form Open Days. Members of the department have visited a range of local schools this year, including Sutton High School, Farnborough College, Charterhouse, Bishop Reindorp and many more. There is also a busy programme of Institute of Physics evening talks on campus throughout the year.

### Sport

UniSPORT is the name that encompasses all the University's sport, exercise and community dance activities, and it offers everyone, whether a student, staff member or a member of the local community, a chance to change their lifestyle.

UniSPORT is active in widening participation through schools, with groups of local schoolchildren visiting the University and enjoying the many coaching opportunities available. There are regular squash roadshows for local schools, which have catered for over



**The Knights are the local American Football team consisting of UniS students, Federal and Associated Colleges students as well as members of the local community.**



1000 children so far, mini tournaments and a squash coaching programme. An ongoing schools dance project and six-week sports courses for children with special needs involve many UniS students as well as specialised coaches and volunteers.

This year saw the appointment of a UniSPORT Sports Development Officer to develop further initiatives between the Students' Union, the local community and UniSPORT. Over 20,000 local people already visit the Varsity Centre each year where there is a sports bar and restaurant, squash courts, tennis and netball courts, a floodlit artificial turf pitch, an archery field and seminar facilities. It is also the home for National League Squash matches. The world's top professional National League Squash players regularly play at the University, attracting local interest, sponsorship and spectators, acting as a recognisable link with the school roadshows and local coaching programmes.

UniS hosted this year's BUSA Trampoline Championship. Current World Record Holder and World Synchronised Trampoline champion Kirsten Lawton is a UniS student. Ross Brewer is another of UniS' sporting stars, and this year in Manchester he won his second Commonwealth Games Gymnastics Gold Medal at the age of 22. UniS was pleased to be chosen as the accommodation Centre for the Commonwealth Games teams participating in the shooting events that were held at Bisley, with the Vice-Chancellor presenting some of the medals.

American Football is a sport that allows a quite unique partnership between University and community, representing the youth

programme, student recruitment, sports development, student teams and alumni, with national success and recognition. The Knights are the local team consisting of UniS students, Federal and Associated Colleges students as well as members of the local community. The team have recently secured a fantastic additional local sponsorship deal and now have Premier Prospects, Personal Assurance and the Royal Mail Sports Foundation as their sponsors. They play and train at the UniSPORT Varsity Centre, which boasts an all weather pitch. American Football is a great sport that enjoys big popularity in Surrey and is an excellent example of how the University works well with its local community.

### The Arts

The University's arts events continue to attract a varied and loyal audience from the local community. Ranging from lectures and exhibitions to a historic sculpture unveiling, the programme of events in the past year offered something for every artistic taste.

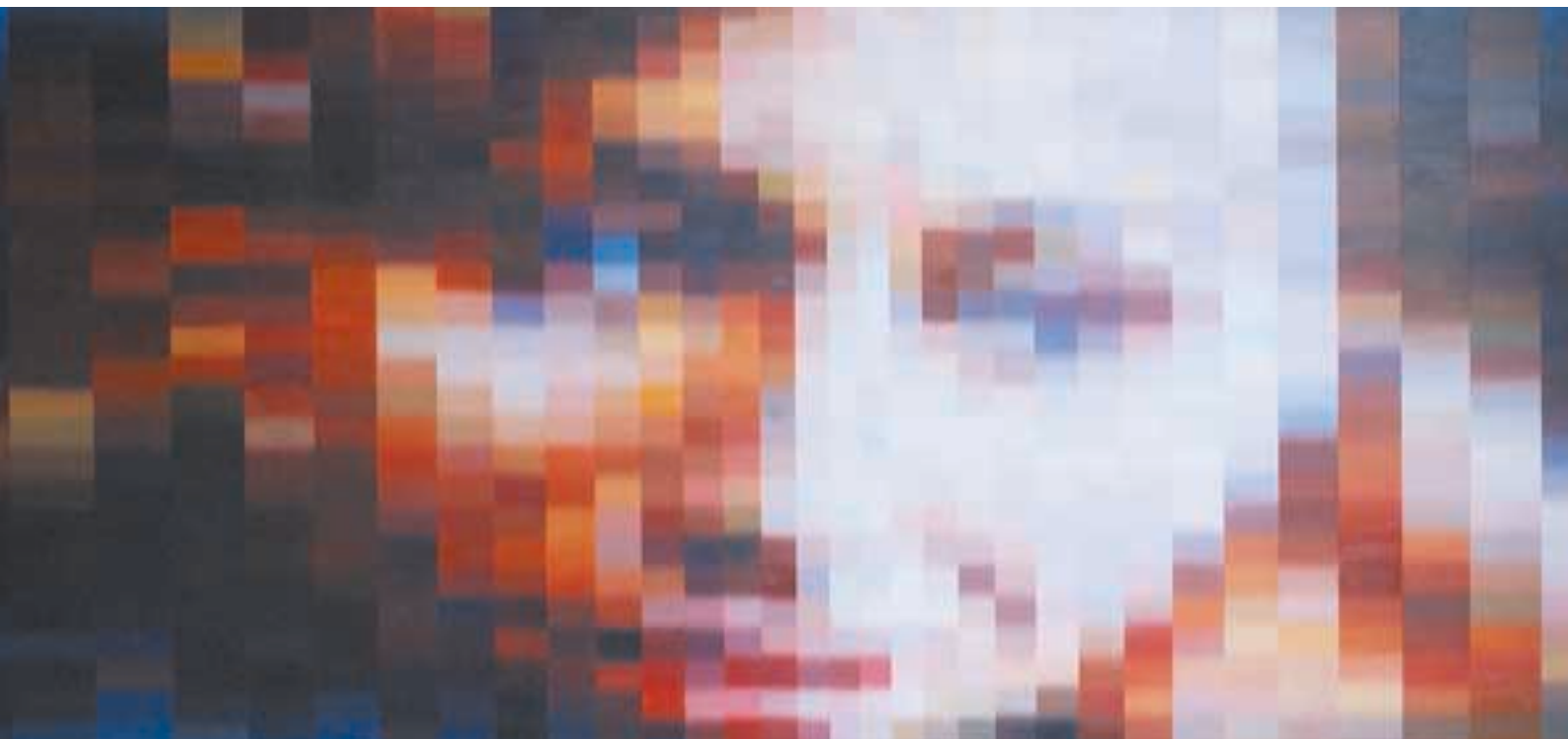
The Inaugural University Arts Lecture was given by Chris Orr in conjunction with an exhibition of his work. Chris calls his work SEMI-ANTICS, a word he invented himself to mean: "semi" half of, part of (as in semi-detached) and "antics", high jinks, fantastic action or trick. SEMI-ANTICS is the art of getting things half right. Double meanings, bizarre conjunctions, transpositions, caricature, misspellings, jokes and accidental misunderstandings are meat and drink to Chris. He writes: "Humour has always been a mechanism to defeat grinding rationalism, and SEMI-ANTICS can use



**Current World Record Holder and World Synchronised Trampoline champion Kirsten Lawton.**

**Professor Chris Orr of the Royal College of Art with Arts Administrator Pat Grayburn.**





The Vice-Chancellor's 2001 Prize to students at Wimbledon School of Art was won by Kathryn Lang. Her paintings 'Motion Pictures' hang in the new Management Building.



Anna Pavord (left), who gave the Annual Literary Lecture.

humour and deadly seriousness in any measures to make a cocktail". The lecture and the exhibition were both much admired with a sense of the unusual and the off-beat.

The Annual Literary Lecture, *Gardens of the Mind*, was given on 18 October 2001 by Anna Pavord, author of *The Tulip*. 'Gardens of the Mind' are so much easier to bring into bloom than the real things, which have a wretched tendency to be heaving with slugs and attacked by unnerving, unnamed varieties of fungal growth. In her lecture, Anna Pavord explored some literary gardens, and took her audience for a tour with Wodehouse round Blandings Castle, with Jane Austen to Donwell Abbey and with George Eliot through a kitchen garden where "...you were in a delicious fluctuation between the scent of jasmine and the juice of gooseberries."

The Morag Morris Poetry Lecture was given by Michael Donaghy. Aply assisted by students from the Guildford School of Acting, who read the poetry, Michael gave an overview of the work of the Welsh poet Dylan Thomas, citing its relevance to its time. Dylan Thomas died suddenly whilst on a lecture tour of America almost fifty years ago. Though only seven years younger than Auden and MacNeice, Thomas seemed to herald a new age in pre-war London – cherubic, exuberant, disruptive, and adopted by the Sitwells. He published *New Poems* in 1943, the year of Eliot's *Four Quartets*. He displayed in *Deaths and Entrances* (1946) those mesmeric rhythms, stunning images, his craftsmanship and sheer originality. With *Collected Poems*, 1952, Dylan Thomas reached the pinnacle of his popularity and his fame.

## The Surrey Scholar

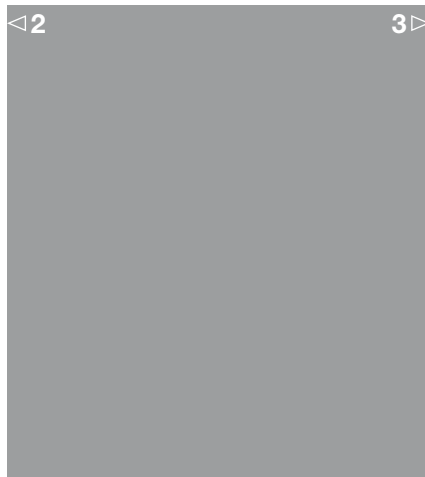
Since 29 May 2002 there has been a notable addition to the High Street in Guildford in the shape of 'The Surrey Scholar', a bronze sculpture presented to the town by the University. It is a tangible reminder to the people of Guildford of the excellence of local education and the ever-increasing collaborations between town and gown. The sculpture has been designed to incorporate references to the Guildford Book Festival and the International Music Festival, two notable 'town and gown' events. Allan Sly, a sculptor with an impressive record of public commissions and site specific sculptures was commissioned to produce the piece. He studied at the Royal Academy of Arts and is a Fellow of the Royal Society of British sculptors and a senior lecturer in Technical Arts Interpretation at Wimbledon School of Art.

HRH the Duke of Kent KG unveiled the sculpture during the University's 35th anniversary celebrations. Located in a busy part of the High Street where people gather to meet friends and listen to the various street musicians who often play there, the sculpture has been specifically made for this site, exploiting the dramatic slope of the hill without obscuring the view up or down the street. The dancing figure has been designed to amplify the sense of movement as the figure skips down the hill, with precariously balanced books and mortar board adding a strong geometric contrast to the flowing lines of the academic gown.



The Surrey Scholar.





# The Year in Brief...

## 1 Did the Earth Move for You?

Tigger helped the Vice-Chancellor and UniS staff and students to launch Science Year by taking part in the Giant Jump in September 2001. The seismometers made by the University's Physics Department registered the effect of the jump on campus.

## 2 UniS Materials Lecture – Sir John Meurig Thomas

Sir John Meurig Thomas FRS FREng Hon, Master of Peterhouse College Cambridge gave the 2001 UniS Materials Lecture in December. Sir John's lecture on 'The Electron and the Characterisation of Advanced Materials' was hosted by Professor Peter Butterworth, Senior Pro Vice-Chancellor.

## 3 The Minister drops in

Sports Minister Richard Caborn MP dropped in to the University's Varsity Centre in November to receive the Regional Statement for Sports Development in the South East, delivered by parachutists from the Royal Navy Raiders. The Statement, prepared by the South East Regional Sports Board, seeks to ensure that people in the South have the best possible opportunity to participate in sport to achieve their sporting objectives.







## The Year in Brief...

### 4 New addition to UniS tree collection – black poplar

The University made its contribution to preserving a rare species of tree during National Tree Week, when the Vice-Chancellor planted a female black poplar close to a male of the species near Terry's Pond, in the hope that young saplings may result in the future.

### 5 Ravi's national award

The University's youngest professor, Ravi Silva, was honoured with a prestigious national prize for his work on the physics of growing nanotubes. The Institute of Physics awarded Ravi the Charles Vernon Boys Medal and Prize, named after the first President of the Physical Society.

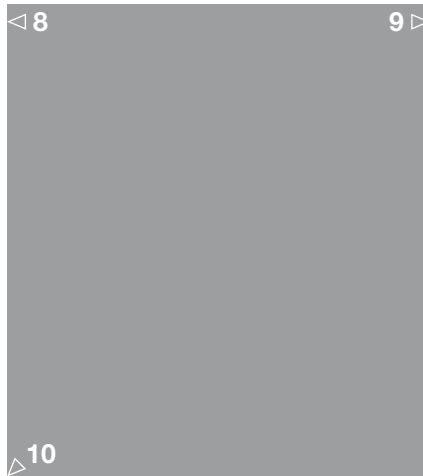
### 6 Visits by Patricia Hewitt...

The Rt Hon Patricia Hewitt MP gave a keynote speech at the University to mark the 10th anniversary of the Daphne Jackson Trust in January 2001. She took the opportunity to announce the creation of a Franklin Medal with a £30,000 annual prize to raise the profile of women scientists.

### 7 ... and Polish Ambassador

His Excellency Dr Stanislaw Komorowski, Ambassador of the Republic of Poland, visited UniS to deliver a keynote lecture, 'Poland's Contribution to the Future of Europe'. The Ambassador is shown here (left) greeting Rafal Soborski, Polish Scholar (right) within the School of Arts. The Polish Embassy contributes towards the Polish Scholar.





# The Year in Brief...

## 8 Vice-Chancellor gives Patron's Lecture

The Vice-Chancellor gave the 2002 Patron's Lecture to the Guildford Institute at the Guildhall in Guildford in March. Giving this prestigious lecture for the second time in six years, Professor Dowling addressed his audience on the subject 'The University of Surrey: a world class university on your doorstep'.

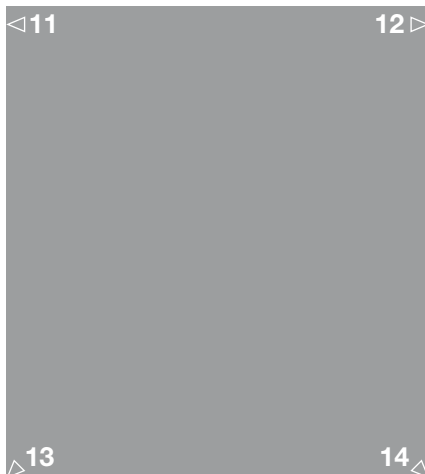
## 10 UniSVoyager Lecture

UniS Voyager arrived in Barbados in December 2001, finishing 12th out of the 36 boats in the Ward Evans Atlantic Rowing Race. István and Simon returned to UniS in March to give a row-by-row account of their trip of a lifetime. They are pictured with their UniS coach Professor Norman Kirkby and Dean of Colours Professor Jim Lynch.

## 9 UniS Graduate honoured – Karen Earp

University of Surrey graduate Karen Earp was honoured with the award of Hotelier of the Year 2001 by the Caterer and Hotelkeeper Management magazine. Karen is General Manager of the Four Seasons Hotel Canary Wharf and has spent 14 of her 17 years in the hotel business with the Four Seasons Group.





## The Year in Brief...

### 11 2002 Commonwealth Games

The Commonwealth Games came to campus in the summer, when competitors in the shooting events, staged at Bisley, stayed in a specially prepared village. The picture shows the Vice-Chancellor presenting the gold medal to the winner of the Women's Trap Shooting Final, Cynthia Meyer from Canada.

### 12 MBE for Betty Johnson

Dr Betty Johnson, visiting Reader in the ATI and Co-ordinator of the Daphne Jackson Trust, was awarded an MBE in the Queen's Birthday Honours List in June for services to people returning to careers in Science, Engineering and Technology (SET). Betty was one of the first Daphne Jackson Fellows from 1986-1988.

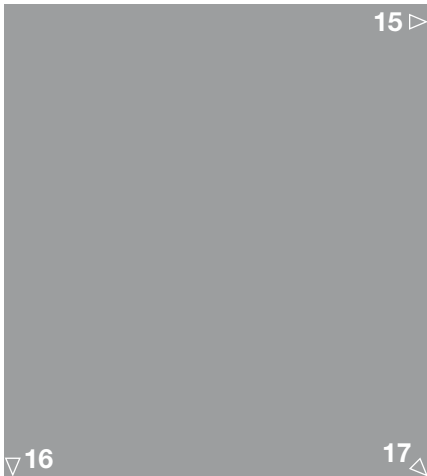
### 13 High Art

The innovative event, 'High Art', took place on the University's Sport's Centre climbing wall involving climbers, lecturers and students from the Dance Department presenting a display of 'vertical dance,' 'A collision of dance and rock climbing in an exhibition of style, artistry and balance.'

### 14 A Festival of Chemistry

Students from 15 local schools enjoyed a fun-filled day of magical (chemical) tricks in April during the Salters' Festival of Chemistry. The groups of eleven to fourteen year olds learned that any magical tricks Harry Potter can do, chemists can do better! Grand Wizard Dr Roger Bolton (left) of the Chemistry Department measures an entry for the nylon making competition.





# The Year in Brief...

## 15 Welcome to new Sabbs

The new Sabbatical Team, headed by President Paul Wright, took over the reigns in the summer. Pictured at the handover receptions the teams old and new, left to right are: Charlotte Dawson, Denise Goodwin, Paul Wright, Toni Borneo, Adam Jakeway, Lisa Widdows, James Buller, John Geeson, Richard Watts and Tristan O'Dwyer.

## 16 Widening Participation

Forty young people aged 14-19 participated in the University's activity day in July, when they were given the chance to find out more about university life and to experience some of the thrills and spills. Activities included climbing up the climbing wall and abseiling down and (pictured here) reading the news 'live' on student radio station GU2.

## 17 35th Anniversary Celebrations

As part of the University's 35th Anniversary celebrations, HRH The Duke of Kent KG, Chancellor, conferred Honorary Degrees upon Mr Arthur Chandler, University Archivist for 13 years and now Shepard Archivist, and Mr David Watts, who led Guildford Borough Council as Chief Executive for 18 years and helped build excellent links between 'town and gown'.



# Preliminary Financial Statements

The University has achieved an excellent financial outturn for the financial year to 31 July 2002, with a surplus of £3.2 million.

There are a number of reasons for this good result.

Foremost, our academic schools have nearly managed to meet their overall budget targets without the need for the use of the University's central contingencies. This gives us further confidence that the devolved but centrally monitored planning and budgeting process is now more soundly based. Because we have met our overall student recruitment targets for 2002/2003, there is a good chance that this improvement can be repeated in the current financial year.

Secondly, the introduction of the Oracle Financials accounting system and subsequent financial coding changes have enabled us to be more precise with our VAT recoveries, although part of this improvement in 2001/2002 will not be able to be repeated in later years.

Finally the University has been able to improve its cash-flow position, which has resulted in more interest earnings and lower interest payments. Again, part of this improvement will not be repeatable in later years.

The University's Executive Board has been giving careful consideration to how it can reward and incentivise those Schools which achieved outturns better than target.

## Income and expenditure accounts

for the year ended 31 July 2002

	Consolidated	
	2001/2002	2000/2001
	£000	£000
<b>Income</b>		
Funding Council grants	31,159	29,478
Academic fees and support grants	34,649	31,218
Research grants and contracts	22,511	19,845
Other operating income	33,871	27,171
Endowment and trust income and interest receivable	9,263	8,812
<b>Total income</b>	<b>131,453</b>	<b>116,524</b>
<b>Expenditure</b>		
Staff costs	69,028	65,142
Other operating expenses	48,409	40,667
Depreciation	6,442	5,790
Interest payable	4,120	4,070
<b>Total expenditure</b>	<b>127,999</b>	<b>115,669</b>
Surplus on continuing operations after depreciation of assets and before tax and minority interests	3,454	855
Taxation	(213)	(6)
Surplus on continuing operations after depreciation of assets and tax and before minority interests	3,241	849
Minority interests	4	7
<b>Surplus for the year</b>	<b>3,245</b>	<b>856</b>

## Balance Sheet

as at 31 July 2002

	Consolidated	
	2002	2001
	£000	£000
<b>Fixed assets</b>		
Tangible assets	92,990	82,073
Investments	25,087	26,144
	<b>118,077</b>	<b>108,217</b>
Endowment asset investments	61,487	58,908
<b>Current assets</b>		
Stocks and stores in hand	1,318	1,099
Debtors	21,116	15,432
Investments	4,423	2,980
Cash at bank and in hand	4,416	5,255
	<b>31,273</b>	<b>24,766</b>
<b>Creditors</b>		
Amounts falling due within one year	(40,326)	(29,463)
Net current liabilities	(9,053)	(4,697)
Total assets less current liabilities	170,511	162,428
<b>Creditors</b>		
Amounts falling due after more than one year	(46,363)	(48,783)
Provisions for liabilities and charges	(1,194)	(1,128)
Total net assets	122,954	112,517
Deferred capital grants	16,061	10,652
<b>Endowments</b>		
Specific	1,891	1,376
General	59,596	57,532
	<b>61,487</b>	<b>58,908</b>
<b>Reserves</b>		
Restricted reserves	1,166	1,183
Revaluation reserve	946	1,765
Income and expenditure account	43,284	39,995
	<b>45,396</b>	<b>42,943</b>
Total funds before minority interests	122,944	112,503
Minority interests	10	14
<b>Total funds</b>	<b>122,954</b>	<b>112,517</b>



# Numbers of Staff and Students

## Total Student Numbers 2001/2002

Undergraduates	5,695
Undergraduates (part-time)*	2,232
Postgraduates taught	2,960
Postgraduate research	936
<b>TOTAL</b>	<b>11,823</b>

20,868 students undertook Continuing Professional Development provided by UniS or pursued other courses not leading to an award at the University.

At our Associated institutions (not including University of Surrey Roehampton), 4,495 students were registered for awards of UniS in 2001/2002.

\* The majority of part-time undergraduate students are pursuing programmes in Combined Studies.

## Academic Awards 2001/2002

Awarded to students registered at UniS

First Degrees	1,116
Undergraduate Diplomas and Certificates	448
Postgraduate Diplomas and Certificates	249
Masters Degrees	1,205
Doctorates	218
<b>TOTAL</b>	<b>3,236</b>

Students registered at the University of Surrey Roehampton gained 2,326 awards. 1392 First Degrees, 11 Undergraduate Diplomas and Certificates, 674 Postgraduate Diplomas and Certificates, 234 Masters Degrees and 15 Doctorates.

In addition, students registered at our Associated Institutions gained 1277 awards. 926 First Degrees, 147 Undergraduate Diplomas and Certificates, 135 Postgraduate Diplomas and Certificates, 65 Masters Degrees and 4 Doctorates.

## Total Staff Numbers 2000/2001

	Full-time	Part-time	Total
Academic	428	71	499
Academic related	304	82	386
Computing	24	5	29
Manual	141	263	404
Research	289	60	349
Clerical	324	258	582
Technician	93	11	104
Tutors	66	87	153
<b>TOTALS</b>	<b>1,669</b>	<b>837</b>	<b>2,506</b>



# The Federal University of Surrey

University of Surrey, Guildford, Surrey, GU2 7XH

University of Surrey Roehampton, Senate House, Roehampton Lane, London, SW15 5PU

## UniS Associated Institutions

### Farnborough College of Technology

- Vocationally orientated institution offering a wide range of FE and HE programmes
- Accredited institution since 2002
- Foundation, BA, BSc and MSc degrees validated by the University

### Guildford College of Further and Higher Education

- Wide range of vocational, professional and academic qualifications
- Associated institution since September 2000
- BA Business Studies and Cert Ed/PGCE validated by the University

### Guildford School of Acting

- Founded as a School of Dance in 1936 and reconstituted as the Guildford School of Acting in 1964
- Associated institution since 1993
- BA degrees in Theatre and Stage Management and Technical Theatre validated by the University

### HMS Sultan, Gosport, Nuclear Department

- MSc and PG Diplomas validated by the University
- Associated institution since 1985

### North East Surrey College of Technology (NESCOT)

- Specialises in vocational education with a full range of FE and HE programmes
- Associated institution since 1979
- BSc and MSc degrees validated by the University

### The Pre-Retirement Association (PRA)

- Specialises in mid-career and pre-retirement education
- Associated institution of UniS since 1996
- Offers PG Certificate and MSc validated by the University

### SHL (UK) Ltd

- International firm specialising in HR, management consultancy, assessment and training with PG Diploma validated by the University
- Associated institution since 1995

### Southern Theological Education and Training Scheme (STETS)

- Certificate, Diploma and BA in Christian Ministry and Mission validated by the University
- Associated institution since 1999

### St John's Seminary

- Courses of preparation for the Roman Catholic priesthood, including Bachelor of Theology validated by the University
- Associated institution since 1998

### St Mary's College – A College of the University of Surrey

- Catholic college of HE established 1850
- College of the University since 1992, accredited 1996
- BA, BA ITT, BSc, PGCE, MA and MSc degrees accredited by the University

### Wimbledon School of Art

- Specialist school of art and design
- Accredited institution since 1994
- BA and MA degrees accredited by the University

## USR Associated Institutions

### Centre for British Teachers

- PGCE Secondary by Distance Learning validated since 1996

### School Centred Initial Teacher Training

- Consortium based in London, West Midlands and the South West
- PGCE Secondary in Design and Technology, Mathematics and Modern Foreign Languages validated since 1993

### SCITT Devon Performing Arts

- Associated with Roehampton since 1999
- Offers PGCE Secondary in Music and Drama, validated by USR

### SCITT (Agency for Jewish Education)

- Associated with Roehampton since 2000
- Offers PGCE Primary, validated by Roehampton

### Westminster Pastoral Foundation

- Associated with Roehampton since 1994
- Offers MA in Psychoanalytic Psychotherapy, Postgraduate Diploma/MA in Supervision of Counselling and Psychotherapy, MA in Group-Analytic Psychotherapy and Postgraduate Diploma/MA in Psychodynamic Counselling validated by Roehampton

The 37th Vice-Chancellor's Annual Report gives a brief overview of major developments at the University of Surrey from 1st September 2001 to 31st August 2002 for presentation to the Court of the University. The University Charter was presented in 1966.

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Every effort has been made to ensure the accuracy of the information in this Annual Report but the University can accept no responsibility for errors and omissions.



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